付表 6.7.1　地下水利用持続性の評価

CityMun	Province	Total Area (km^2)	Area inside the Study Area (km^2)	Ratio	GWP_H	GWP_L	SWE_H	SWE_L	Demand for other uses in 2008	GWP_H for Level 2&3 and Industrial use in 2008	GWP_L for Level 2&3 and Industrial use in 2008	Demand for Level 2&3 and Industrial use in 2008	Demand for other uses in 2025	GWP_H for Level 2&3 and Industrial use in 2025	GWP_L for Level 2&3 and Industrial use in 2025	Demand for Level 2&3 and Industrial use in 2025	Evalu-ation in 2008	Evalu-ation in 2025
					(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)		
Angat	Bulacan	59	53	0.898	10.4	4.3	0.0	0.0	1.0	9.4	3.4	1.6	1.5	8.9	2.8	2.4		
Baliuag	Bulacan	44	44	1.000	8.7	3.6	0.0	0.0	1.7	7.0	1.9	5.4	1.8	6.9	1.8	10.9	R	HR
Bulacan	Bulacan	69	11	0.161	2.6	1.1	2.6	1.1	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.7	HR	HR
Bustos	Bulacan	40	18	0.438	3.7	1.5	0.0	0.0	0.3	3.4	1.3	1.1	0.5	3.2	1.1	1.6		R
Calumpit	Bulacan	47	47	1.000	9.6	4.0	9.1	3.8	0.1	0.6	0.2	6.7	0.0	0.6	0.2	10.5	HR	HR
Dona Remedios Trinidad	Bulacan	879	854	0.972	44.8	18.7	0.0	0.0	0.0	44.8	18.6	1.0	0.1	44.8	18.6	1.5		
Guiguinto	Bulacan	25	2	0.066	0.4	0.2	0.3	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.4	HR	HR
Hagonoy	Bulacan	95	95	1.000	20.0	8.3	20.0	8.3	0.3	0.0	0.0	8.0	0.0	0.0	0.0	13.5	HR	HR
Malolos City	Bulacan	73	73	1.000	16.0	6.7	14.4	6.0	2.7	1.5	0.6	7.7	2.6	1.5	0.6	17.1	HR	HR
Norzagaray	Bulacan	247	207	0.839	14.5	6.0	0.0	0.0	0.7	13.8	5.4	3.9	1.2	13.3	4.9	5.9		R
Pandi	Bulacan	50	1	0.028	0.3	0.1	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.3	0.1	0.2	R	R
Paombong	Bulacan	46	46	1.000	9.8	4.1	9.8	4.1	0.1	0.0	0.0	2.9	0.2	0.0	0.0	4.4	HR	HR
Plaridel	Bulacan	35	20	0.565	4.4	1.8	0.0	0.0	0.4	4.0	1.4	2.8	0.4	4.0	1.5	5.3	R	HR
Pulilan	Bulacan	44	44	1.000	9.1	3.8	0.0	0.0	2.0	7.2	1.8	0.7	1.9	7.3	1.9	4.9		R
San Ildefonso	Bulacan	167	167	1.000	31.1	13.0	0.0	0.0	2.0	29.1	11.0	1.9	3.2	27.9	9.7	2.8		
San Miguel	Bulacan	236	236	1.000	40.2	16.7	0.0	0.0	2.7	37.5	14.1	4.1	4.3	35.9	12.5	6.2		
San Rafael	Bulacan	105	105	1.000	20.9	8.7	0.0	0.0	1.6	19.3	7.1	1.4	2.6	18.3	6.1	2.2		
Santa Maria	Bulacan	79	1	0.010	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2	R	HR
Aliaga	Nueva Ecija	92	92	1.000	18.5	7.7	0.0	0.0	1.0	17.5	6.7	1.0	1.1	17.4	6.6	2.4		
Bongabon	Nueva Ecija	229	225	0.979	25.3	10.5	0.0	0.0	1.0	24.3	9.5	1.0	1.5	23.8	9.0	1.3		
Cabanatuan City	Nueva Ecija	198	198	1.000	39.9	16.6	0.0	0.0	1.7	38.2	14.9	13.3	1.2	38.8	15.5	21.0		R
Cabiao	Nueva Ecija	113	113	1.000	20.5	8.5	0.0	0.0	1.2	19.2	7.3	1.0	1.1	19.4	7.4	3.3		
Carranglan	Nueva Ecija	739	693	0.937	42.4	17.7	0.0	0.0	0.7	41.7	17.0	0.0	0.8	41.6	16.9	0.6		
Gabaldon	Nueva Ecija	253	252	0.999	17.9	7.4	0.0	0.0	0.4	17.5	7.1	0.6	0.5	17.4	7.0	1.0		
Gapan	Nueva Ecija	165	165	1.000	29.2	12.2	0.0	0.0	1.5	27.7	10.6	1.8	1.8	27.4	10.4	4.0		
Gen Mamerto Natividad	Nueva Ecija	98	98	1.000	19.3	8.0	0.0	0.0	0.6	18.7	7.5	0.5	0.8	18.5	7.2	0.7		
General Tinio	Nueva Ecija	581	580	0.999	85.1	35.5	0.0	0.0	0.6	84.5	34.9	1.0	2.1	83.0	33.4	1.6		
Guimba	Nueva Ecija	219	137	0.626	28.0	11.7	0.0	0.0	1.3	26.7	10.3	0.8	1.8	26.2	9.9	1.1		
Jaen	Nueva Ecija	90	90	1.000	16.5	6.9	0.0	0.0	1.0	15.5	5.9	0.9	1.4	15.1	5.4	1.5		
Laur	Nueva Ecija	221	221	1.000	33.1	13.8	0.0	0.0	0.4	32.7	13.4	0.6	0.6	32.6	13.2	0.9		
Licab	Nueva Ecija	60	60	1.000	11.1	4.6	0.0	0.0	0.4	10.7	4.3	0.5	0.5	10.5	4.1	0.6		
Llanera	Nueva Ecija	114	114	1.000	23.7	9.9	0.0	0.0	0.6	23.1	9.2	0.1	3.5	20.2	6.3	0.3		
Lupao	Nueva Ecija	143	130	0.909	28.1	11.7	0.0	0.0	1.1	27.0	10.6	0.0	5.0	23.1	6.7	0.1		
Science City Of Munoz	Nueva Ecija	142	142	1.000	32.7	13.6	0.0	0.0	0.9	31.8	12.8	2.5	1.2	31.5	12.4	3.3		
Palayan City	Nueva Ecija	136	136	1.000	20.7	8.6	0.0	0.0	0.5	20.2	8.1	0.9	0.7	20.0	7.9	1.1		
Pantabangan	Nueva Ecija	421	421	1.000	21.9	9.1	0.0	0.0	0.1	21.8	9.0	0.6	14.6	7.3	0.0	0.7		R
Penaranda	Nueva Ecija	79	79	1.000	13.9	5.8	0.0	0.0	0.2	13.7	5.6	1.1	0.3	13.6	5.5	1.5		
Quezon	Nueva Ecija	68	68	1.000	13.6	5.7	0.0	0.0	0.7	12.9	4.9	0.0	3.1	10.5	2.6	0.4		
Rizal	Nueva Ecija	124	124	1.000	17.2	7.2	0.0	0.0	1.2	16.0	6.0	0.0	1.6	15.6	5.5	0.3		
San Antonio	Nueva Ecija	157	157	1.000	29.6	12.3	0.0	0.0	1.1	28.5	11.2	1.0	1.5	28.1	10.8	1.6		
San Isidro	Nueva Ecija	58	58	1.000	10.4	4.3	0.0	0.0	0.6	9.8	3.7	1.3	0.5	9.9	3.8	2.7		
San Jose City	Nueva Ecija	162	162	1.000	33.4	13.9	0.0	0.0	0.3	33.1	13.6	7.7	0.4	33.1	13.6	10.0		
San Leonardo	Nueva Ecija	52	52	1.000	10.0	4.1	0.0	0.0	0.7	9.3	3.5	1.7	0.9	9.1	3.3	2.7		
Santa Rosa	Nueva Ecija	117	117	1.000	21.5	8.9	0.0	0.0	0.7	20.8	8.3	1.6	1.0	20.5	7.9	2.1		
Santo Domingo	Nueva Ecija	83	83	1.000	17.8	7.4	0.0	0.0	1.0	16.8	6.4	0.3	1.0	16.8	6.4	1.8		
Talavera	Nueva Ecija	135	135	1.000	30.0	12.5	0.0	0.0	1.5	28.4	11.0	3.0	1.5	28.5	11.0	6.0		
Talugtug	Nueva Ecija	73	39	0.528	8.8	3.7	0.0	0.0	0.3	8.5	3.4	0.1	1.1	7.7	2.5	0.2		
Zaragosa	Nueva Ecija	72	72	1.000	12.7	5.3	0.0	0.0	0.7	12.0	4.6	0.4	0.9	11.8	4.4	1.0		
Angeles City	Pampanga	63	63	1.000	13.3	5.5	0.0	0.0	1.1	12.1	4.4	18.4	0.0	13.3	5.5	29.2	HR	HR
Apalit	Pampanga	60	60	1.000	12.0	5.0	4.4	1.8	0.8	7.7	3.2	5.8	0.7	7.7	3.2	9.1	R	HR
Arayat	Pampanga	177	177	1.000	26.1	10.9	0.0	0.0	2.5	23.5	8.3	0.0	3.4	22.6	7.4	0.9		
Bacolor	Pampanga	74	74	1.000	17.0	7.1	0.0	0.0	0.6	16.4	6.5	0.5	0.7	16.2	6.3	0.8		
Candaba	Pampanga	208	208	1.000	35.6	14.8	0.0	0.0	1.8	33.7	13.0	1.2	2.7	32.9	12.2	1.5		
Floridablanca	Pampanga	121	83	0.690	14.9	6.2	0.0	0.0	0.6	14.3	5.6	3.5	0.8	14.1	5.4	4.7		
Guagua	Pampanga	49	49	1.000	10.4	4.3	1.7	0.7	1.0	8.7	3.3	4.3	1.0	8.7	3.3	7.4	R	R
Lubao	Pampanga	155	149	0.960	31.4	13.1	16.7	6.9	2.5	14.8	6.2	2.1	6.3	14.8	6.2	3.7		
Mabalacat	Pampanga	146	140	0.962	21.3	8.9	0.0	0.0	1.2	20.1	7.7	17.7	3.9	17.4	5.0	25.9	R	HR
Macabebe	Pampanga	102	102	1.000	20.8	8.7	20.8	8.7	0.4	0.0	0.0	3.1	0.6	0.0	0.0	4.1	HR	HR
Magalang	Pampanga	105	105	1.000	25.5	10.6	0.0	0.0	2.4	23.1	8.2	0.0	4.9	20.6	5.7	3.0		
Masantol	Pampanga	46	46	1.000	9.4	3.9	9.4	3.9	1.0	0.0	0.0	0.0	1.3	0.0	0.0	0.7		HR
Mexico	Pampanga	122	122	1.000	27.7	11.5	0.0	0.0	2.5	25.2	9.1	2.1	3.3	24.4	8.3	4.0		
Minalin	Pampanga	45	45	1.000	9.2	3.8	7.4	3.1	0.5	1.8	0.7	1.2	0.8	1.8	0.7	1.6	R	R
Porac	Pampanga	293	292	0.995	27.2	11.3	0.0	0.0	1.8	25.3	9.5	1.9	2.8	24.3	8.5	3.9		
City Of San Fernando	Pampanga	69	69	1.000	15.9	6.6	0.0	0.0	2.8	13.1	3.8	34.9	3.5	12.4	3.1	47.5	HR	HR
San Luis	Pampanga	55	55	1.000	10.0	4.2	0.0	0.0	1.0	9.0	3.1	0.0	1.2	8.8	3.0	1.1		
San Simon	Pampanga	60	60	1.000	11.6	4.8	0.0	0.0	0.5	11.1	4.4	1.7	0.7	10.9	4.1	2.2		
Santa Ana	Pampanga	40	40	1.000	7.7	3.2	0.0	0.0	1.6	6.1	1.6	1.0	2.4	5.4	0.8	2.4		R
Santa Rita	Pampanga	23	23	1.000	5.2	2.2	0.0	0.0	0.8	4.4	1.3	0.4	2.6	2.5	0.0	1.9		R
Santo Tomas	Pampanga	14	14	1.000	3.0	1.3	1.1	0.4	0.3	2.0	0.8	1.8	0.3	2.0	0.8	2.9	R	HR
Sasmuan	Pampanga	45	45	0.999	8.9	3.7	8.9	3.7	0.5	0.1	0.0	0.0	0.7	0.1	0.0	0.3		HR
Bamban	Tarlac	251	147	0.585	2.2	0.9	0.0	0.0	0.7	1.5	0.2	0.5	2.5	0.0	0.0	1.5	R	HR
Capas	Tarlac	422	134	0.317	13.0	5.4	0.0	0.0	2.7	10.3	2.7	0.9	8.6	4.4	0.0	1.2		R
Concepcion	Tarlac	221	221	1.000	49.9	20.8	0.0	0.0	4.4	45.5	16.4	3.0	12.8	37.1	8.0	4.1		
La Paz	Tarlac	117	117	1.000	21.8	9.1	0.0	0.0	3.9	17.9	5.2	0.6	5.5	16.3	3.6	1.0		
Tarlac City	Tarlac	261	132	0.506	28.6	11.9	0.0	0.0	6.4	22.2	5.5	6.6	6.9	21.7	5.0	10.0	R	R
Victoria	Tarlac	112	83	0.744	16.9	7.0	0.0	0.0	1.5	15.3	5.5	0.4	1.9	15.0	5.1	0.5		
Total		10,990	9,890		1,476.3	615.1	126.5	52.7	88.2	1,272.2	484.5	209.2	157.7	1,207.3	430.0	344.1		

R=At Risk, HR=At high risk

出典： JICA 調査団

付表 6.7.2　持続的地下水源の不足水量

CityMun	Province	Total Area (km^2)	Area inside the Study Area (km^2)	Ratio	GWP_H for Level 2&3 and Industrial use in 2008	GWP_L for Level 2&3 and Industrial use in 2008	Demand for Level 2&3 and Industrial use in 2008	Deficit in 2008	GWP_H for Level 2&3 and Industrial use in 2025	GWP_L for Level 2&3 and Industrial use in 2025	Demand for Level 2&3 and Industrial use in 2025	Deficit in 2025
					(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)	(MCM/y)
Angat	Bulacan	59	53	0.898	9.4	3.4	1.6	0.0	8.9	2.8	2.4	0.0
Baliuag	**Bulacan**	**44**	**44**	**1.000**	**7.0**	**1.9**	**5.4**	**0.0**	**6.9**	**1.8**	**10.9**	**4.0**
Bulacan	**Bulacan**	**69**	**11**	**0.161**	**0.0**	**0.0**	**0.5**	**0.5**	**0.0**	**0.0**	**0.7**	**0.7**
Bustos	Bulacan	40	18	0.438	3.4	1.3	1.1	0.0	3.2	1.1	1.6	0.0
Calumpit	**Bulacan**	**47**	**47**	**1.000**	**0.6**	**0.2**	**6.7**	**6.2**	**0.6**	**0.2**	**10.5**	**9.9**
Dona Remedios Trinidad	Bulacan	879	854	0.972	44.8	18.6	1.0	0.0	44.8	18.6	1.5	0.0
Guiguinto	**Bulacan**	**25**	**2**	**0.066**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**	**0.0**	**0.4**	**0.4**
Hagonoy	**Bulacan**	**95**	**95**	**1.000**	**0.0**	**0.0**	**8.0**	**8.0**	**0.0**	**0.0**	**13.5**	**13.5**
Malolos City	**Bulacan**	**73**	**73**	**1.000**	**1.5**	**0.6**	**7.7**	**6.2**	**1.5**	**0.6**	**17.1**	**15.6**
Norzagaray	Bulacan	247	207	0.839	13.8	5.4	3.9	0.0	13.3	4.9	5.9	0.0
Pandi	Bulacan	50	1	0.028	0.3	0.1	0.1	0.0	0.3	0.1	0.2	0.0
Paombong	**Bulacan**	**46**	**46**	**1.000**	**0.0**	**0.0**	**2.9**	**2.9**	**0.0**	**0.0**	**4.4**	**4.4**
Plaridel	**Bulacan**	**35**	**20**	**0.565**	**4.0**	**1.4**	**2.8**	**0.0**	**4.0**	**1.5**	**5.3**	**1.2**
Pulilan	Bulacan	44	44	1.000	7.2	1.8	0.7	0.0	7.3	1.9	4.9	0.0
San Ildefonso	Bulacan	167	167	1.000	29.1	11.0	1.9	0.0	27.9	9.7	2.8	0.0
San Miguel	Bulacan	236	236	1.000	37.5	14.1	4.1	0.0	35.9	12.5	6.2	0.0
San Rafael	Bulacan	105	105	1.000	19.3	7.1	1.4	0.0	18.3	6.1	2.2	0.0
Santa Maria	**Bulacan**	**79**	**1**	**0.010**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.2**	**0.0**
Aliaga	Nueva Ecija	92	92	1.000	17.5	6.7	1.0	0.0	17.4	6.6	2.4	0.0
Bongabon	Nueva Ecija	229	225	0.979	24.3	9.5	1.0	0.0	23.8	9.0	1.3	0.0
Cabanatuan City	Nueva Ecija	198	198	1.000	38.2	14.9	13.3	0.0	38.8	15.5	21.0	0.0
Cabiao	Nueva Ecija	113	113	1.000	19.2	7.3	1.0	0.0	19.4	7.4	3.3	0.0
Carranglan	Nueva Ecija	739	693	0.937	41.7	17.0	0.0	0.0	41.6	16.9	0.6	0.0
Gabaldon	Nueva Ecija	253	252	0.999	17.5	7.1	0.6	0.0	17.4	7.0	1.0	0.0
Gapan	Nueva Ecija	165	165	1.000	27.7	10.6	1.8	0.0	27.4	10.4	4.0	0.0
Gen Mamerto Natividad	Nueva Ecija	98	98	1.000	18.7	7.5	0.5	0.0	18.5	7.2	0.7	0.0
General Tinio	Nueva Ecija	581	580	0.999	84.5	34.9	1.0	0.0	83.0	33.4	1.6	0.0
Guimba	Nueva Ecija	219	137	0.626	26.7	10.3	0.8	0.0	26.2	9.9	1.1	0.0
Jaen	Nueva Ecija	90	90	1.000	15.5	5.9	0.9	0.0	15.1	5.4	1.5	0.0
Laur	Nueva Ecija	221	221	1.000	32.7	13.4	0.6	0.0	32.6	13.2	0.9	0.0
Licab	Nueva Ecija	60	60	1.000	10.7	4.3	0.5	0.0	10.5	4.1	0.6	0.0
Llanera	Nueva Ecija	114	114	1.000	23.1	9.2	0.1	0.0	20.2	6.3	0.3	0.0
Lupao	Nueva Ecija	143	130	0.909	27.0	10.6	0.0	0.0	23.1	6.7	0.1	0.0
Science City Of Munoz	Nueva Ecija	142	142	1.000	31.8	12.8	2.5	0.0	31.5	12.4	3.3	0.0
Palayan City	Nueva Ecija	136	136	1.000	20.2	8.1	0.9	0.0	20.0	7.9	1.1	0.0
Pantabangan	Nueva Ecija	421	421	1.000	21.8	9.0	0.6	0.0	7.3	0.0	0.7	0.0
Penaranda	Nueva Ecija	79	79	1.000	13.7	5.6	1.1	0.0	13.6	5.5	1.5	0.0
Quezon	Nueva Ecija	68	68	1.000	12.9	4.9	0.0	0.0	10.5	2.6	0.4	0.0
Rizal	Nueva Ecija	124	124	1.000	16.0	6.0	0.0	0.0	15.6	5.5	0.3	0.0
San Antonio	Nueva Ecija	157	157	1.000	28.5	11.2	1.0	0.0	28.1	10.8	1.6	0.0
San Isidro	Nueva Ecija	58	58	1.000	9.8	3.7	1.3	0.0	9.9	3.8	2.7	0.0
San Jose City	Nueva Ecija	162	162	1.000	33.1	13.6	7.7	0.0	33.1	13.6	10.0	0.0
San Leonardo	Nueva Ecija	52	52	1.000	9.3	3.5	1.7	0.0	9.1	3.3	2.7	0.0
Santa Rosa	Nueva Ecija	117	117	1.000	20.8	8.3	1.6	0.0	20.5	7.9	2.1	0.0
Santo Domingo	Nueva Ecija	83	83	1.000	16.8	6.4	0.3	0.0	16.8	6.4	1.8	0.0
Talavera	Nueva Ecija	135	135	1.000	28.4	11.0	3.0	0.0	28.5	11.0	6.0	0.0
Talugtug	Nueva Ecija	73	39	0.528	8.5	3.4	0.1	0.0	7.7	2.5	0.2	0.0
Zaragosa	Nueva Ecija	72	72	1.000	12.0	4.6	0.4	0.0	11.8	4.4	1.0	0.0
Angeles City	**Pampanga**	**63**	**63**	**1.000**	**12.1**	**4.4**	**18.4**	**6.3**	**13.3**	**5.5**	**29.2**	**15.9**
Apalit	**Pampanga**	**60**	**60**	**1.000**	**7.7**	**3.2**	**5.8**	**0.0**	**7.7**	**3.2**	**9.1**	**1.4**
Arayat	Pampanga	177	177	1.000	23.5	8.3	0.0	0.0	22.6	7.4	0.9	0.0
Bacolor	Pampanga	74	74	1.000	16.4	6.5	0.5	0.0	16.2	6.3	0.8	0.0
Candaba	Pampanga	208	208	1.000	33.7	13.0	1.2	0.0	32.9	12.2	1.5	0.0
Floridablanca	Pampanga	121	83	0.690	14.3	5.6	3.5	0.0	14.1	5.4	4.7	0.0
Guagua	Pampanga	49	49	1.000	8.7	3.3	4.3	0.0	8.7	3.3	7.4	0.0
Lubao	Pampanga	155	149	0.960	14.8	6.2	2.1	0.0	14.8	6.2	3.7	0.0
Mabalacat	**Pampanga**	**146**	**140**	**0.962**	**20.1**	**7.7**	**17.7**	**0.0**	**17.4**	**5.0**	**25.9**	**8.5**
Macabebe	**Pampanga**	**102**	**102**	**1.000**	**0.0**	**0.0**	**3.1**	**3.1**	**0.0**	**0.0**	**4.1**	**4.1**
Magalang	Pampanga	105	105	1.000	23.1	8.2	0.0	0.0	20.6	5.7	3.0	0.0
Masantol	**Pampanga**	**46**	**46**	**1.000**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.7**	**0.7**
Mexico	Pampanga	122	122	1.000	25.2	9.1	2.1	0.0	24.4	8.3	4.0	0.0
Minalin	Pampanga	45	45	1.000	1.8	0.7	1.2	0.0	1.8	0.7	1.6	0.0
Porac	Pampanga	293	292	0.995	25.3	9.5	1.9	0.0	24.3	8.5	3.9	0.0
City Of San Fernando	**Pampanga**	**69**	**69**	**1.000**	**13.1**	**3.8**	**34.9**	**21.8**	**12.4**	**3.1**	**47.5**	**35.2**
San Luis	Pampanga	55	55	1.000	9.0	3.1	0.0	0.0	8.8	3.0	1.1	0.0
San Simon	Pampanga	60	60	1.000	11.1	4.4	1.7	0.0	10.9	4.1	2.2	0.0
Santa Ana	Pampanga	40	40	1.000	6.1	1.6	1.0	0.0	5.4	0.8	2.4	0.0
Santa Rita	Pampanga	23	23	1.000	4.4	1.3	0.4	0.0	2.5	0.0	1.9	0.0
Santo Tomas	**Pampanga**	**14**	**14**	**1.000**	**2.0**	**0.8**	**1.8**	**0.0**	**2.0**	**0.8**	**2.9**	**1.0**
Sasmuan	**Pampanga**	**45**	**45**	**0.999**	**0.1**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.3**	**0.2**
Bamban	**Tarlac**	**251**	**147**	**0.585**	**1.5**	**0.2**	**0.5**	**0.0**	**0.0**	**0.0**	**1.5**	**1.5**
Capas	Tarlac	422	134	0.317	10.3	2.7	0.9	0.0	4.4	0.0	1.2	0.0
Concepcion	Tarlac	221	221	1.000	45.5	16.4	3.0	0.0	37.1	8.0	4.1	0.0
La Paz	Tarlac	117	117	1.000	17.9	5.2	0.6	0.0	16.3	3.6	1.0	0.0
Tarlac City	Tarlac	261	132	0.506	22.2	5.5	6.6	0.0	21.7	5.0	10.0	0.0
Victoria	Tarlac	112	83	0.744	15.3	5.5	0.4	0.0	15.0	5.1	0.5	0.0
Total		10,990	9,890		1272.2	484.5	209.2	55.1	1207.3	430.0	344.1	118.3

出典： JICA 調査団

付表 7.8.1 (1/3) 事業評価の点数付け基準

Point of Evaluation		Scoring		
		2	1	0
1 Viability of the Project	1.1 Economic viability	The EIRR of the Project is above 15%.	The Project is in either of the following cases: • The EIRR of the Project is in a range of 9 to 15%, • Any economic evaluation of the project has not been made but Project is likely to be economically viable	The Project is in either of the following cases: • The EIRR of the Project is below 9%, • Any economic evaluation for the Project has not been made yet and the project is not likely to be economically viable.
	1.2 Technical viability	Technical viability of the Project has been confirmed through relevant studies and/or through previous implementation.	Technical viability of the Project has not been confirmed but no particular technical difficulty in executing the project is foreseeable.	There remain uncertainties in the technical viability of the Project.
	1.3 Financial affordability	The necessary budgetary arrangement has been made.	The necessary budget arrangement has not been made but any difficulties in arranging the budget are not foreseeable.	Difficulties in budgetary arrangement are foreseeable.
	1.4 Impacts on natural and social environment	The project is not likely to cause any significant adverse impact to the natural and social environment.	The Project is in either of the following cases: • The potential adverse impacts on natural and social environment could be mitigated • The ecological and social benefits far outweigh the likely adverse impacts	The potential adverse impacts on the natural and social environment are likely to be serious and beyond mitigation
	1.5 Adaptation to climate change	The Project would possess the direct mechanism adaptable to the climate change.	The Project would possess the indirect mechanism adaptable to the climate change.	The Project would hardly possess anyt mechanism adaptable to the climate change.
2 Enhanced Livelihood	2.1 Creation of new job opportunities in the Region	The Project would directly contribute to creation of the new job opportunities in the Region.	The Project would make an indirect contribution to creation of the job opportunities in the region.	The Project would hardly make any contribution to creation of the job opportunities in the region.
	2.2 Increase of the income levels in the region	The Project would directly contribute to increase of the income levels in the Region.	The Project would make an indirect contribution to increase of the income levels in the region.	The Project would hardly make any contribution to increase of income levels in the region.
	2.3 Improvement of livelihood for the poor, the indigenous peoples, the women-headed households, the out-of-school youths, the handicapped, the elderly and other vulnerable groups.	The Project would directly contribute to improvement of livelihood for the poor, the women-headed households, the out-of-school youths, the handicapped, the elderly and other vulnerable groups.	The Project would make an indirect contribution to improvement of livelihoo for the poor, the women-headed households, the out-of-school youths, the handicapped, the elderly and other vulnerable groups.	The Project would hardly make any contribution to improvement of livelihood for the poor, the women-headed households, the out-of-school youths, the handicapped, the elderly and other vulnerable groups.
	2.4 Reduction of the income gaps between the urban areas and the rural areas	The Project would directly contribute to a reduction in income gaps between the urban and rural areas	The Project would make an indirect contribution to reduction in income gaps between the urban and rural areas.	The Project would hardly make any contribution to the reduction in income gaps between the urban and rural areas.

付表 7.8.1 (2/3) 事業評価の点数付け基準

Point of Evaluation			Scoring		
			2	1	0
3 Improved Quality Life	3.1	Increase of access to safe drinking water	The Project would directly contribute to increase of access to safe drinking water.	The Project would make an indirect contribution to increase of access to safe drinking water.	The Project would hardly make any contribution to increase of access to safe drinking water.
	3.2	Increase of the municipal water supply volume	The Project would directly contribute to increase of the municipal water supply volume	The Project would make an indirect contribution to increase of the municipal water supply volume.	The Project would hardly make any contribution to increase of the municipal water supply volume.
	3.3	Improvement of sanitary and health conditions	The Project would directly contribute to improvement of the sanitary conditions and/or reduction of water-related diseases.	The Project would make an indirect contribution to the improvement of sanitary conditions and/or reduction of water-related diseases.	The Project would hardly make any contribution to the improvement of sanitary conditions and/or reduction of water-related diseases..
	3.4	Mitigation of flood risks and hazards	The Project would directly reduce risks to life and damage to property/assets due to chronic flooding.	The Project would make an indirect contribution to the reduction of risks to life and damage to property/assets due to chronic flooding.	The Project would hardly make any contribution to the reduction of risks to life and damage to property/assets due to chronic flooding.
4 Decentralized Development	4.1	Development of regional economic centers	The Project is indispensable to the development of regional economic centers. (Typical examples of the Project are such as the bulk water supply project and the urban flood control/drainage improvement project.)	The Project is not necessarily indispensable to but could support the development of the regional economic centers	The Project would hardly make any contribution to development of the regional centers.
	4.2	Increase of productivity in the Region's agriculture, industrial and service sectors.	The Project would directly contribute to the increase of productivity in the Region's agriculture, industrial and service sectors.	The Project would make an indirect contribution to the increase of productivity in the Region's agriculture, industrial and service sectors.	The Project would hardly make any contribution to the increase of productivity in the Region's agriculture, industrial and service sectors.
	4.3	Creation of a favorable climate for enterprise and private investment in the Region	The Project would directly contribute to the creation of a favorable climate for enterprise development and private investments in the Region.	The Project would make an indirect contribution to the creation of a favorable climate for enterprise development and private investments in the Region.	The Project would hardly make any contribution to the creation of a favorable climate for enterprise development and private investments in the Region.
	4.4	Enhancement of social equity in the Region	The Project would directly contribute to the equitable distribution of access to the following: • economic opportunities • economic goods and services • social services	The Project would make an indirect contribution to the equitable distribution of access to the following: • economic opportunities • economic goods and services • social services	The Project would hardly make any contribution to the equitable distribution of access to the following: • economic opportunities • economic goods and services • social services.

付表 7.8.1 (3/3) 事業評価の点数付け基準

Point of Evaluation		Scoring		
		2	1	0
5 Sustained Ecosystem	5.1 Enhancement of the sustainable monitoring on the ecosystem	The Project would directly contribute to enhancement of the sustaining monitoring of vital ecosystems.	The Project would make an indirect contribution to enhancement of the sustaining monitoring of vital ecosystems.	The Project would hardly make any contribution to enhancement of the sustaining monitoring of vital ecosystems.
	5.2 Protection of the ecologically vulnerable areas	The Project would directly contribute to the protection of ecologically vulnerable areas.	The Project would make an indirect contribution to the protection of ecologically vulnerable areas.	The Project would hardly make any contribution to the protection of ecologically vulnerable areas .
	5.3 Promotion of vegetation in the watersheds	The Project would directly contribute to the increase of vegetation cover of the watersheds.	The Project would make an indirect contribution the increase of vegetation cover in the watersheds.	The Project would hardly make any contribution to the increase of vegetation cover in the watersheds.
	5.4 Reduction of potential pollution loads	The Project would directly contribute to the reduction of potential pollution loads.	The Project would make an indirect contribution to the reduction of potential pollution loads.	The Project would hardly make any contribution to the reduction of potential pollution loads.
6 Empowered People	6.1 Promotion of stakeholder participation in project planning and execution	The Project is inherently designed to promote stakeholder participation throughout the project cycle.	Some of the Project activities would support and encourage stakeholder participation.	The nature of the Project precludes any opportunity for meaningful stakeholder participation.
	6.2 Improvement/transfer of knowledge and skills, beliefs and attitudes through participatory approaches in water-related projects	The Project is designed to facilitate the transfer of skills and knowledge as well as promote changes in beliefs, values and attitudes related to water resource use, protection and management.	Some of the Project activities would support and encourage the transfer of skills and knowledge as well as promote changes in beliefs, values and attitudes related to water resource use, protection and management.	The nature of the Project precludes any opportunity to transfer of skills and knowledge as well as promote changes in beliefs, values and attitudes related to water resource use, protection and management.
	6.3 Promotion of community-based activities	The Project is inherently designed to promote community-based activities.	The Project would make a certain indirect support to or partly encourage community-based activities.	The nature of the Project precludes any possibility for community-based undertakings.
	6.4 Empowerment of the indigenous peoples, the women-headed HH, handicapped, the out-of-school youths, the elderly and other vulnerable stakeholders	The empowerment of such vulnerable stakeholders is inherent in the Project design.	The empowerment of such vulnerable stakeholders may be incidental but is not latent in the Project design.	The nature of the Project precludes any meaningful opportunity to empower such vulnerable stakeholders.

付表 9.2.1 (1/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-G-01	
Project Title	Balog-Balog Multipurpose Project Phase I	
Status of Project	On-going	
Objective Area	Tarlac Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 1999-2010	Estimated by Study Team for 2011-2025
	2,362 as of 2009	236 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	1999-2010*	

Project Description
- Construction of 113m high earth & rock fill dam across Bulsa River to generate electricity & provide year round irrigation water to service area of 39,150ha.(Phase I & 2)
- Phase I involves rehabilitation of existing systems (TARRIS & SMORIS), raising Tarlac Diversion dam ogee by 1.3m, construction of irrigation & drainage facilities for an expansion area of 2,200ha, resettlement works, construction of north main canal, improvement of drainage system.
- Beneficiaries: 7,340 farm-families
- Target area (new): 2,220ha
- Target area (rehabilitation): 10,255ha

Remarks
- *: Estimated and/or proposed by project proponent
- For 2011-2025, 10% of the project cost (236 Mil. Pesos) is considered.

Source of Information
- NIA: Project Briefer (As of September 30, 2009).
- NIA: Indicative Irrigation Development Program, 2010-2019.

Project Code	AI-G-02	
Project Title	Along-along Creek Irrigation Project (UPRIIS Div3)	
Status of Project	On-going	
Objective Area	San Antonio, Nueva Ecija Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2010	Estimated by Study Team for 2011-2025
	250 as of 2009	25 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	2009-2010*	

Project Description
- Construction of check gate, irrigation and drainage facilities to generate additional service area of 2,500ha for UPRIIS District III, and address inundation problems in some barangays of San Antonio
- Water sources ; Cabungan Creek (New) & Along-Along Creek (Rehab)
- Project works ; (New) Irrigation Canal along Brgy. San Jose
  (Rehab) 1) Canal, 2) Raising of embankment, & 3) Dredging
- Beneficiaries: 300 farm-families
- Target area (new): 2,500ha

Remarks
- *: Estimated and/or proposed by project proponent
- For 2011-2025, 10% of the project cost (25 Mil. Pesos) is considered.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.

付表 9.2.1 (2/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-G-03	
Project Title	Repair, Rehabilitation of Existing Groundwater Irrigation Systems, Establishment of Groundwater Pump Project (REGIP)	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Rehabilitation and development on NIA assisted irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2019	Estimated by Study Team for 2011-2025
	333 as of 2009	398 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Annual Program, 2010 – 2019*	

Project Description
- Rehabilitation/repair and improvement of groundwater pump irrigation projects to sustain the operation of the existing wells.
- Construction & installation of new deep wells and shallow tube wells nationwide
- Proposed components for 2010-2019 in the study area
  - No of system: CIS-29
  - Beneficiaries: 4,169 farmer
  - Target area: 7,622ha

Remarks
- *: Estimated and/or proposed by project proponent
- The project cost estimated is only for inside the study area.
- It is assumed that the project continues till 2025 and the cost for 2020-2025 is equal to that for 2016-2019.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Regional Irrigation Development Program, 2010-2019, Region III.

Project Code	AI-G-04	
Project Title	Balikatan Sagip Patubig Program (BSPP)	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Rehabilitation and development on NIA assisted irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2019	Estimated by Study Team for 2011-2025
	58 as of 2009	46 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Annual Program, 2010 – 2019*	

Project Description
- Rehabilitation program designed to bring back idle and non-functioning CIS into operation & provide irrigation to new areas. Program promotes participation among national government - DA/NIA, LGU, IAs
- Proposed components for 2010-2019 in the study area
  - No of system: CIS-9
  - Beneficiaries: 764farmer
  - Target area: 1,347ha

Remarks
- *: Estimated and/or proposed by project proponent
- The project cost estimated is only for inside the study area.
- It is assumed that the project continues till 2025 and the cost for 2020-2025 is equal to that for 2016-2019.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Regional Irrigation Development Program, 2010-2019, Region III.

付表 9.2.1 (3/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-G-05	
Project Title	Repair, Rehabilitation, Restoration & Preventive Maintenance of Existing National & Communal Irrigation Facilities (RRENIS/CIS)	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Rehabilitation and development on NIA assisted irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2019	Estimated by Study Team for 2011-2025
	1,579 as of 2009	1,579 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Annual Program, 2010 – 2019*	

Project Description
- A. Rehabilitation of irrigation facilities and structures of new & existing NIS/CIS
- B. Preventive maintenance of existing irrigation facilities & structures in NIS. Activities include minor repairs of lining, raising of embankment, grouted rip raping, construction of new canals, clearing & weeding modification of turn-outs, repair of diversion/irrigation structures, repair of steel gates/flash boards/staff gauges, installation of reinforcing concrete and repair of transmission lines.
- Proposed components for 2010-2019 in the study area
  - No of system: NIS-3, CIS-24
  - Beneficiaries: 41,105farmer
  - Target area: 50,038ha

Remarks
- *: Estimated and/or proposed by project proponent
- The project cost estimated is only for inside the study area.
- It is assumed that the project continues till 2025 and the cost for 2020-2025 is equal to that for 2016-2019.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Regional Irrigation Development Program, 2010-2019, Region III.

Project Code	AI-G-06	
Project Title	Restoration/Rehabilitation of Existing NIA Assisted Irrigation System (PRE-NAIS)	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Rehabilitation and development on NIA assisted irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2019	Estimated by Study Team for 2011-2025
	7,353 as of 2009	8,767 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Annual Program, 2010 – 2019*	

Project Description
- Proposed components for 2010-2019 in the study area
  (UPRIIS)
  - No of system: NIS-5
  - Beneficiaries: 67,733farmer
  - Target area: 167,125ha
  (Others in Study Area)
  - No of system: NIS-1, CIS-33
  - Beneficiaries: 2,907farmer
  - Target area:5,029ha

Remarks
- *: Estimated and/or proposed by project proponent
- The estimated project cost by the project proponent is as follows; UPRISS: 6,990Mil. Pesos, Others: 363Mil. Pesos.
- It is assumed that the project continues till 2025 and the cost for 2020-2025 is equal to that for 2016-2019.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Regional Irrigation Development Program, 2010-2019, Region III and UPRISS.

付表 9.2.1 (4/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-G-07	
Project Title	Participatory Irrigation Development Project APL1-Infrastructure Development	
Status of Project	On-going	
Objective Area	Bulacan and Pampanga Provinces	
Implementing Agency	NIA	
Objectives	Rehabilitation of NIS to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2013	Estimated by Study Team for 2011-2025
	68.5 as of 2009	41 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	2009 – 2013*	

Project Description
- Nationwide project
- The project seeks to improve NIA's financial viability through institutional reform & capability building including better service delivery to farmers; enhance farmers participation & their capability to manage NIS transferred from NIA to Ias & further narrow the gap between service areas & actual irrigated areas.
- APL1-Infrastructure development: Physical infrastructure improvement (14core A NIS) & sustenance (44core B NIS); policy instruments & institutional development for improved IMT in O&M (58 NIS under NIMF, 5 pilot CIS under CIDF); capacity building for IA; organization & financial corporate strengthening.
- APL1-Irrigation Sector Program (NIA-Rationalization Plan), incentives & terminal leaves,

- AMRIS is selected as a project site in the study area.
- Target area (rehabilitation): 26,791ha
- Beneficiaries: 49,000 farm-families
- Proposed civil works includes; 1) rehabilitation of North and South constant gates, 2) repair and improvement of control house, 3) construction of measuring device, 4) canal lining, 5) replacement of steel gates, and 6) manual and mechanized desisting in the canals.

Remarks
- *: Estimated and/or proposed by project proponent
- For 2011-2025, 60% of the project cost (41 Mil. Pesos) is considered.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Regional Irrigation Development Program, 2010-2019, Region III.
- WB: Project Appraisal Document, 2009.

Project Code	AI-G-08	
Project Title	Rehabilitation of Small Water Impounding Projects / Diversion Dams	
Status of Project	On-going	
Objective Area	Nueva Ecija, Bulacan Province	
Implementing Agency	BSWM	
Objectives	Development of communal and small scale irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2011	Estimated by Study Team for 2011-2025
	25.4 as of 2009	128 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	2009 – 2011*	

Project Description
- Regular Rehabilitation of small water impounding project
- Proposed components for 2009-20111 in the study area
  - 7 SWIPs in Nueva Ecija and Bulacan
  - Restored area = 235ha

Remarks
- *: Estimated and/or proposed by project proponent
- It is assumed that the project continues till 2025 and the annual cost is equal to 25.4Mil Pesos/ 3years (8.5Mil Pesos/year).

Source of Information
- BSWM

付表 9.2.1 (5/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-G-09	
Project Title	Comprehensive Agrarian Reform Program, Irrigation Component (CARP-IC)	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces, covering Agrarian Reform Communities (ARCs)	
Implementing Agency	DAR/NIA	
Objectives	Rehabilitation and development on NIA assisted irrigation system as a regular program to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	1,020 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA / World Bank / JICA*	
Expected Implementation Schedule	1993 -*	
Project Description - The program provides facilities necessary to enhance farm productivity and income of CARP beneficiaries. - The Program involves pre-engineering, construction / rehabilitation of irrigation and drainage facilities, farm roads, marketing facilities, and institutional development. - Irrigation component covers development of CIS/CIP and strengthening of the IAs through the irrigation development projects		
Remarks - *: Estimated and/or proposed by project proponent - According to the previous investment for CARP-IC, 356Mil.Pesos/year has been allocated for CARP-IC for the entire country. The ratio of the rice production for four provinces (Nueva Ecija, Pampanga, Tarlac and Bulacan) and that for the entire country in 2007 is about 0.19, based on the country STAT by Bureau of Agricultural Statistics, DA. Assuming that necessary budget is proportional to the rice production, it is estimated that 68Mil. Pesos/year would be necessary for the study area.		
Source of Information - DAR : Agrarian Reform Infrastructure Support Project, Phase-III. - NIA : CARP-IC Project - NIA: Indicative Irrigation Development Program, 2010-2019.		

Project Code	AI-G-10	
Project Title	Upper Tabuating SRIP	
Status of Project	On-going	
Objective Area	General Tino, Nueva Ecija Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2011	Estimated by Study Team for 2011-2025
	251.7 as of 2009	76 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	2009 – 2011*	
Project Description - Construction of a zoned earth fill dam with a height of 25m and a reservoir area of 71.50ha for irrigation, flood control and aquaculture - Target area (New): 700ha		
Remarks - *: Estimated and/or proposed by project proponent - For 2011-2025, 30% of the project cost (76 Mil. Pesos) is considered.		
Source of Information - NIA: Indicative Irrigation Development Program, 2010-2019. - NIA : UPRIIS Div-3.		

付表 9.2.1 (6/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-P-01	
Project Title	Balintingon Reservoir Multipurpose Project (BRMP)	
Status of Project	On-going	
Objective Area	Nuva Ecija Province	
Implementing Agency	Municipality of General Tinio	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2016	Estimated by Study Team for 2011-2025
	13,591 as of 2009	13,591 as of 2009
EIRR	15.14 %*	
Expected Source of Fund	Selected Investor*	
Expected Implementation Schedule	2010 – 2016*	

Project Description

- The project envisions the construction of a 140m high rock fill center-core dam and its appurtenant structures across Sumacbao River to regulate the discharge of the catchment's area of about 228km^2. A reservoir with a storage capacity of 572MCM would be created. At the toe of the dam on the right abutment, an open type powerhouse equipped with two Francis type turbines with a capacity of 15MW each would be constructed. These main features, would be supplemented by a diversion weir (140m long) and new irrigation facilities (109km of main canal, 168km of laterals and sub-laterals, main and supplementary farm ditches, 210km of drainage channels, and access roads). At full implementation, the project would serve an area of about 14,900 hectares in the Balintingon area.
- Beneficiaries: 9,152 farm-families
- Target area (new): 14,900ha
- Installed capacity of hydropower plant: 30MW
- Expected generated power: 119.6GWH

Remarks

- *: Estimated and/or proposed by project proponent
- Revised ICC form submitted to NEDA in February, 2008
- Resolution No.84-2008: LGU is in partnership with NIA
- Resolution No.85-2008: the BRMP is a public domain of Gen. Tinio
- Resolution No.86-2008: Gen. Tinio to secure financing
- Resolution No.87-2008: Governor of Nueva Ecija to allocate Php0.1billion for social fund for the people displaced in the project.
- Resolution No.21-2009: Mayer of Gen.Tinio to invite investors to undertake design and secure financing package for the construction of BRMP
- Invitation for bidding in April, 2009
- Eight investors from China, US showed interest to participate through BOT
- MOA was singed on February 17, 2010 between NIA and Investor (Concordo Pacific Investment Holding Ltd. Inc.) for “Full Blown Study” to be completed within 120 days
- EO from the president to be able to proceed with the project mobilization. It is expected to be released before the end of the year.
- The project cost is as follows; Peso: 4,206, Loan: 9,385.
- It is estimated that 800-1,000families would be affected by the project.

Source of Information

- Supplemental Report, Balintingon RMP, Nueva Ecija, 2008 with revised ICC form as of February 2008
- PPT presentation on Balintingon RMP by Municipality of General Tinio.
- Interview by JST.

付表 9.2.1 (7/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-P-02	
Project Title	Balog-Balog Multipurpose Project Phase II	
Status of Project	Planned	
Objective Area	Tarlac Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2011-2019	Estimated by Study Team for 2011-2025
	16,095 as of 2009	16,095 as of 2009
EIRR	19.09 %*	
Expected Source of Fund	ODA loan / GAA*	
Expected Implementation Schedule	2011- 2019*	

Project Description

- Construction of 113m high earth & rock fill dam with storage capacity of 575MCM (effective storage: 525MCM) across Bulsa River to generate electricity & provide year round irrigation water to service area of 39,150ha as well as flood control in low-lying areas. The project envisions to provide upland communities to enlarge in inland fish production on the reservoir.
- Beneficiaries: 15,660 farm-families
- Target area (new): 28,330ha
- Target area (rehabilitation): 6,080ha
- Installed capacity of hydropower plant: 43.5MW
- Expected generated power: 89GWH

Remarks

- *: Estimated and/or proposed by project proponent
- Updated FS was completed in December 2009
- Submitted to NEDA for evaluation, possible BOT
- The project cost estimated is for Phase II.
- It is estimated that 548faimilies would be affected by the project.

Source of Information

- NIA: Indicative Irrigation Development Program, 2010-2019
- NIA: Project Briefer (As of September 30, 2009).
- Interview by JST

付表 9.2.1 (8/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-P-03	
Project Title	Sector Loan on Rehabilitation of Irrigation Facilities	
Status of Project	Planned	
Objective Area	Pampanga Province	
Implementing Agency	NIA	
Objectives	Rehabilitation of NIS to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2011-2016	Estimated by Study Team for 2011-2025
	222 as of 2009	222 as of 2009
EIRR	28.4 % for all*	
Expected Source of Fund	JICA / GAA*	
Expected Implementation Schedule	2011 – 2016*	

Project Description

- Nationwide project
- Optimization of irrigation potentials of NIS & CIS not covered by PIDP & ISOEIP.
- Involves restoration, rehabilitation, construction of irrigation facilities.

(Study Area)

Rehabilitation of Porac-Gumain NIS of 3,126ha.

In this existing NIS, the irrigable area is devastated during the eruption of Mt. Pinatubo, where lahar and volcanic ash covered the whole irrigable area by an average of depth of 30cm, and hence drainage canals were totally blocked. As a result, excess water during rainy season has no place to way out at farm level, which submerge the area or underwater. This project is essential to resolved all problems prior to Irrigation Management Transfer (IMT) such as squatters, water usage control, environment awareness, conservation and protection of irrigation and drainage facilities.

- Outline of the Project includes, 1) Construction of civil works for rehabilitation of diversion works, canal system, drainage system, road, and O&M facilities, and 2) Institutional Strengthening Program

Remarks

- *: Estimated and/or proposed by project proponent
- F/S completed
- Total project cost is 10,155Mil. Pesos(Peso:1.523, Loan:8.632)
- The project cost estimated is for Porac-Gumain NIS.

Source of Information

- NIA: Indicative Irrigation Development Program, 2010-2019.
- JICA preparatory study in 2009.

付表 9.2.1 (9/16) 農業セクターにおけるプロジェクト内容

Project Code	AI-P-04	
Project Title	Casecnan Multi-purpose Irrigation & Power Project Irrigation Component Phase II	
Status of Project	Planned	
Objective Area	Nueva Ecija Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2012-2018	Estimated by Study Team for 2011-2025
	7,000 as of 2009	7,000 as of 2009
EIRR	28.00%*	
Expected Source of Fund	ODA loan / GAA*	
Expected Implementation Schedule	2012 – 2018*	

Project Description
- Construction of the remaining 33 km Super Diversion Canal (SDC), irrigation facilities to generate 21,000 new service area & rehabilitation of downstream portion of UPRIIS covering 40,000ha.
  - Beneficiaries: 81,000 farm-families
  - Target area (new): 21,000ha
  - Target area (Rehabilitation): 40,000ha
- Project component of Phase II includes 1) new construction such as extension of SDC, construction of lateral and sub-lateral canals, drainage canals and related structures in 20,321ha, and 2) rehabilitation / improvement of UPRIIS area, such as rehabilitation of the PENRIS main and lateral canals, and related structures.

Remarks
- *: Estimated and/or proposed by project proponent
- Updated F/S was completed in October 2009

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019
- Updated Feasibility Study for the Casecnan Multi-purpose Irrigation & Power Project, Irrigation Component Phase II.

Project Code	AI-P-05	
Project Title	Procurement of Pumps, Drilling Rigs & Related Equipment	
Status of Project	Planned	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Development of communal and small scale irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2011-2013	Estimated by Study Team for 2011-2025
	206 as of 2009	206 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Spanish Loan / GAA*	
Expected Implementation Schedule	2011 – 2013*	

Project Description
- Nationwide project
- Central Luzon area includes the procurement of
  - 1,000 units of centrifugal pumps
  - 1 units of trailer mounted rotary/percussion type drilling rigs
  - 2 units of resistively machines & electric logger
  - back-up spare parts
  - 4 units of service vehicles to be used in the identification, resistively, testing, drilling, installation & monitoring activities of project
  - Beneficiaries: 3,900 farm-families
  - Target area (Rehabilitation): 3,900ha.

Remarks
- *: Estimated and/or proposed by project proponent
- for DA, Need evaluation
- Total project cost is 1,028Mil. Pesos (Peso: 321, Loan: 707).
- The project cost estimated is for Region III.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Comprehensive Infrastructure Integrated Program, 2007.

付表 9.2.1 (10/16)　　農業セクターにおけるプロジェクト内容

Project Code	AI-P-06	
Project Title	Irrigation Water Resources Augmentation Pump Establishment Project	
Status of Project	Planned	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Development of communal and small scale irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2013-2016	Estimated by Study Team for 2011-2025
	130 as of 2009	130 as of 2009
EIRR	(N/A)	
Expected Source of Fund	ODA loan*	
Expected Implementation Schedule	2013 – 2016*	

Project Description
- Nationwide project
- Central Luzon area includes;
  - Procurement of 1,330 units of pumps including diesel engines
  - Total of 301 units of shallow tube wells
  - 1,029 units of surface water pump irrigation to cover an area of 2,360 hectares.
  - Beneficiaries: 1,333 farm -families
  - Target area (New): 1,437ha
  -Target area (Rehabilitation): 924ha

Remarks
- *: Estimated and/or proposed by project proponent
- F/S completed
- Total project cost is 973Mil. Pesos (Peso: 422, Loan: 551).
- The project cost estimated is for Region III.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Comprehensive Infrastructure Integrated Program, 2007.

Project Code	AI-P-07	
Project Title	Appropriate Irrigation Technologies for Enhanced Agricultural Production	
Status of Project	Planned	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA	
Objectives	Improvement of irrigation efficiency in the basin as well as improving productivity with less water	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2015-2020	Estimated by Study Team for 2011-2025
	654 as of 2009	654 as of 2009
EIRR	(N/A)	
Expected Source of Fund	ODA loan / GAA*	
Expected Implementation Schedule	2015 – 2020*	

Project Description
- Nationwide project(Region 3, 4, 6, 11&12)
- The project involves the use of innovative and appropriate technology including photovoltaic energy in power generation and drip tape for water dispersion. Irrigation technology to be implemented includes drip sprinkler and flood irrigation facilitated by solar power.
- Central Luzon area includes the followings.
  - Beneficiaries: 2,000 farm-families
  -Target area (New): 4,000ha

Remarks
- *: Estimated and/or proposed by project proponent
- MOA signed with donor
- Total project cost is 3,250Mil. Pesos (Peso:0.650, Loan:2.600).
- The project cost estimated is for Region III.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.
- NIA: Comprehensive Infrastructure Integrated Program, 2007.

付表 9.2.1 (11/16)　　農業セクターにおけるプロジェクト内容

Project Code	AI-P-08	
Project Title	Central Luzon Groundwater Irrigation Systems Reactivation Project	
Status of Project	Planned	
Objective Area	Nueva Ecija and Pampanga Provinces	
Implementing Agency	NIA	
Objectives	Development of communal and small scale irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2015-2019	Estimated by Study Team for 2011-2025
	1,429 as of 2009	1,429 as of 2009
EIRR	(N/A)	
Expected Source of Fund	ODA loan / GAA*	
Expected Implementation Schedule	2015 – 2019*	

Project Description
- Construction of 100 deep well pump systems covering 5,000ha; provision of rural water supply in selected barangays; procurement of equipment
- Target area (New): 5,000ha

Remarks
- *: Estimated and/or proposed by project proponent
- F/S completed
- According to NIA RegionIII, the project area in the Casecnan Phase II project should be excluded.
- The project cost estimated is as follows; Peso: 626, Loan: 803.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.

Project Code	AI-P-09	
Project Title	Gumain Reservoir Project t	
Status of Project	Planned	
Objective Area	Pampanga Province	
Implementing Agency	NIA	
Objectives	Development of national irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2020-2027	Estimated by Study Team for 2011-2025
	13,729 as of 2009 (2,768 as of 1984)	13,729 as of 2009
EIRR	(N/A)	
Expected Source of Fund	ODA loan / GAA	
Expected Implementation Schedule	2020 - 2027	

Project Description
- Construction of 108m high, zoned embankment dam to store irrigation water to serve irrigation water to serve 11,000ha of paddy & 5,200ha of sugercane area & augment water supply to 7,900ha in Porac-Gumain & Caulaman RIS.
- Target area : 16,200ha (11,000ha of paddy and 5,200ha of sugercane) including the existing Porac-Gumain & Caulaman RIS

Remarks
- *: Estimated and/or proposed by project proponent
- F/S completed in 1985
- Re-study would be necessary.

Source of Information
- NIA: Indicative Irrigation Development Program, 2010-2019.

付表 9.2.1 (12/16)　　農業セクターにおけるプロジェクト内容

Project Code	AI-P-10	
Project Title	Rehabilitation of AMRIS	
Status of Project	Planned	
Objective Area	Bulacan Province	
Implementing Agency	NIA	
Objectives	Rehabilitation of NIS to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	983 as of 2009	983 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description
- The project, located in Bulacan, Region III, will rehabilitate Bustos, Lower & Upper Maasim Dam to recover the function of major irrigation facilities in Angat-Maasim RIS.
- Beneficiaries: 26,000 farm-families

Remarks
- Proposed project already forwarded by NEDA thru DFA to GOJ for Grant Aid Assistance.
- Implementation plan are under preparation by NIA supported by JICA as of March 2010.

Source of Information
- NIA: Comprehensive Infrastructure Integrated Program, 2007.
- Interview by JST.

Project Code	AI-P-11	
Project Title	Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects (SWIP), Small Diversion Dam Projects (SDD)	
Status of Project	Planned	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	DA Region III/LGUs	
Objectives	Development of communal and small scale irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	168.6 as of 2009 (91.5 as of 2002)	168.6 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description
- Bulacan (1SWIP and 2SDD, service area = 125ha)
- Nueva Ecija (1SWIP, service area = 95ha)
- Pampanga (1SWIP and 3SDD, service area = 195ha)
- Tarlac (1SWIP, service area =45ha)
- Nueva Ecija (new construction of 1 DD and rehabilitation of 11 DD and 5 SWIP) proposed by PPDO, Nueva Ecija

Remarks
- D/D completed.

Source of Information
- DA Region III
- PPDO, Nueva Ecija
- Interview by JST

付表 9.2.1 (13/16)　　農業セクターにおけるプロジェクト内容

Project Code	AF-G-01	
Project Title	Aquaculture Fisheries Development Programs	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	BFAR	
Objectives	Improvement of fishery activities toward sustainable fishery development as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	450 as of 2009 (total for AF-G-01 to 04)
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	Annual Program	

Project Description

The program includes the following components.

- Support to accredited/registered private and provincial Tilapia Hatcheries.
  a) Input assistance, b) Training/consultations, c)Upgrading of bloodstocks,
  d) Monitoring of production, e) Strengthening of linkages between hatchery operators
- Seeding of existing communal bodies of water including SFR and SWIP and continuous replenishment of fish stock in the area.
  a) Fingering stocking and dispersal,
  b) Water quality monitoring and assessment of inland waters including SWIPs & SFR
- Extension support, education and training services
  a) Conduct of training in fisheries, b) Technical assistance & advisory services, c) Establishment of techno-demo (Stocking of Large-size Tilapia, Culture of Pangasisu, Culture of Saline Tilapia), d) Input assistance on Tilapia-Ulang

Remarks

- Based on the budget allocation for fishery operation in BFAR region III in 2009, it is assumed that the total budget for the AF-G-01 to 04 is 30Mil. Pesos/year.

Source of Information

- BAFR Central Luzon: Pampanga Priority Plans & Programs, CY2009.

Project Code	AF-G-02	
Project Title	Comprehensive Regulatory Services	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	BFAR	
Objectives	Improvement of fishery activities toward sustainable fishery development as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	*Refer to AF-G-01*
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	Annual Program	

Project Description

The programs includes the following components.

- Fish Health Management & Inspection
  a) Residue monitoring and surveillance of feed mills and registered farms for EU accreditation,
  b) Aquatic animal disease surveillance, monitoring and control
- Monitoring, control & surveillance (MCS)
  a) Deputation of fish warden & fish examiners,
  b) Filing of illegal fishing cases & apprehensions,
  c) Coordination with law enforcement agencies
- Issuance of regulatory documents
  a) FLS,
  b) Import and export permits
- Quarantine services
- Diosdado Macapagal International Airport in Clark, Mabalacat, Pampanga

Remarks

Source of Information

- BAFR Central Luzon: Pampanga Priority Plans & Programs, CY2009.

付表 9.2.1 (14/16)　　農業セクターにおけるプロジェクト内容

Project Code	AF-G-03	
Project Title	Support Projects and Activities	
Status of Project	On-going	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	BFAR	
Objectives	Improvement of fishery activities toward sustainable fishery development as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	*Refer to AF-G-01*
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	Annual Program	

Project Description

The programs include the following components.

- Market development services
- Market-matching and consumer information services, b) Participation to Agri-Aqua trade fairs, c) Marketing assistance
- Project and activities on credit facilitation services
- Assistance to fisher folk in accessing agricultural credit & loan (ACEF, QUEDANCOR, Land Bank of Philippines)
- Fisheries post harvest services
- Distribution of post-harvest equipment & machineries such as live tilapia container box and smokehouse

Remarks

Source of Information

- BAFR Central Luzon: Pampanga Priority Plans & Programs, CY2009.

Project Code	AF-G-04	
Project Title	Fisheries Resources Management for Improved and Sustainable Harvest	
Status of Project	On-going	
Objective Area	Bulacan Province (Hagonoy, Paombongm, City of Malolos, Bulacan)	
Implementing Agency	Provincial Government of Bulacan	
Objectives	Improvement of fishery activities toward sustainable fishery development as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	*Refer to AF-G-01*
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	Annual Program	

Project Description

Obectives

(1) General:

to ensure the attainment of rationally and properly managed and sustained fisheries and aquatic resources in the coastal areas

(2) Specific:

a) Design strategies and projects to address issues and problems in resource management

b) Create awareness and generate support from stakeholders towards

Program components

1) Resource inventory, 2) Policy/Regulatory, 3) Capability building, 4) Livelihood support,
5) Resource enhancement, and 6) Public awareness

On-going activities includes;

1) Advocacy to adoption of Municipal Fisheries Ordinance
2) Mangrove Planting
3) Lecture and Film showing
4) Community river clean-up day

Remarks

Source of Information

- BAFR Central Luzon: Pampanga Priority Plans & Programs, CY2009.

付表 9.2.1 (15/16)　　農業セクターにおけるプロジェクト内容

Project Code	AI-C-01	
Project Title	New Construction of Small Scale Irrigation Project under BSWM	
Status of Project	Conceptual	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	BSWM	
Objectives	Development of communal and small scale irrigation system to address water shortage in existing NISs and CISs	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	514 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description
- Construction of small scale irrigation systems consisting of Small Water Impounding Projects (SWIP), Small Diversion Dam Projects (SDD), Small Farm Reservoir (SFR), Shallow Tube Well (STW) and other rainwater harvesting systems
- The project support the construction of small scale irrigation systems which are not covered by the on-going and planed projects under BSWM
- Proposed Projects
  - Diversion Dam (DD) 18 nos 959ha
  - Small Water Impounding Project (SWIP) 24 nos 1,635 ha
  - Small Farmers Reservoir (SFR) 4 nos 112 ha
  - (Total) (46 nos) (2,706 ha)

Remarks
- It is assumed that the project cost is 0.19Mil. Pesos/ha, referring the project cost of AI-P-11.

Required Action to Upgrade to a Proposed Project for Implementation
- F/S level study would be required.

Source of Information
- BSWM

Project Code	AI-C-02	
Project Title	Introduction of Water Saving Irrigation Technology	
Status of Project	Conceptual	
Objective Area	Bulacan, Nueva Ecija, Pampanga and Tarlac Provinces	
Implementing Agency	NIA / (DA / PhilRice)	
Objectives	Improvement of irrigation efficiency in the basin as well as improving productivity with less water	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	150 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule		

Project Description
- The program aims at;
  - raising water user's awareness on the importance of technology and promote compulsory adoption by farmers
  - minimize water delivery and distribution losses;
  - increasing water use efficiency for increased rice production towards water saving at the system level
  - saving water from the reservoir to increase cropping intensity thru the adoption of quick turn around or third cropping
- The program components include;
  - Trial and research
  - Demonstration farm operation
  - Training to trainers and technical campaign to IAs
  - Monitoring
  - Capacity development of IAs

Remarks
- For the project cost, input on technical assistance by foreign expert team (60mil/pesos/year) for 3yeras is considered.

Required Action to Upgrade to a Proposed Project for Implementation
- TOR for the T.A. should be determined.

Source of Information
- Interview by JST to NIA, NIA-JICA Irrigation Association Strengthening Support Project (TCP2) and Phil Rice

付表 9.2.1 (16/16)　　農業セクターにおけるプロジェクト内容

Project Code	AI-C-03	
Project Title	Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	
Status of Project	Conceptual	
Objective Area	Bulacan and Pampanga Provinces	
Implementing Agency	NIA	
Objectives	Improvement of irrigation efficiency in the basin as well as improving productivity with less water	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	150 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule		

Project Description

The programs include the following components.

- Installation of additional discharge measurement device
- Improvement of discharge monitoring system
- Review of calibration of conversion tables
- Establishment of communication system
- Capacity development

Remarks

- The project cost is roughly estimated by referring the cost for the proposed central operation and monitoring system in the F/S for Casecnan Project Phase II.

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be studied.

Source of Information

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付表 9.3.1 (1/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-G-01	
Project Title	Angat Water Utilization and Aquaduct Improvement Project (AWUAIP) Phase II	
Status of Project	On-going	
Objective Area	Bulacan Province and Metro Manila	
Implementing Agency	MWSS	
Objectives	Rehabilitation of water conveyance facilities for municipal water supply to address inadequate water supply source	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2013	Estimated by Study Team for 2011-2025
	6,090 of 2009	4,568 as of 2009
EIRR	(N/A)	
Expected Source of Fund	China Loan*	
Expected Implementation Schedule	2010-2013*	

Project Description

- This Project is being considered with the aim of maintaining and optimizing the quantity of raw water delivered daily from Angat Dam via the Ipo Dam-Bicti-La Mesa Portal System to the water treatment plants. The project can mitigate the leakage that occurs on some segments of the existing aquaduct No.5 (AQ-5), which was constructed in 1990 and conveys 2,000MLD of raw water to Metro Manila. The leakage is estimated to be equivalent to about 150MLD.
- This project involves the construction of new aquaduct No.6 and the rehabilitation of existing aquaduct No.5 to secure the raw water supply from Ipo dam to Metro Manila.
- The Phase II project includes the followings; 1) L=9.9km aquaduct extension including the rehabilitation of existing AQ-5, and 2) Interconnection works for the six (6) aqueducts and resettlement.

Remarks

- *: Estimated and/or proposed by project proponent
- Bidding among the three (3) nominated Chinese contractors was held on July 7, 2009 and the project was awarded to China International Water & Electric Corp (CWE) having submitted the lowest bid. Contract documentation works is in progress.
- MWSS has just submitted to DOF its loan application for the project proposed to be funded under the preferential buyer's credit facility of the Export-Import Bank of China (China Eximbank), hence activities pertaining to loan application and negotiation is in progress. Once the loan is approved and the loan agreement is signed, then MWSS can now issue the Notice To Proceed to CWE and the construction works is expected to commence by the 1st quarter of this year 2010.
- NEDA, in its letter of August 11, 2009 informed MWSS that the Investment Coordination Committee-Cabinet Committee (ICC=CC) has approved the subject project on August 10, 2009.
- For 2011-2025, 75% of the project cost (4,568Mil. Pesos) is considered.

Source of Information

- MWSS: Summary of Projects & Updates as of 30 September, 2009.
- MWSS: Briefing on the project, available through MWSS web-site.
- Interview by JICA Study Team

付表 9.3.1 (2/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-P-01	
Project Title	Rehabilitation of Umiray-Macua Facilities	
Status of Project	Proposed	
Objective Area	General Nakar and Bulacan Province	
Implementing Agency	MWSS	
Objectives	Rehabilitation of water intake and conveyance facilities for municipal water supply to address inadequate water supply source	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2011	Estimated by Study Team for 2011-2025
	454 as of 2009	454 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Concessionaries*	
Expected Implementation Schedule	2010 – 2011*	

Project Description

- This project is to ensure the flow of raw water from Umiray River to Angat Reservoir as this contributes 20-30% of the present water supply. On November 29, 2004, typhoon "Winnie" has caused severe damages to our Umiray-Angat Transbasin Tunnel and its facilities resulting to the complete stoppage of operation particularly the conveyance of raw water from the Umiray River to the Angat Reservoir. This damage was recovered by the immediate works.
- This project is for the permanent rehabilitation works which includes the following components;1) Complete restoration of the access road to tunnel outlet, 2) Construction of permanent RCDG Bridge for the tunnel outlet, 3) Widening of oxbow channel at the tunnel outlet, 4) Intake structures such as the various mechanical gates; trash rack, waterway protection works, retaining wall, ogee dam, etc, 5) Rehabilitation of mini-hydro plant, 6) Construction of log arresters, 7) Installation of power/communication cables inside the tunnel, 8) Village/Housing relocation

Remarks

- *: Estimated and/or proposed by project proponent
- Updating of cost estimate for bidding was recently completed.
- Processing of the MOA with the municipality of General Nakar, Quezon, is in progress.
- Implementation including bidding process will be done by MWSS but to be funded by the Concessionaries.

Source of Information

- MWSS: Summary of Projects & Updates as of 30 September, 2009.
- MWSS: Briefing on the project, available through MWSS web-site.
- Interview by JICA Study Team

Project Code	MW-P-02	
Project Title	Sumag River Diversion Project	
Status of Project	Proposed	
Objective Area	General Nakar Province	
Implementing Agency	MWSS	
Objectives	New water resources development for municipal water supply to address inadequate water supply source	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2011	Estimated by Study Team for 2011-2025
	540 as of 2009	540 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Common Purpose Facility (CPF) by Concessionaries*	
Expected Implementation Schedule	2010 – 2011*	

Project Description

- This project is to tap of the Sumag River in General Nakar, Quezon, originally part of the Umiray-Angat transbasin project with a supply volume of 188MLD.
- To maximize the potential water transfer from the Umiray-Angat transbasin project, this project is necessary to be implemented.

Remarks

- *: Estimated and/or proposed by project proponent
- Updating of cost estimate already completed.
- This will be funded by the concessionaires through the Common Purpose Facility (CPF) Framework of the Concession Agreement.

Source of Information

- MWSS: Summary of Projects & Updates as of 30 September, 2009.
- Interview by JICA Study Team

付表 9.3.1 (3/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-P-03	
Project Title	Bulacan Treated Bulk Water Supply Project	
Status of Project	Proposed	
Objective Area	Bulacan Province	
Implementing Agency	MWSS / Bulacan Government	
Objectives	Development of bulk water supply system to address inadequate water supply source as well as to secure safe drinking water	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2010-2012	Estimated by Study Team for 2011-2025
	5,500 as of 2009	11,935 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Common Purpose Facility (CPF)　by Concessionaries*	
Expected Implementation Schedule	2010 – 2012*	

Project Description

- This project will address the water supply requirements of the Province of Bulacan through its water district with a total volume of 230MLD.
- In 2007, MOA between MWSS and provincial government of Bulacan on Bulacan water supply plan was signed. According to this, MWSS would implement the Bulacan bulk water supply project in three phases.
- The project is the first phase of the entire plan, which involves the construction of water supply facilities, including a raw aqueduct, a treatment plant, reservoirs, pumping station and primary lines, to cater to the demand of 10 municipalities/cities in Bulacan.
- The concessionaries will convey the raw water to the proposed water-treatment plant.　Bulk water after treatment will then be stored in a reservoir, where it is delivered to the delivery point of each water district of the different municipalities and cities of Bulacan.　The water districts, in turn, will distribute the water to Bulacan residents.
-

Remarks

- *: Estimated and/or proposed by project proponent
- MWSS decided to have this project be implemented by Concessionaries under the Common Purpose Facility (CPF) Framework of the Concession Agreement.
- The annualized unit raw water development cost of 8pesos/ m^3 (with discount rate of 10% and lifetime of 50years) is additionally considered for the estimation of the total project cost.
-

Source of Information

- MWSS: Summary of Projects & Updates as of 30 September, 2009.
- MWSS: Summary of Projects & Updates as of 15 February, 2009.
- Interview by JICA Study Team
-

付表 9.3.1 (4/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-P-04	
Project Title	Metro Clark Bulk Surface Water Project	
Status of Project	Proposed	
Objective Area	Metro Clark (Angeles City, Mabalacat, Porac in Pampanga Province, Bamban, Concepcion, Capas in Tarlac Province)	
Implementing Agency	Clark Development Corporation (CDC)	
Objectives	Development of bulk water supply system to address inadequate water supply source	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	3,527 as of 2009
EIRR	(N/A)	
Expected Source of Fund	CDC with private sector participation*	
Expected Implementation Schedule	(N/A)	

Project Description

- Water supply project for development of new frontier area in Clark Special Economic Zone, which would provide 20,793m^3/day (7.6MCM/year or 0.26m^3/s) of municipal water, was proposed in the master plan to develop new area in Clark Special Economic Zone. The target year is set at 2035 in the master plan. The estimated project cost is 640Mil. Pesos. The potential sites for water resources development are Marimula, Sacobia and Bangut.
- The proposed project has been upgraded into "Metro Clark Bulk Surface Water Project", as of October 2010, according to CDC. The upgraded project involves the development of sustainable new surface water sources to supply treated bulk water to public and private water providers serving Metro Clark as an alternative/supplement to current groundwater sources and to address current supply gaps and future projected demand. Implementation of the project (design, financing, construction, operation and maintenance) is proposed for private sector participation.

Remarks

- *: Estimated and/or proposed by project proponent
- Feasibility study is on-going under support from International Finance Corporation (IFC), which investigates three potential sites for water resources development; Marimula, Sacobia and Bangut.
- Because the result of the F/S is not available as of October 2010, it is assumed that the projected deficit of sustainable groundwater source in Metro Clark (Angeles City, Mabalacat, Porac in Pampanga Province, Bamban, Concepcion, Capas in Tarlac Province) at 2025 by the present study, which is 0.8m^3/s, be supplied through MetroClark Bulk Surface Water Project.
- It should be noted that it would be necessary to construct storage dams at some of the potential sites for water sources (Marimula, Sacobia and Bangut) in order to provide municipal water of 0.8m^3/s, according to the result of the preliminary water balance by the study team.
- The estimated project cost assumed the same annualized unit cost for water supply system development used in Bulacan Treated Bulk Water Supply Project (Code: MW-P-03), i.e. 6.8pesos/m^3 (with interest rate of 10% and lifetime of 50years) , and the annualized unit raw water development cost of 8pesos/m^3 (with discount rate of 10% and lifetime of 50years).

Source of Information

- CDC: Master Development Plan for 10,684Hectares in the Clark Special Economic Zone, Utilities Requirement Projections, 2008.
- CDC: Metro Clark Bulk Surface Water Project, 2010.

付表 9.3.1 (5/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-C-01	
Project Title	Additional Level 3,2, 1 Facilities towards 2025 in Bulacan	
Status of Project	Conceptual	
Objective Area	Bulacan Province	
Implementing Agency	LWUA/WDs/ LGUs/Private WSPs	
Objectives	Municipal water supply system development	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	3,839 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- To address the issue on the inadequate water supply, the development of new water supply system for all water service level for both urban and rural areas are proposed to meet the growing water demand requirement in Bulacan Province. The new water supply system for level 3 will also include the expansion and rehabilitation of the existing water system in the respective cities and municipalities. In the present study, the strategy for physical targets on the water service level ratios is set as follows; increasing with the past trend and additional consideration to level up the municipalities with low level 3 ratio.
- The estimated additional population to be served toward 2025 is as follows (inside the study area only).
  1)Level 1: 140thousand, 2)Level 2: 0, 3)Level 3: 558thoudand.
- These projects also include the soft components addressing the following countermeasures; 1) Utilization of high technology equipment in development of water system, 2) Carrying out immediate water repairs, provide water meters, and perform periodic maintenance, 3) Strict implementation/enforcement of laws and penalties on pilferage, 4) Efficient system operation and maintenance, 5) Quality checked design and well supervised construction, 6) Strict implementation of well design.

Remarks

- The project cost estimated is only for inside the study area.
- Annual O&M cost for level3 system is estimated at about 10pesos/m^3.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

Project Code	MW-C-02	
Project Title	Additional Level 3,2, 1 Facilities towards 2025 in Pampanga	
Status of Project	Conceptual	
Objective Area	Pampanga Province	
Implementing Agency	LWUA/WDs/ LGUs/Private WSPs	
Objectives	Municipal water supply system development	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	4,914 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- To address the issue on the inadequate water supply, the development of new water supply system for all water service level for both urban and rural areas are proposed to meet the growing water demand requirement in Pampanga Province. The new water supply system for level 3 will also include the expansion and rehabilitation of the existing water system in the respective cities and municipalities. In the present study, the strategy for physical targets on the water service level ratios is set as follows; increasing with the past trend and additional consideration to level up the municipalities with low level 3 ratio.
- The estimated additional population to be served toward 2025 is as follows (inside the study area only).
  1)Level 1: 205thousand, 2)Level 2: 3thousand, 3)Level 3: 701thoudand.
- These projects also include the soft components addressing the following countermeasures; 1) Utilization of high technology equipment in development of water system, 2) Carrying out immediate water repairs, provide water meters, and perform periodic maintenance, 3) Strict implementation/enforcement of laws and penalties on pilferage, 4) Efficient system operation and maintenance, 5) Quality checked design and well supervised construction, 6) Strict implementation of well design.

Remarks

- The project cost estimated is only for inside the study area.
- Annual O&M cost for level3 system is estimated at about 10pesos/m^3.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

付表 9.3.1 (6/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-C-03	
Project Title	Additional Level 3,2, 1 Facilities towards 2025 in Nueva Ecija	
Status of Project	Conceptual	
Objective Area	Nueva Ecija Province	
Implementing Agency	LWUA/WDs/ LGUs/Private WSPs	
Objectives	Municipal water supply system development	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	2,903 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- To address the issue on the inadequate water supply, the development of new water supply system for all water service level for both urban and rural areas are proposed to meet the growing water demand requirement in Nueva Ecija Province. The new water supply system for level 3 will also include the expansion and rehabilitation of the existing water system in the respective cities and municipalities. In the present study, the strategy for physical targets on the water service level ratios is set as follows; increasing with the past trend and additional consideration to level up the municipalities with low level 3 ratio.
- The estimated additional population to be served toward 2025 is as follows (inside the study area only).
  1)Level 1: 178thousand, 2)Level 2: 22thousand, 3)Level 3: 415thoudand.
- These projects also include the soft components addressing the following countermeasures; 1) Utilization of high technology equipment in development of water system, 2) Carrying out immediate water repairs, provide water meters, and perform periodic maintenance, 3) Strict implementation/enforcement of laws and penalties on pilferage, 4) Efficient system operation and maintenance, 5) Quality checked design and well supervised construction, 6) Strict implementation of well design.

Remarks

- The project cost estimated is only for inside the study area.
- Annual O&M cost for level3 system is estimated at about 10pesos/m^3.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

Project Code	MW-C-04	
Project Title	Additional Level 3,2, 1 Facilities towards 2025 in Tarlac	
Status of Project	Conceptual	
Objective Area	Tarlac Province	
Implementing Agency	LWUA/WDs/ LGUs/Private WSPs	
Objectives	Municipal water supply system development	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	559 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- To address the issue on the inadequate water supply, the development of new water supply system for all water service level for both urban and rural areas are proposed to meet the growing water demand requirement in Tarlac Province. The new water supply system for level 3 will also include the expansion and rehabilitation of the existing water system in the respective cities and municipalities. In the present study, the strategy for physical targets on the water service level ratios is set as follows; increasing with the past trend and additional consideration to level up the municipalities with low level 3 ratio.
- The estimated additional population to be served toward 2025 is as follows (inside the study area only).
  1)Level 1: 72thousand, 2)Level 2: 0, 3)Level 3: 77thoudand.
- These projects also include the soft components addressing the following countermeasures; 1) Utilization of high technology equipment in development of water system, 2) Carrying out immediate water repairs, provide water meters, and perform periodic maintenance, 3) Strict implementation/enforcement of laws and penalties on pilferage, 4) Efficient system operation and maintenance, 5) Quality checked design and well supervised construction, 6) Strict implementation of well design.

Remarks

- The project cost estimated is only for inside the study area.
- Annual O&M cost for level3 system is estimated at about 10pesos/m^3.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

付表 9.3.1 (7/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-C-05	
Project Title	Extended Bulacan Bulk Water Supply Project	
Status of Project	Conceptual	
Objective Area	Bulacan Province	
Implementing Agency	Bulacan Government / (Bulk water supplier has not yet been identified)	
Objectives	Development of bulk water supply system to address inadequate water supply source as well as to secure safe drinking water	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	16,754 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- It is expected that the population of Bulacan would reach to 4 million in 2025 with urban population of 3miliion, although half of the population is counted outside the study area. It is roughly estimated that the entire Bulacan could require surface water source with about 6.5m^3/s in total in 2025, by assuming the followings; 1) Estimated all deficit for level 2&3 municipal water use and industrial water use inside the study area would be supplied by surface water source, 2) All water demand for level 2&3 municipal water use and industrial water use outside the study area require surface water source, and 3) Industrial water demand outside the study area is proportional to level 2&3 municipal water demand and the proportional coefficient is 12%, which is same as the estimated one for the entire study area. It is expected that additional 3.8m^3/s (6.5-2.7m^3/s) of surface water source would be necessary to be prepared toward 2025. Considering this situation, in the present study, the conceptual project for Extended Bulacan Bulk Water Supply Project is proposed to emphasize more on preparing necessary surface water source in future.
- The possible surface water sources for Bulacan in future would be almost same for Project for Recovery of Reliability of Water Supply in Angat-Umiray System (Code: IS-C-02) as follows; 1) Bayabas storage dam, 2) Balintingon storage dam and conveyance to AMRIS, 3) Upgrading and improvement of irrigation facilities and water management of AMRIS, 4) Excess water for MWSS from Ipo dam. Among these, option 1) and 3) are conditionally recommended for Project for Recovery of Reliability of Water Supply in Angat-Umiray System (Code: IS-C-02) in the present study. Therefore, the remaining options of 2) and 4) would be possible options for the water source for this project.
- The project includes the water resources development as well as the water supply system development with transmission pipeline and water treatment plant.

Remarks

- The estimated project cost assumed the same annualized unit cost for water supply system development used in Bulacan Treated Bulk Water Supply Project (Code: MW-P-03), i.e. 6.8pesos/m^3 (with discount rate of 10% and lifetime of 50years) , and the annualized unit raw water development cost of 8pesos/ m^3 (with discount rate of 10% and lifetime of 50years).

Required Action to Upgrade to a Proposed Project for Implementation

- Revision of MWSS master plan, which considers municipal & industrial water demand of Bulacan, is recommended in order to optimize the water resources distribution in the entire MWSS service area in future. Depending upon the revision, F/S level study could be required.

Source of Information

付表 9.3.1 (8/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MW-C-06	
Project Title	Pampanga Bulk Water Supply Project	
Status of Project	Conceptual	
Objective Area	Pampanga Province	
Implementing Agency	Pampanga Government / (Bulk water supplier has not yet been identified)	
Objectives	Development of bulk water supply system to address inadequate water supply source as well as to secure safe drinking water	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	5,732 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The present study evaluated that the many cities and municipalities in Pampanga province will be at high risk in terms of sustainable groundwater source, based on the water demand and potential balance of groundwater. In these cities and municipalities, the groundwater source would be necessary to be converted to either residual groundwater source at adjacent municipalities/cities or surface water source by 2025. The deficit of sustainable groundwater source is estimated at 2.1m^3/s. The part of the deficit would be supplied through Metro Clark Bulk Surface Water Project (Code: MW-P-04) covering Metro Clark (Angeles City, Mabalacat, Porac in Pampanga Province, Bamban, Concepcion, Capas in Tarlac Province). However, there exist no other plans for supplying surface water source to WDs in Pampanga at this moment. The conceptual project for Pampanga Bulk Water Supply Project is thereby proposed in the present study.
- The possible surface water sources would be as follows; 1) Residual groundwater at surrounding cities/municipalities, 2) Pampanga river at Cong Dadong dam, 3) Gumain storage dam.
- The project includes the water resources development as well as the water supply system development with transmission pipeline and water treatment plant.

Remarks

- It is assumed that 0.8m^3/s be provided through Metro Clark Bulk Surface Water Project (Code: MW-P-04) and the remaining 1.3m^3/s be supplied through Pampanga Bulk Water Supply Project.
- The estimated project cost assumed the same annualized unit cost for water supply system development used in Bulacan Treated Bulk Water Supply Project (Code: MW-P-03), i.e. 6.8pesos/m^3 (with discount rate of 10% and lifetime of 50years) , and the annualized unit raw water development cost of 8pesos/ m^3 (with discount rate of 10% and lifetime of 50years).

Required Action to Upgrade to a Proposed Project for Implementation

- Bulk water supplier has not yet been identified. M/P or F/S level study to select the most appropriate water source for bulk water supply would be required. Although the current agreement between two concessioners and MWSS does not include the water supply service in Bulacan province, a revision of MWSS water supply master plan, which considers municipal & industrial water demand of Bulacan, is recommended, in order to optimize the water resources distribution in Metro Manila and Bulacan in future.

Source of Information

付表 9.3.1 (9/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MS-C-01	
Project Title	Additional Sanitary Facilities towards 2025 in Bulacan	
Status of Project	Conceptual	
Objective Area	Bulacan Province	
Implementing Agency	LGUs	
Objectives	Development of sanitation facilities to address unsafe water supply	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	3,676 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The 100% provision of sanitary toilet in the entire service area by year 2025 is recommended to achieve the sector goal of 100% safe water. The MDGs had targeted that about 90% of the household in the Central Luzon should be able to access to the safe drinking water by the year 2015. The 2008 sanitary toilet ratio of each city and municipality in the service area is projected to increase by 10% by the year 2015 and to target the 100% sanitary toilet coverage in the service area by year 2025.
- The following two types of sanitary toilet are considered; 1) Conventional toilet, 2) EcoSan toilet.
- The estimated additional number of toilet to be installed toward 2025 is as follows (inside the study area only); 1)Conventional: 140thousand, 2) EcoSan: 11thousand
- The project also include the capacity development of implementing agency addressing the following countermeasures; Social preparation for users.

Remarks

- The project cost estimated is only for inside the study area.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

-

Project Code	MS-C-02	
Project Title	Additional Sanitary Facilities towards 2025 in Pampanga	
Status of Project	Conceptual	
Objective Area	Pampanga Province	
Implementing Agency	LGUs	
Objectives	Development of sanitation facilities to address unsafe water supply	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	4,725 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The 100% provision of sanitary toilet in the entire service area by year 2025 is recommended to achieve the sector goal of 100% safe water. The MDGs had targeted that about 90% of the household in the Central Luzon should be able to access to the safe drinking water by the year 2015. The 2008 sanitary toilet ratio of each city and municipality in the service area is projected to increase by 10% by the year 2015 and to target the 100% sanitary toilet coverage in the service area by year 2025.
- The following two types of sanitary toilet are considered; 1) Conventional toilet, 2) EcoSan toilet.
- The estimated additional number of toilet to be installed toward 2025 is as follows (inside the study area only); 1) Conventional: 151thousand, 2) EcoSan: 40thousand
- The project also include the capacity development of implementing agency addressing the following countermeasures; Social preparation for users.

Remarks

- The project cost estimated is only for inside the study area.

Required Action to Upgrade to a Proposed Project for Implementation

- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information

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付表 9.3.1 (10/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MS-C-03	
Project Title	Additional Sanitary Facilities towards 2025 in Nueva Ecija	
Status of Project	Conceptual	
Objective Area	Nueva Ecija Province	
Implementing Agency	LGUs	
Objectives	Development of sanitation facilities to address unsafe water supply	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	3,477 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description
- The 100% provision of sanitary toilet in the entire service area by year 2025 is recommended to achieve the sector goal of 100% safe water. The MDGs had targeted that about 90% of the household in the Central Luzon should be able to access to the safe drinking water by the year 2015. The 2008 sanitary toilet ratio of each city and municipality in the service area is projected to increase by 10% by the year 2015 and to target the 100% sanitary toilet coverage in the service area by year 2025.
- The following two types of sanitary toilet are considered; 1) Conventional toilet, 2) EcoSan toilet.
- The estimated additional number of toilet to be installed toward 2025 is as follows (inside the study area only); 1) Conventional: 112thousand, 2) EcoSan: 29thousand
- The project also include the capacity development of implementing agency addressing the following countermeasures; Social preparation for users.

Remarks
- The project cost estimated is only for inside the study area.

Required Action to Upgrade to a Proposed Project for Implementation
- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information
-

Project Code	MS-C-04	
Project Title	Additional Sanitary Facilities towards 2025 in Tarlac	
Status of Project	Conceptual	
Objective Area	Tarlac Province	
Implementing Agency	LGUs	
Objectives	Development of sanitation facilities to address unsafe water supply	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	968 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description
- The 100% provision of sanitary toilet in the entire service area by year 2025 is recommended to achieve the sector goal of 100% safe water. The MDGs had targeted that about 90% of the household in the Central Luzon should be able to access to the safe drinking water by the year 2015. The 2008 sanitary toilet ratio of each city and municipality in the service area is projected to increase by 10% by the year 2015 and to target the 100% sanitary toilet coverage in the service area by year 2025.
- The following two types of sanitary toilet are considered; 1) Conventional toilet, 2) EcoSan toilet.
- The estimated additional number of toilet to be installed toward 2025 is as follows (inside the study area only); 1) Conventional: 30thousand, 2) EcoSan: 9thousand
- The project also include the capacity development of implementing agency addressing the following countermeasures; Social preparation for users.

Remarks
- The project cost estimated is only for inside the study area.

Required Action to Upgrade to a Proposed Project for Implementation
- Updated provincial water supply, sanitation and sewerage sector plan should be prepared.

Source of Information
-

付表 9.3.1 (11/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MP-G-01	
Project Title	Cabanatuan Sewerage System	
Status of Project	On-going	
Objective Area	Cabanatuan City	
Implementing Agency	Cabanatuan City	
Objectives	Sewerage system development to reduce pollution load to water body	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	189 as of 2009 (96 as of 2000)	189 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- In Cabanatuan City, the sewerage system is designed as combined storm and sewage system with biological STP. The system is designed to serve 33,085 populations by year 2015, about 12% of the projected urban population. Although the sewerage pipelines have been completed, the STP has not yet been completed in the Cabanatuan sewerage system. The STP should be completed as soon as possible.
- The proposed combined sewerage system composed of the followings; 1) drainage / sewer lines, 2) lift stations, 3) waste water treatment plant with capacity of 8,171m^3/day for dry weather flow.
- The proposed biological treatment plant includes anaerobic lagoon and chemical disinfection.

Remarks

- Combined drainage and sewer lines have been started operation.
- Treatment plant has not yet been constructed due to budgetary constraints.

Source of Information

- Cabanatuan City: Water District Development Project, WDDP-USSD, Sewage Treatment Plant (STP) for Cabanatuan City, Design Report, Vol.I, Main Report, 2003.

Project Code	MP-G-02	
Project Title	Expansion of Clark Sewerage System	
Status of Project	Proposed	
Objective Area	Clark Special Economic Zone	
Implementing Agency	Clark Water	
Objectives	Sewerage system development to reduce pollution load to water body	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	456 as of 2009	456 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The sewerage system in Clark is presently serving 80% of the Clark area, about 16,280 population and the non domestic influent of commercial, industrial, government offices and resorts. The current capacity of the STP is 8,023m^3/day. Clark is working on the design for the upgrade of the present WWTP to serve 100% of the Clark Area. There are two stages to be implemented, the first stage with the capacity of 13,500m^3/day will be implemented by June 2010 and the second stage will be implemented on year2012. The plant is designed at 33,000m^3/day for the stage 2 to accommodate the increasing waste water generation in Clark covering the year 2020 design period.

Remarks

- There is no information on the project cost for the Phase II. The total cost is roughly estimated by assuming the unit cost of 0.018mil pesos/m^3, which is derived from the project cost for the Phase I and the incremental capacity.

Source of Information

-

付表 9.3.1 (12/12)　上下水道および衛生セクターにおけるプロジェクト内容

Project Code	MP-C-01	
Project Title	Septage Treatment and Disposal Facility	
Status of Project	Conceptual	
Objective Area	Tarlac Province and 10 selected municipalities and cities (Angeles, San Fernando, Malolos, Cabanatuan, Tarlac, Hagonoy, Baliuag, Calumpit, Mabalacat and Guagua)	
Implementing Agency	LWUA/WDs/LGUs/Private WSPs	
Objectives	Improvement of septage treatment and disposal to reduce pollution load to water body	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	510 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The provision of septage treatment and disposal facilities to about 40% of the 2025 urban population of the cities of Angeles, San Fernando, Malolos, Cabanatua , Tarlac, and the municipalities of Hagonoy, Baliuag, Calumpit, Mabalacat and Guagua have been proposed as a conceptual project.
- On the septage treatment and disposal facilities, there is an existing sanitary landfill in Kalangitan, Capas, Tarlac which is being managed by the Clark Waste Management (CWM) and they have the plan to upgrade the facilities to receive treated and untreated septage for the whole Region 3 as well as the neighboring regions. The sanitary land is designed to cater for 25years projected waste generation of the said service area and the facility is about 100hectares in area. In the present study, it is assumed that this facility will be used for the septage treatment and disposal facilities.
- The capital cost for purchasing truck is considered as the project cost. The O&M cost for collection and tipping fee as well as the transportation cost for the collected septage is also considered for the possible tariff.

Remarks

- The estimated project cost is for initial purchase of trucks for transportation. The lifetime of the trucks would be 7years.
- The estimated annual O&M cost is 2,934pesos/m^3 for septage.

Required Action to Upgrade to a Proposed Project for Implementation

- F/S level study would be required.

Source of Information

-

付表 9.4.1 (1/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-G-01	
Project Title	Pinatubo Hazard Urgent Mitigation Plan　(PHUMP) Phase III Part I	
Status of Project	On-going	
Objective Area	502 km^2 covering Pasac river basin including San Fernando City and nine municipalities Mexico, Santo Tomas, Bacolor, Guagua, San Sasmuan, Floridablanca, Porac, Santa Rita and Lubao.	
Implementing Agency	DPWH	
Objectives	Flood mitigation by new structural measures to address insufficient structural capacity for flood mitigation	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2005-2010	Estimated by Study Team for 2011-2025
	4,700 as of 2009	470 as of 2009
EIRR	19%*	
Expected Source of Fund	GAA and JICA*	
Expected Implementation Schedule	2005-2010*	

Project Description

This Project aims at mitigating the flood risk along Pasac mainstream and its tributaries such as Porac-Gumain River and Guagua River through structural measures, which include construction of a diversion channel for Porac-Gumain River, excavation/dredging of the river channels and rising of the road.

The following components are included:

- Construction of Porac-Gumain Diversion (L=18.7km)
- Construction new bridge (5 bridge)
- Excavation & dredging of main rivers (Porac-Gumain, Dalan Bapor, Lower Guagua, and Pasac River) and local drainage channels
- Raising of road height of raising road by 1.1m (L=19km)
- Raising of bridges (12 bridges)
-

Remarks

- *: Estimated and/or proposed by project proponent
- Resettlement of 40 to 80 families required.
- For 2011-2025, 10% of the project cost (470Mil. Pesos) is considered.
-

Source of Information

- M/P and F/S completed in 1996 and 2002
-

付表 9.4.1 (2/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-G-02	
Project Title	Pinatubo Hazard Urgent Mitigation Plan (PHUMP) Phase III Part II (Monitoring and Planning of Non-structural Measures and Institutional capacity Building)	
Status of Project	On-going	
Objective Area	502 km^2 covering Pasac river basin including San Fernando City and nine municipalities Mexico, Santo Tomas, Bacolor, Guagua, San Sasmuan, Floridablanca, Porac, Santa Rita and Lubao.	
Implementing Agency	DPWH	
Objectives	Flood mitigation by new non-structural measures to address increment of flood damage potential	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2010	Estimated by Study Team for 2011-2025
	50 as of 2009	5 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA and JICA*	
Expected Implementation Schedule	2009-2010*	

Project Description

This Project is a non-structural component of the PHUMP Phase III, and strengthens the flood mitigation effects achieved by the above structural component in the PHUMP Phase III Part I. The Project contains the following items as its principal tasks:

- Watershed management plan for reforestation/agro-forestry, improvement of the upland farming techniques, control for development of the upland farming activities, capacity building and community-based structural measures (hill-side works)
- Flood management plan for development of flood hazard map, FFWS/CBFEWS, CDP and community-based structural measures
- Land use management plan taking the areas vulnerable to flood and soil erosion into account

Remarks

- *: Estimated and/or proposed by project proponent
- For 2011-2025, 10% of the project cost (5Mil. Pesos) is considered.
-

Source of Information

- M/P for PHUMP in 1996
- F/S-Phase II for PHUMP in 2002
- PHUMP Phase III Part I (On-going, 2005-2010)

付表 9.4.1 (3/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-G-03	
Project Title	Maintenance and Rehabilitation Works for River Dike and Slope	
Status of Project	On-going	
Objective Area	Pampanga river basin	
Implementing Agency	DPWH	
Objectives	River channel maintenance and rehabilitation (dike slope protection, dike rehabilitation, and channel excavation & dredging) of Pampanga Main River Channel, Rio Chico River and Pasac river system as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2008-2014	Estimated by Study Team for 2011-2025
	450 as of 2009	679 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	2008-2014*	

Project Description

Most of the existing river dikes, levees, river slope protection and other river structures in Pampanga river basin in particular were originally constructed more than 40 years ago, and they are seriously damaged at present. Moreover, a large volume of sediment accumulation in the river channel is now in progress due to the lahar deposit in the eastern area of Mt. Pinatubo and logging activities in the upper reached of river basin. In order to cope with such degradation of the river structures as well as river channels, DPWH Region III proposed to rehabilitate the deteriorated dike and river slope protection of 54km. Of the 54km in total, 28.6km is for the Pampanga main river channel and Rio Chico River. The remaining 25.4km is for Pasac river system.

Remarks

- *: Estimated and/or proposed by project proponent
- It is assumed that the project continues till 2025 and the annual project cost for the maintenance and rehabilitation of Pampanga main river channel, Rio Chico River is 200Mil.Pesos/7years (28.6Mil.Pesos/year) and the annual project cost for the maintenance and rehabilitation of Pasac river system is 250Mil.Pesos/15years (16.7Mil.Pesos/year). The estimated annual project cost is 45.3Mil/ Pesos/year.

Source of Information DPWH Region III

Project Code	FL-G-04	
Project Title	Flood Forecasting and Warning System Capacity Building Project upon Dam Release in the Philippines	
Status of Project	On-going	
Objective Area	The catchment areas of the following six (6) dams and their vicinities: - Angat Dam and, Pantabangan Dam in Pampanga river Basin - Ambuklao Dam and San Roque Dam in Agno river basin - Magat Dam and Binga Dam in Cagayan river basin	
Implementing Agency	PAGASA	
Objectives	Capacity building on the flood forecasting and waning for the appropriate dam reservoir operation in Pampanga river basin as well as Agno and Cagayan river basin	
Project Cost (Million Pesos)	Estimated by Project Proponent for 2009-2012	Estimated by Study Team for 2011-2025
	600 as of 2009	300 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA and JICA*	
Expected Implementation Schedule	2009-2012*	

Project Description

The flood forecasting and warning system (FFWS) for Pampanga river basin was initially established in 1973 by PAGASA through financial and technical assistance from Government of Japan. The financial assistance from the Government of Japan was further extended to Pampanga river basin providing with the supplementary facilities and equipment for the effective reservoir operation of Pantabangan and Angat Dams in 1982. A Japan Grant Aid Project was also undertaken, in a period from 2007 to 2009, in collaboration with PAGASA as the counterpart agency to upgrade the FFWSs, which have been constructed through the two projects.

This Project has been just commenced, with duration of 1,200days, immediately after the above upgrading of FFWS in order to achieve the capacity building on the flood forecasting and waning for the appropriate dam reservoir operation in Pampanga river basin as well as Agno and Cagayan river basin.

Remarks

- *: Estimated and/or proposed by project proponent
- For 2011-2025, 50% of the project cost (300Mil. Pesos) is considered.

Source of Information

- JICA

付表 9.4.1 (4/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-P-01	
Project Title	Flood Control Measures in Mt. Pinatubo Devastated Area- Focus on Pasac Delta	
Status of Project	Proposed	
Objective Area	573km^2 in the drainage area of Abacan River below Mexico Bridge of Gapan-San Fernando-Olongapo Road, and eastern drainage area of the existing "Tail Dike"	
Implementing Agency	DPWH	
Objectives	Flood mitigation by new structural measures to address insufficient structural capacity for flood mitigation	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	4,320 as of 2009	4,320 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA and Export-Import Bank of Korea*	
Expected Implementation Schedule	(N/A)	

Project Description

This Project has been proposed in 2009 on the premises of the financial and technical assistance from Export-Import Bank of Korea (Korea Eximbank) and Korea Water Resources Corporation (K-Water). The principal task of this Project is to increase the channel flow capacity of the existing Pilot Channel from the present 2-year return period to 20-year return period. The task of the Project is further expanded to repair/rehabilitation of seven sluice gates, which were constructed along the right bank of Pampanga mainstream through the under mentioned Pampanga Delta Development Project, Flood Component (PDDP FC) Phase I.

Flood mitigation for Abacan River, San Fernando River and their connecting creeks/drainage channels through the following works:

- Widening of the existing "Pilot Third River Channel" (22.6km in length from the confluence with Abacan River/ San Fernando River up to the confluence with the Pasac River) to 60m in the bottom width from the existing bottom width of 30 to 60m
- Excavation of the Pasac River as an eastern alignment of the Pilot Third River Channel,
- Local drainage improvement connecting the San Fernando River to the Third River and the San Fernando River excavation (total length:29.6km)
- Key road raising to ensure that transportation routes can be maintained during floods

Remarks

- *: Estimated and/or proposed by project proponent

Source of Information

- DPWH

Project Code	FL-P-02	
Project Title	Bacolor Comprehensive Rehabilitation Master Plan	
Status of Project	Proposed (Draft of M/P has been completed in 2009)	
Objective Area	Bacolor Municipality covering an area of 74km^{22}	
Implementing Agency	Bacolor Municipality and DPWH	
Objectives	Flood mitigation by new structural measures to address insufficient structural capacity for flood mitigation	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	1,500 as of 2009	1,500 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	(N/A)	

Project Description

Bacolor Municipality has proposed the draft of the Rehabilitation Master Plan, which aims at rehabilitating and promoting the growth of the municipality's physical and socio-economic environments, which were damaged by eruption of Mt. Pinatubo. The Master Plan includes various flood mitigation projects such as improvement of creeks/drainage, construction of drainage pumps and construction of diversion channel from Pasig Potrero River to West Mega Dike.

The following components are included.

- Construction of Gugu Ring Dike (7.80km in length)
- Completion of the Unfinished Portion of Gugu Dike (1.00km in length)
- Channel excavation of Gugu Creek and other various creeks (20.00km in length)
- Slope protection of various creeks in Bacolor Municipality (11.00km in length)
- Construction of new drainage canals (47.50km in length)
- Installation of Floodwater Pumps in the southern part of Bacolor (2 units)
- Construction of Diversion Channel for Pasig-Potrero River

Remarks

- *: Estimated and/or proposed by project proponent

Source of Information

- Bacolor Comprehensive Rehabilitation Master Plan

付表 9.4.1 (5/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-C-01	
Project Title	Flood Mitigation for Pampanga Delta	
Status of Project	Conceptual	
Objective Area	255 km^2 in Pampanga Delta including the municipalities of (a) Macabebe, Apalit and San Simon in Pampanga Province and (b) Calumpit and Hagonoy in Bulacan Province	
Implementing Agency	DPWH	
Objectives	Flood mitigation for Pampanga Delta along Pampanga mainstream and Labangan Floodway	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	5,468 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	(N/A)	

Project Description

The PDDP FC had aimed at mitigating the flood damage along the downstream of Pampanga by the river channel improvement, and the PDDP-FC Phase I was completed in 2002. The PDDP FC Phase II was scheduled to follow but has been differed due to a large number of house resettlements required.

The structural measures adapted in the above PDDP-FC Phase II are the river channel implement by construction of river bank and channel dredging/excavation. The major hindrance to such river channel improvement is addressed to the houses densely packed along the river channel, which require a large number of house relocations. In order to cope with such hindrance, adaptation of an appropriate resettlement plan and/or the alternative flood mitigation measures other than the construction of river bank would be required to pursue the PDDP-FC Phase I.

Remarks

- *: Estimated and/or proposed by project proponent
- The estimated project cost assumed the least cost option among the possible alternatives considered in the study.

Required Action to Upgrade to a Proposed Project for Implementation

- F/S level study would be required to re-study and select optimum measures to mitigate the flood condition based upon the result of the Phase I project.

Source of Information

- DPWH: Pampanga Delta Development Project (Flood Control Component), Review Study for Phase II, 2003.
- JICA Study Team

付表 9.4.1 (6/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-C-02	
Project Title	Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and Neva Ecija	
Status of Project	Conceived (The CBFEWS for Bulacan Province has been established in 2005, and that for Pampanga Province is now being examined.)	
Objective Area	Provinces of Pampanga, Tarlac and Neva Ecija	
Implementing Agency	Provincial Gov. .of Pampanga, Tarlac and Neva Ecija, and PAGASA	
Objectives	Development of flood monitoring and dissemination system to address inadequate information and knowledge relevant to flood mitigation	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	75 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Budget of Provincial Gov. .of Pampanga, Tarlac and Neva Ecija*	
Expected Implementation Schedule	(N/A)	

Project Description

The major tasks of the CBFEWS includes (i) establishment of the simple monitoring and communication system managed by the community for flood warning, (ii) capacity building for the municipal/barangay persons to effectively operate, maintain and manage the flood warning system and (iii) Information Education Campaign (IEC) for the residents on the eligible flood evacuation routes/evacuation centers. These tasks would facilitate the participatory approach of the community to the effective flood warning and evacuation works. Moreover, the tasks would not require the huge cost for the project implementation.

The following components are included.

- Establishment of the System, which consists of network of rainfall and water level monitoring stations and communication equipment for data and information transfer,
- Capacity building dot the municipal and/or barangay personnel for operation and management of the System, and
- Information Education Campaign (IEC) for the residents on the CBFEWS
-

Remarks

- *: Estimated and/or proposed by project proponent

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be determined, referring the similar project in Bulacan

Source of Information

- JICA Study Team

Project Code	FL-C-03	
Project Title	Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs	
Status of Project	Proposed	
Objective Area	Provinces of Bulacan, Pampanga, Tarlac and Neva Ecija	
Implementing Agency	Provincial Gov. .of Bulacan, Pampanga, Tarlac and Neva Ecija	
Objectives	Maintenance and rehabilitation of drainage and flood control facilities, which are under jurisdiction of LGUs	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	3,000 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Budget of LGUs (City/Municipality) and DPWH*	
Expected Implementation Schedule	(N/A)	

Project Description

The city/municipal governments proposed the master plan called “Medium Term Development Plan 2010-2013”, which includes the component for maintenance, rehabilitation and improvement of the existing drainage and flood control facilities under the jurisdictions of city/municipal governments. Implementation period of the said maintenance, rehabilitation and improvement works is limited to a three-year period of 2010-2013. However, the sustainable maintenance, rehabilitation and improvement are deemed to be indispensable. From this point of view, a conceptual plan for the captioned project is worked out assuming that the project shall be implemented as the annual regular program toward 2025.

Remarks

- *: Estimated and/or proposed by project proponent

Source of Information

- JICA Study Team

付表 9.4.1 (7/7)　洪水および土砂災害軽減セクターにおけるプロジェクト内容

Project Code	FL-C-04	
Project Title	Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula	
Status of Project	Conceptual	
Objective Area	Whole Study Area	
Implementing Agency	Department of Education, Region III	
Objectives	Education on the subjects related to IWRM for Pampanga river basin through integration of the salient points of IWRM to the primary and secondary school curricula	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	8 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Budget of Department of Education Region III*	
Expected Implementation Schedule	(N/A)	

Project Description

One of the important issues on IWRM is addressed, in the stakeholder meeting, to improvement of the residents' awareness on the water-related management works. Moreover, improvement of public morals is important to refraining of the unfavorable activities against IWRM such as garbage dumping into the waterways, and encroachment along the river areas. In order to attain such improvement of public awareness and public morals, the captioned project is worked out.

Remarks

- *: Estimated and/or proposed by project proponent

Source of Information

- JICA Study Team

付表 9.5.1 (1/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-01	
Project Title	Forest Protection and Law Enforcement Program (FPLEP)	
Status of Project	On-going	
Objective Area	About 1,984km^2 of untenured forestlands within PRB, with particular attention to so called “hotspots” in Pantabangan-Carranglan, Penaranda and DRT-Gen. Tinio WFRs, Mt. Arayat National Park and O’Donnell Watershed	
Implementing Agency	DENR 3 - PENRO/CENRO	
Objectives	To protect untenured forestlands from illegal activities such as timber poaching, unauthorized resource extraction, encroachment, land conversion and forest fires as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	39 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Continuing*	

Project Description

The program is a regular undertaking of the DENR Region III through the respective Provincial/Community ENR Offices. It involves surveillance, apprehension, confiscation and initiation of legal proceedings against perpetrators of timber poaching and other illegal forest extraction activities. It includes prevention and management of forest fires by organized and trained community brigades through Forest Fire Control and Management (FFCM).
The following activities are included.

1) Protection (patrolling and surveillance) of untenured forestlands: 1,984km^2
2) Capacity building/ Strengthening of multi-sectoral forest protection councils (MFPC): 10 councils/year
3) Implementation of fire mgt. plan: 3 CENROs/year
4) Support to anti-illegal logging/timber poaching (IEC, Monitoring, Court litigation): 4 provinces/year
5) Vulnerability assessment and geo-hazard mapping: 4 provinces/year

Remarks

- *: Estimated and/or proposed by project proponent
- No. of forest rangers deployed (as of 2008): 102
- The allocated budget for 2009 was 2.4mil.pesos/year.
- Unit cost assumed
  1) 6.4 pesos/ha/year for Protection (patrolling and surveillance) of untenured forestlands
  2) 70,000pesos/council/year for Capacity building/ Strengthening of multi-sectoral forest protection councils (MFPC)
  3) 7,000pesos/ CENRO/year for Implementation of fire mgt. plan
  4) 50,000pesos/ province/year for Support to anti-illegal logging/timber poaching (IEC, Monitoring, Court litigation)
  5) 50,000pesos/ provinces/year for Vulnerability assessment and geo-hazard mapping
- Required annual budget is calculated at 2.59 mil. pesos/year.

Source of Information

- DENR-FMS III

付表 9.5.1 (2/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-02	
Project Title	Community Based Forest Management Program (CBFMP)	
Status of Project	On-going	
Objective Area	20.24 km^2 of forestlands in Pampanga (Angeles City, Arayat, Magalang, Porac); Bulacan (DRT); and N. Ecija (Bongabon, Carrangalan. Gabaldon, Gen. Tinio, Laur, Llanera, Lupao, Pantabangan, Rizal, San Jose City), which are under active Community-based Forest Management Agreement (CBFMA) tenure.	
Implementing Agency	DENR- FMS 3 - RCBFMO	
Objectives	Sustainable forest management through granting of 25-year renewable tenurial rights and authority to organized forest occupants to manage, develop, protect and utilize forest resources as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	71 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	1999- Continuing*	

Project Description

The CBFM program is the national forestry program formulated in 1995, and adopted as the nationwide strategy for sustainable forest management pursuant to EO 318 of 2004. The activities include: (i) reforestation (675ha), (ii) agro-forestry (1,349ha), (iii) forest protection (2,024ha), and (iv) livelihood development.
The livelihood development is anchored on agro-forestry, which provides additional income sources from fruit bearing trees along with the production of forestry seedlings, cash crops (such as vegetables, ginger, coffee, pineapple and cassava), livestock, poultry, freshwater fish culture, etc.

Remarks
- *: Estimated and/or proposed by project proponent
- Tenured Area: 18,150 ha (Tenured area will continue to increase over time as the DENR continues to evaluate and approve applications for CBFMA under the program.)
- Actual area planted as of 2009: 1,310 ha in 10 years
- Number of Beneficiaries: 40 POs; 3,020 households
- Unit cost assumed
  1) 13,500 pesos/ha for reforestation
  2) 28,000 pesos/ha for agro-forestry
  3) 2,100 pesos/ha for forest protection
  4) 490,000 pesos/year for livelihood development
- Required annual budget is calculated at 4.71 mil. pesos/year.

Source of Information
- DENR-FMS III- CBFM Office

付表 9.5.1 (3/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-03	
Project Title	Integrated Agro-forestry Development Program (IAFDP or CBFM-CARP)	
Status of Project	On-going	
Objective Area	779 ha in Bongabon, N. Ecija and Norzagaray, Bulacan	
Implementing Agency	DENR III- FMS (RCBFMO) in partnership with DAR	
Objectives	To adopt sustainable upland agricultural production through agro-forestry using CBFM approach, in areas occupied by agrarian reform communities	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	31 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Dept. of Agrarian Reform (DAR)*	
Expected Implementation Schedule	2007- 2015*	

Project Description

The IAFD program is a special CBFM program for upland agrarian reform beneficiaries under the Comprehensive Agrarian Reform Program (CARP). It is being undertaken by the DENR through a Memorandum of Understanding with the Department of Agrarian Reform (DAR). The DAR provides funding support for agro-forestry and livelihood development while the DENR provides technical assistance to the POs.

The following activities are included.

1) Agro-forestry: 779ha
2) Forest protection: 779ha
3) Relocation survey, mapping & monitoring: 779ha
4) Organizational development and stakeholder capability building, Sustenance of livelihood projects, Technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Tenured Area : 1,297 ha (CBFM-CARP) in N. Ecija and Bulacan
- Actual Area Planted (as of 2008): 520 ha in 2 years
- Number of Beneficiaries: 2 POs; 79 households
- Unit cost assumed
  1) 28,000 pesos/ha for agro-forestry
  2) 1,500 pesos/ha for forest protection
  3) 2,500 pesos/ha for relocation survey, mapping & monitoring
  4) 230,000 pesos/year for other activities
- Required annual budget is calculated at 6.15 mil. pesos/year.

Source of Information:

- DENR-FMS III-CBFM Office

付表 9.5.1 (4/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-04	
Project Title	Coastal Resource Management Program (CRMP)	
Status of Project	On-going	
Objective Area	774 ha of mangrove areas in Pampanga and Bulacan	
Implementing Agency	DENR - PAWZCMS	
Objectives	To reforest and rehabilitate coastal/mangrove areas as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	37 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Continuing*	

Project Description

Through this program, the DENR-PAWCZMS-CMMD will continue to reforest logged over mangrove areas and protect old-growth mangrove forests within the coast of Bulacan and Pampanga. This lends support to the initiative of the Operational Plan of the Manila Bay Coastal Strategy which aims to conserve critical marine habitats and biodiversity within Manila Bay while providing alternative livelihood to fisher folks. The program also involves participatory coastal resource assessment, mapping, updating of municipal coastal resource database and formulation and implementation of Coastal Zone and Sea Use Plans.

The following activities are included.

1) Mangrove reestablishment/rehabilitation of swamp areas (nursery establishment, reforestation, silviculture): 539ha
2) Protection and maintenance of remaining old-growth mangrove forests: 235ha
3) Protection and maintenance of newly established mangrove plantations: 539ha
4) Participatory coastal resource assessment & Preparation and implementation of coastal resource mgt. plans, establishment of coastal and marine sanctuaries, monitoring, law enforcement and policy support, including Organizational development: community organization, capacity development, IEC: 6 municipalities
5) Technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Area reforested (as of 2008): 85 ha newly planted in 4 years
- Area protected: 170 ha of old-growth mangrove forests in 4 years
- Unit cost assumed
  1) 33,000 pesos/ha for mangrove reestablishment/rehabilitation
  2) 5,300 pesos/ha for protection and maintenance of remaining old-growth mangrove forests
  3) 1,500 pesos/ha for protection and maintenance of newly established mangrove plantations
  4) 265,000 pesos/year for participatory coastal resource assessment, etc.
  5) 310,000 pesos/year for technical support
- Required annual budget is calculated at 2.45mil. pesos/year.

Source of Information

- DENR-PAWCZMS, 2008/2009.

付表 9.5.1 (5/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-05	
Project Title	Protected Area Community Based Resource Management Program (PACBRMP)	
Status of Project	On-going	
Objective Area	168 ha of tenured and untenured areas within priority protected areas in N.Ecija, Pampanga and Bulacan, subject to the issuance of PACBRMA	
Implementing Agency	DENR - PAWZCMS	
Objectives	Sustainable forest management which grants occupants of protected areas 25 year s of tenure rights and authority to manage, develop, protect and utilize forest resources within allowable zones of the protected forests by virtue of the issuance of PACBRMA(a regular program)	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	13 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	1999- Continuing*	

Project Description

The program covers the buffer and multiple use zones of priority protected areas and some ancestral domains of indigenous communities. The main strategy is CBFM with timber establishment in 56ha and agro-forestry in 112ha. It is expected to provide alternative sources of income to IPs through agro-forestry.

The following activities are included.

1) Forest plantation development and management (nursery establishment, enrichment planting, ANR, silviculture): 56ha
2) Agro-forestry development (nursery establishment, agro-forestry, crop production: 112ha
3) Protection of old timber stands and newly established plantation: 168ha
4) Relocation survey, mapping & monitoring: 168ha
5) Organizational development, livelihood development, technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Tenured Area: 50 ha, which is part an ancestral domain claim in Mt. Arayat, Pampanga
- One PO with 107 household-members benefited
- Unit cost assumed
  1) 13,500 pesos/ha for Forest plantation
  2) 28,000 pesos/ha for agro-forestry
  3) 1,500 pesos/ha for protection of old timber stands and newly established plantation
  4) 600 pesos/ha for relocation survey, mapping & monitoring
  5) 490,000 pesos/year for other activities
- Required annual budget is calculated at 0.84 mil. pesos/year.

Source of Information

- DENR - PAWZCMS-CMMD III, 2008/2009.

付表 9.5.1 (6/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-06	
Project Title	Private Forest Plantation Development Program (PFPDP)	
Status of Project	On-going	
Objective Area	1,865ha in Pampanga (Porac); Bulacan (DRT, San Miguel) ; and N.Ecija (Laur, Gabaldon, Gen. Tinio, San Jose, Palyan City, Bongabon) that are covered by various private forest lease agreements with commercial timber plantation companies and private individuals	
Implementing Agency	DENR-FRCD	
Objectives	Sustainable forest management through granting of tenurial rights and authority to organized forest occupants to manage, develop, protect and utilize forest resources as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	93 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	1982- Continuing*	

Project Description

Private forest plantation development is covered by various forms of forest lease contracts and management agreements with private companies or individuals, such as IFMA, SIFMA, AFFLA, PFDA, TFLA and FLGMA. The concessionaires plant commercial species of timber and derive their income from harvested tree stands. The DENR regulates the volume of timber extraction in accordance with the annual allowable cut (ACC) specified in the lease agreement.
The following activities are included.

1) Tree plantation development (nursery establishment, timber plantation establishment, agro-forestry: 1,865ha
2) Maintenance of newly established plantations and protection of natural forests/buffer strips: 1,865ha
3) Relocation survey, mapping & monitoring: 1,865ha
4) Monitoring, regulation and capability building, technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Tenured Area: 15,539ha of production forests covered by various private forms of forest lease agreements
- Actual Area Planted (as of 2008): 2,917 ha in 26years
- Unit cost assumed
  1) 30,000 pesos/ha for tree plantation development
  2) 3,000 pesos/ha for maintenance of newly established plantations and protection of natural forests/buffer strips
  3) 5,000 pesos/ha for relocation survey, mapping & assessment
  4) 1,000,000 pesos/year for other activities
- Required annual budget is calculated at 6.21 mil. pesos/year.

Source of Information

- DENR-FMS III – FRDD

付表 9.5.1 (7/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-07	
Project Title	NIA-UPRIIS's Watershed Management Program	
Status of Project	On-going	
Objective Area	Protection: 10,356 ha of the Pantabangan-Carranglan Watershed Forest Reserve (WFR) under NIA-UPRIIS management; Reforestation: 1500 ha surrounding Masiway Dam	
Implementing Agency	NIA-UPRIIS	
Objectives	To protect, manage, maintain and/or rehabilitate 10,356 ha of the established forests and agro-forestry plantations in Pantabangan-Carranglan Watershed Forest Reserve (WFR); Specifically, to rehabilitate 100 ha of denuded forests around Masiway Dam as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	180 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA with financial assistance from EDC *	
Expected Implementation Schedule	1997- Continuing*	

Project Description

The NIA-UPRIIS co-manages (with the DENR) and derives earnings from the established agro-forestry areas with organized POs and cooperatives within the 10,356 ha of Pantabangan-Carranglan WFR. Recently, the NIA-UPRIIS started to rehabilitate and reforest an initial 100 ha of Pantabangan-Masiway watersheds jointly with the Energy Development Corporation. EDC operates the Masiway dam for hydroelectric power generation. Reforestation efforts will be sustained until 2025. Under this joint management arrangement, EDC provides funds and technical assistance in the propagation and use of indigenous species to reforest the denuded areas surrounding the dam. The NIA helps create additional income sources by hiring locals in contract reforestation.

The following activities are included.

1) Protection (patrolling, surveillance, monitoring, fire management): 10,356ha
2) Plantation Development (nursery establishment, reforestation, agro-forestry): 1,500ha
3) Maintenance of newly established plantations: 1,500ha
4) Road grading, infra support etc., Maintenance works, Organizational development and stakeholder capability building, Sustenance of livelihood project, Technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Management Area: 10,356 ha of Pantabangan-Carranglan WFR per LOI No. 1002 issued on March 1980 and subsequent joint Memorandu of Agreement with the NPC
- 100 ha of Pantabangan watershed around Masiway dam for rehabilitation under joint management with EDC
- Unit cost assumed
  1) 500 pesos/ha for protection
  2) 28,000 pesos/ha for plantation development
  3) 2,500 pesos/ha for maintenance of newly established plantation
  4) 2,000,000 pesos/year for other activities
- Required annual budget is calculated at 11.98 mil. pesos/year.

Source of Information

- NIA-UPRIIS, 2009

付表 9.5.1 (8/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-08	
Project Title	NPC's Watershed Management Program	
Status of Project	On-going	
Objective Area	14,166 ha of Pantabangan-Carranglan WFR in N. Ecija and 55,079 ha of Angat WFR in Bulacan; Reforestation and silvi-pasture in 1,950ha of these areas	
Implementing Agency	National Power Corporation	
Objectives	Primarily, to protect the remaining forest cover and related resources of the two watershed forest reserves against illegal activities and encroachment; On a limited scale, to reforest severely denuded areas within the buffer zone of the Angat WFR as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	107 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Universal Consumers' Environmental Charge (UCEC)/Universal Levy Fund (ULF)*	
Expected Implementation Schedule	1995- Continuing*	

Project Description

The NPC is in charge of the management of the watersheds that support the two hydro-electric dams in the basin through the Pantabangan Watershed Action Team (PWAT) and Angat Watershed Action Team (AWAT), respectively. Activities are financed out of the charges collected from power consumers. The NPC's programs are anchored primarily on forest protection involving patrolling, surveillance and apprehension of violations in partnership with organized community volunteers. In Angat WFR, the NPC maintains the strong support of the Armed Forces of the Philippines military contingent. To strengthen protection, the immediate thrusts include resettlement and livelihood development for forest occupants, which consist of rattan production, inland fishery and honey bee culture.

In the Pantabangan-Carranglan area of responsibility, the NPC is an active member of the Inter-Agency Task Force together with the NIA, the DENR, the LGU and the Protected Area Management Board (PAMB), which is now formulating a comprehensive Forest Land Use Plan (FLUP) with the technical assistance of EcoGov, an environmental NGO. The major hurdles for PWAT include the management of forest fires, which are rampant in the Pantabangan-Carranglan area, and protection against illegal activities such as timber poaching, charcoal making and "kaingin" farming. PWAT partners with universities and colleges to implement livelihood programs for forest occupants, such as handicraft making, mushroom growing, honey bee culture and charcoal briquette production.

The following activities are included.

1) Forest protection (patrolling, surveillance, monitoring, apprehension): 69,245ha
2) Reforestation and maintenance of newly established forest: 450ha
3) Silviculture (Assisted Natural Regeneration) and Erosion Control: 1,500ha
4) Maintenance of newly established forests: 1,950ha
5) Resettlement and socio-economic survey: 1,200HH
6) Livelihood development, Stakeholder capability building, IEC and Public Awareness, Monitoring, Research and Development (Biodiversity/Philippine Eagle conservation Project)

Remarks

- *: Estimated and/or proposed by project proponent
- Management Area: 10, 14,166 ha of Pantabangan-Carranglan WFR in N. Ecija per MOA with NIA and 55,079 ha of Angat WFR in Bulacan per EO 258 of July 1995
- Actual Area Planted (as of 2008): 90 ha of Pantabangan-Carranglan WFR by PWAT and 130 ha of Angat WFR by AWAT
- Unit cost assumed
  1) 60 pesos/ha for forest protection
  2) 48,000 pesos/ha for reforestation and maintenance of newly established forest
  3) 13,000 pesos/ha for silviculture
  4) 1,250 pesos/ha for maintenance of newly established forests
  5) 13,000 pesos/HH for resettlement and socio-economic survey
  6) 2,635,000 pesos/year for other activities
- Required annual budget is calculated at 7.14 mil. pesos/year.
-

Source of Information

- NPC - PWAT and AWAT, 2009.

付表 9.5.1 (9/16) 流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-09	
Project Title	Integrated Social Forestry (ISF) Projects	
Status of Project	On-going	
Objective Area	1,143ha of the ISF_tenured areas, with initial targets identified in (a) Nueva Ecija: 50 ha of Talavera WS, 50 ha of Aulo-Cabo WS for protection, 200 ha of Carranglan WS for reforestation; (b) Tarlac: 500 ha of O'Donnell WS for reforestation	
Implementing Agency	DENR-CENRO and Local Government Units	
Objectives	Sustainable forest management through granting of 25-year certificates of stewardship contracts (CSC) to individual households forest occupants to sustainably manage, develop, protect and utilize forest resources as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	51 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Internal revenue allotment (IRA) of LGUs and Countrywide Development Funds (CDF) of congressional district*	
Expected Implementation Schedule	1999- Continuing*	

Project Description

The implementation of ISF projects has been devolved to LGUs by virtue of RA 9160 or the Local Government Code of 1991. Through the program, the province of N. Ecjia plans to rehabilitate 200 ha of ISF areas within Carranglan watershed. Tarlac plans to rehabilitate 500 ha of ISF areas in O'Donnell watershed, which is expected to be funded out of the country-wide development fund.

The following activities are included.

1) Forest plantation development and management (nursery establishment, enrichment planting, ANR, silviculture): 381ha
2) Agro-forestry Development (nursery establishment, agro-forestry, crop production): 762ha
3) Protection of old plantations and maintenance of newly established plantations: 1,143ha
4) Relocation survey, mapping & monitoring: 1,143ha
5) Organizational development and stakeholder capability building, Sustenance of livelihood project, Technical support

Remarks

- *: Estimated and/or proposed by project proponent
- Tenured Area: 12,942 ha
- Actual Area Planted (as of 2008): 100 ha in Talavera and Aulo-Cabo Watersheds
- Number of Beneficiaries: 5,590 households
- Unit cost assumed
  1) 13,500 pesos/ha for forest plantation development and management
  2) 28,000 pesos/ha for agro-forestry development
  3) 1,500 pesos/ha for protection of old plantations and maintenance of newly established plantations
  4) 600 pesos/ha for relocation survey, mapping & monitoring
  5) 1,020,000 pesos/year for other activities
- Required annual budget is calculated at 3.40 mil. pesos/year.

Source of Information

- DENR-FMS III-CBFM Office, 2009.

付表 9.5.1 (10/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-10	
Project Title	Private Sector WM initiatives	
Status of Project	On-going	
Objective Area	Reforestation of 735 ha of denuded protection forests within Pampanga and Bulacan	
Implementing Agency	Private sector	
Objectives	To rehabilitate "adopted" watersheds forest areas through reforestation and protection in partnership with the DENR as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	32 as of 2009
EIRR	(N/A)	
Expected Source of Fund	Private sector*	
Expected Implementation Schedule	1999- Continuing*	

Project Description

The private sector is a potent partner and would be fully harnessed in DENR's "Adopt-a-Watershed Program". Efforts will extend beyond the usual tree planting activities in watersheds supporting domestic water supply sources. The Clark Development Corporation (CDC) and Subic-Clark Alliance for Development (SCAD) have plans to undertake comprehensive watershed management programs in line with the future domestic water supply projects for Clark SEZ. .
Other private companies led by big cement factories like Holcim are active partners in the "Adopt-a-Mountain Program" in Angat-Maasim watersheds. Meanwhile, the DENR-Manila Water Corp.-Maynilad Water Services partnership is now being explored to improve forest cover in the Angat watershed areas in order to sustain the domestic water supply of Metro Manila.
The following activities are included.

1) Forest plantation development (reforestation, nursery establishment and river bank vegetation): 735ha
2) Maintenance of newly established plantations: 735ha
3) Relocation survey, mapping & monitoring: 735ha
4) Organizational development and stakeholder capability building

Remarks

- *: Estimated and/or proposed by project proponent
- The project costs are borne by the private agencies through volunteer work and as part of their social responsibility agenda.
- Unit cost assumed
- 25,000 pesos/ha for forest plantation development
- 1,500 pesos/ha for Maintenance of newly established plantations
- 600 pesos/ha for relocation survey, mapping & monitoring
- 500,000 pesos/year for other activities
- Required annual budget is calculated at 2.12 mil. pesos/year.

Source of Information

- DENR-FMS III, LGUs, 2009.

付表 9.5.1 (11/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-11	
Project Title	Forest Mgt. Program (FMP)	
Status of Project	On-going	
Objective Area	44,600ha Pantabangan-Carranglan and Talavera Watersheds, with 14,133 ha earmarked for reforestation and agroforestry.	
Implementing Agency	DENR-FASPO	
Objectives	To strengthen forest management in partnership with the LGUs and the communities and to improve the economic conditions of upland dwellers through sustainable resource utilization.	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	5,870.64 as of 2009	996 as of 2009
EIRR	20.9%*	
Expected Source of Fund	JICA Loan*	
Expected Implementation Schedule	2011-2020*	

Project Description

FMP is a 10-year JICA-assisted project in the pipeline and targeted for implementation in 2011. It covers three critical river basins in the country, namely, Upper Magat-Cagayan River Basin in Region II, Jalaur River Basin in Iloilo and Upper Pamapanga River Basin. The latter includes 44,600 ha, all of which are inside the study area.

The project components include: (i) physical survey and mapping and socio-economic baseline profiling; (ii) PO formation and CBFMA acquisition; (iii) PO capacity building; (iv) forest tree plantation, silvi-pasture and agro-forestry with bio-fuel and soil conservation measures; (v) infrastructure support such as farm-to-market roads, bridges, and pipeline irrigation system for agro-forestry; (vi) policy initiative (including establishment of cost sharing mechanism and payment for environmental services); and (vii) monitoring and evaluation.

The total area covered by forest plantation development in Upper Pampamga river basin is 14,133ha. It is assumed that 30% of the area is covered by reforestation and the rest is covered by agro-forestry.

Remarks
- *: Estimated and/or proposed by project proponent
- As of August 2010, the project has been approved by the NEDA-ICC's Technical Board.
- The estimated project cost by project proponent is for entire project.
- The estimated cost by Study Team is only for Upper Pampanga river basin.

Source of Information
- DENR-FASPO, 2009.

付表 9.5.1 (12/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-G-12	
Project Title	Pampanga River Basin Rehabilitation Program (PRBRP)	
Status of Project	On-going	
Objective Area	Protection and maintenance of 500ha out of the newly established areas (2,000 ha) in Pampanga, Bulacan, N. Ecija and Tarlac	
Implementing Agency	DENR-FMS 3 - FRCD	
Objectives	Protection and maintenance of remaining newly established reforestation stands as part of the uncompleted works under the PRRB	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	12 as of 2009	12 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	1999- Continuing*	

Project Description

The PRBRP is a special project undertaken by the DENR-FMS 3 from 2004 to 2008 in response to the spate of flood events in the basin. It was temporarily shelved in 2009 due to budget constraints. The accomplishments involved reforestation of 4,900 and maintenance and protection of 2,900ha of newly established plantations within the forestlands in Pampanga, N. Ecija, Bulacan and Tarlac. The PRBP utilized the CBFM beneficiaries who were contracted to undertake the reforestation or planting activities while DENR provides technical and financial assistance.
For the year 2010-2012, the project will be resumed in order to carry out remaining maintenance and protection activities involving a backlog of 500 ha out of 2,000 ha of newly established tree plantations.

Remarks
- *: Estimated and/or proposed by project proponent
- Undertaken through contract reforestation scheme

Source of Information
- DENR-FMS III- FRCD, 2009.

付表 9.5.1 (13/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-C-01	
Project Title	Upland Development Program (UDP)	
Status of Project	Conceptual	
Objective Area	10,505 ha of severely eroded areas and areas of watersheds supporting O'Donnell and Porac-Gumain national irrigation systems (NIS) that are not yet covered by any on-going or proposed watershed rehabilitation program	
Implementing Agency	DA-Bureau of Soils and Water Management/NIA/DENR/LGUs	
Objectives	Sustainable upland agricultural production geared at rehabilitating forest cover, arresting soil erosion and improving water conservation through agro-forestry with the introduction of appropriate diversified farming systems and sloping agricultural land technology.	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	980 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

The original model of the Upland Development Program was implemented by the Department of Agriculture (DA) in Mindanao. It aimed to address upland poverty by replacing the widespread practice of slash and burn ("kaingin") system with sustainable alternative farm management systems. The concept of this model UDP is sustainable upland agricultural production using appropriate soil and water conservation strategies such as Sloping Agricultural Technology (SALT) and its variants in integrated or diversified farming systems anchored on agro-forestry. It gained wide acceptance and proved successful among upland farmers in Mindanao.
The UDP is conceived as one of the better options for heavily eroded areas with critical (30% or more) slopes and watershed areas supporting other NIS where any form of management is lacking and where severe soil erosion is a cause for concern.

In the basin, the potential severe erosion areas comprise some 22,114 ha while watershed areas supporting other NIS (O'Donnell and Porac-Gumain WS) which are not under any management scheme comprise some 60,826 ha. Only 20% of the former and 10% of the latter, which is 10,505ha in total, are targeted for this project until 2025.

Remarks
- 93,230pesos/ha is assumed for the cost estimation, referring the project cost of UDP in Southern Mindanao (€18.3million covering 16,000 ha)

Required Action to Upgrade to a Proposed Project for Implementation
- F/S level study would be required.

Source of Information
- DA-UDP. 2004

付表 9.5.1 (14/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-C-02	
Project Title	Protected Area Mgt. Program (PAMP)	
Status of Project	Conceptual	
Objective Area	56,147 ha, which comprise the most critical of the initial components of the NIPAS (protected areas) in terms of conservation of biodiversity, unique ecosystem and cultural heritage, namely: (i) Biak Na Bato NP, (ii) Minalungao NP; (iii) LT: DRT-Gen. Tinio WS; (iv) Mt. Arayat NP, and (v) Talavera Watershed Reserve.	
Implementing Agency	DENR-PAWCZMS	
Objectives	To formally declare and manage these areas as NIPAS sites through congressional and executive legislation and establishment of appropriate management mechanisms	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	404 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

The activities will include:

- watershed characterization (basic resource inventory, assessment and mapping; socio-economic surveys);
- designation and ground delineation of management zones;
- policy and institutional support initiation though organization of PAMBs and establishment of IPAF;
- formulation of Protected Area Management Plans and harmonization with ancestral domain plans, forest land use plans and comprehensive land use plans to address conflicting land use issues
- mechanisms to streamline compliance with FPIC requirements in ancestral domain areas
- initial implementation of priority action plans:
  - community-based reforestation through assisted natural regeneration in 5,615ha of degraded forests
  - biodiversity and wildlife conservation
  - alternative livelihood for forest occupant
  - IEC campaigns

Remarks

- It is assumed that 33,000peso/ha is required for community-based reforestation.
- It is estimated that 124mil.pesos is required for other activities.
- It is assumed that 30% of the project cost is required for project management and TA.

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components as well as TOR for T.A. should be determined.

Source of Information

- DENR-PAWCZMD, 2009.

付表 9.5.1 (15/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-C-03	
Project Title	Urban Greening Program	
Status of Project	Conceptual	
Objective Area	Greening of 7,256ha of urban corridors, including 222 km of highways, river banks, community parks, school grounds, public plazas and subdivisions in urban areas	
Implementing Agency	DENR/LGU/Private Sector	
Objectives	To establish urban tree/forest corridors in strategic locations in each LGU	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	264 as of 2009
EIRR	(N/A)	
Expected Source of Fund	IRA*	
Expected Implementation Schedule	(N/A)	

Project Description

Reforestation focusing on strategic urban spaces using appropriate timber and non-timber species to enhance the urban greening initiatives and provide balance to uncontrolled urban sprawl.
It is expected that 7,256ha in total of urban corridors would be covered by forest..

The LGUs' active involvement in watershed management through organized tree planting activities in partnership with the academe, business groups and NGOs will be enhanced. LGUs have the advantage of strong local influence and could therefore mobilize a critical mass of volunteers and resources from both private and public agencies to launch a full-scale greening program in their localities. Moreover, owing to LGU's strong presence in the lowlands rather than the uplands LGUs could be more effective partners in the watershed management by focusing their efforts in urban greening.

Remarks
- *: Estimated and/or proposed by project proponent
- It is assumed that 30,000pesos/ha is required for tree-planting and maintenance.
- 100,000pesos/year is required for organization, monitoring and technical support.

Required Action to Upgrade to a Proposed Project for Implementation
- Basic project components should be determined.

Source of Information
- LGUs, 2009.

付表 9.5.1 (16/16)　　流域管理セクターにおけるプロジェクト内容

Project Code	WS-C-04	
Project Title	Community-based Eco-Tourism Program	
Status of Project	Conceptual	
Objective Area	10,984ha within Candaba Sawamp, Pantabangan-Carranglan WFR, and Biak-na-Bato National Park (These areas contain critical habitats and biodiversity that presents a high potential for eco-tourism development.)	
Implementing Agency	Department of Tourism, Local Government Units and private sector	
Objectives	To generate additional income for communities through eco-tourism while contributing resources and sustaining public support for the protection and conservation of critical habitats and natural ecosystems	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	264 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

Candaba Swamp, Pantabangan-Carranglan WFR and Biak-na-Bato National Park are among the emerging and key potential ecotourism sites identified by the National Ecotourism Steering Committee. As such these areas are already enjoying tourist patronage on a limited scale, but there is room for improving the facilities and services to improve tourist traffic. Eco-tourism thrives on the principle of regulated public access during particular seasons of the year, when for example, migratory birds and other important species could be the focus of tourist attraction to support conservation. Eco-tourism will sustain public interest and support to conservation and protection efforts.
There is a huge potential for providing additional income to organized communities through low-impact guided tours, hostel and restaurant management, trekking and camping services, health and wellness services, sale of souvenir items and the like. At the same time, funds generated in part could be used to finance reforestation activities.

About 1,098ha will be reforested in phases out of funds generated.

Remarks
- It is assumed that 30,000pesos/ha is required for initial reforestation.
- It is estimated that 167mil. pesos is required for other activities.
- It is assumed that 30% of the project cost is required for project management.

Required Action to Upgrade to a Proposed Project for Implementation
- F/S level study would be required.

Source of Information
- DOT, NEDA Region III, 2009.

付表 9.6.1 (1/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-G-01	
Project Title	Ecological Solid Waste Management Program (ESWMP)	
Status of Project	On-going	
Objective Area	All LGUs in the basin	
Implementing Agency	Local Government Units	
Objectives	To prevent potential contamination of ground, surface and coastal waters due to improperly disposed domestic solid wastes as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	192 as of 2009
EIRR	(N/A)	
Expected Source of Fund	LGU equity (from 20% Development Fund)*	
Expected Implementation Schedule	Continuing*	

Project Description

The present activities under the LGUs' 10-year Ecological Solid Waste Management Plans will be sustained until 2025 at the very least or improved at best. These activities consist primarily of soft measures, such as segregation at source; waste reduction, recycling and reuse; upgrading of open dumpsites into controlled dumpsites; composting; operation and maintenance of materials recovery facilities (MRFs).

Besides the LGUs in the province of Tarlac, only seven other LGUs of Pampanga and Bulacan are disposing of their residual wastes in the Sanitary Landfill (SLF) in Capas, Tarlac. The two (2) smaller SLFs in SJDM City and Norzagaray are inadequately designed and are therefore operating more as controlled dumpsites until upgraded.

Remarks:

- *: Estimated and/or proposed by project proponent
- The 100-ha sanitary landfill in Sitio Kalangitan in Capas, Tarlac has been operating since 2004 but remains under-utilized. The LGUs plan to establish a common waste transfer station for a cluster of LGUs in order to overcome financial constraints and thereby optimize access to this facility.
- The project cost is estimated based on budget of Pampanga Province as of 2008.

Source of Information

- DENR-EMB III; LGUs, 2008-2009.

Project Code	WQ-G-02	
Project Title	Industrial Pollution Control Program (IPCP)	
Status of Project	On-going	
Objective Area	All industries in the basin that are covered by the Phil. EIS system	
Implementing Agency	DENR-EMB III	
Objectives	To control industrial pollution through compliance with regulatory requirements of the Clean Water Act and the Phil. EIS system and by promoting industrial self-regulation as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	153 as of 2009
EIRR	(N/A)	
Expected Source of Fund	GAA*	
Expected Implementation Schedule	Continuing*	

Project Description

Through the program, the DENR-EMB regulates industrial pollution by way of issuing and monitoring adherence to Environmental Compliance Certificates (ECC), Discharge Permits and Self Monitoring Reports (SMRs) as well as pollution adjudication for non-compliant industries.

The agency promotes environmental self-regulation by industries under its twin programs, namely the Revised Industrial Eco-watch System (RIES) and the Philippine Environmental Partnership Program (PEPP). The former rates industries in color codes-- i.e., Gold, Silver, Green or Blue to indicate compliance and Red or Black to indicate non-compliance with the Clean Water Act. The latter provides incentives and rewards for adopting pollution prevention and cleaner production processes.

Remarks

- *: Estimated and/or proposed by project proponent
- The project cost is estimated based on the budget for EMB Region III in 2009.

Source of Information

- DENR-EMB III, 2009.

付表 9.6.1 (2/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-G-03	
Project Title	Sagip-Ilog Project	
Status of Project	On-going	
Objective Area	San Fernando River, Angat River, Candaba Swamp	
Implementing Agency	Local Government Units	
Objectives	To clean up waterways of solid wastes, pollutive substances, sediments and illegal structures as a regular program	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	11 as of 2009
EIRR	(N/A)	
Expected Source of Fund	IRA of LGUs*	
Expected Implementation Schedule	Continuing*	

Project Description

The “Sagip-Ilog” Program is a river clean-up drive undertaken by the LGUs in coordination with the DENR. On a smaller scale, the “Linis Estero” Program involves clean-up of creeks and small waterways.

The Sagip San Fernando River is one of the flagship environmental projects of the City government of San Fernando. Presently the project involves only clean up activities. Future plans include dredging/desilting, slope protection works, bank re-vegetation and river park development.

The Sagip-Ilog Angat initiative of the municipality of San Rafael, Bulacan involves inventory of industrial polluters and clean up activities in partnership with industries and the private sector. The LGU of Candaba for its part initiated de-silting, clean up activities and advocacy campaigns against waste dumping in Candaba Swamp.

Remarks
- *: Estimated and/or proposed by project proponent
- The project cost is estimated based on budget of Pampanga Province in 2008

Source of Information
- LGUs, 2008-2009.

付表 9.6.1 (3/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-P-01	
Project Title	Clean Development Mechanism (CDM) Projects	
Status of Project	Proposed	
Objective Area	Cluster of six (6) commercial hog farms owned by Star Superior Farms in Bulacan; Metro Clark Waste Management Corp.'s Sanitary Landfill facility in Sitio Kalangitan, Capas, Tarlac, (3) Bulacan Engineered Sanitary Landfill in Bgy. Sto. Crrito, San Jose Del Monte City, Bulacan.	
Implementing Agency	Private Industries	
Objectives	To capture/recovery of carbon and other greenhouse gas emissions in order to generate electricity from wastewater/organic wastes collected from hog farms and from domestic, commercial and industrial sources, respectively. The companies will eventually earn by feeding the electricity generated to the Luzon-Visayas power grid and at the same time trading their carbon credits. The proceeds can be used to refinance their operations. The companies will earn additional revenues by feeding the electricity generated to the Luzon-Visayas power grid and at the same time trading their carbon emission credits. The proceeds can be used to refinance their operations.	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	1,036 as of 2009	1,036 as of 2009
EIRR	For Metro Clark SLF, 4.93%*	
Expected Source of Fund	Private sector: For livestock farms, through BOT scheme. For SLFs, the project implementers will avail of loans through the financing windows of the World Bank/Land Bank of the Philippines Carbon Finance Support Facility *	
Expected Implementation Schedule	2011-2020*	

Project Description

The two projects identified above consist of wastewater and waste collection, treatment and gas-capture facilities capable of sequestering methane (along with other greenhouse gases) to produce electricity in commercial quantities. The three projects have passed DENR's host country approval and are presently being registered with the CDM Executive Board in Bonn, Germany as waste-to-energy (methane sequestration and CO_2 recovery) projects. The Clark SLF facility can generate as much as 6.5 MW of electricity, while the Bulacan SLF can generate as much as 5.0 MW of electricity.

Remarks

- *: Estimated and/or proposed by project proponent
- The CDM was established under the Kyoto Protocol to the United Nations Framework Convention on Climate Change. It is designed to assist developed countries to comply with their quantified greenhouse gas (GHG) emission limitation targets and at the same time help meet developing countries' sustainable development objectives through carbon trading.
- The estimated cost does not include the cost for power generation.
- The estimated annual O&M cost is 63Mil.Peoss/year.

Source of Information

- DENR-EMB. Philippine Bio-Sciences Co., Inc., MCWMC. 2009.

付表 9.6.1 (4/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-C-01	
Project Title	Capacity Development to Upgrade WQ Monitoring and Data Management Program	
Status of Project	Conceptual	
Objective Area	Nine priority water bodies in PRB: Pampanga R., San Fernando/Abacan R., Angat R./Labangan FW, Quitangil R., Sapang Balen Cr., Pasac R., Candaba Swamp, Mouth of Manila Bay	
Implementing Agency	DENR-EMB III	
Objectives	To build capacity for upgrading of the WQ and effluent monitoring, regulation and data management	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	140 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

This DENR-EMB III will improve the collection and management of data on water quality by way of:

- Rationalizing the system of water quality/effluent monitoring and compliance
- Thorough inventory and estimation of all pollution sources
- Upgrading its staff and laboratory capability
- Capacity building for WQMA Governing Board, private industries and other stakeholders
- Strengthening regulatory and coordination mechanisms among the DENR-EMB, the LGUs, relevant agencies and clientele
- Environmental awareness as part of school curriculum; public IEC utilizing multi-media

Remarks

- The project cost is estimated based on DENR-EBM III regional budget for environmental management, pollution control, research & laboratory as of 2009.

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be determined.

Source of Information

- DENR-EMB III, 2009.

Project Code	WQ-C-02	
Project Title	Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	
Status of Project	Conceptual	
Objective Area	Fishpond areas in Bulacan and Pampanga	
Implementing Agency	Bureau of Fisheries and Aquatic Resources	
Objectives	To protect the waters in and surrounding the fishpond areas from eutrophication	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	48 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

The project will complement the fisheries projects of the DA-BFAR Region III and the F.I.S.H. program of the provinces of Pampanga and Bulacan. The program will include assessment and carrying capacity studies, R&D, advocacy, legislative support, capability building and information management program, which aims to:

- enhance awareness and capability to adopt cleaner aquaculture production technologies
- improve regulatory mechanisms through the issuance of supporting local ordinances pursuant to the Fisheries Code
- develop and pilot new or emerging low water use-low water quality impact technologies and best management practices, such as the use of “pro-biotics” for sustainable fisheries production and disease control, including possible remediation measures for eutrophication, algal bloom and related fish kills and disease infestation
- develop appropriate indicators and institute water and fisheries resources monitoring and evaluation systems

Remarks

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be determined.

Source of Information

- DA-BFAR III.

付表 9.6.1 (5/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-C-03	
Project Title	Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	
Status of Project	Conceptual	
Objective Area	Priority non-compliant SMEs in the basin, by industry type	
Implementing Agency	DTI/DENR/Private industries	
Objectives	To build capacity to adopt new and emerging cleaner production management options and eco-efficient technologies especially among small and medium-scale enterprises.	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	60 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

Participatory assessment, opportunity matching, preparation of industry-specific Action Plans and adoption on pilot scale of the most eco-efficient and appropriate green industry options through:

- Inventory of non-compliant industries and organization of CP team
- Evaluation of participating industries' production and environmental management systems
- Needs assessment and priority setting (e.g., vis-à-vis process flow/input-output analysis)
- Institutional, policy, market-based financial support mechanisms
- Preparation of industry-specific Clean Production Manuals
- Training and technology transfer
- IEC and other promotional activities

Remarks

- Cleaner production technologies and management practices already abound in the basin. Examples include waste-to-energy projects such as bio-gas digesters, "bagasse" as fuels for heating steam turbines, effluent re-use and recycling into cooling waters, distillery effluents into liquid fertilizer, industrial waste material and by-products as alternative fuel or alternative raw material for cement processing. The adoptability of these and other emerging green industry opportunities to non-compliant industries in the basin, particularly SMEs, will be explored.

Required Action to Upgrade to a Proposed Project for Implementation

- TOR for the T.A. should be determined.

Source of Information

- DENR-EMB III. ADB: Clean Energy Applications in Asia and the Pacific, 2006. ADB TA to the Republic of the Philippines for the Promotion of Cleaner Production, 2002.

付表 9.6.1 (6/6)　水環境管理セクターにおけるプロジェクト内容

Project Code	WQ-C-04	
Project Title	Construction of Sanitary Landfills and Support Facilities in Nueva Ecija and Cluster Waste Transfer Stations in Bulacan and Pampanga	
Status of Project	Conceptual	
Objective Area	(1) Nueva Ecija: Gen. Tinio, Palayan City, San Jose City, Munoz City, Sta. Rosa; (2) Bulacan: Baliuag, Calumpit, Hagonoy, Mololos City; (3 Pampanga:) Angeles City, Guagua, Mabalacat, San Fernando City	
Implementing Agency	Local Government Units	
Objectives	To prevent potential contamination of ground, surface and coastal waters due to improperly disposed domestic solid wastes. The cluster transfer station is deemed as a less costly alternative to construction of SLF in each LGU.	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	2,025 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

Construction of five (5) suitably engineered Sanitary Landfills in N. Ecija and four (4) Transfer Station-cum-Materials Recovery Facilities (MRFs) for a cluster of LGUs in Bulacan and Pampanga. The Transfer Stations will have adequate support facilities for sorting, compaction composting, segregation of recyclables and handling of residuals prior to final disposal. Two complete engineered facilities are now presently operating in the basin and could serve as final disposal areas of residual wastes from the proposed Transfer Stations. One is the 100-ha Sanitary Landfill in Sitio Kalangitan, Capas, Tarlac, which started operating in 2006. The other is the newly constructed (2009) 52-ha Bulacan Engineered Sanitary Landfill in San Jose Del Monte City.

The proposed facilities and coverage population are as follows.

1) Construction of five (5) suitably engineered Sanitary Landfills in N. Ecija
   -Provincial sanitary landfill at Gen.Tinio
   -Sanitary landfill: Munoz City, San Jose City, Palayan City and St.Rosa
   -MRFs etc.: 12 municipalities
   -Coverage population: 485,802
2) Construction of four (4) Cluster Transfer Station-cum-Materials Recovery Facilities (MRFs) for a cluster of LGUs in Bulacan and Pampanga
   -Construction of one (1) cluster transfer stations each for: (a) Baliuag and Calumpit, (b) Hagonoy and Malolos City, (c) Angeles City and Guagua, (d) Mabalacat and San Fernando City
   -Coverage population: 2,020,740

Remarks:

- Improved and more efficient segregation, reduction, reuse and recycling at source is prerequisite for these facilities to function and provide benefits at optimum level. Capability of LGUs to implement these at the local level needs to be enhanced. Construction of additional satellite MRFs in the barangay and municipal levels may become necessary over time.

- The LGUs are now assisted by the DENR-EMB in implementing their Ecological Solid Waste Management Plans in compliance with RA 9003. At present, the LGUs are in various stages of implementing these plans but resources are extremely inadequate to enable the complete closure of open dumps and construction of Sanitary Landfills.

- The project cost for SLF in N. Ecija is based on the Province's MTD as of 2009. The annual O&M cost for the SLF in N. Ecija is assumed to be 10.9% of the initial investment cost, referring to similar project, which resulted in estimated per capita cost of 45pesos/person/year.

- The annual O&M cost for the cluster waste transfer stations and final disposal is estimated at 161pesos/person/year.

Required Action to Upgrade to a Proposed Project for Implementation

- F/S level study would be required.

Source of Information

- DENR-EMB III; LGUs, 2009. JICA Master Plan on Solid Waste Management for Boracay Island and Malay Municipality, 2008.

付表 9.7.1 (1/4)　水資源開発、水配分に関するインターセクターにおけるプロジェクト内容

Project Code	IS-C-01	
Project Title	Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	
Status of Project	Conceptual	
Objective Area	Entire Pampanga river basin	
Implementing Agency	NWRB / Others	
Objectives	Establishment of groundwater monitoring system to address sustainable water source for municipal water supply	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	297 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- It is recommended that periodical intensive groundwater monitoring for the municipalities and cities whose groundwater usage is at risk. There is also inferred land subsidence in the lower reach of the study area based on some previous studies, which should be verified in detail. Considering these, the conceptual projects for Establishment of Comprehensive Groundwater Resources Monitoring in Pampanga River Basin is proposed in the present study.
- The projects should include the following activities.
  1) Establishment of monitoring wells and observation
     - Proper locations and density of monitoring wells to capture the lowering of groundwater level and salt-water intrusion in a basin scale, especially for lower reach of Pampanga river basin, should be selected.
     - Monitoring wells for sole use should be installed (1 monitoring well/30km^2 in average).
     - Monitoring network for land subsidence in lower reach of the study area should be installed, utilizing the installed monitoring wells.
     - Database and their management system should be established.
     - Water level and water quality in the monitoring wells should be periodically monitored by WDs, LGUs etc.
     - The monitoring results should be stored in one database and shared by stakeholders.
  2) Groundwater resource management
     - Groundwater resource management by NWRB and/or river basin organization based on the periodically monitored data, which may include the policy establishment for groundwater regulation and so on, should be implemented.
- It is proposed that the installation of monitoring wells would be gradually expanded during 15years. The lower Pampanga area should be firstly covered by the monitoring wells.

Remarks

- The monitoring wells would be installed in strategic location based on geology within the river basin (totally about 5,400km^2 mainly in plain are), which requires about 180 monitoring wells.
- It is assumed that the cost for developing a monitoring well is 1.5 mil pesos/well, which results in 270 mil pesos for installing the monitoring wells. It is further assumed that 10% of the cost for installation of monitoring wells is required for establishing the data management system as well as monitoring network for land subsidence.
- The estimated initial investment cost is 297 mil. pesos.

- Annual maintenance cost for the installed monitoring wells and data management system is assumed to be 0.5% of the initial investment cost.
- The cost for observation by observer is assumed to be 12,000pesos/well/year, which requires 2.2mil. pesos/year for operation of the monitoring.
- The estimated annual O&M cost is 3.7 mil. pesos/year.

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be studied.

Source of Information

付表 9.7.1 (2/4)　水資源開発、水配分に関するインターセクターにおけるプロジェクト内容

Project Code	IS-C-02	
Project Title	Project for Recovery of Reliability of Water Supply in Angat-Umiray System	
Status of Project	Conceptual	
Objective Area	Bulacan Province and Metro Manila	
Implementing Agency	NWRB / NIA/ MWSS/ NPC / Bulacan Government	
Objectives	Recovery of reliability of water supply in Angat-Umiray system	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	7,966 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- It is evaluated that the present reliability of water supply in Angat-Umiray system is not enough for both Municipal water supply for MWSS and irrigation water supply for AMRIS. To address this problem, the conceptual project for Recovery of Reliability of Water Supply in Angat-Umiray System is proposed. The project would include both new water resources development and reduction of water demand.
- The preliminary study to discuss the future direction of the project has identified the following alternatives.
  Alternative-1: Upgrading AMRIS + Bayabas dam
  Alternative-2: Upgrading AMRIS + Balintingon dam ($2.9m^3/s$) + Laiban dam ($0.5m^3/s$)
  Alternative-3: Upgrading AMRIS + Laiban dam ($3.1m^3/s$)
  Alternative-4: Laiban dam ($4.0m^3/s$) only
- The study team conditionally recommends Alternative-1, based on the overall evaluation. The technical variability of Alterenative-1 will have to be clarified by further study and proper institutional arrangement should be considered for implementation of this alternative.
-

Remarks

Required Action to Upgrade to a Proposed Project for Implementation

- F/S level study would be required.

Source of Information

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付表 9.7.1 (3/4)　水資源開発、水配分に関するインターセクターにおけるプロジェクト内容

Project Code	IS-C-03	
Project Title	Enhancement of Monitoring System for Surface Water in Pampanga River Basin	
Status of Project	Conceptual	
Objective Area	Entire Pampanga river basin	
Implementing Agency	NWRB / Others	
Objectives	Establishment of Inter-sector surface water monitoring system to prepare for future expected increase of conflict among water users, especially between municipal and irrigation water users	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	10 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- The usage of surface water will increase and become more complicated, because of very complicated water movement by abstraction for irrigation and municipal use and their return flow. To utilize the limited water resources more efficiently and effectively, it is vital to monitor the actual condition of water movement by natural and artificial drainage system. The conceptual project for Enhancement Monitoring System for Surface Water in Pampanga River Basin is proposed to realize the inter-sector surface monitoring system by enhancing the existing monitoring system by each sector and agency.
- The projects should include the following activities.
  1) Establishment of monitoring networks
     - Proper and important monitoring locations for capturing the actual movement of surface water in the basin should be selected. The monitoring points may include the existing hydrometric stations, large storage dams and major intakes.
     - At the selected monitoring stations, the strengthening of monitoring method such as automatic observation and transfer of data should be introduced.
     - Database and their management system should be established.
     - Monitoring results should be stored in one database and shared by stakeholders.
  2) Surface water resource management by NWRB and/or river basin organization based on the monitored data should be conducted. The monitored data may be utilized for controlling water use permit. The accumulated monitoring data will benefit significantly for the preparation of the next river basin management planning so as to grade-up the spiral of IWRM process.
- Recommended measures
  - Establishing main database and data transfer system: 1
  - Establishing local database and data transfer system for storage dams: 2
  - Establishing local database and data transfer system for dam-intake: 6
  - Installation of automatic gauge(water level and rainfall), cable facilities for discharge measurement and establishing data transfer system at HMS: 1
  - Establishing data transfer system with PAGASA flood warning system (optional): 1
  - Software and system development: 1
- It is proposed that the project be implemented firstly in Umiray-Angat system as a pilot project. Then, the remaining area in Pampanga river basin should be covered by the project after getting the lesson and learned from the pilot project.

Remarks

- Unit cost for installation of automatic gauge station and cable facilities for discharge measurement with data transfer facilities = 5.0mil.pesos/st.
- Unit cost for installation of local database and data transfer facilities = 0.25mil.pesos/st.
- Unit cost for installation of main database and data transfer facilities = 0.50mil.pesos/st.
- The cost for software and system development is assumed to be 25% of the installation cost for the facilities.
- The estimated initial investment cost is 10mil. pesos.

- Annual maintenance cost for the installed facilities is assumed to be 0.5% of the initial investment cost.
- Unit cost for data transfer = 0.075mil.pesos/st./year
- Unit cost for observer for HMS = 0.012mil.pesos/st./year
- Unit cost for operator for data input and transfer = 0.12mil.pesos/st./year
- Unit cost for discharge measurement = 0.05mil.pesos/st./year
- The estimated annual O&M cost is 2.0mil. pesos/year.

Required Action to Upgrade to a Proposed Project for Implementation

- Basic project components should be determined.

Source of Information

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付表 9.7.1 (4/4)　水資源開発、水配分に関するインターセクターにおけるプロジェクト内容

Project Code	IS-C-04	
Project Title	Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	
Status of Project	Conceptual	
Objective Area	Angat-Umiray system (1st phase) Entire Pampanga river basin or Nation-wide (2nd phase)	
Implementing Agency	NWRB / Others	
Objectives	Capacity development for water allocation and distribution to prepare for future expected increase of conflict among water users, especially between municipal and irrigation water users	
Project Cost (Million Pesos)	Estimated by Project Proponent	Estimated by Study Team for 2011-2025
	(N/A)	300 as of 2009
EIRR	(N/A)	
Expected Source of Fund	(N/A)	
Expected Implementation Schedule	(N/A)	

Project Description

- To recover the inadequate reliability of water supply in Angat-Umiray system, it is indispensible to improve water allocation including refinement of water use permit. The capacity development of NWRB and Relevant Agencies on Water Allocation and Distribution is proposed as one of conceptual projects, in order to improve the water governance by NWRB.
- The operation of hydropower plant should be well balanced for other functions of the storage dam such as flood control, water use for irrigation and municipal water supply. The proper regulation of operation of hydropower plant is also one of the topics to be dealt with in the project.
- The project is also to prepare for the expected increase of conflict among water users in the entire Pampanga river basin and even in the entire country in long-term on the basis of the experience in Angat-Umiray system.
- The expected outputs of the project are as follows.
    1) Improvement of water permitting system, especially for irrigation water use, in Angat-Umiray system,
    2) Enhanced Capacity of NWRB and relevant agencies on operation of water allocation and its monitoring in Angat-Umiray system,
    3) Identification of critical area for water conflict in the nationwide considering possible future climate change,
    4) Preparation of framework for application of the refined methodology for water allocation and water permitting system to the identified critical areas, and
    5) Recommendation on improvement of institution and legislation, through the activities on the project.

Remarks

- Two phases are considered for implementation for total 5years. In the 1st phase, Angat-Umiray system will be mainly dealt with as a pilot area. Based on the experience in 1st Phase IInd phase will be implemented for the entire Pampanga river basin or nation-wide activity.
- For the project cost, input on technical assistance by foreign expert team (60 mil.pesos/year) for 5years is considered.

Required Action to Upgrade to a Proposed Project for Implementation

- TOR for the T.A. should be determined.

Source of Information

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付表 11.1.1 (1/2)　事業グループ分け(グループ A の事業)

Project Group	Sector	Serial No.	Project		Implementing Agency	Initial Investment Cost	O&M cost
			Code	Name of Project		(Million Pesos)	(Mil.Pesos/year)
A	Agriculture/ Irrigation and Fishery	1	AI-G-03	Repair, Rehabilitation of Existing Groundwater Irrigation Systems, Establishment of Groundwater Pump Project (REGIP)	NIA	398	None
		2	AI-G-04	Balikatan Sagip Patubig Program (BSPP)	NIA	46	None
		3	AI-G-05	Repair, Rehabilitation, Restoration & Preventive Maintenance of Existing National & Communal Irrigation Facilities	NIA	1,579	None
		4	AI-G-06	Restoration/Rehabilitation of Existing NIA Assisted Irrigation System (RRE-NIAIS)	NIA	8,767	None
		5	AI-G-08	Rehabilitation of Small Water Impounding Projects / Diversion Dams	DA-BSWM	128	None
		6	AI-G-09	Comprehensive Agrarian Reform Program, Irrigation Component	NIA	1,020	None
		7	AF-G-01	Aquaculture Fisheries Development Programs	DA-BFAR	450	None
		8	AF-G-02	Comprehensive Regulatory Services	DA-BFAR		
		9	AF-G-03	Support Projects and Activities	DA-BFAR		
		10	AF-G-04	Fisheries Resources Management for Improved and Sustainable Harvest	DA-BFAR		
		Sub-total				12,388	0.0
A	Municipal Water Supply, Sanitation and Sewerage	11	MW-G-01	Angat Water Utilization and Aquaduct Improvement Project (AWUAIP) Phase 2	MWSS	4,568 *	30.5
		12	MW-P-01	Rehabilitation of Umiray-Macua Facilities	MWSS	454	2.3
		13	MW-P-02	Sumag River Diversion Project	MWSS	540	2.7
		14	MW-P-03	Bulacan Treated Bulk Water Supply Project	MWSS/LGU	11,935	119.3
		15	MW-P-04	Metro Clark Bulk Surface Water Project	CDC	3,527	35.3
		16	MW-C-01	Additional Level 3,2, 1 Facilities towards 2025 in Bulacan	LWUA/WDs/LGUs /Private WSPs	3,839	324.2
		17	MW-C-02	Additional Level 3,2, 1 Facilities towards 2025 in Pampanga	LWUA/WDs/LGUs /Private WSPs	4,914	416.6
		18	MW-C-03	Additional Level 3,2, 1 Facilities towards 2025 in Nueva Ecija	LWUA/WDs/LGUs /Private WSPs	2,903	249.3
		19	MW-C-04	Additional Level 3,2, 1 Facilities towards 2025 in Tarlac	LWUA/WDs/LGUs /Private WSPs	559	46.2
		20	MW-C-05	Extended Bulacan Bulk Water Supply Project	LGU	16,754	167.7
		21	MW-C-06	Pampanga Bulk Water Supply Project	LGU	5,732	57.4
		22	MS-C-01	Additional Sanitary Facilities towards 2025 in Bulacan	LGUs	3,676	18.4
		23	MS-C-02	Additional Sanitary Facilities towards 2025 in Pampanga	LGUs	4,725	23.6
		24	MS-C-03	Additional Sanitary Facilities towards 2025 in Nueva Ecija	LGUs	3,477	17.4
		25	MS-C-04	Additional Sanitary Facilities towards 2025 in Tarlac	LGUs	968	4.8
		Sub-total				68,571	1,515.6
A	Management of Flood and Sediment Disasters	26	FL-G-03	Maintenance and Rehabilitation Works for River Dike and Slope	DPWH	679	None
		27	FL-C-03	Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs	LGUs	3,000	None
		28	FL-C-04	Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula	DE-Region III	8	None
		Sub-total				3,687	0.0
A	Watershed Management	29	WS-G-01	Forest Protection and Law Enforcement Program (FPLEP)	DENR/PENRO/CENRO	39	None
		30	WS-G-02	Community-based Forest Management Program	DENR/RCBFMO	71	None
		31	WS-G-04	Coastal Resource Management Program (CRMP)	DENR/PAWCZMS	37	None
		32	WS-G-05	Protected Area Community-based Resource Management Program (CBFM-PACBRMA)	DENR/PAWCZMS	13	None
		33	WS-G-06	Private Forest Plantation Development Program (PFPDP)	DENR-FRDD	93	None
		34	WS-G-07	NIA-UPRIIS' Watershed Management Program	NIA-UPRIIS	180	None
		35	WS-G-08	NPC's Watershed Management Program	NPC	107	None
		36	WS-G-09	Integrated Social Forestry (ISF) Projects	LGUs/DENR/RCBFMO	51	None
		37	WS-G-10	Private-sector Watershed Management Initiatives	Private Firm/NGOs	32	None
		Sub-total				623	0.0
A	Water-related Environment Management	38	WQ-G-01	Ecological Solid Waste Management Program (ESWMP)	DENR-EMB III	192	None
		39	WQ-G-02	Industrial Pollution Control Program (IPCP)	DENR-EMB III	153	None
		40	WQ-G-03	Sagip-Ilog Project	DENR-EMB/LGUs/Pvt. Sector	11	None
		41	WQ-P-01	Clean Development Mechanism	Private Industries	1,036	63.0
		42	WQ-C-04	Construction of Sanitary Landfills and Support Facilities in Nueva Ecija and Cluster Waste Transfer Stations in Bulacan and Pampanga	LGUs	2,025	349.0
		Sub-total				3,417	412.0
A	Others	43	IS-C-02	Project for Recovery of Reliability of Water Supply in Angat-Umiray System	NWRB/NIA/MWSS/NPC/LGU	7,966	39.8
		Sub-total				7,966	39.8
	Total for Group A Projects					**96,652**	**1,967.4**

Note: *: The project cost is not total cost, but only for 2011-2025.

付表 11.1.1 (2/2)　事業グループ分け（グループ B の事業)

Project Group	Sector	Serial No.	Project		Implementing Agency	Initial Investment Cost	O&M cost
			Code	Name of Project		(Million Pesos)	(Mil.Pesos/year)
B	Agriculture/ Irrigation and Fishery	1	AI-G-01	Balog-Balog Multipurpose Project Phase 1	NIA	236 *	11.8
		2	AI-G-02	Along-along Creek Irrigation Project (UPRIIS Div3)	NIA	25 *	1.3
		3	AI-G-07	Participatory Irrigation Development Project, APL1-Infrastructure Development	NIA	41 *	0.3
		4	AI-G-10	Upper Tabuating SRIP	NIA	76 *	1.3
		5	AI-P-01	Balintingon Reservoir Multipurpose Project (BRMP)	NIA/G. Trino	13,591	68.0
		6	AI-P-02	Balog-Balog Multipurpose Project Phase 2	NIA	16,095	80.5
		7	AI-P-03	Sector Loan on Rehabilitation of Irrigation Facilities	NIA	222	1.1
		8	AI-P-04	Casecnan Multi-purpose Irrigation & Power Project Irrigation Component Phase 2	NIA	7,000	35.0
		9	AI-P-05	Procurement of Pumps, Drilling Rigs & Related Equipment	NIA	206	1.0
		10	AI-P-06	Irrigation Water Resources Augmentation Pump Establishment Project	NIA	130	0.7
		11	AI-P-07	Appropriate Irrigation Technologies for Enhanced Agricultural Production	NIA	654	3.3
		12	AI-P-08	Central Luzon Groundwater Irrigation Systems Reactivation Project	NIA	1,429	7.1
		13	AI-P-09	Gumain Reservoir Project	NIA	13,729	68.6
		14	AI-P-10	Rehabilitation of AMRIS	NIA	983	4.9
		15	AI-P-11	Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects, Small Diversion Dam Projects	DA Region III/LGUs	169	0.8
		16	AI-C-01	New Construction of Small Scale Irrigation Project under BSWM	BSWM/LGUs	514	2.6
		17	AI-C-02	Introduction of Water Saving Irrigation Technology	NIA	150	None
		18	AI-C-03	Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	NIA	150	7.5
		Sub-total				55,400	295.8
B	Municipal Water Supply, Sanitation and Sewerage	19	MP-G-01	Cabanatuan Sewerage System	LGU	189	1.9
		20	MP-G-02	Expansion of Clark Sewerage System	Clark Water	456	4.6
		21	MP-C-01	Septage Treatment and Disposal Facility	MCWMC/LGUs/WDs/Private	510	355.0
		Sub-total				1,155	361.5
B	Management of Flood and Sediment Disasters	22	FL-G-01	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part I	DPWH	470 *	23.5
		23	FL-G-02	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part II	DPWH	5 *	0.3
		24	FL-G-04	Flood Forecasting and Warning System Capacity Building Project upon Dam Release in the Philippines	PAGASA	300	None
		25	FL-P-01	Flood Control Measures in Mt. Pinatubo Devastated Area- Focus on Pasac Delta	DPWH	4,320	21.6
		26	FL-P-02	Bacolor Comprehensive Rehabilitation Master Plan	LGU	1,500	7.5
		27	FL-C-01	Flood Mitigation for Pampanga Delta	DPWH	5,468	27.3
		28	FL-C-02	Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N. Ecija	LGUs	8	0.4
		Sub-total				12,071	80.6
B	Watershed Management	29	WS-G-03	Integrated Agro-Forestry Development Program (CBFM-CARP)	DENR/RCBFMO/DAR	31	None
		30	WS-G-11	Forestlands Management Project (FMP)	DENR-FASPO	996	None
		31	WS-G-12	Pampanga River Basin Rehabilitation Project (PRBRP)	DENR-FRCD	12 *	None
		32	WS-C-01	Upland Development Program	DA/DENR/LGUs	980	None
		33	WS-C-02	Protected Area Management Program (PAMP)	DENR/PAWCZMS	404	None
		34	WS-C-03	Urban Greening Program	DENR/LGUs/Pvt. Sector	264	None
		35	WS-C-04	Community-based Eco-tourism Program	DOT/DENR/LGUs	264	None
		Sub-total				2,951	0.0
B	Water-related Environment Management	36	WQ-C-01	Capacity Development to Upgrade WQ Monitoring and Data Management Program	DENR-EMB	140	None
		37	WQ-C-02	Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	DA-BFAR	48	None
		38	WQ-C-03	Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	DTI/DENR/Private Industries	60	None
		Sub-total				248	0.0
B	Others	39	IS-C-01	Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	NWRB/Others	297	3.7
		40	IS-C-03	Enhancement of Monitoring System for Surface Water in Pampanga River Basin	NWRB/Others	10	2.0
		41	IS-C-04	Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	NWRB/Others	300	None
		Sub-total				607	5.7
	Total for Group B Projects					**72,432**	**743.5**
Grand Total						**169,084**	**2,710.9**

Note: *: The project cost is not total cost, but only for 2011-2025.

付表 11.2.1 (1/3)　2010 年 9・10 月に開催された TWG 会議、SH 会議及び SC/TWG 合同会議の主要目的及び協議内容

TWG Meeting on Sep. 29, 2010

Objectives:

1. To discuss the proposed prioritization order of the projects and development scenario for IWRM of Pampanga River Basin
2. To discuss the proposed IWRM institutional setup.
3. To discuss the interim results of preliminary Initial Environmental Evaluation (IEE) done for the projects

Contents of Major Discussions:

1. The TWG members shall have another meeting for their own validation on the prioritization of the different projects that were identified.

   The TWG Workshop for the validation of the prioritization of project components of the IWRM Plan is scheduled on October 7, 2010 at Sulo Hotel from 9 – 4 pm.

2. The monitoring of water quality and the watershed environment shall not be integrated into one TWG in the organizational structure of the RBC since water quality is with EMB and there is a possibility for either of the sectors to be neglected.

   The proposal of the Study Team was a separate TWG for each. However, it was decided to integrate them under one TWG through FDG since the two sectors are coordinated and both are under the organization of DENR.

3. The Study Team proposed that DILG shall head the TWG for water supply, sanitation and sewerage in the proposed organization setup of RBC. However, the TWG shall be headed by the LWUA or water districts (WDs) while the sanitation and sewerage to be under the DENR-EMB.

   The original idea of the Study Team was for the DOH to chair the TWG for monitoring sanitation and sewerage, while it was modified to DILG in accordance with suggestion by FDG.

TWG Meeting on Oct. 07, 2010

Objectives:

1. To validate and/or improve the evaluation criteria for prioritization of projects as components of the IWRM Plan; and
2. To validate and/or improve the results of prioritization of projects made by the Study Team through Delphi technique

Improvement of Results of Project Evaluations and Prioritization of Projects:

1. The results of project evaluations and prioritization of projects made by the Study Team were revised by 13 TWG Members who represent from NIA, NPC, BSWM, PHILVOLCS, DENR-RBCO, DPWH-FCSEC, PAGASA, DILG-Region III, Tarlac Province, Bulacan Province, NEDA-Region III, MWSS, DENR-PAWB and NWRB.

Contents of Major Discussions:

1. The cost of P75M for the project "FL-C-02: Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N.E" is deemed to be too costly in comparison with the cost of the similar project completed in Bulacan. Moreover, the Project shall be implemented earlier than its target implementation in 2016 proposed by the Study Team.
2. The benefits by the above Project could be gained for a longer period of time if it can be implemented earlier. Moreover, it is recommended to give the project more functionality by not limiting its use to flood alone but to utilize the data that can be monitored for research development, infrastructure, etc.
3. It was informed that the Provincial Disaster Coordinating Council (PDCC) of Nueva Ecija is now considering the proposal for the community-based flood early warning system which will be discussed with the Governor.
4. After the discussion, the participants replicated the evaluation done by Mr. Otogawa by project sets. Using the Scoring Matrix, the participants revised the scores of the projects for each set, as they see fit. Revised scores were placed in the blank above the scoring made by Mr. Otogawa. The new scores were incorporated and the total scores were collated by the encoders for each project set. The scores for Project Sets 1, 2 and 3 were collated and integrated by the Chief Encoder using geometric mean to arrive at the final scores.

付表 11.2.1 (2/3)　2010 年 9・10 月に開催された TWG 会議、SH 会議及び SC/TWG 合同会議の主要目的及び協議内容

Stakeholder Meeting on Oct. 13, 2010

Objectives:

1. To present the methodologies for the formulation of the development scenarios, implementation program and investment program of the water-related projects proposed as components of the IWRM Plan for Pampanga River Basin by the JICA Study Team;
2. To discuss the approach and framework for the proposed institutional set-up plan for IWRM for Pampanga River Basin;
3. To present the web-page developed for the Pampanga River Basin Study; and
4. To review and validate the development scenarios, implementation program and investment program targeted for the short-term, mid-term and long-term.

Contents of Major Discussions:

1. The Study Team shall come up with a review of the Medium Term Development Plan (MTDP) of each province within the river basin. The particular consideration shall be given to the following three projects: (1) Cabo Holistic Development Project; (2) Tabuating River Irrigation System and (3) Sierra Madre Watershed Development Program.
   * The Study Team made an attempt to review the MTDP, but it was virtually difficult to take overview of the MTDPs for the whole provinces in the study area. Due to the difficulty, the whole of the MTDP was not incorporated and it was reflected only in the "FL-C-03: the Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs". It is further noted that of the above three projects to be given the particular consideration, the "Tabuating River Irrigation System "has been included as a part of the proposed IWRM Plan (refer to AI-G-10: Upper Tabuating SRIP"), but other two projects were not incorporated due to the invalid old information on them.
2. In accordance with comments given in the meeting, the following revisions were made for the Project of "MW-P-04: Metro Clark Bulk Water Supply Project".
   - The name of Project was renamed from "Development of Water Supply System for Clark Special Economic Zone (2020～2025)
   - The project implementation period is revised from 2020-2025 to 2011-2025.
   - The objective area is expanded from the Clark New Frontier Area to the whole Metro Clark, which covers a part of Tarlac and Pampanga Province.
   - The classification of the Project is revised from the Group-B Project to Group-A Project.
3. In accordance with the comments given in the meeting, the target completion year of the Project of "MP-C-01: Construction/ Provision of Septage Treatment and Disposal Facilities" was revised from 2020 to 2025.
4. In accordance with the comments, the development scenario on "Level 3 Water Supply System" was modified to the development scenario on "Level 3, 2,1 Water Supply System".
5. In accordance with the comments in the meeting, the following two projects were added as the components of the IWRM Plan for Pampanga River Basin.
   - FL-C-03 Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs
   - FL-C-04 Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula
6. In accordance with the comments in the meeting, the following two projects were transferred from Group-B to Group-A:
   - WQ-P-01: Clean Development Mechanism Projects
   - WQ-C-04: Construction of Sanitary Landfills and Support facilities in Nueva Ecija and Cluster Water Transfer Stations in Bulacan

付表 11.2.1 (3/3)　2010 年 9・10 月に開催された TWG 会議、SH 会議及び SC/TWG 合同会議の主要目的及び協議内容

Joint SC and TWG Meeting on

Objectives:

1. To present the revised prioritization order of the projects and development scenarios as well as the revised institutional setup plan for IWRM of the Pampanga River Basin.

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Contents of Major Discussions:

1. There shall be a footnote that states that the proposed grouping of the projects into Group A & B is not fixed but the projects can be transferred from one grouping to the other depending on the future situation and necessity for the project
2. The Chairperson for the TWG on Water Supply, Sanitation and Sewerage in the organization setup for RBC should be DILG and DOH instead of DILG and LWUA.
3. E.O. to be drafted should include a provision that will direct National Government Agencies to initially allocate contributions to the operation of the RBC from their respective offices and eventual allocation of specific funds from the national government for its operation.
4. The long-term option of legislative action to institutionalize creation of RBOs/RBCs in the country should be included.
5. Issues/conflicts on arbitration and monitoring of water rights shall be resolved first at the RBC level and only unresolved issues shall be elevated to NWRB. In this regard, the arbitration shall be subject to the guidelines or agreement that will be developed between RBC and NWRB.

付表 11.2.2 (1/2)　開発シナリオ及びその関連事業 (グループ A)

Sector	Development Scenario	Term of Implementation	Project Code	Project Name of Project	Implementing Agency	Cost (million pesos) Short-term	Mid-term	Long-term	Total
Agriculture/Irrigation and Fisheries	**(1) Rehabilitation of Existing Irrigation Facilities** The agricultural productivities shall be improved through rehabilitation of the existing irrigation facilities.	Whole Terms	AI-G-03	Repair, Rehabilitation of Existing Groundwater Irrigation Systems, Establishment of Groundwater Pump Project (REGIP)	NIA	216	91	91	398
			AI-G-04	Balikatan Sagip Patubig Program (BSPP)	NIA	46	0	0	46
			AI-G-05	Repair, Rehabilitation, Restoration & Preventive Maintenance of Existing National & Communal Irrigation Facilities	NIA	1,027	276	276	1,579
			AI-G-06	Restoration/Rehabilitation of Existing NIA Assisted Irrigation System (RRE-NIAIS)	NIA	3,437	2,665	2,665	8,767
			AI-G-08	Rehabilitation of Small Water Impounding Projects / Diversion Dams	DA-BSWM	43	43	43	128
			AI-G-09	Comprehensive Agrarian Reform Program, Irrigation Component	NIA	340	340	340	1,020
	(2) Sustainable Fishery Production The fishery productivities shall be sustained through the on-going regular projects.	Whole Terms	AF-G-01	Aquaculture Fisheries Development Programs	DA-BFAR	150	150	150	450
			AF-G-02	Comprehensive Regulatory Services	DA-BFAR				
			AF-G-03	Support Projects and Activities	DA-BFAR				
			AF-G-04	Fisheries Resources Management for Improved and Sustainable Harvest	DA-BFAR				
	Total					**5,259**	**3,565**	**3,565**	**12,388**
Municipal Water Supply, Sanitation and Sewerage	**(1) Short-term Development of Bulk Water Supply System for Bulacan Province** MWSS shall provide the bulk municipal water supply system to Bulacan Province in order to retrieve the deterioration of the groundwater currently used as the source for municipal water use in the Province by 2015. The water supply system shall have the supply capacity of 2.7m^3/s, which could cover the municipal water demand of about one million.	Short-term	MW-P-03	Bulacan Treated Bulk Water Supply Project	MWSS/LGU	11,935	0	0	11,935
	(2) Strengthening of Water Supply Capacity of Angat Umiray System (a) The more sustainable water supply by Angat-Umiray system shall be enhanced through implementaion of MW-G-01, MW-P-01 and MW-P-02 by 2015 so as to mitigate the chronic shortage for the municipal water use in Metro Manila and the irrigation water use in AMRIS. (b) The reliability of water supply in Angat Umiray System shall be fully recovred through implementaion of IS-C-02 by 2020.	Short-term and Mid-term	MW-G-01	Angat Water Utilization and Aquaduct Improvement Project (AWUAIP) Phase 2	MWSS	4,568	0	0	4,568
			MW-P-01	Rehabilitation of Umiray-Macua Facilities	MWSS	454	0	0	454
			MW-P-02	Sumag River Diversion Project	MWSS	540	0	0	540
			IS-C-02	Project for Recovery of Reliability of Water Supply in Angat-Umiray System	NWRB/NIA/ MWSS/NPC/LGU	100	7,866	0	7,966
	(3) Expansion of Level 3, 2, 1 Municipal Supply System (a) The coverage of Level 3, 2, 1 water supply system with safe drinking water supply shall reach 100% by 2025. (b) The coverage ratios of the Level 3 Water Supply System in the urban area shall increase 1% per annum by 2015, and their average ratio shall reach 80% by 2025. At the same time, the lowest coverage ratio in the urban area shall not be below 46.5% in 2025. (c) The present average coverage ratio of Level 3 Water Supply System in the rural area shall be maintained until 2025, notwithstanding the future increment of population. The target coverage ratio to be maintained is 18% in average for the whole study area.	Whole Terms	MW-C-01	Additional Level 3,2, 1 Facilities towards 2025 in Bulacan	LWUA/WDs/LGUs/ Private WSPs	1,404	1,200	1,235	3,839
			MW-C-02	Additional Level 3,2, 1 Facilities towards 2025 in Pampanga	LWUA/WDs/LGUs/ Private WSPs	1,714	1,588	1,612	4,914
			MW-C-03	Additional Level 3,2, 1 Facilities towards 2025 in Nueva Ecija	LWUA/WDs/LGUs/ Private WSPs	973	957	973	2,903
			MW-C-04	Additional Level 3,2, 1 Facilities towards 2025 in Tarlac	LWUA/WDs/LGUs/ Private WSPs	221	169	169	559
	(4) Construction/Provision of Sanitary Toilet The rate of construction/provision of the sanitary toilets in all municipalities and cities shall increase at the rate of 10% per annum by 2015, and the whole households in the study area shall be provided with the sanitary toilet by 2025.	Whole Terms	MS-C-01	Additional Sanitary Facilities towards 2025 in Bulacan	LGUs	1,774	948	954	3,676
			MS-C-02	Additional Sanitary Facilities towards 2025 in Pampanga	LGUs	1,969	1,356	1,400	4,725
			MS-C-03	Additional Sanitary Facilities towards 2025 in Nueva Ecija	LGUs	1,394	1,037	1,046	3,477
			MS-C-04	Additional Sanitary Facilities towards 2025 in Tarlac	LGUs	370	294	304	968
	(5) Development of Bulk Water Supply System for Metro Clark The bulk water supply system (supply capacity of 0.8m^3/s) shall be gradually expanded to the entire Metro Clark by 2025.	Whole Terms	MW-P-04	Metro Clark Bulk Surface Water Project	CDC	1,176	1,176	1,175	3,527
	(6) Long-term Development of Bulk Water Supply System for Bulacan and Pampanga Province The bulk water supply system with the supply capacity of additional 3.8m^3/s for Bulacan and 1.3m^3/s for Pampanga Province shall be developed by 2025 in order to serve the incremental provincial population and cope with deterioration of the groundwater quality.	Long-term	MW-C-05	Extended Bulacan Bulk Water Supply Project	LGU	0	0	16,754	16,754
			MW-C-06	Pampanga Bulk Water Supply Project	LGU	0	0	5,732	5,732
	Total					**28,592**	**16,591**	**31,354**	**76,537**

付表 11.2.2 (2/2)　開発シナリオ及びその関連事業 (グループ A)

Sector	Development Scenario	Term of Implementation	Project Code	Name of Project	Implementing Agency	Cost (million pesos) Short-term	Mid-term	Long-term	Total
Management of Flood and Sediment Disasters	**(1) Sustainment of Regular Program for Maintenance and Rehabilitation of River Dike and Slope** Until 2025, the following regular program for maintenance and rehabilitation of the deteriorated river dike and slope of Pampanga, Angat and Pasac river systems of 54km in length, which are under jurisdiction of DPWH, shall be sustained to maintain the original river flow capacities and morphology	Whole Terms	FL-G-03	Maintenance and Rehabilitation Works for River Dike and Slope	DPWH	226	226	227	679
	(2) Sustainment of Regular Program for Maintenance and Rehabilitation of Drainage and Flood Control Facilities for LGUs Until 2025, the following regular program for maintenance and rehabilitation of the drainage and flood control facilities, which are under jurisdiction of the Provincial Governments of Pampanga, Bulacan, Nueva Ecija and Tarlac, shall be sustained to maintain the original design capacity of the facilities.	Whole Terms	FL-C-03	Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs	LGUs	1,000	1,000	1,000	3,000
	(3) Improvement of Public Awarenss on IWRM Toward 2025, public awarness on IWRM shall be improved thorugh the annual regular program on the salient points of IWRM into school curricula for primary and secondary school in the aspect of IWRM for Pampanga river basin.	Whole Terms	FL-C-04	Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula	DE-Region III	2	3	3	8
	Total					**1,228**	**1,229**	**1,230**	**3,687**
Watershed Management	**(1) Susttainment of the On-going Regular Program for Watershed Management** The major on-going nine (9) regular programs for watershed management in Pampanga river basin shall be sustained by 2025, which could lead to the following outcomes: (a) The 285,300has. of tenured and untenured forestlands shall be protected against illegal harvesting, encroachment, forest fires, illegal land use and conversion. (b) The present forest cover of 187,500has shall be expanded through timber forest establishment and agro-forestry by about 10,000has. at the rate of 660has. per annum. Forest expansion will cover an additional 2.63% of the total classified and unclassified forestlands (377,500has.) in Pampanga river basin by 2025. (c) The present agro-forestry cover shall expand by about 29,700has. at the rate of 200has. per annum as the basic strategy to provide additional income source to upland dwellers, particularly the indigenous peoples. (d) Conservation of natural ecosystems and their critical habitats will be sustained in order to protect bio-diversity. The area to be conserved includes: (i) natural forests within the 79,800has. of protected areas of Mt. Arayat NP, Pantabangan-Carranglan WFR and Angat WFR, and (ii) old and re-established mangrove forests within 77,400has. of coastal areas of Pampanga and Bulacan.	Whole Terms	WS-G-01	Forest Protection and Law Enforcement Program (FPLEP)	DENR/PENRO/CENRO	13	13	13	39
			WS-G-02	Community-based Forest Management Program	DENR/RCBFMO	24	24	23	71
			WS-G-04	Coastal Resource Management Program (CRMP)	DENR/PAWCZMS	12	12	13	37
			WS-G-05	Protected Area Community-based Resource Management Program (CBFM-PACBRMA)	DENR/PAWCZMS	4	4	5	13
			WS-G-06	Private Forest Plantation Development Program (PFPDP)	DENR-FRCD	36	29	28	93
			WS-G-07	NIA-UPRIIS' Watershed Management Program	NIA-UPRIIS	100	40	40	180
			WS-G-08	NPC's Watershed Management Program	NPC	51	28	28	107
			WS-G-09	Integrated Social Forestry (ISF) Projects	LGUs/DENR/RCBFMO	17	17	17	51
			WS-G-10	Private-sector Watershed Management Initiatives	Private Firm/NGOs	11	11	10	32
	Total					**268**	**178**	**177**	**623**
Water-related Environment Management	**(1) Dealing with Contamination of Surface, Ground and Coastal Water** The pollution load from various sources shall be reduced by sustaining the ongoing non-strutural measures under three (3) ongoing regular DENR and LGU programs that are intended to protect water quality.	Whole Terms	WQ-G-01	Ecological Solid Waste Management Program (ESWMP)	DENR-EMB III	64	64	64	192
			WQ-G-02	Industrial Pollution Control Program (IPCP)	DENR-EMB III	51	51	51	153
			WQ-G-03	Sagip-Ilog Project	DENR-EMB/ LGU/Pvt. Sector	5	3	3	11
	(2) Reduction of Risk for Contamination in Water Body By 2025, the structural measures will be implemented to reduce the risk of contamination from livestock, domestic and industrial wastes. These include: (a) waste-to-energy CDM projects for livestock farms in Bulacan and the sanitary landfill in Tarlac and Bulacan; and (b) sanitary landfills in N. Ecija and waste transfer stations in Pampanga and Bulacan.	Whole Terms	WQ-P-01	Clean Development Mechanism Projects	Private Industries	518	518	0	1,036
			WQ-C-04	Construction of Sanitary Landfills and Support Facilities in Nueva Ecija and Cluster Waste Transfer Stations in Bulacan	LGUs	675	675	675	2,025
	Total					**1,313**	**1,311**	**793**	**3,417**
Grand Total						**36,660**	**22,874**	**37,119**	**96,652**

付表 11.2.3　グループ A の事業実施スケジュール

Sector	Code	Name of Project	Implementing Agency	Short-term	Mid-term	Long-term
Agriculture/ Irrigation and Fisheries	AI-G-03	Repair, Rehabilitation of Existing Groundwater Irrigation Systems, Establishment of Groundwater Pump Project (REGIP)	NIA			
	AI-G-04	Balikatan Sagip Patubig Program (BSPP)	NIA			
	AI-G-05	Repair, Rehabilitation, Restoration & Preventive Maintenance of Existing National & Communal Irrigation Facilities	NIA			
	AI-G-06	Restoration/Rehabilitation of Existing NIA Assisted Irrigation System (RRE-NIAIS)	NIA			
	AI-G-08	Rehabilitation of Small Water Impounding Projects / Diversion Dams	DA-BSWM			
	AI-G-09	Comprehensive Agrarian Reform Program, Irrigation Component	NIA			
	AF-G-01	Aquaculture Fisheries Development Programs	DA-BFAR			
	AF-G-02	Comprehensive Regulatory Services	DA-BFAR			
	AF-G-03	Support Projects and Activities	DA-BFAR			
	AF-G-04	Fisheries Resources Management for Improved and Sustainable Harvest	DA-BFAR			
Municipal Water Supply, Sanitation and Sewerage	MW-P-03	Bulacan Treated Bulk Water Supply Project	MWSS/LGU			
	MW-G-01	Angat Water Utilization and Aquaduct Improvement Project (AWUAIP) Phase 2	MWSS			
	MW-P-01	Rehabilitation of Umiray-Macua Facilities	MWSS			
	MW-P-02	Sumag River Diversion Project	MWSS			
	IS-C-02	Project for Recovery of Reliability of Water Supply in Angat-Umiray System	NWRB/NIA/MWSS/NPC/LGU			
	MW-C-01	Additional Level 3,2, 1 Facilities towards 2025 in Bulacan	LWUA/WDs/LGUs/Private WSPs			
	MW-C-02	Additional Level 3,2, 1 Facilities towards 2025 in Pampanga	LWUA/WDs/LGUs/Private WSPs			
	MW-C-03	Additional Level 3,2, 1 Facilities towards 2025 in Nueva Ecija	LWUA/WDs/LGUs/Private WSPs			
	MW-C-04	Additional Level 3,2, 1 Facilities towards 2025 in Tarlac	LWUA/WDs/LGUs/Private WSPs			
	MS-C-01	Additional Sanitary Facilities towards 2025 in Bulacan	LGUs			
	MS-C-02	Additional Sanitary Facilities towards 2025 in Pampanga	LGUs			
	MS-C-03	Additional Sanitary Facilities towards 2025 in Nueva Ecija	LGUs			
	MS-C-04	Additional Sanitary Facilities towards 2025 in Tarlac	LGUs			
	MW-P-04	Metro Clark Bulk Surface Water Project	CDC			
	MW-C-05	Extended Bulacan Bulk Water Supply Project	LGU			
	MW-C-06	Pampanga Bulk Water Supply Project	LGU			
Management of Flood and Sediment Disasters	FL-G-03	Maintenance and Rehabilitation Works for River Dike and Slope	DPWH			
	FL-C-03	Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs	LGUs			
	FL-C-04	Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula	DE-Region III			
Watershed Management	WS-G-01	Forest Protection and Law Enforcement Program (FPLEP)	DENR/PENRO/CENRO			
	WS-G-02	Community-based Forest Management Program	DENR/RCBFMO			
	WS-G-04	Coastal Resource Management Program (CRMP)	DENR/PAWCZMS			
	WS-G-05	Protected Area Community-based Resource Management Program (CBFM-PACBRMA)	DENR/PAWCZMS			
	WS-G-06	Private Forest Plantation Development Program (PFPDP)	DENR-FRCD			
	WS-G-07	NIA-UPRIIS' Watershed Management Program	NIA-UPRIIS			
	WS-G-08	NPC's Watershed Management Program	NPC			
	WS-G-09	Integrated Social Forestry (ISF) Projects	LGUs/DENR/RCBFMO			
	WS-G-10	Private-sector Watershed Management Initiatives	Private Firm/NGOs			
Water-related Environment Management	WQ-G-01	Ecological Solid Waste Management Program (ESWMP)	DENR-EMB III			
	WQ-G-02	Industrial Pollution Control Program (IPCP)	DENR-EMB III			
	WQ-G-03	Sagip-Ilog Project	DENR-EMB/LGU/Pvt. Sector			
	WQ-P-01	Clean Development Mechanism Projects	Private Industries			
	WQ-C-04	Construction of Sanitary Landfills & Support Facilities in Nueva Ecija and Cluster Waste Transfer Stations in Bulacan & Pampanga	LGUs			

付表 11.2.4　調査団によるグループ B の事業の評価結果（得点付け結果）

Sector	Project Code	Viability of the Project						Enhanced Livelihood					Improved Quality of Life					Decentralized Development					Sustained Ecosystem					Empowered People					Grand Total	Rank
		1	2	3	4	5	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T		
Agriculture / Irrigation and Fishery	AI-P-01	3.0	3.0	2.0	2.0	1.0	11.0	3.0	3.0	2.0	3.0	11.0	1.0	1.0	1.0	2.0	5.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	3.0	2.0	9.0	**49.0**	**15**
	AI-P-02	3.0	3.0	3.0	2.0	1.0	12.0	3.0	3.0	2.0	3.0	11.0	1.0	1.0	1.0	2.0	5.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	3.0	2.0	9.0	**50.0**	**12**
	AI-P-03	3.0	3.0	3.0	3.0	2.0	14.0	2.0	3.0	2.0	3.0	10.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	4.0	10.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	2.0	8.0	**50.0**	**12**
	AI-P-04	3.0	3.0	2.0	3.0	1.0	12.0	3.0	3.0	2.0	3.0	11.0	1.0	1.0	1.0	1.0	4.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	3.0	2.0	9.0	**49.0**	**15**
	AI-P-05	2.0	2.0	2.0	3.0	1.0	10.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	1.0	2.0	2.0	1.0	6.0	**40.0**	**28**
	AI-P-06	2.0	3.0	2.0	2.0	2.0	11.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	1.0	1.0	6.0	1.0	1.0	1.0	1.0	4.0	1.0	2.0	2.0	2.0	7.0	**40.0**	**28**
	AI-P-07	2.0	2.0	3.0	3.0	2.0	12.0	2.0	3.0	3.0	3.0	11.0	2.0	2.0	1.0	2.0	7.0	1.0	2.0	2.0	2.0	7.0	1.0	1.0	2.0	1.0	5.0	3.0	3.0	3.0	3.0	12.0	**54.0**	**4**
	AI-P-08	2.0	2.0	2.0	2.0	2.0	10.0	2.0	3.0	2.0	3.0	10.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	1.0	2.0	7.0	1.0	1.0	2.0	1.0	5.0	2.0	2.0	2.0	2.0	8.0	**44.0**	**24**
	AI-P-09	2.0	2.0	2.0	2.0	1.0	9.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	1.0	1.0	2.0	1.0	5.0	**38.0**	**30**
	AI-P-10	2.0	2.0	3.0	2.0	1.0	10.0	3.0	3.0	2.0	3.0	11.0	3.0	3.0	2.0	1.0	9.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	2.0	1.0	5.0	2.0	2.0	2.0	3.0	9.0	**53.0**	**7**
	AI-P-11	2.0	2.0	2.0	2.0	3.0	11.0	3.0	3.0	2.0	3.0	11.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	2.0	3.0	9.0	1.0	1.0	2.0	1.0	5.0	3.0	2.0	3.0	2.0	10.0	**50.0**	**12**
	AI-C-01	2.0	2.0	1.0	2.0	3.0	10.0	3.0	3.0	2.0	3.0	11.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	3.0	2.0	9.0	**46.0**	**20**
	AI-C-02	2.0	2.0	2.0	2.0	3.0	11.0	3.0	3.0	3.0	3.0	12.0	2.0	1.0	1.0	1.0	5.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	2.0	1.0	5.0	3.0	3.0	3.0	3.0	12.0	**54.0**	**4**
	AI-C-03	2.0	2.0	2.0	2.0	2.0	10.0	2.0	3.0	3.0	3.0	11.0	1.0	2.0	2.0	1.0	6.0	1.0	2.0	2.0	2.0	7.0	2.0	2.0	2.0	2.0	8.0	3.0	3.0	3.0	3.0	12.0	**54.0**	**4**
Municipal Water Supply, Sanitation and Sewerage	MW-P-04	2.0	2.0	2.0	2.0	1.0	9.0	2.0	2.0	1.0	1.0	6.0	2.0	3.0	2.0	1.0	8.0	2.0	2.0	2.0	1.0	7.0	1.0	1.0	1.0	1.0	4.0	1.0	1.0	1.0	1.0	4.0	**38.0**	**30**
	MP-C-01	2.0	2.0	2.0	2.0	1.0	9.0	1.0	1.0	1.0	1.0	4.0	3.0	1.0	3.0	1.0	8.0	2.0	1.0	2.0	2.0	7.0	1.0	3.0	2.0	3.0	9.0	2.0	2.0	2.0	1.0	7.0	**44.0**	**24**
Management of Flood and Sediment Disasters	FL-P-01	3.0	3.0	3.0	2.0	1.0	12.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	3.0	3.0	8.0	3.0	3.0	3.0	2.0	11.0	1.0	2.0	1.0	2.0	6.0	3.0	2.0	3.0	2.0	10.0	**56.0**	**2**
	FL-P-02	1.0	1.0	1.0	2.0	1.0	6.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	2.0	3.0	7.0	2.0	2.0	2.0	1.0	7.0	1.0	1.0	1.0	1.0	4.0	2.0	1.0	2.0	1.0	6.0	**38.0**	**30**
	FL-C-01	2.0	2.0	2.0	2.0	2.0	10.0	2.0	3.0	3.0	2.0	10.0	1.0	2.0	2.0	3.0	8.0	3.0	3.0	3.0	2.0	11.0	2.0	1.0	1.0	1.0	5.0	3.0	3.0	3.0	2.0	11.0	**55.0**	**3**
	FL-C-02	2.0	2.0	1.0	3.0	3.0	11.0	2.0	2.0	2.0	3.0	9.0	1.0	1.0	2.0	3.0	7.0	2.0	1.0	2.0	1.0	6.0	1.0	1.0	1.0	1.0	4.0	3.0	3.0	3.0	2.0	11.0	**48.0**	**17**
Watershed Management	WS-C-01	2.0	2.0	2.0	3.0	3.0	12.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	3.0	6.0	1.0	2.0	2.0	3.0	8.0	1.0	3.0	3.0	2.0	9.0	3.0	2.0	3.0	2.0	10.0	**53.0**	**7**
	WS-C-02	2.0	2.0	2.0	3.0	3.0	12.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	3.0	6.0	1.0	2.0	2.0	3.0	8.0	1.0	3.0	3.0	2.0	9.0	3.0	2.0	3.0	2.0	10.0	**53.0**	**7**
	WS-C-03	2.0	3.0	2.0	3.0	1.0	11.0	1.0	1.0	1.0	1.0	4.0	1.0	1.0	2.0	2.0	6.0	1.0	1.0	2.0	1.0	5.0	2.0	3.0	3.0	2.0	10.0	3.0	2.0	3.0	2.0	10.0	**46.0**	**20**
	WS-C-04	2.0	2.0	2.0	3.0	1.0	10.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	2.0	1.0	5.0	2.0	2.0	1.0	2.0	7.0	2.0	2.0	2.0	2.0	8.0	2.0	1.0	2.0	2.0	7.0	**45.0**	**23**
Water-related Environment Management	WQ-P-01	2.0	2.0	2.0	3.0	3.0	12.0	1.0	3.0	1.0	1.0	6.0	1.0	1.0	2.0	1.0	5.0	2.0	1.0	2.0	1.0	6.0	1.0	2.0	3.0	2.0	8.0	2.0	2.0	3.0	3.0	10.0	**47.0**	**19**
	WQ-C-01	2.0	3.0	2.0	3.0	1.0	11.0	1.0	1.0	1.0	1.0	4.0	3.0	2.0	3.0	1.0	9.0	2.0	1.0	2.0	1.0	6.0	3.0	2.0	2.0	2.0	9.0	2.0	2.0	2.0	1.0	7.0	**46.0**	**20**
	WQ-C-02	2.0	2.0	2.0	3.0	1.0	10.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	2.0	1.0	5.0	1.0	3.0	2.0	2.0	8.0	3.0	3.0	1.0	2.0	9.0	2.0	2.0	2.0	2.0	8.0	**48.0**	**17**
	WQ-C-03	2.0	2.0	2.0	2.0	2.0	10.0	1.0	1.0	1.0	1.0	4.0	2.0	1.0	3.0	1.0	7.0	1.0	1.0	2.0	1.0	5.0	3.0	2.0	1.0	3.0	9.0	2.0	2.0	2.0	2.0	8.0	**43.0**	**27**
	WQ-C-04	2.0	2.0	2.0	2.0	1.0	9.0	1.0	1.0	1.0	1.0	4.0	3.0	1.0	3.0	1.0	8.0	2.0	1.0	2.0	1.0	6.0	1.0	3.0	2.0	3.0	9.0	2.0	2.0	2.0	2.0	8.0	**44.0**	**24**
Others	IS-C-01	2.0	3.0	2.0	3.0	2.0	12.0	1.0	1.0	1.0	1.0	4.0	3.0	3.0	3.0	1.0	10.0	1.0	2.0	2.0	1.0	6.0	3.0	3.0	1.0	2.0	9.0	3.0	3.0	2.0	2.0	10.0	**51.0**	**10**
	IS-C-03	2.0	3.0	2.0	3.0	2.0	12.0	1.0	1.0	1.0	1.0	4.0	3.0	3.0	3.0	1.0	10.0	1.0	2.0	2.0	1.0	6.0	3.0	2.0	1.0	2.0	8.0	3.0	3.0	3.0	2.0	11.0	**51.0**	**10**
	IS-C-04	2.0	2.0	2.0	3.0	2.0	11.0	2.0	3.0	2.0	2.0	9.0	3.0	3.0	3.0	1.0	10.0	2.0	3.0	3.0	3.0	11.0	2.0	2.0	2.0	1.0	7.0	3.0	3.0	3.0	3.0	12.0	**60.0**	**1**

付表 11.2.5　TWG メンバーによるグループ B の事業の評価結果（得点付け結果）

Sector	Project Code	Viability of the Project						Enhanced Livelihood					Improved Quality of Life					Decentralized Development					Sustained Ecosystem					Empowered People					Grand Total	Rank
		1	2	3	4	5	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T		
Agriculture / Irrigation and Fishery	AI-P-01	2.9	2.7	1.9	1.8	1.1	10.4	2.9	2.9	2.0	2.8	10.7	1.0	1.0	1.0	1.9	4.9	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.0	1.0	4.0	2.0	1.9	2.8	1.9	8.6	**47.6**	**18**
	AI-P-02	3.0	3.0	3.0	2.0	1.0	12.0	3.0	3.0	2.0	2.8	10.8	1.0	1.0	1.0	2.0	5.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	3.0	2.0	9.0	**49.8**	**13**
	AI-P-03	3.0	2.9	3.0	2.9	2.0	13.8	2.0	2.9	2.1	2.8	9.8	1.0	1.0	1.0	1.1	4.1	1.9	2.1	1.9	2.7	8.6	1.0	1.0	1.0	1.0	4.0	1.9	1.9	1.9	1.9	7.6	**47.8**	**17**
	AI-P-04	3.0	3.0	2.0	3.0	1.1	12.1	2.9	2.9	2.0	2.8	10.7	1.0	1.0	1.0	1.0	4.0	2.0	3.0	2.0	2.0	9.0	1.0	1.0	1.1	1.0	4.1	2.0	2.0	3.0	2.0	9.0	**48.8**	**14**
	AI-P-05	2.0	2.0	2.0	3.0	1.0	10.0	1.9	1.9	2.0	1.9	7.7	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	1.0	2.0	2.0	1.0	6.0	**39.7**	**29**
	AI-P-06	2.0	3.0	2.0	2.0	2.0	11.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	1.0	1.0	6.0	1.0	1.0	1.0	1.0	4.0	1.0	2.0	2.0	2.0	7.0	**40.0**	**28**
	AI-P-07	2.0	2.0	3.0	3.0	2.0	12.0	2.0	3.0	3.0	3.0	11.0	2.0	2.0	1.0	2.0	7.0	1.0	2.0	2.0	2.0	7.0	1.0	1.0	2.0	1.0	5.0	3.0	3.0	3.0	3.0	12.0	**54.0**	**4**
	AI-P-08	2.0	2.0	2.0	2.0	2.0	10.0	2.0	3.0	2.0	3.0	10.0	1.0	1.0	1.0	1.0	4.0	1.0	3.0	1.0	2.0	7.0	1.0	1.0	2.0	1.0	5.0	2.0	2.0	2.0	2.0	8.0	**44.0**	**24**
	AI-P-09	2.0	2.0	2.0	2.0	1.0	9.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	1.0	4.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.1	1.0	4.1	1.0	1.0	2.0	1.0	5.0	**38.1**	**30**
	AI-P-10	2.1	2.0	2.9	2.1	1.1	10.1	2.9	3.0	1.9	2.9	10.7	2.9	2.9	1.9	1.1	8.8	1.9	3.0	1.9	1.9	8.7	1.0	1.0	2.1	1.0	5.1	1.9	1.9	1.9	2.8	8.5	**51.9**	**8**
	AI-P-11	2.1	2.1	1.9	2.1	2.9	11.1	3.0	3.0	2.1	3.0	11.1	1.1	1.1	1.1	1.1	4.2	1.1	3.0	2.0	2.9	8.9	1.1	1.1	2.1	1.1	5.2	2.9	2.0	3.0	2.1	9.9	**50.4**	**12**
	AI-C-01	2.0	1.9	1.0	2.1	2.9	9.8	3.0	3.0	2.1	3.0	11.1	1.1	1.1	1.1	1.1	4.2	1.1	3.0	2.0	2.0	8.0	1.1	1.1	1.1	1.1	4.3	2.0	2.0	2.8	1.9	8.6	**46.0**	**21**
	AI-C-02	2.1	2.1	2.1	2.0	2.8	11.0	2.7	2.8	2.8	2.8	11.1	1.8	1.0	1.0	1.0	4.8	1.8	2.7	1.8	2.0	8.3	1.0	1.0	1.8	1.0	4.8	2.6	2.7	2.7	2.7	10.7	**50.7**	**10**
	AI-C-03	2.0	2.0	2.0	2.0	2.0	10.0	2.0	3.0	2.9	2.9	10.8	1.0	2.0	2.0	1.0	6.0	1.0	2.0	2.0	2.0	7.0	2.0	2.0	2.0	2.0	8.0	3.0	3.0	3.0	3.0	12.0	**53.8**	**5**
Municipal Water Supply, Sanitation and Sewerage	MW-P-04	1.9	1.9	1.9	1.9	1.0	8.6	1.9	2.0	1.0	1.0	5.9	2.1	2.9	1.9	1.0	7.9	2.0	2.0	2.1	1.1	7.1	1.0	1.1	1.0	1.1	4.1	1.0	1.0	1.0	1.0	4.0	**37.6**	**32**
	MP-C-01	2.0	2.0	2.0	1.9	1.0	8.9	1.0	1.0	1.0	1.0	4.0	2.5	1.1	2.9	1.0	7.5	1.9	1.0	1.9	2.0	6.8	1.0	2.9	1.9	2.9	8.7	2.0	2.0	2.0	1.0	7.0	**42.9**	**27**
Management of Flood and Sediment Disasters	FL-P-01	3.0	3.0	3.0	2.0	1.1	12.1	1.9	2.9	2.0	1.9	8.7	1.0	1.0	2.9	3.0	7.9	2.9	2.9	2.9	2.0	10.7	1.0	2.0	1.0	2.0	6.0	3.0	2.0	3.0	2.0	10.0	**55.4**	**2**
	FL-P-02	1.0	1.0	1.0	2.0	1.1	6.1	1.9	2.0	2.0	2.0	7.9	1.0	1.0	2.0	3.0	7.0	2.0	2.0	2.0	1.0	7.0	1.0	1.0	1.0	1.0	4.0	2.0	1.0	2.0	1.0	6.0	**38.0**	**31**
	FL-C-01	2.0	2.0	2.0	2.0	2.0	10.0	1.9	3.0	3.0	2.0	9.9	1.0	2.0	2.0	3.0	8.0	2.8	2.8	3.0	2.0	10.5	2.0	1.0	1.0	1.0	5.0	3.0	3.0	3.0	2.0	11.0	**54.5**	**3**
	FL-C-02	2.0	2.0	1.0	3.0	3.0	11.0	1.9	2.0	2.0	3.0	8.9	1.0	1.0	2.0	3.0	7.0	2.0	1.0	2.0	1.0	6.0	1.1	1.1	1.1	1.1	4.2	3.0	3.0	3.0	2.0	11.0	**48.1**	**15**
Watershed Management	WS-C-01	1.9	1.9	2.0	3.0	3.0	11.8	2.0	2.0	2.0	2.0	8.0	1.0	1.0	1.0	2.9	5.9	1.0	2.0	2.0	3.0	8.0	1.1	3.0	3.0	2.0	9.1	3.0	2.1	3.0	2.1	10.1	**52.9**	**7**
	WS-C-02	2.0	2.0	2.0	3.0	3.0	12.0	2.0	2.0	2.0	1.9	7.9	1.1	1.1	1.0	3.0	6.2	1.0	2.0	2.0	3.0	8.0	1.1	3.0	3.0	2.0	9.1	3.0	2.0	2.9	2.0	9.9	**53.1**	**6**
	WS-C-03	2.0	3.0	2.0	3.0	1.0	11.0	1.0	1.0	1.0	1.0	4.0	1.0	1.0	2.0	2.0	6.0	1.0	1.0	2.0	1.0	5.0	2.0	3.0	3.0	2.0	10.0	3.0	2.0	3.0	2.0	10.0	**46.0**	**20**
	WS-C-04	2.0	2.0	2.0	3.0	1.0	10.0	2.0	2.0	2.0	2.0	8.0	1.0	1.0	2.0	1.0	5.0	2.0	2.0	1.0	2.0	7.0	2.0	2.0	2.0	2.0	8.0	2.0	1.1	2.0	2.0	7.1	**45.1**	**23**
Water-related Environment Management	WQ-P-01	1.9	2.0	2.0	3.0	3.0	11.9	1.0	2.9	1.1	1.0	6.0	1.0	1.0	2.0	1.0	5.0	2.0	1.0	2.0	1.1	6.1	1.0	2.0	3.0	2.0	8.0	2.0	2.0	3.0	3.0	10.0	**46.9**	**19**
	WQ-C-01	2.0	2.9	2.0	3.0	1.0	10.9	1.0	1.0	1.0	1.0	4.0	3.0	1.9	3.0	1.0	8.9	2.0	1.0	2.0	1.0	6.0	2.9	2.0	2.0	2.0	8.9	2.0	2.0	2.0	1.0	7.0	**45.7**	**22**
	WQ-C-02	2.0	2.0	2.0	3.0	1.0	10.0	1.9	2.0	2.0	2.0	7.9	1.0	1.0	2.0	1.0	5.0	1.0	3.0	2.0	2.0	8.0	3.0	3.0	1.0	1.9	8.9	2.0	2.0	2.0	2.0	8.0	**47.8**	**16**
	WQ-C-03	2.0	2.0	2.0	2.1	2.0	10.1	1.0	1.0	1.0	1.0	4.0	2.0	1.0	3.0	1.0	7.0	1.0	1.0	2.0	1.0	5.0	3.0	2.0	1.0	3.0	9.0	2.0	2.0	2.1	2.0	8.1	**43.1**	**26**
	WQ-C-04	2.0	2.0	2.0	2.1	1.1	9.1	1.1	1.0	1.1	1.0	4.1	2.6	1.0	3.0	1.0	7.6	2.0	1.1	2.0	1.1	6.1	1.0	2.9	2.0	3.0	8.9	2.0	2.0	2.0	2.0	8.0	**43.8**	**25**
Others	IS-C-01	2.0	3.0	2.0	3.0	2.0	12.0	1.0	1.0	1.0	1.0	4.0	2.9	2.9	3.0	1.0	9.8	1.0	2.0	2.0	1.0	6.0	3.0	3.0	1.0	2.1	9.1	2.8	2.8	1.9	2.0	9.6	**50.5**	**11**
	IS-C-03	2.0	3.0	2.0	3.0	2.0	12.0	1.0	1.0	1.0	1.0	4.0	2.9	2.9	3.0	1.1	9.9	1.0	2.0	2.0	1.0	6.0	3.0	2.1	1.0	2.0	8.1	2.9	2.9	3.0	2.0	10.8	**50.8**	**9**
	IS-C-04	2.0	2.0	2.0	3.0	2.0	11.0	1.9	2.8	2.1	2.0	8.8	2.8	2.8	2.8	1.0	9.5	2.0	2.9	2.9	2.9	10.7	2.0	2.0	2.0	1.0	7.0	2.9	2.9	2.9	2.8	11.6	**58.6**	**1**

付表 11.2.6　短期、中期、長期に実施されるグループ B の事業

Priority Order	Project Code	Implementing Agency	Initial Investment Cost (Million Pesos)				Implementaion Period (years)				Score
			Short-tem	Mid-term	Long-term	Total	Short-tem	Mid-term	Long-term	Total	
Group-A Project for Maintenance and Rehabilitation of Existing Facilities			5,485	3,791	3,792	13,067					
On-going Group-B Projects			2,339	498	0	2,837					
IS-C-04	Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	NWRB/Others	300			300	Less than 5				**58.6**
FL-P-01	Flood Control Measures in Mt. Pinatubo Devastated Area- Focus on Pasac Delta	DPWH	4,320			4,320	Less than 5				**55.4**
FL-C-01	Flood Mitigation for Pampanga Delta	DPWH	100	5,368		5,468	5	5		10	**54.5**
AI-P-07	Appropriate Irrigation Technologies for Enhanced Agricultural Production	NIA	654			654	Less than 5				**54.0**
AI-C-03	Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	NIA	150			150	Less than 5				**53.8**
WS-C-02	Protected Area Management Program (PAMP)	DENR/ PAWCZMS	202	202		404	5	5		10	**53.1**
WS-C-01	Upland Development Program	DA/DENR/ LGUs	490	490		980	5	5		10	**52.9**
AI-P-10	Rehabilitation of AMRIS	NIA	983			983	Less than 5				**51.9**
IS-C-03	Enhancement of Monitoring System for Surface Water in Pampanga River Basin	NWRB/ Others	10			10	Less than 5				**50.8**
AI-C-02	Introduction of Water Saving Irrigation Technology	NIA	150			150	Less than 5				**50.7**
IS-C-01	Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	NWRB/ Others	99	99	99	297	5	5	5	15	**50.5**
AI-P-11	Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects, Small Diversion Dam Projects	DA Region III/ LGUs	169			169	Less than 5				**50.4**
AI-P-02	Balog-Balog Multipurpose Project Phase 2	NIA	8,942	7,153		16,095	5	4		9	**49.8**
AI-P-04	Casecnan Multi-purpose Irrigation & Power Project Irrigation Component Phase 2	NIA	5,000	2,000		7,000	5	2		7	**48.8**
FL-C-02	Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N. Ecija	LGUs	8			8	Less than 5				**48.1**
WQ-C-02	Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	DA-BFAR	48			48	Less than 5				**47.8**
AI-P-03	Sector Loan on Rehabilitation of Irrigation Facilities	NIA	222			222	Less than 5				**47.8**
WS-C-03	Urban Greening Program	LGUs	88	88	88	264	5	5	5	15	**46.0**
AI-C-01	New Construction of Small Scale Irrigation Project under BSWM	BSWM/ LGUs	257	257		514	5	5		10	**46.0**
WQ-C-01	Capacity Development to Upgrade WQ Monitoring and Data Management Program	DENR-EMB	140			140	Less than 5				**45.7**
WS-C-04	Community-based Eco-tourism Program	DOT/DENR/ LGUs	132	132		264	5	5		10	**45.1**
AI-P-01	Balintingon Reservoir Multipurpose Project (BRMP)	NIA/ G. Trino		9,708	3,883	13,591		5	2	7	**44.6**
AI-P-08	Central Luzon Groundwater Irrigation Systems Reactivation Project	NIA		1,429		1,429		Less than 5			**44.0**
WQ-C-03	Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	DTI/DENR/ Private Industries		60		60		Less than 5			**43.1**
MP-C-01	Septage Treatment and Disposal Facility	MCWMC/ LGUs/WDs/ Private		255	255	510		5	5	10	**42.9**
AI-P-06	Irrigation Water Resources Augmentation Pump Establishment Project	NIA		130		130		Less than 5			**40.0**
AI-P-05	Procurement of Pumps, Drilling Rigs & Related Equipment	NIA		206		206		Less than 5			**39.7**
AI-P-09	Gumain Reservoir Project	NIA		1,716	12,013	13,729		1	7	8	**38.1**
FL-P-02	Bacolor Comprehensive Rehabilitation Master Plan	LGU			1,500	1,500				Less than 5	**38.0**
Total			30,287	33,582	21,630	85,499					

付表 11.2.7　グループ B の事業実施スケジュール

Sector	Code	Name of Project	Implementing Agency	Short-term	Mid-term	Long-term
Agriculture/Irrigation and Fisheries	AI-P-07	Appropriate Irrigation Technologies for Enhanced Agricultural Production	NIA			
	AI-C-02	Introduction of Water Saving Irrigation Technology	NIA			
	AI-C-03	Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	NIA			
	AI-G-01	Balog-Balog Multipurpose Project Phase 1	NIA			
	AI-G-02	Along-along Creek Irrigation Project (UPRIIS Div3)	NIA			
	AI-G-10	Upper Tabuating SRIP	NIA			
	AI-G-07	Participatory Irrigation Development Project, APL1-Infrastructure Development	NIA			
	AI-P-10	Rehabilitation of AMRIS	NIA			
	AI-P-03	Sector Loan on Rehabilitation of Irrigation Facilities	NIA			
	AI-P-11	Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects, Small Diversion Dam Projects	DA Region III/LGUs			
	AI-P-02	Balog-Balog Multipurpose Project Phase 2	NIA			
	AI-P-04	Casecnan Multi-purpose Irrigation & Power Project Irrigation Component Phase 2	NIA			
	AI-C-01	New Construction of Small Scale Irrigation Project under BSWM	BSWM/LGUs			
	AI-P-08	Central Luzon Groundwater Irrigation Systems Reactivation Project	NIA			
	AI-P-06	Irrigation Water Resources Augmentation Pump Establishment Project	NIA			
	AI-P-05	Procurement of Pumps, Drilling Rigs & Related Equipment	NIA			
	AI-P-01	Balintingon Reservoir Multipurpose Project (BRMP)	NIA/G. Trino			
	AI-P-09	Gumain Reservoir Project	NIA			
Municipal Water Supply, Sanitation and Sewerage	MP-G-01	Cabanatuan Sewerage System	LGU			
	MP-G-02	Expansion of Clark Sewerage System	Clark Water			
	MP-C-01	Septage Treatment and Disposal Facility	LWUA/WDs/LGUs/Private WSPs			
Management of Flood and Sediment Disasters	FL-G-01	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part I	DPWH			
	FL-G-02	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part II	DPWH			
	FL-P-01	Flood Control Measures in Mt. Pinatubo Devastated Area- Focus on Pasac Delta	DPWH			
	FL-C-01	Flood Mitigation for Pampanga Delta	DPWH			
	FL-G-04	Flood Forecasting and Warning System Capacity Building Project upon Dam Release in the Philippines	PAGASA			
	FL-C-02	Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N. Ecija	LGUs			
	FL-P-02	Bacolor Comprehensive Rehabilitation Master Plan	LGU			
Watershed Management	WS-G-03	Integrated Agro-Forestry Development Program (CBFM-CARP)	DENR/RCBFMO/DAR			
	WS-G-11	Forestlands Management Project (FMP)	DENR-FASPO			
	WS-G-12	Pampanga River Basin Rehabilitation Project (PRBRP)	DENR-FRCD			
	WS-C-01	Upland Development Program (UDP)	DA/DENR/LGUs			
	WS-C-02	Protected Area Management Program (PAMP)	DENR-PAWZCMS			
	WS-C-03	Urban Greening Program	DENR/LGUs/Pvt. Sector			
	WS-C-04	Community-based Eco-tourism Program	DOT/DENR/LGUs			
Water-related Environment Management	WQ-C-01	Capacity Development to Upgrade WQ Monitoring and Data Management Program	DENR-EMB			
	WQ-C-02	Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	DA-BFAR			
	WQ-C-03	Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	DTI/DENR/Private Industries			
Others	IS-C-01	Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	NWRB/Others			
	IS-C-03	Enhancement of Monitoring System for Surface Water in Pampanga River	NWRB/Others			
	IS-C-04	Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	NWRB/Others			

付表 11.2.8 (1/3)　開発シナリオ及びその関連事業（グループ B）

Sector	Development Scenario	Target Completion Period	Project		Implementing Agency	Cost (Million)			
						Short-term (2011-2015)	Mid-term (2016-2020)	Long-term (2021-2025)	Total (2011-2025)
Agriculture/Irrigation and Fisheries	**(1) Improvement of Irrigation Technologies** The innovative irrigation technologies shall be developed and the capacity building on usage of the technologies shall be made so as to increase the irrigation efficiency and save the irrigation water by 2015.	Short-term	AI-P-07	Appropriate Irrigation Technologies for Enhanced Agricultural Production	NIA	654			654
			AI-C-02	Introduction of Water Saving Irrigation Technology	NIA	150			150
			AI-C-03	Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	NIA	150			150
	(2) Short-term Development of Irrigation Systems The agricultural productivity shall be increased through the seven (7) irrigation development projects, which contribute to the beneficial area (newly developed) of 5,880ha, the beneficial area (rehabilitated) of 37,046 ha and beneficiaries of 56,640 farm-families in total, by 2015.	Short-term	AI-G-01	Balog-Balog Multipurpose Project Phase 1	NIA	236			236
			AI-G-02	Along-along Creek Irrigation Project (UPRIIS Div3)	NIA	25			25
			AI-G-10	Upper Tabuating SRIP	NIA	76			76
			AI-G-07	Participatory Irrigation Development Project, APL1-Infrastructure Development	NIA	41			41
			AI-P-10	Rehabilitation of AMRIS	NIA	983			983
			AI-P-03	Sector Loan on Rehabilitation of Irrigation Facilities	NIA	222			222
			AI-P-11	Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects, Small Diversion Dam Projects	DA Region III/ LGUs	169			169
	(3) Mid-term Development of Irrigation Systems The agricultural projects shall be increased through the six (6) irrigation development projects, which contribute to the beneficial area (newly developed) of 58,443 ha, the beneficial area (rehabilitated) of 50,904 ha and the beneficiaries of 101,893 farm-families in total by 2020.	Short-term/Mid-term	AI-P-02	Balog-Balog Multipurpose Project Phase 2	NIA	8,942	7,153		16,095
			AI-P-04	Casecnan Multi-purpose Irrigation & Power Project Irrigation Component Phase 2	NIA	5,000	2,000		7,000
			AI-C-01	New Construction of Small Scale Irrigation Project under BSWM	BSWM/LGUs	257	257		514
			AI-P-08	Central Luzon Groundwater Irrigation Systems Reactivation Project	NIA		1,429		1,429
			AI-P-06	Irrigation Water Resources Augmentation Pump Establishment Project	NIA		130		130
			AI-P-05	Procurement of Pumps, Drilling Rigs & Related Equipment	NIA		206		206
	(4) Long-term Development of Irrigation Systems The agricultural projects shall be increased through the two (2) irrigation development projects, which contribute to the beneficial area (newly developed) of 31,100 ha and the beneficiaries of 9,152 farm-families in total by 2025.	Mid-term/Long-term	AI-P-01	Balintingon Reservoir Multipurpose Project (BRMP)	NIA/G. Trino		9,708	3,883	13,591
			AI-P-09	Gumain Reservoir Project	NIA		1,716	12,013	13,729
	Total					**16,905**	**22,599**	**15,896**	**55,400**
Municipal Water Supply, Sanitation and Sewerage	**(1) Development of Sewerage Systems** The on-going development for the sewerage systems for Cabanatuan City in Nueva Ecija and Clark City in Tarlac shall be completed by 2015. Upon completion of the projects, about 12 % of the population in Cabanatuan City and 100% in Clark would be served by the public sewerage system.	Short-term	MP-G-01	Cabanatuan Sewerage System	LGU	189			189
			MP-G-02	Expansion of Clark Sewerage System	Clark Water	456			456
	(2) Construction/Provision of Septage Treatment and Disposal Facilities The services of the septage treatment and disposal facilities shall be provided to about 80% of the urban area in the following ten cities/municipalities by 2025: (1) Angeles, (2) San Fernado, (3) Guagua and (4) Mabalacat, (5) Baliuag, (6) Calumpit, (7) Hagonoy and (8) Malolos, (9) Cabanatuan and (10) Tarlac.	Mid-term/Long-term	MP-C-01	Septage Treatment and Disposal Facility	LWUA/WDs/LGUs /Private WSPs		255	255	510
	Total					**645**	**255**	**255**	**1,155**

付表 11.2.8 (2/3)　開発シナリオ及びその関連事業（グループＢ）

Sector	Development Scenario	Target Completion Period	Project		Implementing Agency	Cost (Million)			
						Short-term	Mid-term	Long-term	Total
						(2011-2015)	(2016-2020)	(2021-2025)	(2011-2025)
Management of Flood and Sediment Disasters	**(1) Flood Mitigation for Pasac River Basin (Eastern Pinatubo Area)** All on-going, proposed and conceptual flood mitigation projects for Pasac river basin shall be completed by 2015. Upon completion of the projects, the chronic flood damage in the area of about 57,300 ha would be mitigated, and about 309,000 people would be benefitted.	Short-term	FL-G-01	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part I	DPWH	470			470
			FL-G-02	Pinatubo Hazard Urgent Project (PHUMP) Phase III Part II	DPWH	5			5
			FL-P-01	Flood Control Measures in Mt. Pinatubo Devastated Area- Focus on Pasac Delta	DPWH	4,320			4,320
	(2) Flood Mitigation for Pampanga Delta The flood mitigation plan for Pampanga Delta shall be completed by 2020. Upon completion of the projects, the chronic flood damage in Pampanga Delta of about 32,400 ha would be mitigated, and about 175,000 people would be benefitted.	Short-term and Mid-term	FL-C-01	Flood Mitigation for Pampanga Delta	DPWH	100	5,368		5,468
	(3) Capacity Building on the Appropriate Dam Reservoir Operation against Flood The capacity building on the appropriate reservoir operation against flood for Pantabangan Dam and Angat Dam shall be made through the technical cooperation by JICA by 2015.	Short-term	FL-G-04	Flood Forecasting and Warning System Capacity Building Project upon Dam Release in the Philippines	PAGASA	300			300
	(4) Establishment of Community-based Flood Forecasting and Warning System for Provinces of Pampanga, Tarlac and Nueva Ecija Succeeding to Bulacan Province, Pampanga, Tarlac and Nueva Ecija shall be provided with the community-based flood forecasting and waning system by 2015.	Short-term	FL-C-02	Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N. Ecija	LGUs	8			8
	(5) Flood Mitigation for Bacolor Municipality The current potential flood damage in Bacolor Municipality shall be reduced through river channel improvement of Gugu River, drainage improvement by 2025.	Long-term	FL-P-02	Bacolor Comprehensive Rehabilitation Master Plan	LGU			1,500	1,500
	Total					**5,203**	**5,368**	**1,500**	**12,071**
Watershed Management	**(1) Strengthening of the On-going Reforestation Efforts** The seven (7) special projects shall be implemented in order to strengthen the on-going reforestation efforts. The target outcomes by the special projects are as below: (a) The forest cover shall expand by 39,900has. at the rate of 2,660has./yr by 2025 through implementation of WS-G-03, WS-G-11, WS-G-12, WS-C-01, WS-C-02 and WS-C-04. (b) Agro-forestry cover shall expand by 21,500has. at the rate of 1,430has./yr through implementation of WS-G-11, WS-G-12 and WS-C-01. The expansion of agro-forestry could enhance access to the livelihood and economic opportunities for upland occupants, particularly the indigenous communities. (c) The degraded and severely eroded uplands/untenured watersheds of 10,500has. in particular shall be restored through implementation of WS-C-01. (d) Urban greening (WS-C-03) shall cover 7,300has. of open spaces and 222 linear km of roads and riverbanks. (e) The objective forest protection area of 56,100has. under WS-C-02 shall be officially included into the NIPAS areas and provided with the formal management in order to conserve the biodiversity in critical habitats and natural ecosystems. (f) The facilities and services for eco-tourism to the natural integrated protected areas and/or the critical habitats in the study area shall be improved through WS-C-04 so as to increase the income levels for the communities and to enhance the present natural conditions of the important habitats and ecosystems in these areas.	Whole Period	WS-G-03	Integrated Agro-Forestry Development Program (CBFM-CARP)	DENR/ RCBFMO/DAR	31			31
			WS-G-11	Forestlands Management Project (FMP)	DENR-FASPO	498	498		996
			WS-G-12	Pampanga River Basin Rehabilitation Project (PRBRP)	DENR-FRCD	12			12
			WS-C-01	Upland Development Program (UDP)	DA/DENR/ LGUs	490	490		980
			WS-C-02	Protected Area Management Program (PAMP)	DENR-PAWZCMS	202	202		404
			WS-C-03	Urban Greening Program	DENR/LGUs/ Pvt. Sector	88	88	88	264
			WS-C-04	Community-based Eco-tourism Program	DOT/DENR/LGUs	132	132		264
	Total					**1,453**	**1,410**	**88**	**2,951**

付表 11.2.8 (3/3)　開発シナリオ及びその関連事業（グループ B）

Sector	Development Scenario	Target Completion Period	Project		Implementing Agency	Cost (Million)			
						Short-term (2011-2015)	Mid-term (2016-2020)	Long-term (2021-2025)	Total (2011-2025)
Water-related Environment Management	**(1) Improvement of Monitoring and Processing System for the Water Quality Data** DENR shall improve the monitoring and processing system for the water quality data taking the following measures: (a) Rationalize water quality monitoring and pollution regulatory compliance, (b) Compile inventory of pollution sources, (c) Upgrade management capability of DENR Staffs and other stakeholders and (d) Upgrade the data management system	Short-term	WQ-C-01	Capacity Development to Upgrade WQ Monitoring and Data Management Program	DENR-EMB	140			140
	(2) Capacity Development to Reduce Pollution Load The capability of fishpond operators and non-compliant industries will be improved over the mid-term towards adopting cleaner production options in order to reduce their impacts on water quality.	Short-term and Mid-term	WQ-C-02	Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	DA-BFAR	48			48
			WQ-C-03	Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	DTI/DENR/ Private Industries		60		60
	Total					**188**	**60**	**0**	**248**
Others	**(1) Enhancement of Monitoring of Groundwater and Surface Water** The monitoring of the groundwater and surface water shall be enhanced in order to apprehend the actual status of the water resources in Pampanga river basin	Whole Terms	IS-C-01	Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	NWRB/Others	99	99	99	297
			IS-C-03	Enhancement of Monitoring System for Surface Water in Pampanga River	NWRB/Others	10			10
	(2) Capacity Development on Water Allocation and Distribution The appropriate methodologies on the water allocation and distribution for municipal water use, irrigation, hydropower generation and other various water uses shall be introduced to NWRB and other relevant agencies	Short-term	IS-C-04	Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	NWRB/Others	300			300
	Total					**409**	**99**	**99**	**607**
Grand Total						**24,803**	**29,791**	**17,838**	**72,432**

付表 12.4.1　流域および森林管理の統制機能

National Agencies	DENR					PAMB	Office of the President		DPWH		DA		DE
							NCIP	NDCC	PMO-MFC	FCSEC	BSWM	NIA	NPC
	FMB, FMS			RBCO	PAWD								
	PENRO/CENRO				PASU								
Local Government / Type of Service	LGUs, WDs												
	Municipality	Province	City	RBO									
WATERSHED MANAGEMENT				◎									
・ Watershed Project				Rationalize									
・ Protection of Soil and Water											⊙		
・ Control of Illegal Logging, Kaingin Farming, Unsustainable Practices													
・ Flood Control				National M/P	O			◎	⊙	Planning			
・ Protection of Project Area												O	O
FOREST MANAGEMENT (CBFM)		⊙		Rationalize									
・ Social Forestry	O		O										
・ Community-based Forestry Project	O		O										
・ Integrated Social Forestry Program	O	O	O										
・ Community Forestry	O		O										
・ Forest Fire Protection	O		O										
・ Conservation of Mangrove	O		O		⊙/O	O							
PROTECTED AREA MANAGEMENT						⊙							
・ Management of Conservation Areas							O						
TECHNICAL ASSISTANCE	DENR-FMS												
・ Policies, Plans, Programs													
・ Forest Protection and Maintenance													
・ Community Involvement													

Notes: ⊙ Main national agency; ◎ Regulatory function; O responsible organization

出典：JICA 調査団

付表 13.3.1 (1/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
1. Agriculture/ Irrigation and Fisheries	AI-P-01: Balintingon Reservoir Multipurpose Project (BRMP)	Major activities are the construction of the facilities: ・ Rock-fill center-core dam (H=140m) and its appurtenant structures with an aim to have the reservoir with 572 MCM storage capacity. ・ Open-type powerhouse equipped with 2 Francis type turbines with the capacity of 15 MW ・ Diversion weir (L=140m) ・ Irrigation facilities: main canal (L=109km), laterals(L=168km) and sub-laterals, main and supplementary farm ditches, drainage channels (L=210km), and access roads	Group I	EIS
	AI-P-02: Balog-Balog Multipurpose Project Phase 2	Major activities are construction of the facilities: ・ High earth and rock fill dam (H=113.5m) with the storage capacity of 625 MCM (effective storage: 525 MCM) ・ Hydropower plant with the capacity of 43.5MW ・ 150 to 200 deep production wells to develop ground water for supplementation of the irrigation water supply ・ Fishery component consisting of the construction and production of tilapia species in fixed floating cages of at least 150 ha within the Balog-Balog reservoir area. Estimated fishery production per cage is 6,300 kg/year*cage.	Group I	EIS
	AI-P-03: Sector Loan on Rehabilitation of Irrigation Facilities	Major activity is rehabilitation of diversion works, canal system, drainage system, road, and O&M facilities.	Group V	App. for APS
	AI-P-04: Casecnan Multi-purpose Power & Irrigation Project Irrigation Component Phase 2	Major activities are: ・ New construction of extension of Super Diversion Canal, construction of lateral, and sub-lateral canals, drainage canals and related structures ・ Rehabilitation/Improvement of UPRIS, such as rehabilitation of PENRIS main and lateral canals, and related structures	Group II/III	EIS/App. for APS
	AI-P-05: Procurement of Pumps, Drilling Rigs & Related Equipment	Major activity is procurement of the following materials: ・ 1,000 units of centrifugal pumps ・ 1 units of trailer mounted rotary/percussion type drilling rings ・ 2 units of resistively machines & electric logger	Group V	App. for APS
	AI-P-06: Irrigation Water Resources Augmentation Pump Establishment Project	Major activities are: ・ Procurement of 1,330 units of pumps including diesel engines ・ Installation of 301 units of shallow tube wells ・ Installation of 1,029 units of surface water pump irrigation to cover the entire target area	-	-
	AI-P-07: Appropriate Irrigation Technologies for Enhanced Agricultural Production	Major activity is installation of the irrigation system with drip sprinkler and flood irrigation operated by the solar power	-	-

付表 13.3.1 (2/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
1. Agriculture/ Irrigation and Fisheries	AI-P-08: Central Luzon Groundwater Irrigation Systems Reactivation Project	Major activities are: ・Construction of 100 deep well pump systems covering 5,000 ha ・Provision of rural water supply in the selected barrangays ・Procurement of equipment	-	-
	AI-P-09: Gumain Reservoir Project	Major activity is construction of 108m high, zoned embankment dam to store irrigation water which covers 11,000 ha of paddy field and 5,200 ha of sugarcane plantation and to increase the water supply in 7,900 ha of Porac-Gumain & Caulaman RIS.	Group I	EIS
	AI-P-10: Rehabilitation of AMRIS	Major activity is rehabilitation of Bustos, Lower & Upper Maasim Dam.	-	-
	AI-P-11: Construction of Priority Small Scale Irrigation Systems/Small Water Impounding Projects (SWIP), Small Diversion Dam Projects (SDD)	Major activities are: ・Construction of SWIP and SDD in the above-mentioned provinces ・Rehabilitation of SDD and SWIP in Nueva Ecija	Group II/III	IEE checklist/ App. for APS
	AI-C-01: New Construction of Small Scale Irrigation Project under BSWM	Major activity is construction of small scale irrigation systems which are not covered by on-going and planned projects under BSWM such as: ・Diversion Dam (18 nos in 959 ha) ・Small Water Impounding Projects (24 nos in 1,635 ha) ・Small Farm Reservoir (4 nos in 112 ha) ・Shallow Tube Well (STW) and others	Group II/III	IEE checklist/ App. for APS
	AI-C-02: Introduction of Water Saving Irrigation Technology	Major activities are: ・Trial and research on water saving irrigation technology ・Operation of demonstration farms on water saving irrigation technology ・Training to trainers and technical campaign to Irrigator's Associations ・Monitoring with close coordination among related agencies, such as DA, NIA, PhilRice, IRRI, and JICA technical cooperation project, etc. ・Capacity development of IAs	-	-
	AI-C-03: Improvement of Monitoring System and Capacity Development for Proper Water Management in NISs and CISs	Major activities are: ・Installation of additional discharge measurement device ・Improvement of discharge monitoring system ・Review of calibration of conversion tables ・Establishment of communication system ・Capacity development	-	-

付表 13.3.1 (3/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
2. Municipal Water Supply, Sanitation and Sewerage	MW-P-01: Rehabilitation of Umiray-Macua Facilities	Major activities is permanent rehabilitation works which includes: ・ Complete restoration of the access road to tunnel outlet ・ Construction of permanent RCDG bridge for tunnel outlet ・ Widening of ox-bow channel at the tunnel outlet ・ Intake structures such as various mechanical gates; trash rack, waterway protection works, retaining wall, ogee dam, etc. ・ Rehabilitation of mini-hydro plant ・ Construction of log arresters ・ Installation of power/communication cables inside the tunnel ・ Village/Housing relocation	-	-
	MW-P-02: Sumag River Diversion Project	Major activity is construction works such as: ・ Intake facilities ・ Connection canal to the tunnel	Group II/III	IEE/App. for APS
	MW-P-03: Bulacan Treated Bulk Water Supply Project	Major activity is construction works such as: water supply facilities, including a raw aqueduct, a treatment plant, reservoirs, pumping station and primary lines which cover 10 municipalities of Bulacan.	-	-
	MW-P-04: Metro Clark Bulk Surface Water Project	Major activity is installation of the water system with possible construction of storage dams at some of the potential sites such as Marimula, Sacobia and Bangut.	Group I	EIS (Possible amendment for existing ECC)
	MW-C-01: Additional Level 3,2,1 facilities towards 2025 in Bulacan MW-C-02: Additional Level 3,2,1 facilities towards 2025 in Pampanga MW-C-03: Additional Level 3,2,1 facilities towards 2025 in Nueva Ecija MW-C-04: Additional Level 3,2,1 facilities towards 2025 in Tarlac	Major activities are: ・ Development of water supply systems: 1) Installation of new water system 2) Expansion and rehabilitation of the existing water system ・ Soft components: 1) Utilization of high technology equipment in development of water system 2) Immediate water repairs 3) Provision of water meters	Group II/III	IEE/App. for APS
	MW-C-05: Extended Bulacan Bulk Water Supply Project	There are four (4) options proposed: ・ Bayabas Storage Dam ・ Balintingon Storage Dam (same as AI-P-01) ・ Upgrading and improvement of irrigation facilities and water management of AMRIS, consisting of installation of the water pipes/aqueducts ・ Excess water for MWSS from the dams such as Ipo dam which can be constructed outside the Pampanga river basin	Group I	EIS

付表 13.3.1 (4/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
2. Municipal Water Supply, Sanitation and Sewerage	MW-C-06: Pampanga Bulk Water Supply Project	There are three (3) options proposed: ・Residual groundwater at surrounding cities/municipalities ・Pampanga river at Cong Dadong dam ・Gumain storage dam, same as AI-P-09	Group I	EIS
	MS-C-01: Additional sanitary facilities towards 2025 in Bulacan	Major activities are: ・Installation of conventional toilets and ecosan toilets ・Capacity development of the implementing agencies for social preparation for users	-	-
	MS-C-02: Additional sanitary facilities towards 2025 in Pampanga			
	MS-C-03: Additional sanitary facilities towards 2025 in Nueva Ecija			
	MS-C-04: Additional sanitary facilities towards 2025 in Tarlac			
	MP-C-01: Septage Treatment and Disposal Facility	Major activity is purchase of trucks for transportation of septage to the septage treatment and disposal facilities, such as the existing sanitary landfill in Kalangitan, Capas, Tarlac.	-	-
3. Management of Flood and Sediment Disasters	FL-P-01: Flood Control Measures in Mt. Pinatubo Devastated Area-Focus on Pasac Delta	Major activities are: ・Widening of the existing “pilot third river channel” (22.6 km in length from the confluence with Abacan river/San Fernando river) from the existing bottom width of 30 to 60 m ・Excavation of the Pasac river as an eastern alignment of the pilot third river channel ・Local drainage improvement connecting the San Fernando river to the Third river and the excavation of San Fernando river (total length:29.6m) ・Key road raising to ensure that the transportation routes can be maintained during floods	Group II/III	The type of the document for ECC shall require further discussion with EMB
	FL-P-02: Bacolor Comprehensive Rehabilitation Master Plan	Major activities are: ・Construction of Gugu ring dike (7.8 km in length) ・Completion of the unfinished portion of Gugu Dike (1.0 km in length) ・Channel excavation of Gugu creek and other various creeks (20 km in length) ・Slope protection of various creeks in Bacolor municipality (11.0 km in length) ・Construction of new drainage canals (47.5 km in length) ・Installation of floodwater pumps in the southern part of Bacolor (2 units) ・Construction of diversion channel for Pasig-Potrero river	Group II/III	The type of the document for ECC shall require further discussion with EMB
	FL-C-01: Flood Mitigation for Pampanga Delta	The options proposed are: ・Construction of riverbank and channel dredgeing/excavation at the downstream of Pampanga river ・Development of the flood retarding basin through construction of the dike	Group I	EIS

付表 13.3.1 (5/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
3. Management of Flood and Sediment Disasters	FL-C-02: Community Based Flood Early Warning System for Provinces of Pampanga, Tarlac and N. Ecija	Major activities are: ・ Establishment of the simple monitoring and communication system managed by the community for flood warning ・ Capacity building for the municipal and barangay personnel for operation, maintenance and management of the flood warning system ・ Information, Education and Communication (IEC) for the residents on the eligible flood evacuation routes/evacuation centers	-	-
	FL-C-03: Maintenance, Rehabilitation and Improvement for Drainage and Flood Control Facilities under Jurisdiction of LGUs	Major activity is implementation of the maintenance, rehabilitation and improvement works for drainage and flood control facilities.	-	-
	FL-C-04: Integration of Salient Points of IWRM for Pampanga River Basin into School Curricula	Major activity is awareness raising activities targeting the students.	-	-
4. Watershed Management	WS-C-01: Upland Development Program	Possible component of the project is capacity development of upland farmers through the trainings, such as FFS with provision of the necessary equipments.	-	-
	WS-C-02: Protected Area Management Program	Major activities are: ・ Characterization of watershed (basic resource inventory, assessment and mapping, and socio-economy survey) ・ Designation and ground delineation of the management zones ・ Organization of PAMBs and establishment of IPAF ・ Formulation of Protected Area Management Plans and harmonization with ancestral domain plans, forest land use plans and comprehensive landuse plans to address conflicting land use issues ・ Setting up of the mechanism to streamline compliance with FPIC requirements in ancestral domain areas ・ Initial implementation of priority action plans: - Community-based reforestation through assisted natural regeneration in 5,615 ha of degraded forests - Biodiversity and wildlife conservation - Alternative livelihood for forest occupants - IEC campaigns	-	-
	WS-C-03: Urban Greening Program	Major activities are: ・ Community/volunteers organization ・ Planting of timber and non-timber species	-	-

付表 13.3.1 (6/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
4. Watershed Management	WS-C-04: Eco-tourism Program	Major activities are: ・Capacity development of the communities on guiding tours and relevant business management ・Installation/renovation of the relevant facilities	-	-
5. Water-related Environment Management	WQ-P-01: Clean Development Mechanism	Major activities are: ・Installation of facilities for wastewater and waste collection ・Installation of treatment facilities to capture and convert methane gas, and to produce electricity	Group II/III	IEE/App. for APS
	WQ-C-01: Capacity Development to Upgrade Water Quality monitoring and Data Management Program	Major activities are: ・Revision and rationalization of the existing monitoring system of water quality/effluent ・Preparation of inventory and identification of the pollution sources ・Capacity development of the staffs on laboratory management with the provision of appropriate facilities and equipments ・Capacity development of WQMA governing board, private industries and other stakeholders ・Strength the regulatory and coordination mechanism among the DENR-EMB, the LGUs and relevant agencies ・IEC	-	-
	WQ-C-02: Capacity Development to Improve Water Quality and Aquaculture Fisheries Management	Major activities are: ・Assessment of carrying capacity studies ・Capacity building of relevant agencies ・Setup the information management systems	-	-
	WQ-C-03: Capacity Development Project to Improve Industry Adoption of Cleaner Production Options	Major activities are: ・Organization of the counterpart team ・Preparation of inventory of non-compliant industries ・Evaluation of production and environmental management system of the participating industries ・Needs assessment and priority setting ・Setting up of institutional, policy, market-based financial support mechanisms ・Preparation of the industry-specific clean production manuals ・Trainings ・IEC	-	-

付表 13.3.1 (7/7) IWRM 計画関連事業の概要

Sector	Proposed/Conceptual Program/Project	Outline/Scope of the Program/Project	Groups under PEISS	Possible Documents Required For ECC/CNC Application
5. Water-related Environment Management	WQ-C-04: Construction of Sanitary Landfills and Support Facilities in Nueva Ecija and Cluster Waste Transfer Stations in Bulacan and Pampanga	Major activities are: ・Construction of 5 sanitary landfills in Nueva Ecija, with the capacity for the 485,802 populations: 1) Provincial sanitary landfill at Gen.Tino 2) Sanitary landfills at Munoz City, San Jose City, Palayan City and St. Rosa 3) Materials Recovery Facilities : 12 municipalities ・Construction of 4 cluster transfer station-cum-materials recovery facilities for a cluter of LGUs in Bulacan and Pampanga, with the capacity for 2,020, 740 populations 1) Construction of 1 cluster transfer station each for a) Baliuag and Calumpit, b) Hagonoy and Malolos City, c) Angeles City and Guagua, d) Mabalacat and San Fernando City	Group II/III	IEE-checklist/ App. for APS
6. Inter-sector for Water Resources Management	IS-C-01: Establishment of Comprehensive Groundwater Monitoring in Pampanga River Basin	Major activities are: ・Installation of monitoring wells ・Setting up of the monitoring network with the database management system ・Capacity development of NWRB in ground water resource monitoring, which may include policy setting up for the groundwater regulation.	-	-
	IS-C-02: Project for Recovery of Reliability of Water Supply in Angat-Umiray System	There are four (4) options proposed which could be combined depending on the results of the following studies : ・Bayabas Storage Dam ・Balintingon Storage Dam (same as AI-P-01) ・Upgrading and improvement of irrigation facilities and water management of AMRIS, consisting of installation of the water pipes/aqueducts ・Excess water for MWSS from the dams such as Ipo dam which can be constructed outside the Pampanga river basin	Group I	EIS
	IS-C-03: Enhancement of Monitoring System for Surface Water in Pampanga River Basin	Major activities are: ・Establishment of monitoring networks with proper database management ・Capacity development of NWRB/RBO in monitoring of surface water to obtain the necessary data for control of water permits	-	-
	IS-C-04: Capacity Development of NWRB and Relevant Agencies on Water Allocation and Distribution	Major activities are: ・ Capacity development of NWRB and relevant agencies on 1) improvement of water permit system, especially irrigation water use in Angat-Umiray system, and 2) operation of water allocation and its monitoring in Angat-Umiray system ・ Identification of potential/existing critical area for water	-	-

付表 13.3.2 (1/4) IWRM 計画関連事業のスクリーニング結果

		Sector	Agriculture/Irrigation and Fishery													
		Project Code*/ Impact Items	AI-P-01	AI-P-02	AI-P-03	AI-P-04	AI-P-05	AI-P-06	AI-P-07	AI-P-08	AI-P-09	AI-P-10	AI-P-11	AI-C-01	AI-C-02	AI-C-03
Social Environment	1	Involuntary resettlement	**A-**	**A-**	C-	C-	-	-	-	-	C-	C-	C-	C-	-	-
	2	Local Economy such as Employment & Livelihood, etc.	B+/C-	B+/C-	B+	B+	B+	B+	B+	B+	B+/C-	B+	B+	B+	B+	C+
	3	Land use & Utilization of Local Resources	B+/C-	B+/C-	B+	B+/ C-	B+	B+	B+	B+	B+/C-	C+/C-	B+	B+	B+	C+
	4	Regional severance	C-	C-	-	C-	-	-	-	-	C-	-	C-	C-	-	-
	5	Existing social infrastructure & Services such as Traffic/Existing Public Facilities	C+/C-	B+ /C-	B+	C-	-	-	C+	-	B+	B+	-	-	B+	-
	6	Social vulnerable groups such as the poverty and ethnic minority	C+/**A-**	C+/**A-**	C+/C-	C+/C-	C+/C-	C+/C-	-	C+/C-	C+/C-	C+/C-	C+/C-	C+/C-	-	-
	7	Inequality between beneficiaries and project-affected peoples	**B-**	**B-**	-	-	-	-	-	-	C-	C-	C-	C-	-	-
	8	Cultural heritage	C-	C-	-	-	-	-	-	-	C-	-	C-	C-	-	-
	9	Conflict of interests	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-	C-	-	-
	10	Water use right and common land use right	**B-**	**B-**	C-	C-	C-	C-	-	C-	**B-**	C-	C-	C-	C+	-
	11	Sanitation	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-	C-	-	-
Natural Environment	12	Disaster (natural risk) and epidemic as HIV	B+ /C-	B+ /C-	C-	C-	C-	C-	-	C-	B+ /C-	C-	C-	C-	-	-
	13	Topography and geology	**B-**	**B-**	-	-	C-	C-	-	-	**B-**	-	-	-	-	-
	14	Soil erosion	C-	C-	-	C-	-	-	-	-	C-	C-	C-	C-	-	-
	15	Ground water	C+/C-	C+/C-	-	-	C-	C-	-	C-	C+/C-	C-	C+/C-	C+/C-	-	-
	16	Flow regime of lake and river	**B-**	**B-**	C-	**B-**	C-	C-	-	-	**B-**	C-	C-	C-	-	-
	17	National Park or equivalent area in terms of its ecological importance	C-	**B-**	C-	C-	-	C-	C-	C-	C-	C-	C-	C-	-	-
	18	Coastal and sea area	C-	C-	C-	C-	C-	C-	-	C-	-	C-	C-	C-	-	-
	19	Flora and fauna	**B-**	**B-**	C-	C-	C-	-	-	C-	**B-**	C-	C-	C-	-	-
	20	Climate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	Landscape	**B-**	**B-**	-	-	-	-	-	-	**B-**	-	C-	C-	-	-
Pollution	22	Global warming	-	-	-	-	-	-	C+	-	-	-	-	-	-	-
	23	Air pollution	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-	C-	-	-
	24	Water pollution	**B-**	**B-**	C+/C-	C+/C-	C+/C-	C+/C-	C+/C-	C+/C-	**B-**	C+/C-	C+/C-	C+/C-	-	-
	25	Soil pollution	C-	C-	C+/C-	C+/C-	C+/C-	C+/C-	C+/C-	C+/C-	C-	-	C+/C-	C+/C-	-	-
	26	Waste	**B-**	**B-**	C-	C-	C-	C-	-	C-	**B-**	C-	C-	C-	-	-
	27	Noise and vibration	**B-**	**B-**	C-	C-	-	-	-	-	C-	C-	C-	C-	-	-
	28	Ground subsidence	-	-	-	-	C-	C-	-	C-	-	-	C-	C-	-	-
	29	Offensive odor	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-	C-	-	-
	30	Bottom sediment	**B-**	**B-**	-	-	-	-	-	-	**B-**	-	C-	C-	-	-
	31	Accident	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-	C-	-	-

Note:Evaluation categories are as follows;

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* The project codes correspond to the project titles as shown in 付表 13.3.1.

付表 13.3.2 (2/4) IWRM 計画関連事業のスクリーニング結果

		Sector	Municipal Water Supply, Sanitation and Sewerage														
		Project Code*/ Impact Items	MW-P- 01	MW-P- 02	MW-P- 03	MW-P- 04	MW-C - 01	MW-C - 02	MW-C - 03	MW-C - 04	MW-C - 05				MW-C – 06		
											Opt.1	Opt.2	Opt.3	Opt.4	Opt.1	Opt.2	Opt.3
Social Environment	1	Involuntary resettlement	C-	C-	C-	C-	C-	C-	C-	C-	C-	**A-**	C-	**A-**	C-	C-	C-
	2	Local Economy such as Employment & Livelihood, etc.	C+	C+	C+	C+	C+	C+	C+	C+	B+/C-	B+/C-	B+	B+/C-	B+	C+/C-	B+/C-
	3	Land use & Utilization of Local Resources	B+	B+	B+	B+	C+	C+	C+	C+	C+/C-	B+/C-	B+	C+/C-	B+	B+	B+/C-
	4	Regional severance	-	-	-	-	C-	C-	C-	C-	B+/C-	C-	-	B+/C-	C-	C-	C-
	5	Existing social infrastructure & Services such as Traffic/Existing Public Facilities	B+	-	-	-	-	-	-	-	C-	B+/C-	B+	B+/C-	-	-	B+
	6	Social vulnerable groups such as the poverty and ethnic minority	C-	C-	C-	C-	C-	C-	C-	C-	C+/C-	C+/**A-**	C+/C-	C+/**A-**	C+/C-	C+/C-	C+/C-
	7	Inequality between beneficiaries and project-affected peoples	C-	C-	C-	C-	C-	C-	C-	C-	C-	**B-**	-	**B-**	C-	-	C-
	8	Cultural heritage	-	-	-	C-	C-	C-	C-	C-	C-	C-	-	C-	C-	C-	C-
	9	Conflict of interests	-	-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	**B-**	C-	C-
	10	Water use right and common land use right	-	C-	C-	**B-**	C-	C-	C-	C-	**B-**	**B-**	C-	C-	C-	C-	**B-**
	11	Sanitation	-	C+	B+	C-	C+	C+	C+	C+	C-	C-	C-	C-	C-	C+/C-	C-
Natural Environment	12	Disaster (natural risk) and epidemic as HIV	-	C+	B+	B+ C-	C-	C-	C-	C-	C-	B+ /C-	C-	C-	C-	C-	B+ /C-
	13	Topography and geology	-	-	-	**B-**	-	-	-	-	**B-**	**B-**	-	**B-**	-	-	**B-**
	14	Soil erosion	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	-	C-	C-	-	C-
	15	Ground water	-	-	-	C+/C-	-	-	-	-	C+/C-	C+/C-	-	C+/C-	C+/C-	C-	C+/C-
	16	Flow regime of lake and river	**B-**	**B-**	C-	**B-**	C-	C-	C-	C-	**B-**	**B-**	C-	**B-**	C-	**B-**	**B-**
	17	National Park or equivalent area in terms of its ecological importance	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	-	-	C-	C-	C-
	18	Coastal and sea area	-	-	-	-	C+/C-	C+/C-	C+/C-	C+/C-	-	C-	C-	-	-	C-	-
	19	Flora and fauna	C-	C-	C-	C-	C-	C-	C-	C-	**B-**	**B-**	C-	**B-**	C-	-	**B-**
	20	Climate	-	-	-	-	-	-	-	-	-	-	-	-	-	C-	-
	21	Landscape	C-	C-	C-	**B-**	C-	C-	C-	C-	**B-**	**B-**	-	**B-**	C-	-	**B-**
Pollution	22	Global warming	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23	Air pollution	-	-	-	C-	-	-	-	-	C-	C-	C-	C-	C-	C-	C-
	24	Water pollution	C+/C-	C+/C-	B+/C-	**B-**	C+/C-	C+/C-	C+/C-	C+/C-	**B-**	**B-**	C+/C-	**B-**	C+/C-	-	**B-**
	25	Soil pollution	-	-	-	C-	-	-	-	-	C-	C-	C+/C-	C-	C+/C-	-	C-
	26	Waste	-	-	-	**B-**	-	-	-	-	**B-**	**B-**	C-	**B-**	C-	-	**B-**
	27	Noise and vibration	C-	C-	C-	C-	C-	C-	C-	C-	C-	**B-**	C-	**B-**	C-	B+	C-
	28	Ground subsidence	-	C+	B+	-	B+	B+	B+	B+	-	-	-	-	C-	-	-
	29	Offensive odor	-	-	-	C-	-	-	-	-	C-	C-	C-	C-	C-	-	C-
	30	Bottom sediment	-	-	C-	**B-**	C-	C-	C-	C-	**B-**	**B-**	-	**B-**	C-	C-	**B-**
	31	Accident	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-	C-

Note:Evaluation categories are as follows;

A+/-: Significant positive/negative impact is expected.

B+/-: Some positive/negative impact is expected to some extent.

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* The project codes correspond to the project titles as shown in 付表 13.3.1.

付表 13.3.2 (3/4) IWRM 計画関連事業のスクリーニング結果

		Sector	Municipal Water Supply, Sanitation and Sewerage					Flood and Sediment Disaster Management							Watershed Management			
		Project Code*/ Impact Items	MS-C- 01	MS-C- 02	MS-C- 03	MS-C- 04	MP-C- 01	FL-P- 01	FL-P- 02	FL-C- 01		FL-C- 02	FL-C- 03	FL-C- 04	WS-C - 01	WS-C - 02	WS-C - 03	WS-C - 04
										Opt.1	Opt.2							
Social Environment	1	Involuntary resettlement	-	-	-	-	-	C-	C-	**A-**	-	-	-	-	-	-	-	-
	2	Local Economy such as Employment & Livelihood, etc.	C+	C+	C+	C+	C+	B+	B+	B+	B+	-	B+	-	C+	B+	C+	C+
	3	Land use & Utilization of Local Resources	-	-	-	-	-	B+	B+	B+	**A-**	-	-	-	C+	C+	C+	C+
	4	Regional severance	-	-	-	-	-	C-	-	C-	C-	-	C+/C-	-	-	-	-	-
	5	Existing social infrastructure & Services such as Traffic/Existing Public Facilities	-	-	-	-	C+	B+	-	-	**B-**	-	B+	-	-	-	-	C+
	6	Social vulnerable groups such as the poverty and ethnic minority	-	-	-	-	-	C-	C-	C-	C-	C+	C+	-	C+	C+	C+	C+
	7	Inequality between beneficiaries and project-affected peoples	-	-	-	-	-	C-	C-	**B-**	C-	-	C+/C-	-	C-	C-	-	C-
	8	Cultural heritage	C-	C-	C-	C-	-	-	-	-	-	-	C-	-	-	-	C-	-
	9	Conflict of interests	-	-	-	-	-	-	-	C-	**B-**	-	C-	-	C-	C-	C-	C-
	10	Water use right and common land use right	-	-	-	-	-	-	-	-	-	-	C-	C+	C-	C-	C-	C-
	11	Sanitation	B+	B+	B+	B+	B+	-	-	-	-	-	-	-	-	-	-	-
Natural Environment	12	Disaster (natural risk) and epidemic as HIV	C+	C+	C+	C+	B+	B+	B+	B+	B+/**B-**	B+	C+	-	-	-	-	-
	13	Topography and geology	-	-	-	-	-	C-	C-	C-	C-	-	-	-	-	-	-	-
	14	Soil erosion	-	-	-	-	-	C-	C-	C-	C+/C-	-	C+	-	C+	C+	C+	C+
	15	Ground water	C+/C-	C+/C-	C+/C-	C+/C-	-	C-	C-	C-	C-	-	-	-	-	-	-	-
	16	Flow regime of lake and river	-	-	-	-	-	C-	C-	C+/C-	**B-**	-	C-	-	-	-	-	-
	17	National Park or equivalent area in terms of its ecological importance	C+/C-	C+/C-	C+/C-	C+/C-	C+	C+/C-	C+/C-	C-	**B-**	-	C+/C-	C+	C+	B+	C+	B+
	18	Coastal and sea area	C+/C-	C+/C-	C+/C-	C+/C-	-	C-	C-	C-	C-	-	-	C+	-	-	-	-
	19	Flora and fauna	C+/C-	C+/C-	C+/C-	C+/C-	-	C+/C-	C+/C-	-	**B-**	-	C+/C-	C+	B+	B+	B+	B+
	20	Climate	-	-	-	-	-	-	-	C-	-	-	-	-	-	-	-	-
	21	Landscape	-	-	-	-	-	C-	C-	C-	C-	-	-	-	C+	C+	C+	C+
Pollution	22	Global warming	-	-	-	-	-	-	-	C-	C-	-	-	C+	C+	C+	C+	C+
	23	Air pollution	-	-	-	-	-	-	-	C-	C-	-	-	C+	-	-	-	-
	24	Water pollution	C+/C-	C+/C-	C+/C-	C+/C-	C+	C-	C-	**B-**	**B-**	-	C-	C+	-	-	-	-
	25	Soil pollution	C+/C-	C+/C-	C+/C-	C+/C-	C+	C-	C-	C-	-	-	C-	C+	-	-	-	-
	26	Waste	C+/C-	C+/C-	C+/C-	C+/C-	C+-	C-	C-	**B-**	C-	-	C-	C+	-	-	-	-
	27	Noise and vibration	-	-	-	-	-	C-	C-	**B-**	C-	-	C-	-	-	-	-	-
	28	Ground subsidence	-	-	-	-	-	-	-	--	-	-	-	-	-	-	-	-
	29	Offensive odor	C+/C-	C+/C-	C+/C-	C+/C-	-	-	-	-	-	-	C-	-	-	-	-	-
	30	Bottom sediment	-	-	-	-	-	C-	C-	C-	-	-	-	-	-	-	-	-
	31	Accident	C-	C-	C-	C-	-	C-	C-	C-	C-	-	C-	-	-	-	-	-

Note:Evaluation categories are as follows;

A+/-: Significant positive/negative impact is expected.

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* The project codes correspond to the project titles as shown in 付表 13.3.1.

付表 13.3.2 (4/4) IWRM 計画関連事業のスクリーニング結果

		Sector	Water-related Environment Management					Inter-sector for Water Resources Management						
		Project Code*/ Impact Items	WQ-P-01	WQ-C-01	WQ-C-02	WQ-C-03	WQ-C-04	IS-C- 01	IS-C- 02				IS-C- 03	IS-C- 04
									Opt.1	Opt.2	Opt.3	Opt.4		
Social Environment	1	Involuntary resettlement	-	-	-	-	C-	-	C-	**A-**	C-	**A-**	-	-
	2	Local Economy such as Employment & Livelihood, etc.	C+	-	C+	-	C+	C+	B+/C-	B+/C-	B+	B+/C-	C+	C+
	3	Land use & Utilization of Local Resources	C+	C+	C+	C+	C+	C+	C+/C-	B+/C-	B+	C+/C-	C+	C+
	4	Regional severance	-	-	-	-	-	-	B+/C-	C-	-	B+/C-	-	-
	5	Existing social infrastructure & Services such as Traffic/Existing Public Facilities	-	-	-	-	-	-	C-	B+/C-	B+	B+/C-	-	-
	6	Social vulnerable groups such as the poverty and ethnic minority	-	-	-	-	-	-	C+/C-	C+/**A-**	C+/C-	C+/**A-**	-	-
	7	Inequality between beneficiaries and project-affected peoples	-	-	-	-	-	-	C-	**B-**	-	**B-**	-	-
	8	Cultural heritage	-	-	-	-	C-	-	C-	C-	-	C-	-	-
	9	Conflict of interests	-	-	-	-	C-	-	C-	C-	C-	C-	-	B+
	10	Water use right and common land use right	-	-	-	-	C-	-	**B-**	**B-**	C-	C-	-	-
	11	Sanitation	C+	-	-	-	B+	-	C-	C-	C-	C-	-	-
Natural Environment	12	Disaster (natural risk) and epidemic as HIV	-	-	-	-	-	-	C-	B+ /C-	C-	C-	-	-
	13	Topography and geology	-	-	-	-	C-	-	**B-**	**B-**	-	**B-**	-	-
	14	Soil erosion	-	-	-	-	C-	-	C-	C-	-	C-	-	-
	15	Ground water	-	-	-	-	C+	B+	C+/C-	C+/C-	-	C+/C-	C+	C+
	16	Flow regime of lake and river	-	-	-	-	-	-	**B-**	**B-**	C-	**B-**	-	-
	17	National Park or equivalent area in terms of its ecological importance	C+	C+	C+	C+	C+	-	C-	C-	-	-	-	-
	18	Coastal and sea area	-	C+	C+	C+	C+	-	-	C-	C-	-	-	-
	19	Flora and fauna	C+	C+-	C+-	C+-	C+-	-	**B-**	**B-**	C-	**B-**	-	-
	20	Climate	-	-	-	-	-	-	-	-	-	-	-	-
	21	Landscape	-	-	-	-	-	-	**B-**	**B-**	-	**B-**	-	-
Pollution	22	Global warming	C+	-	-	C+	-	-	-	-	-	-	-	-
	23	Air pollution	C+	-	-	C+	C+	-	C-	C-	C-	C-	-	-
	24	Water pollution	B+	B+	B+	C+	C+	C+	**B-**	**B-**	C+/C-	**B-**	B+	C+
	25	Soil pollution	B+	C+	C+	C+	C+	-	C-	C-	C+/C-	C-	-	-
	26	Waste	B+	-	-	C+	B+	-	**B-**	**B-**	C-	**B-**	-	-
	27	Noise and vibration	-	-	-	-	C-	-	C-	**B-**	C-	**B-**	-	-
	28	Ground subsidence	-	-	-	-	-	-	-	-	-	-	-	C+
	29	Offensive odor	C+/ C-	-	-	C+	C+/ C-	-	C-	C-	C-	C-	-	-
	30	Bottom sediment	-	-	-	-	-	-	**B-**	**B-**	-	**B-**	-	-
	31	Accident	C-	-	-	-	C-	-	C-	C-	C-	C-	-	-

Note:Evaluation categories are as follows;

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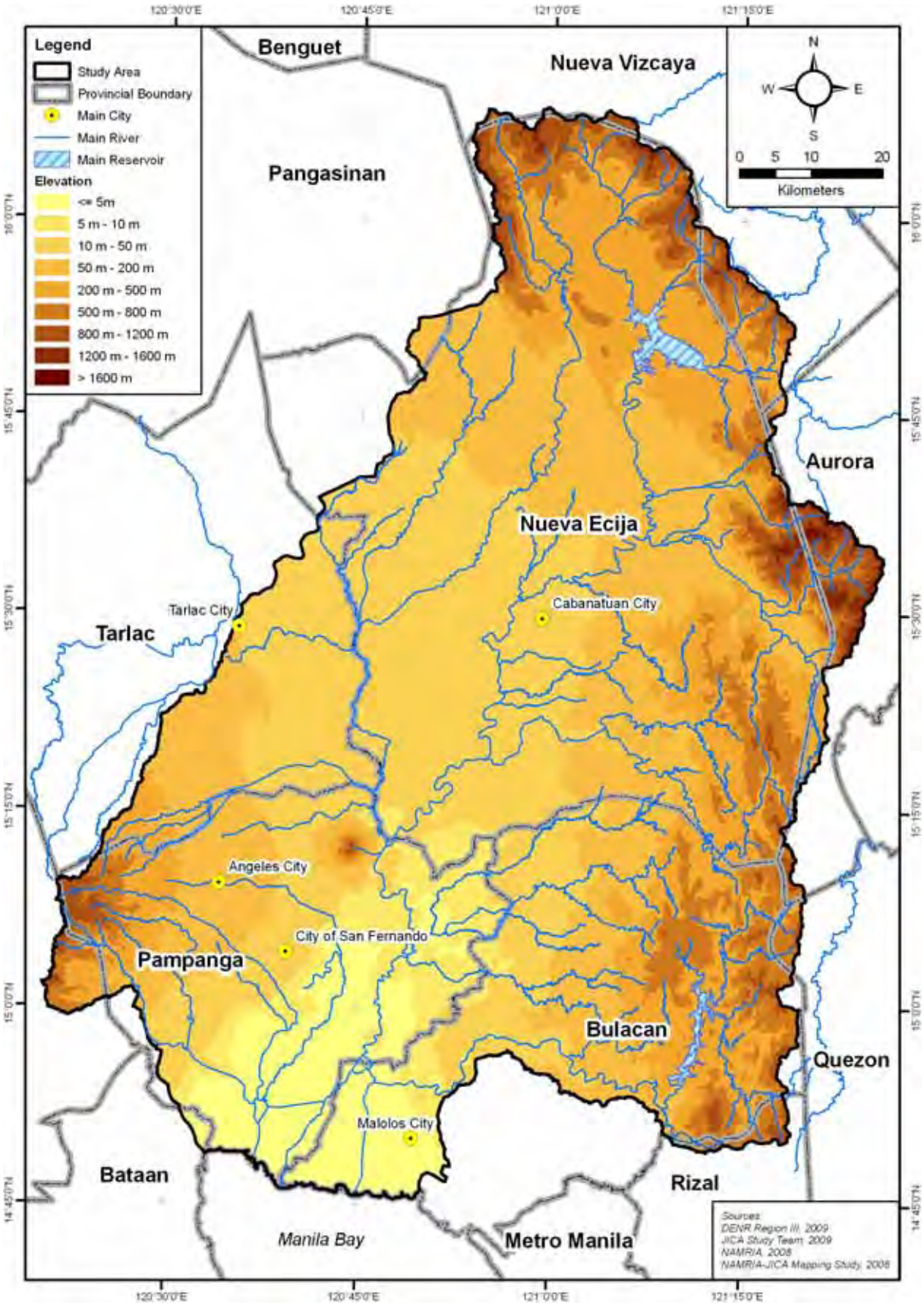
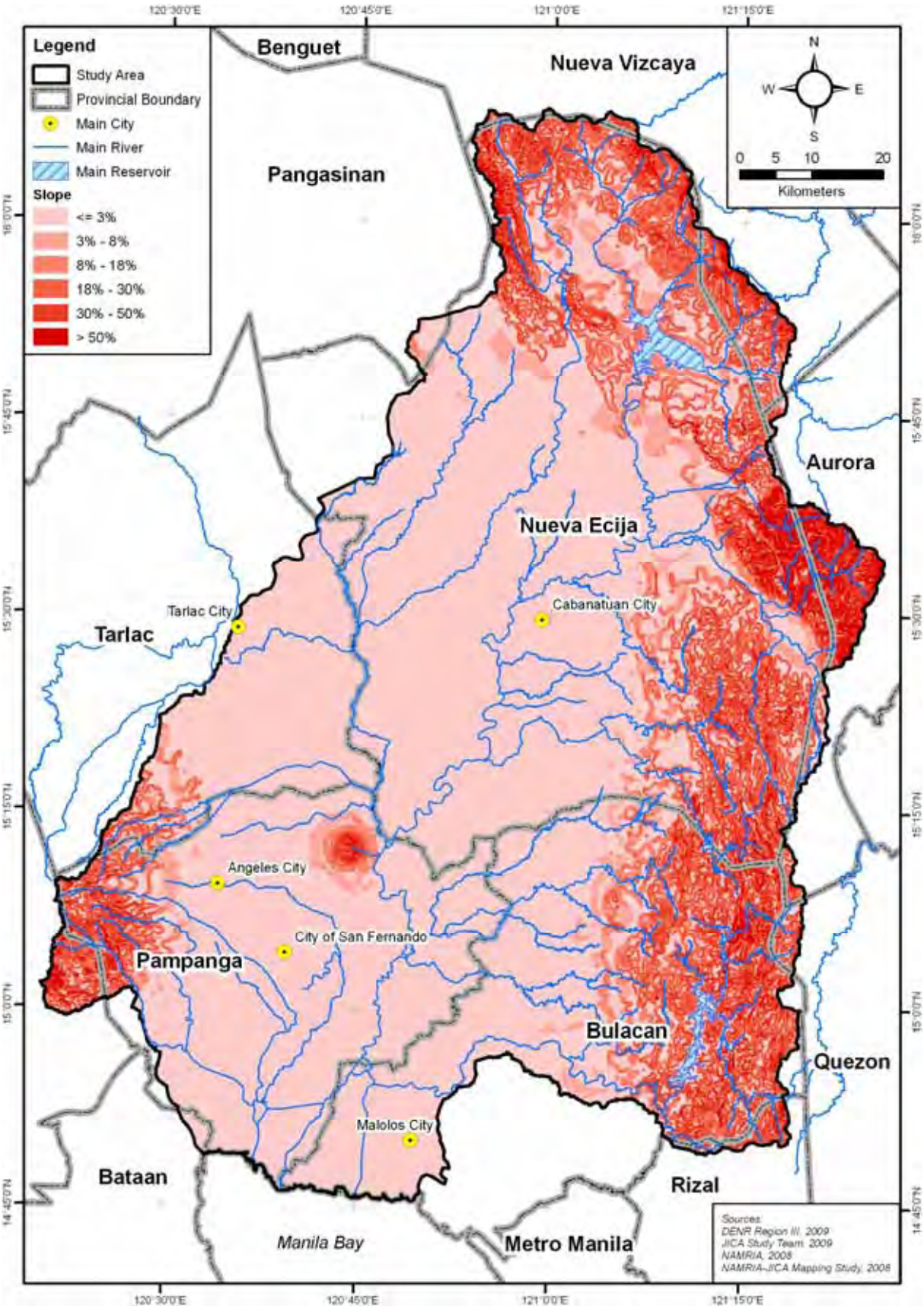
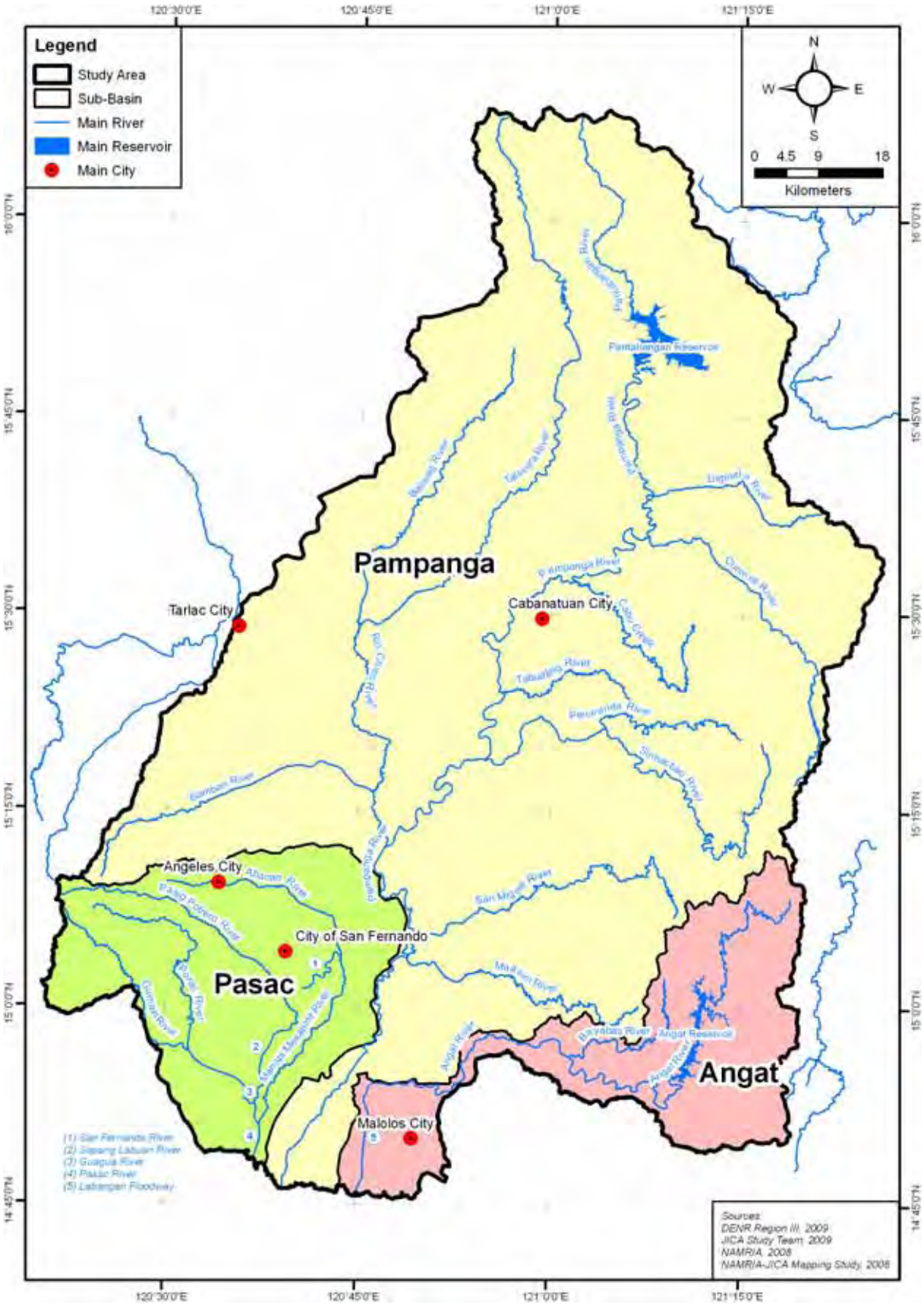
付　図



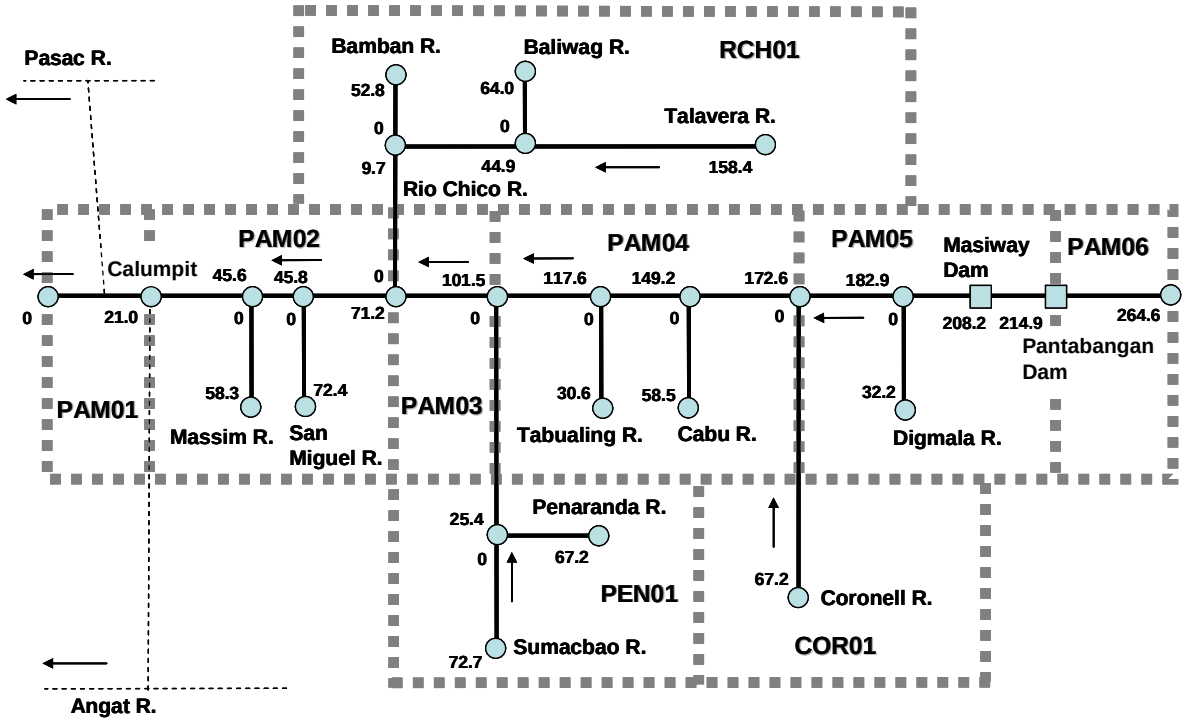
付図 2.1.1　　標高区分分布



付図 2.1.2　　地形勾配区分分布



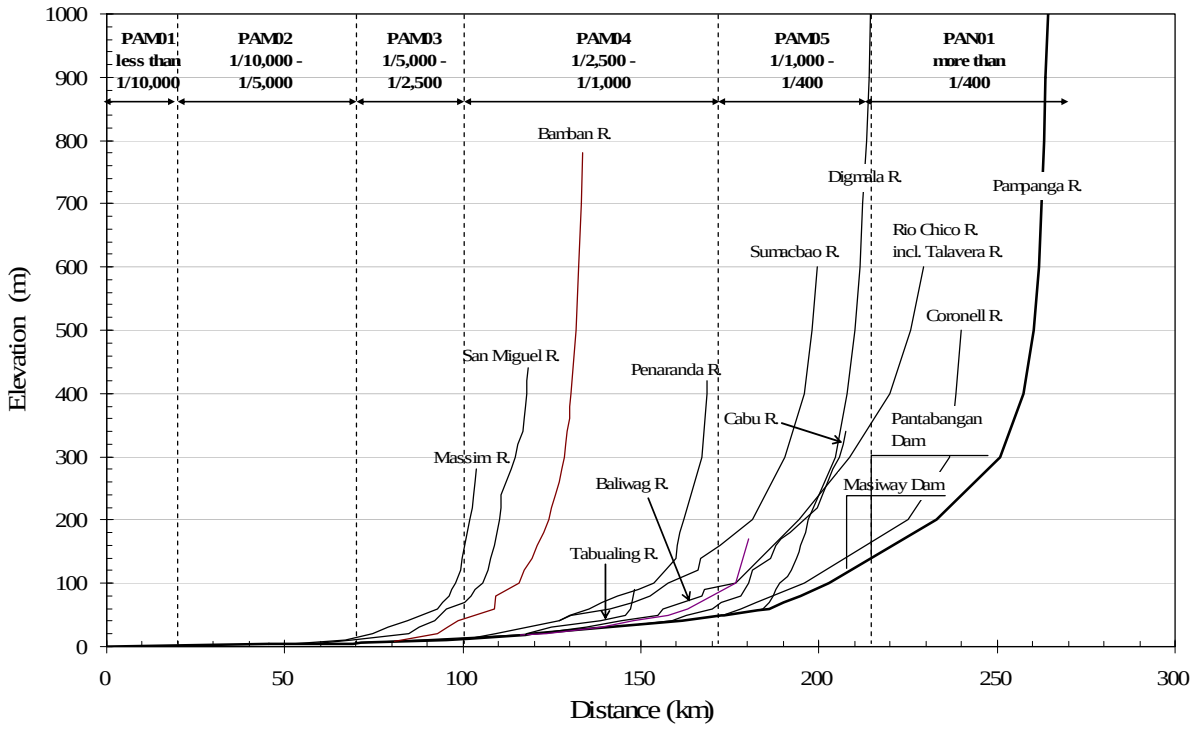
付図 2.2.1　　主要 3 流域位置図



Note: Number shows distance in km from downstream end of a river.

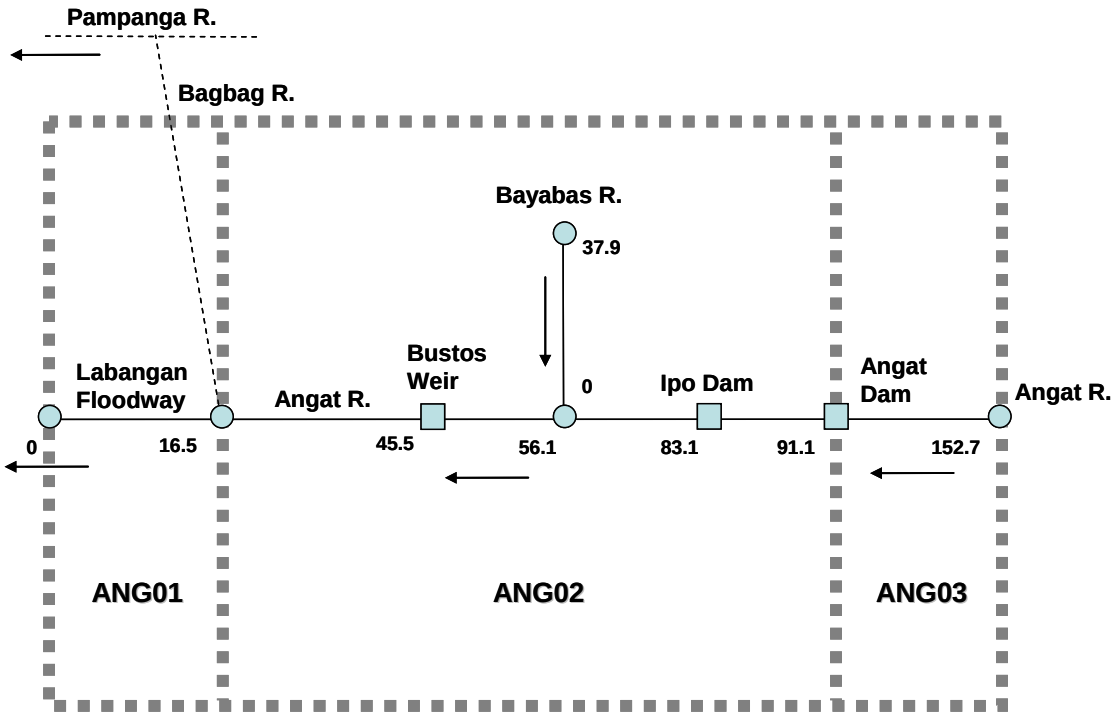
Source: JICA Study Team

付図 2.2.2　　Pampanga 本川システム概略図



Source: JICA Study Team

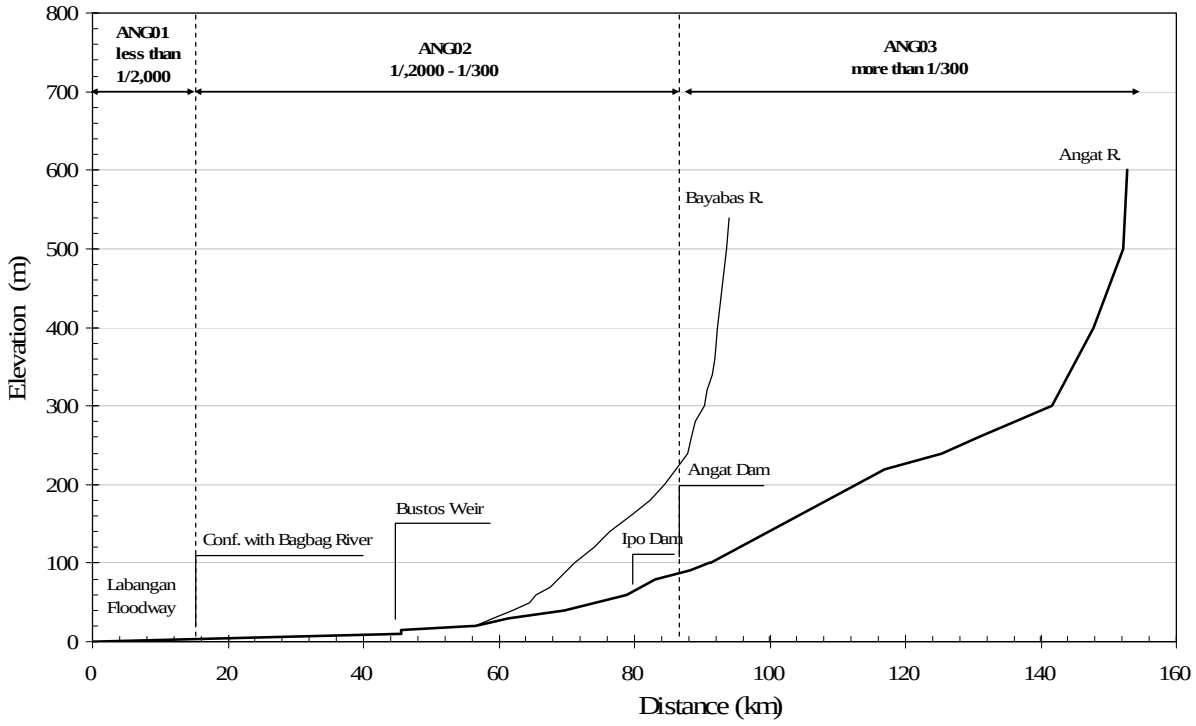
付図 2.2.3　　Pampanga 本川縦断図



Note: Number shows distance in km from downstream end of a river.

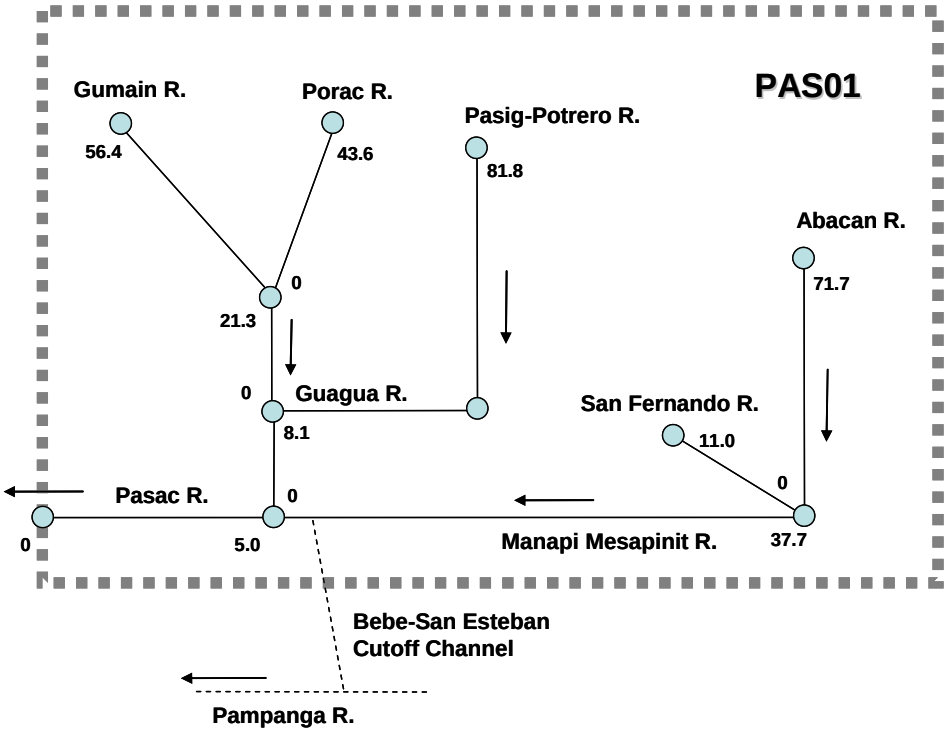
Source: JICA Study Team

付図 2.2.4　　Angat 川システム概略図



Source: JICA Study Team

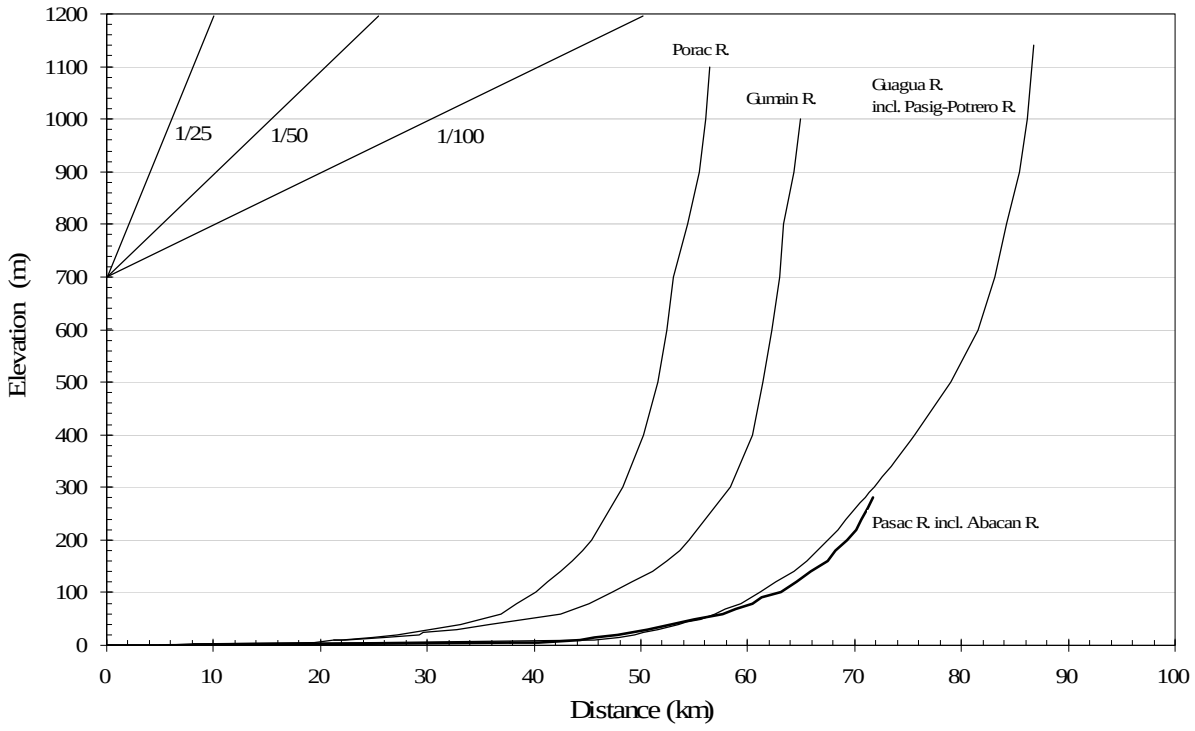
付図 2.2.5　　Angat 川縦断図



Note: Number shows distance in km from downstream end of a river.

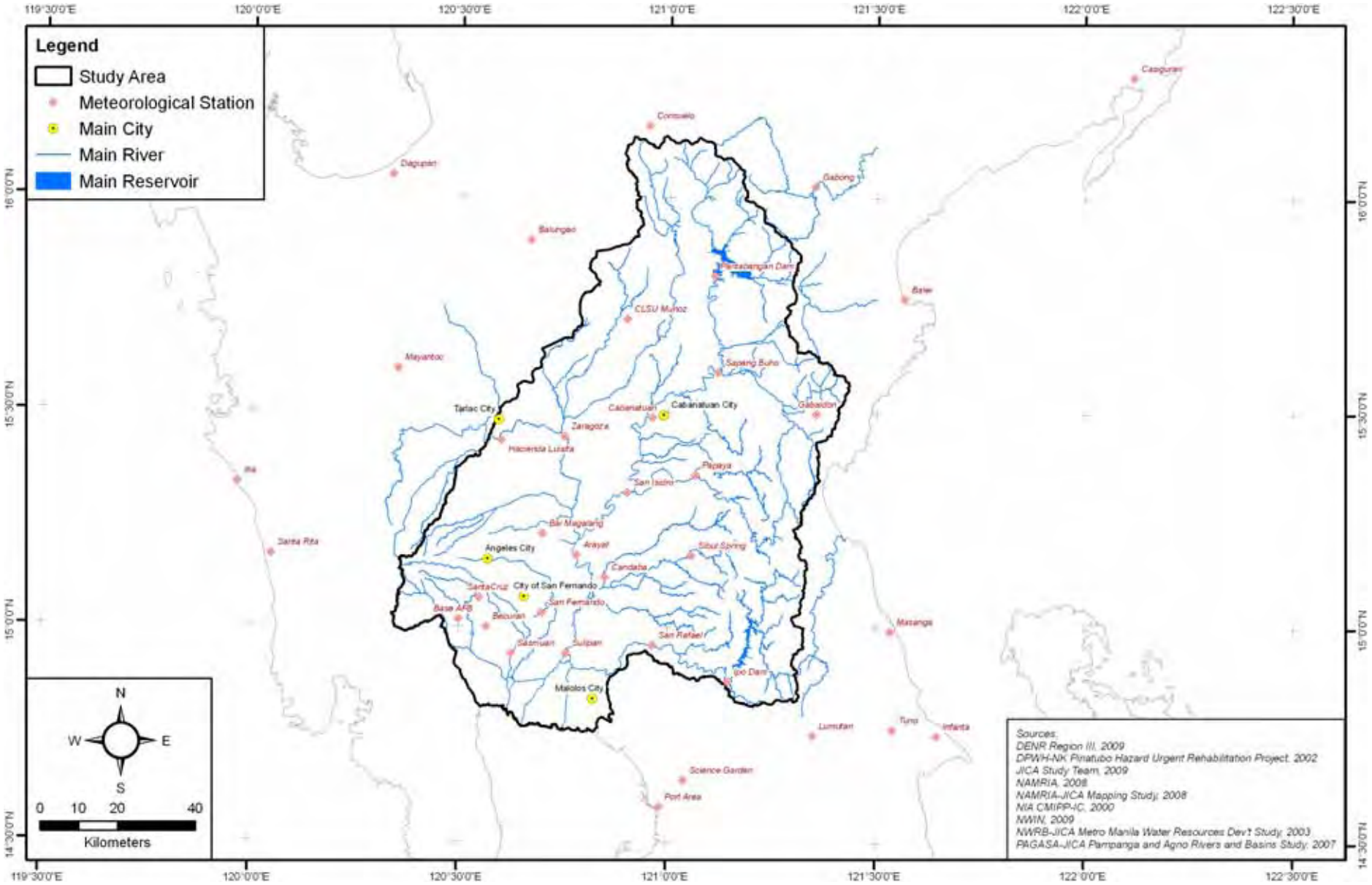
Source: JICA Study Team

付図 2.2.6　　Pasac 川システム概略図

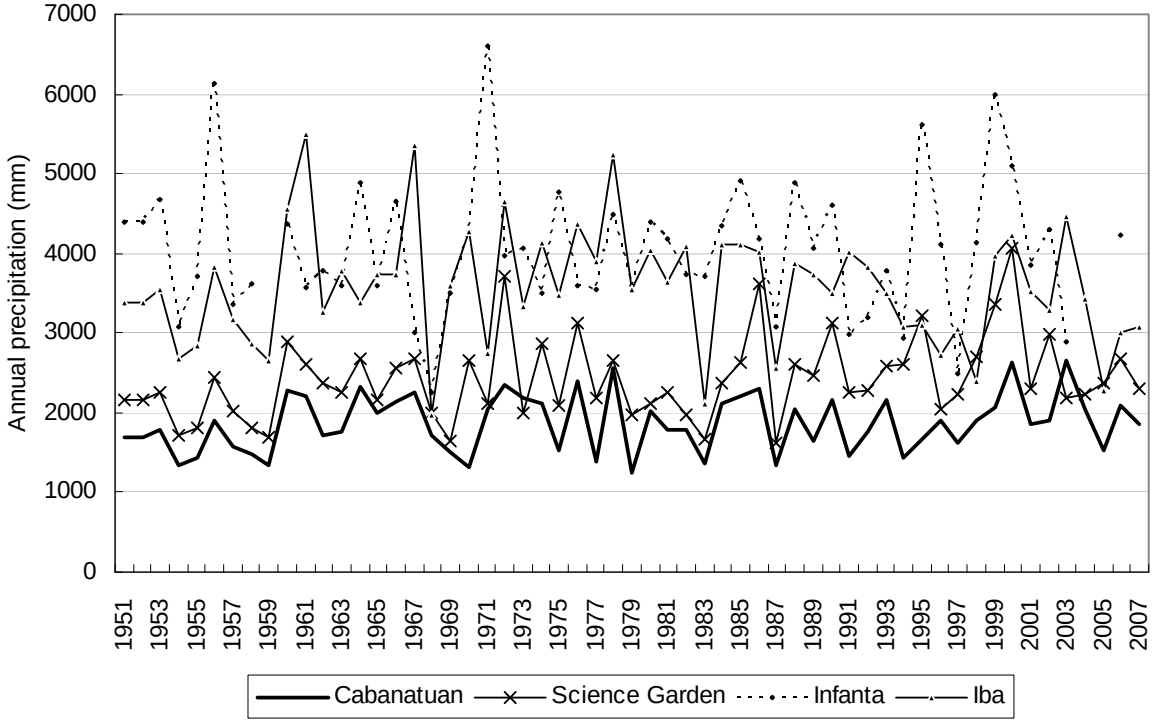


Source: JICA Study Team

付図 2.2.7　　Pasac 川縦断図

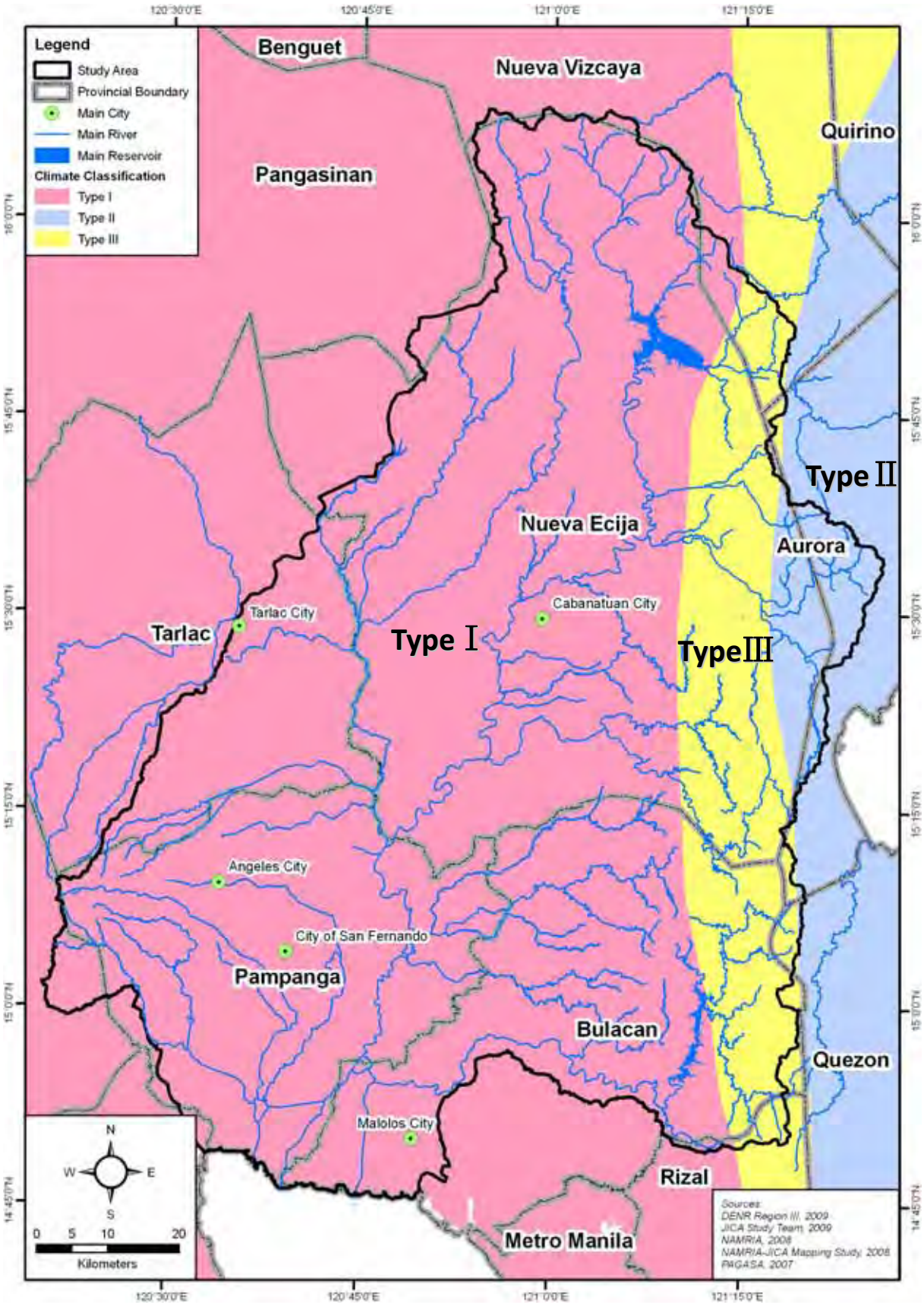


付図 2.3.1　　気象観測所位置図

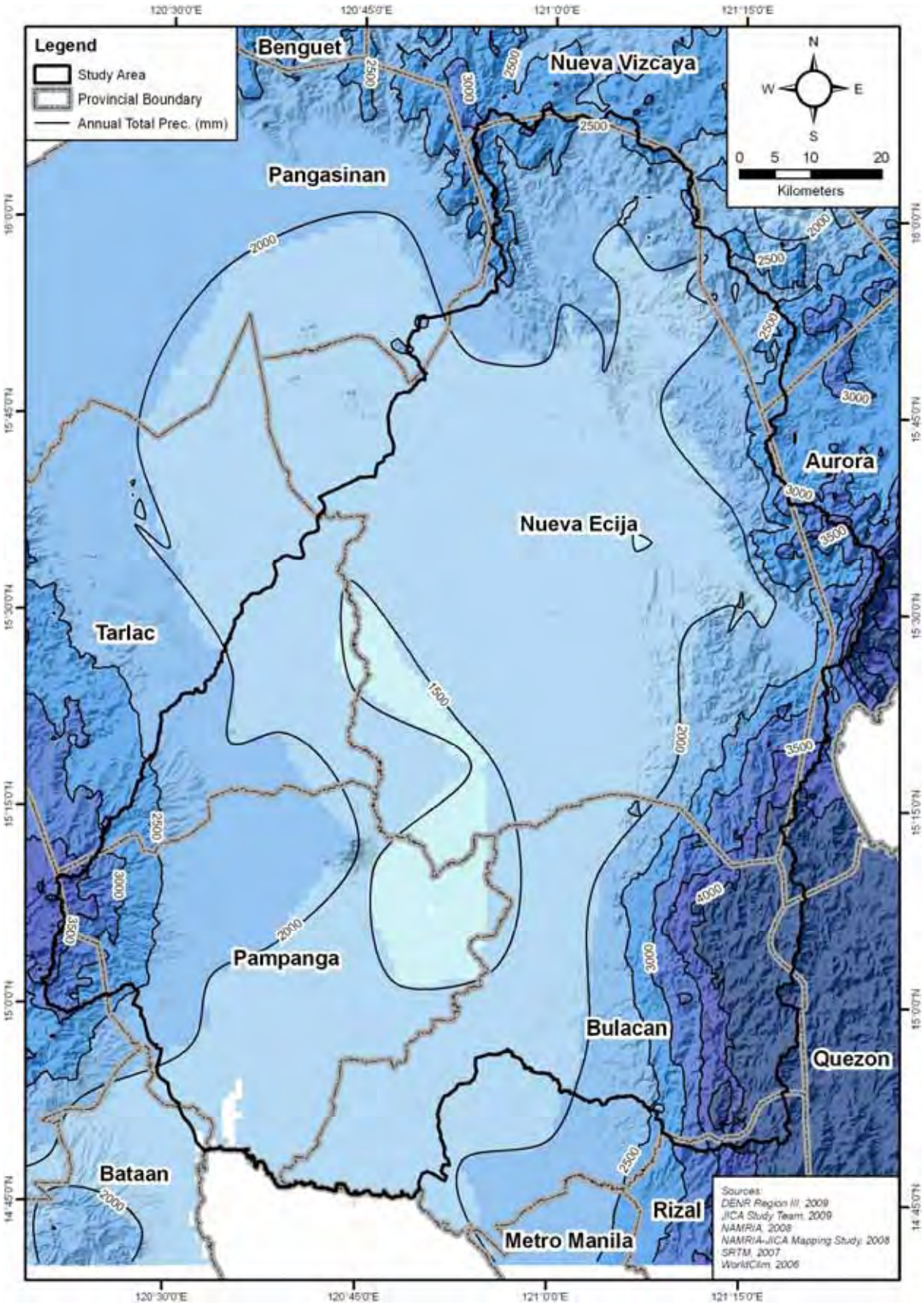


Source: JICA Study Team based on PAGASA data

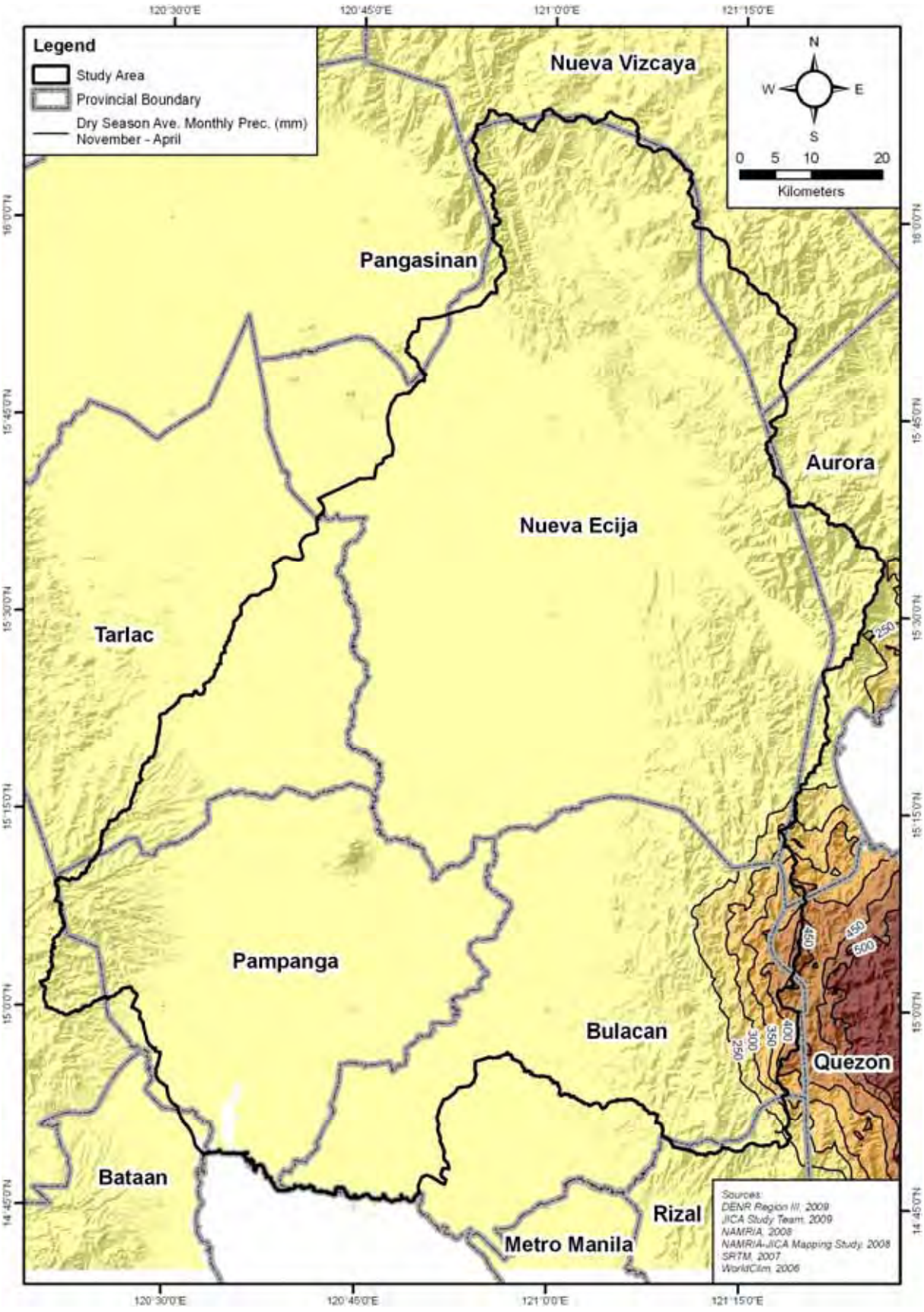
付図 2.3.2　　主要観測所の年降雨量変化



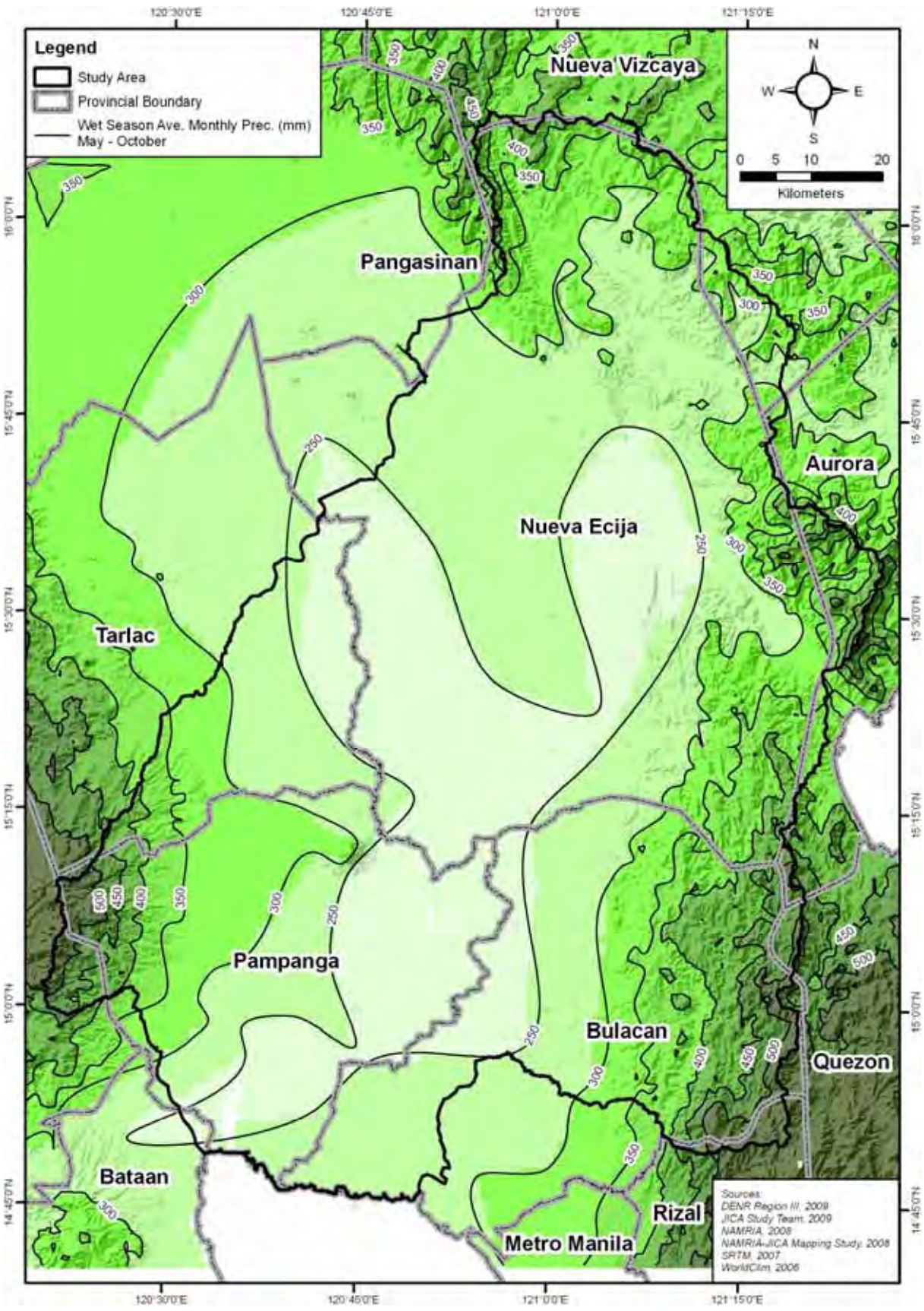
付図 2.3.3　　フィリピン国における気候区分



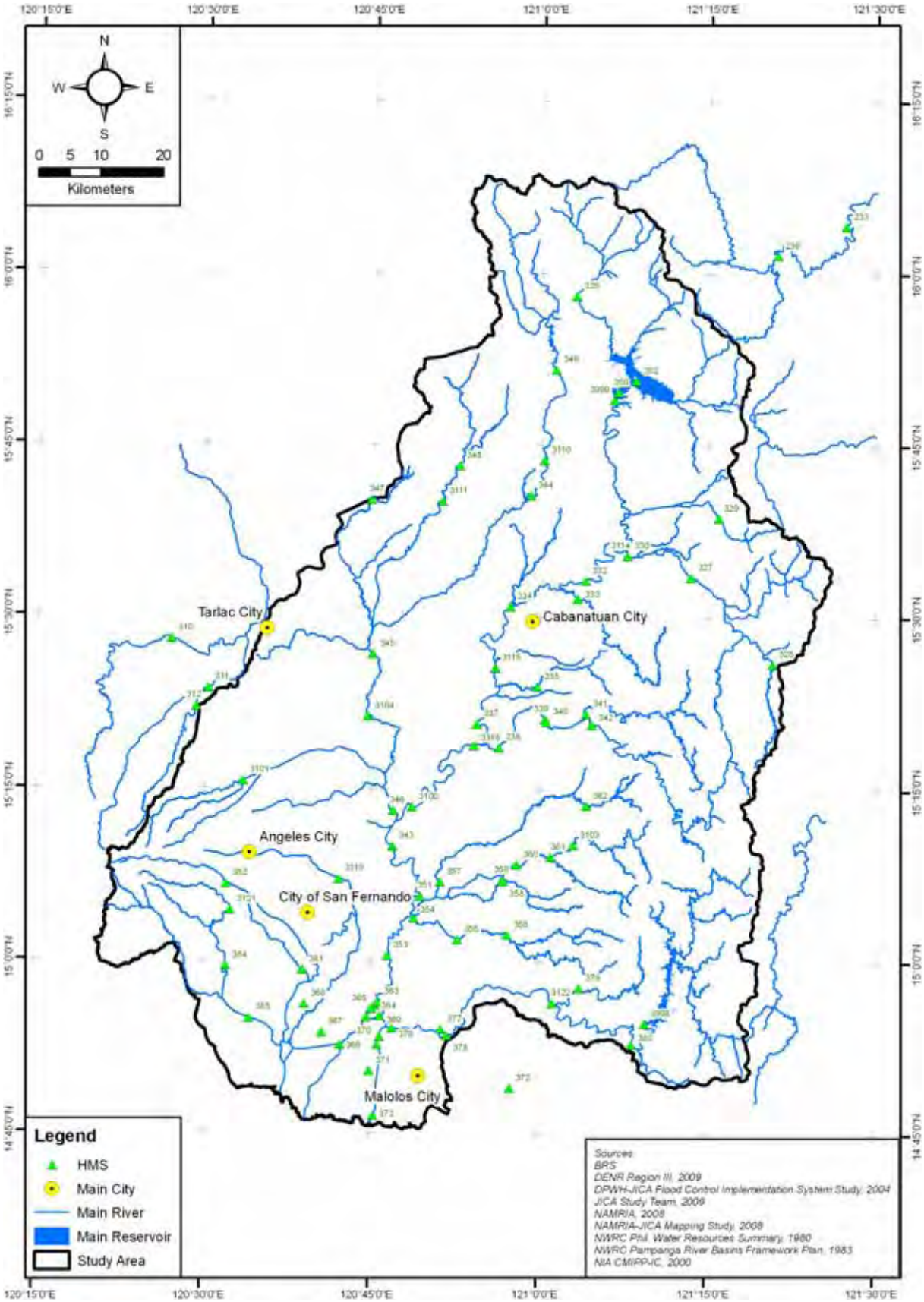
付図 2.3.4　　年降雨量の空間分布



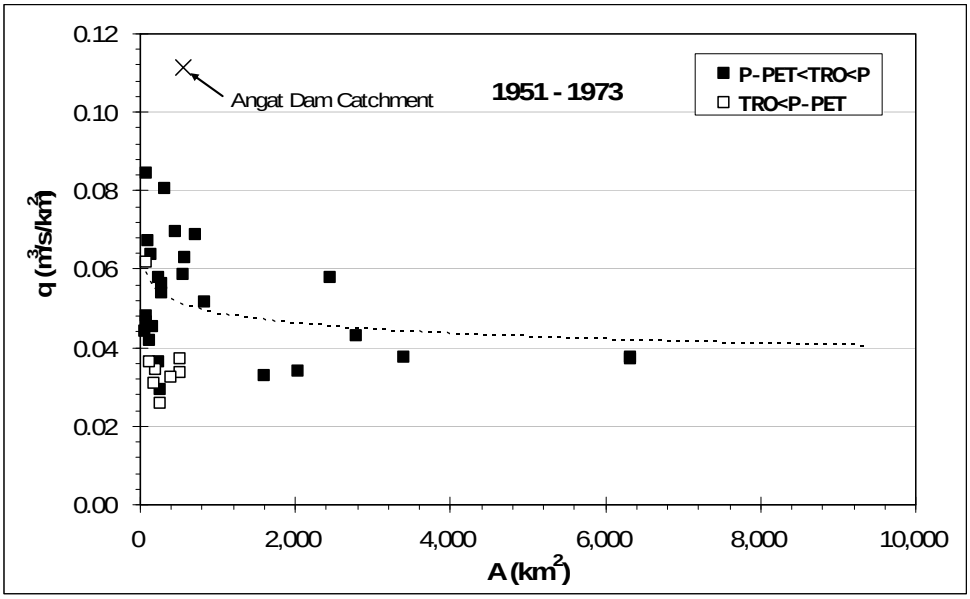
付図 2.3.5　　乾期の降雨量の空間分布

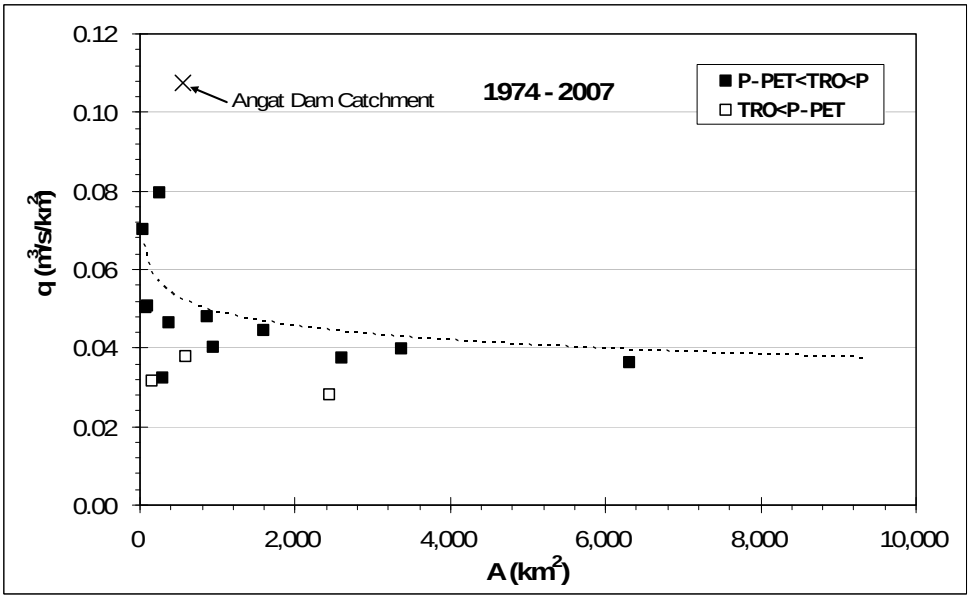


付図 2.3.6　　雨期の降雨量の空間分布



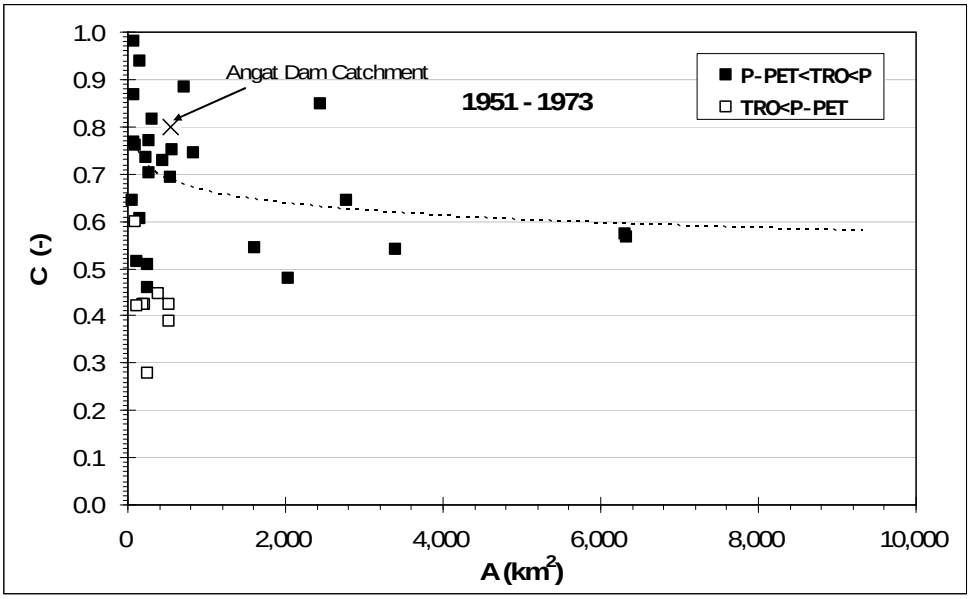
付図 2.4.1　　水文観測所位置図

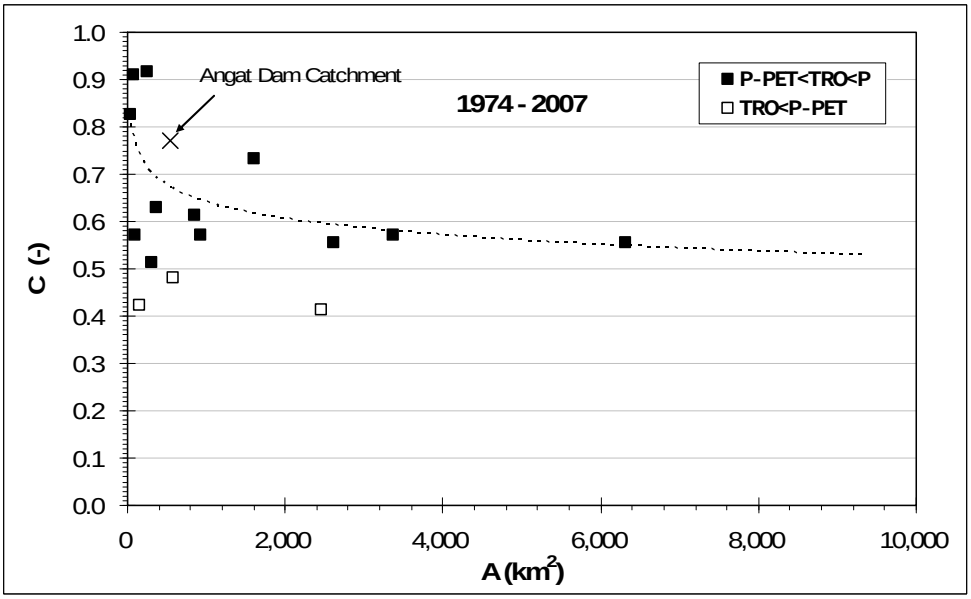




Source: JICA Study Team

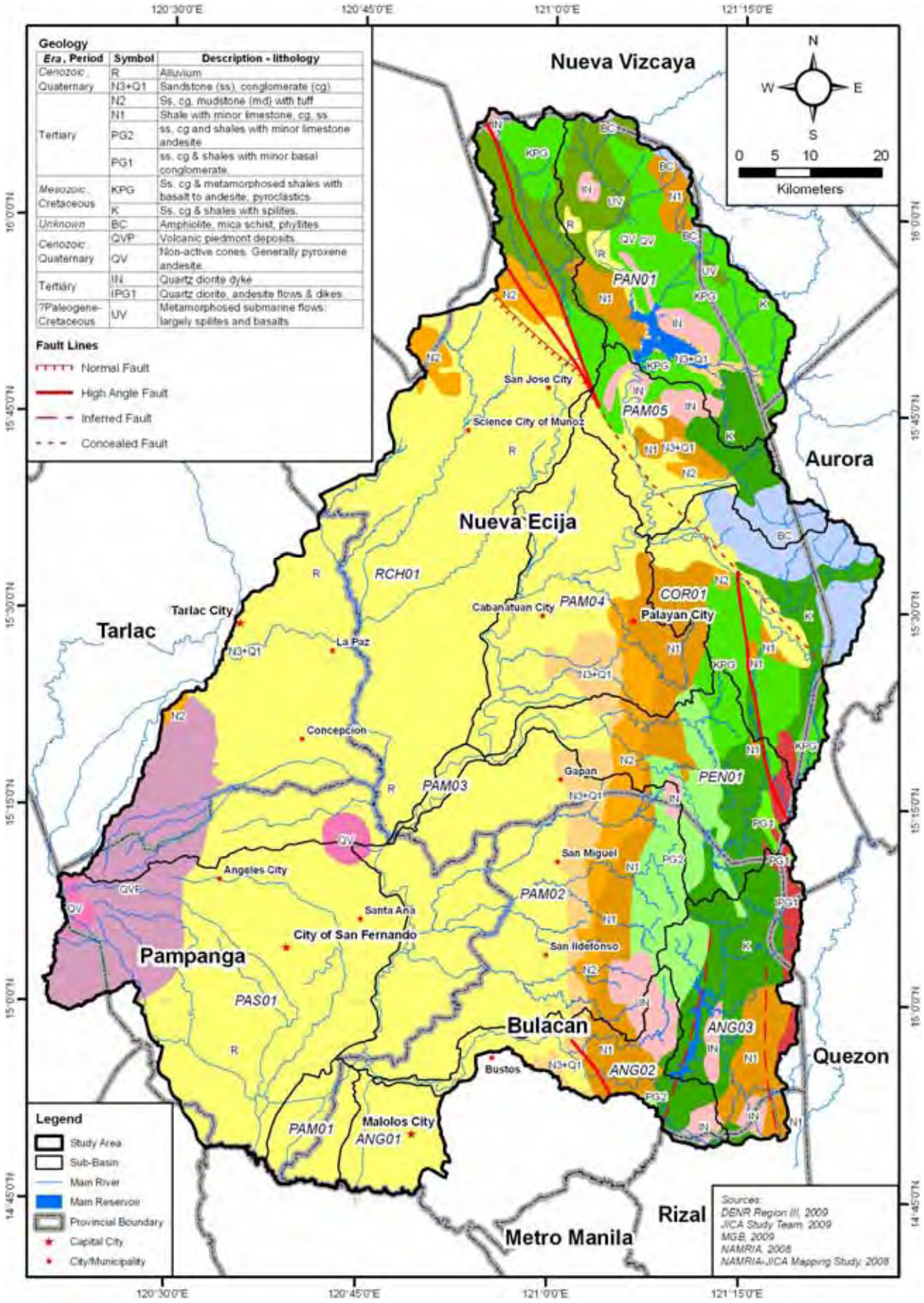
付図 2.4.2　　比流量と集水面積の関係



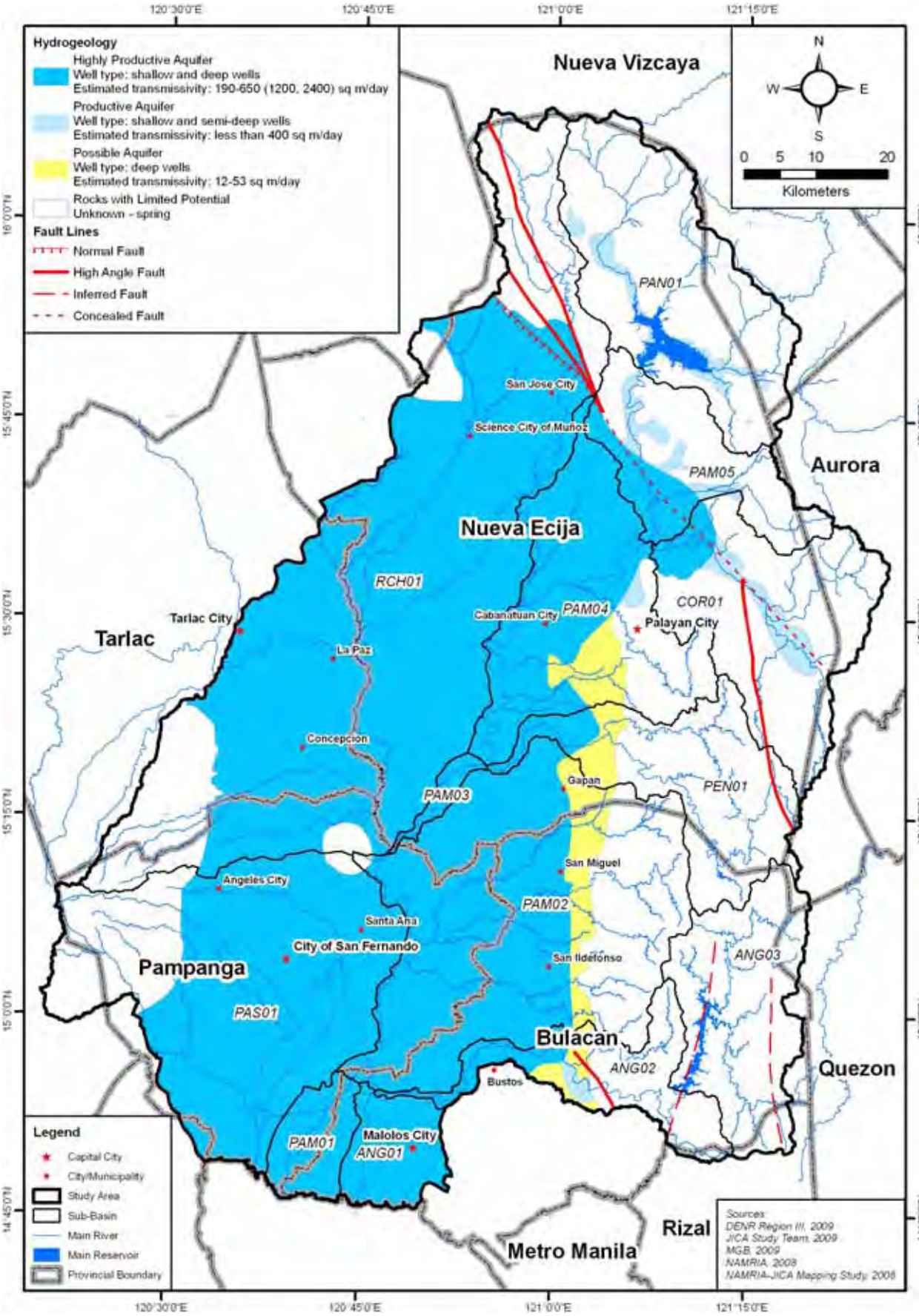


Source: JICA Study Team

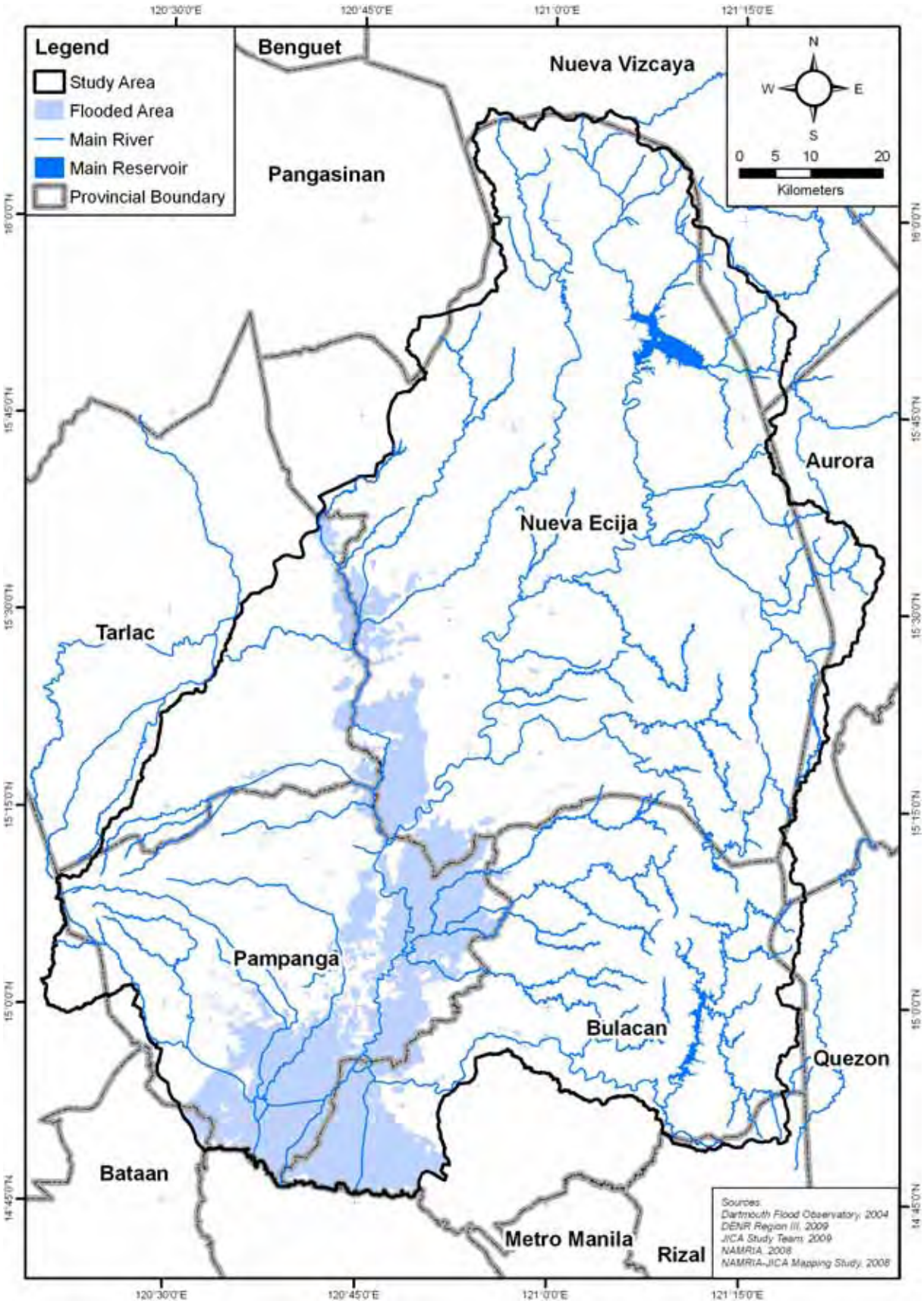
付図 2.4.3　　流出率と集水面積の関係



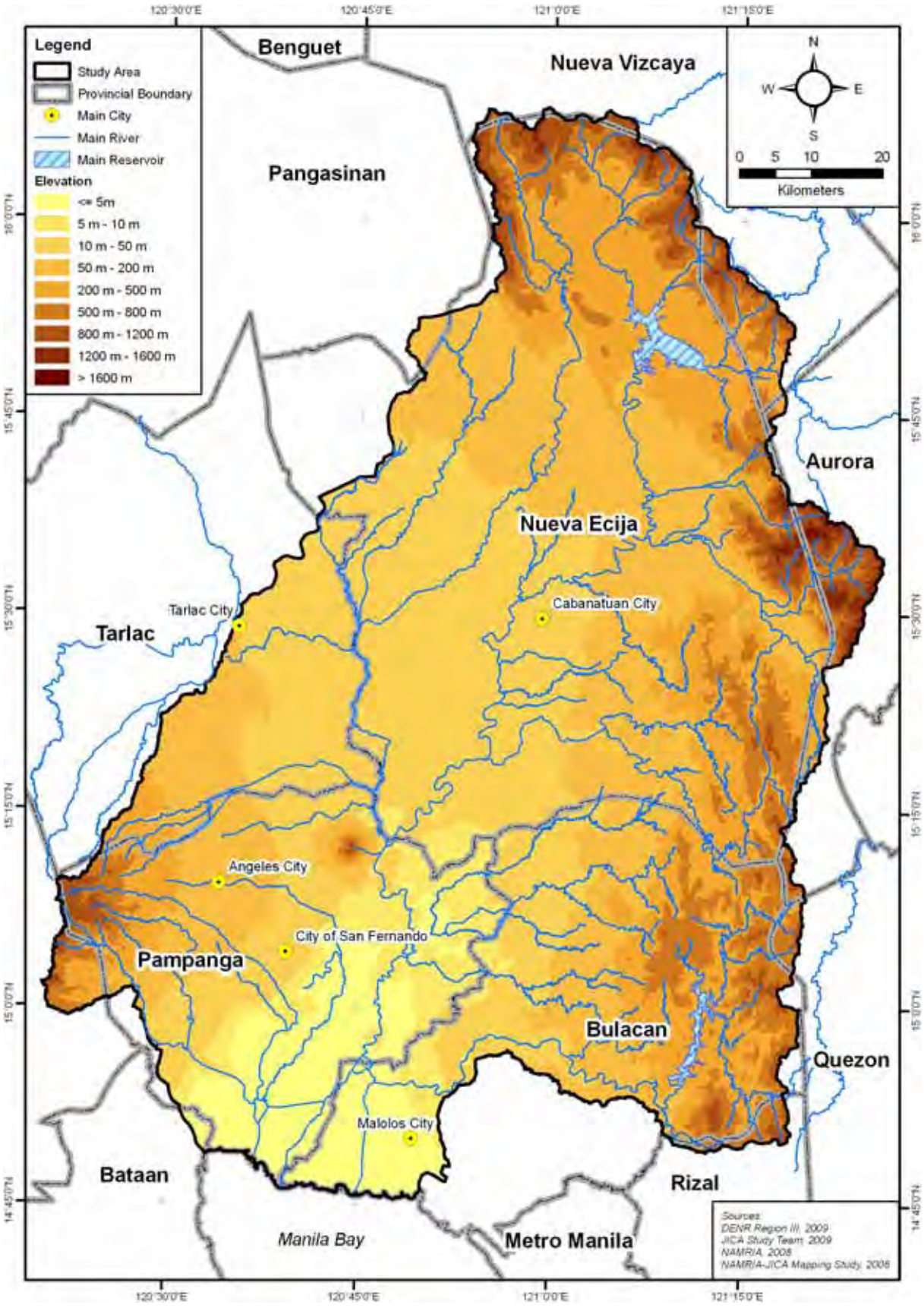
付図 2.5.1　　調査地域の地質図



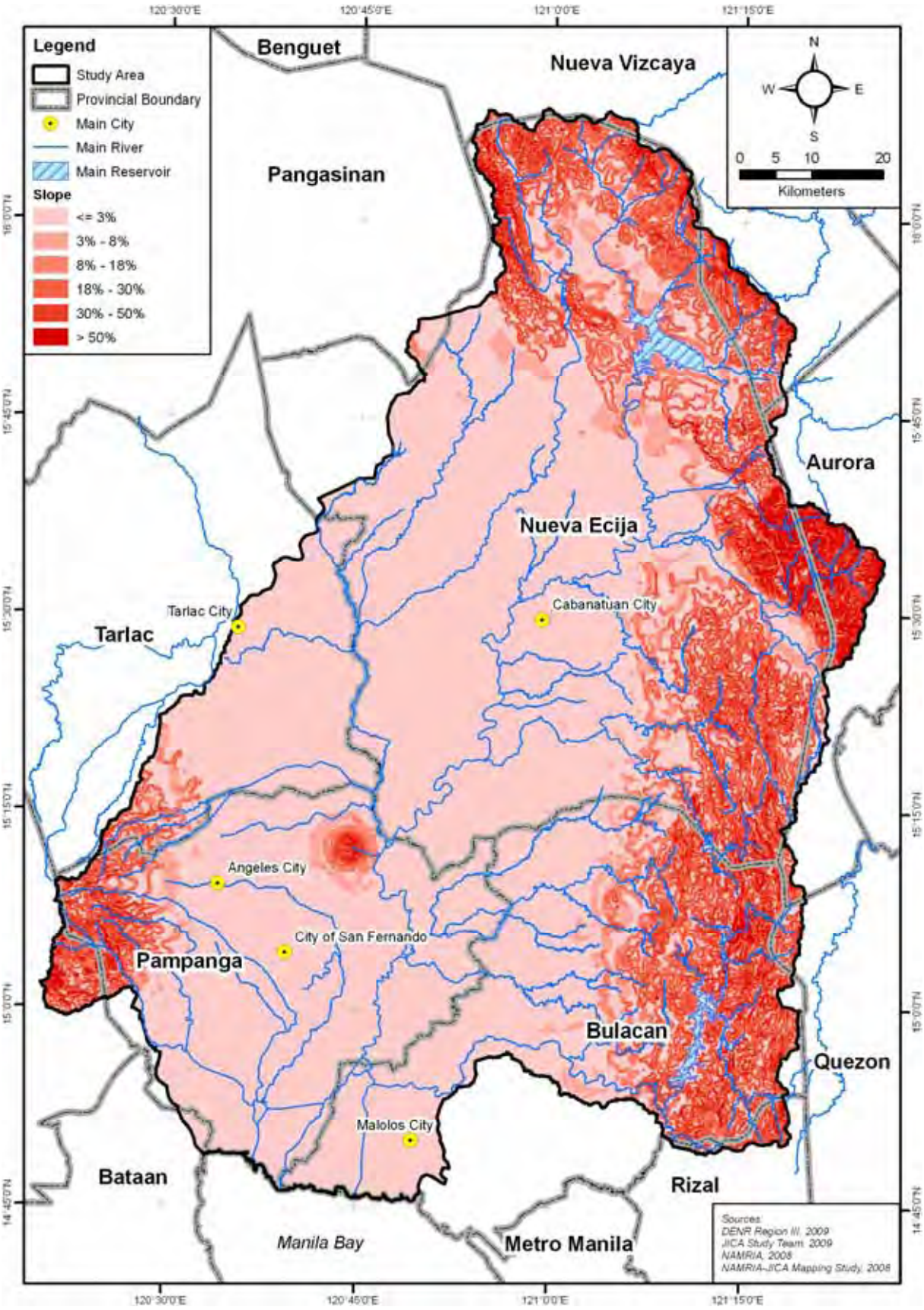
付図 2.6.1　　調査地域の水理地質図



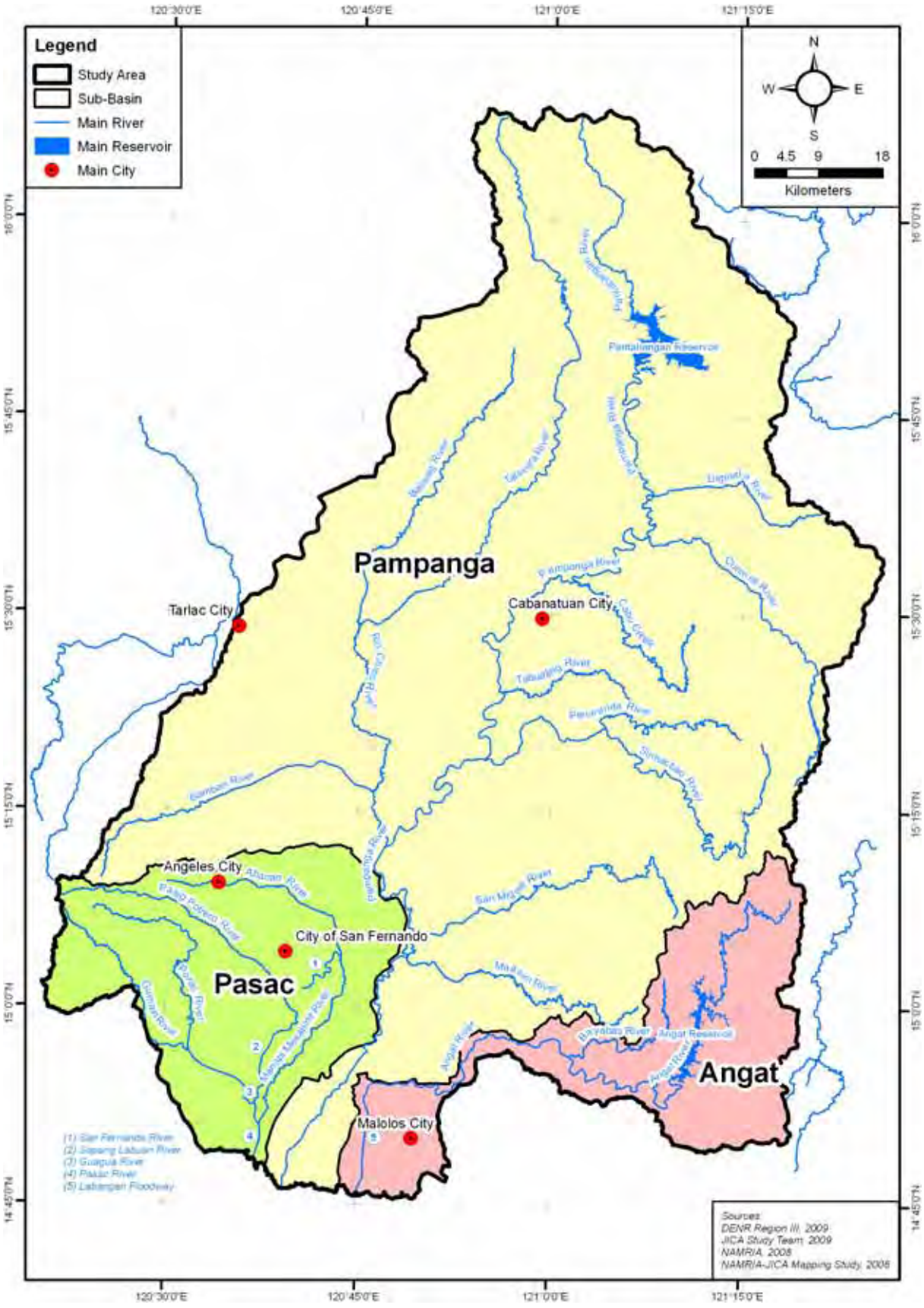
付図 2.10.1　　2004 年 8 月台風 Marce による洪水氾濫域



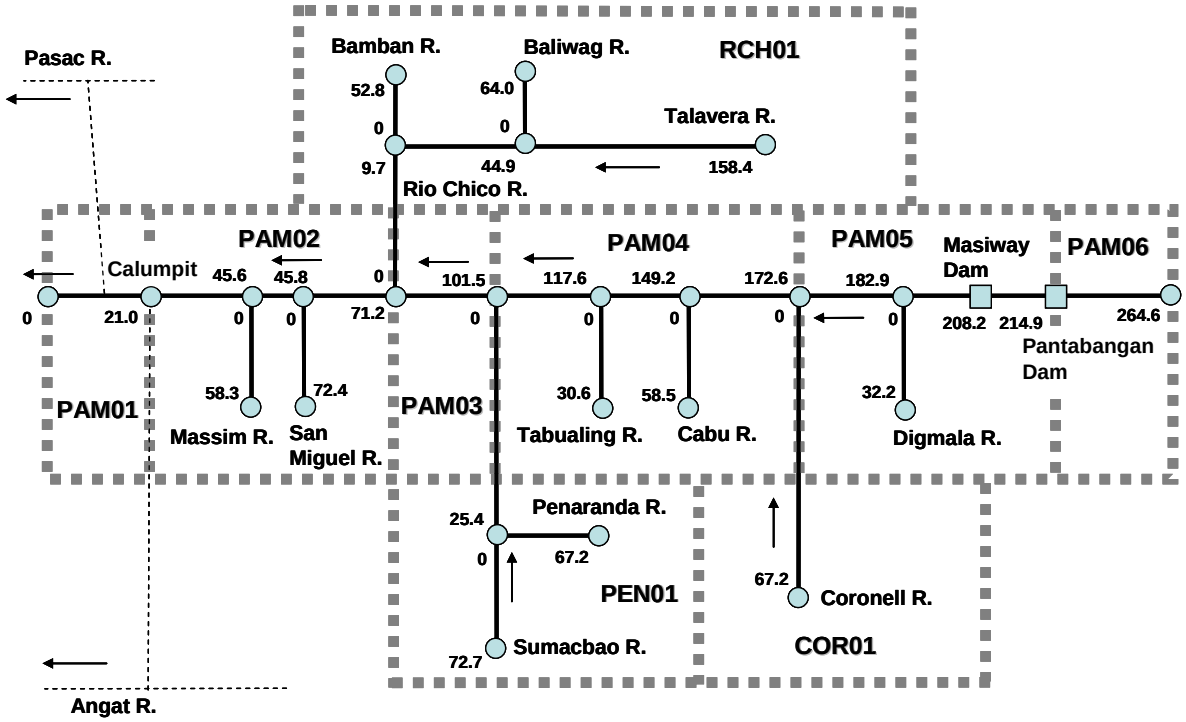
付図 2.1.1　　標高区分分布



付図 2.1.2　　地形勾配区分分布



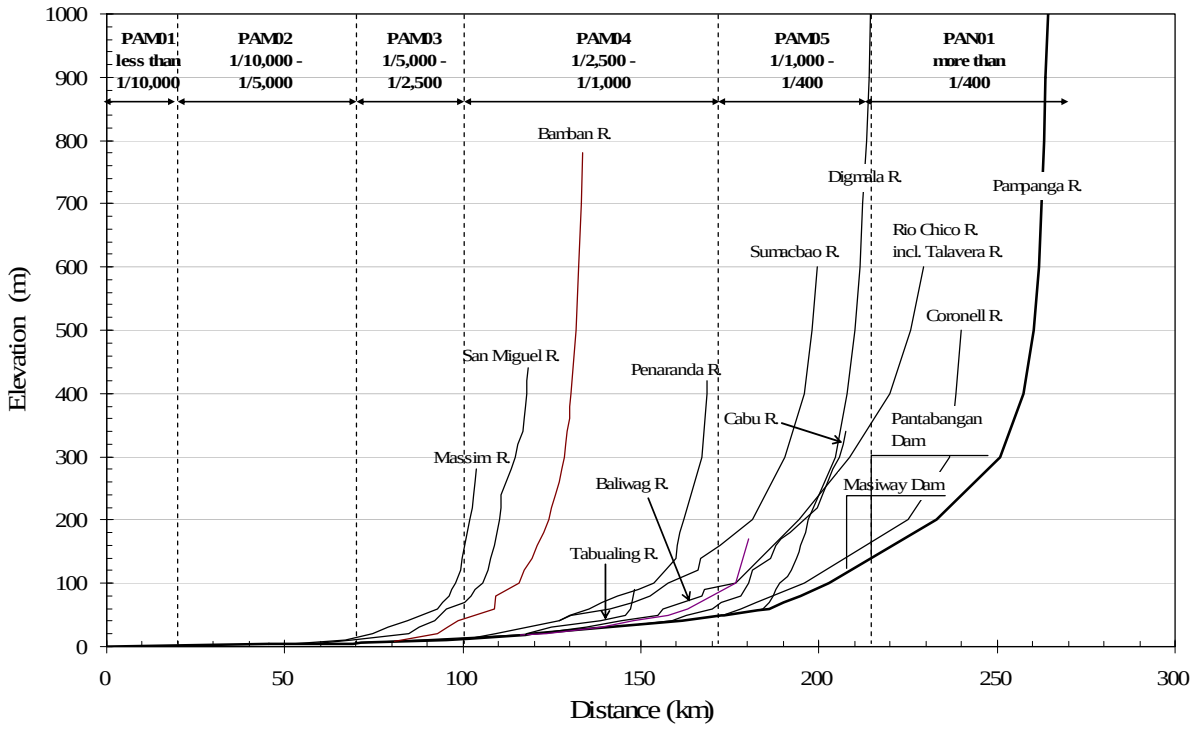
付図 2.2.1　　主要 3 流域位置図



Note: Number shows distance in km from downstream end of a river.

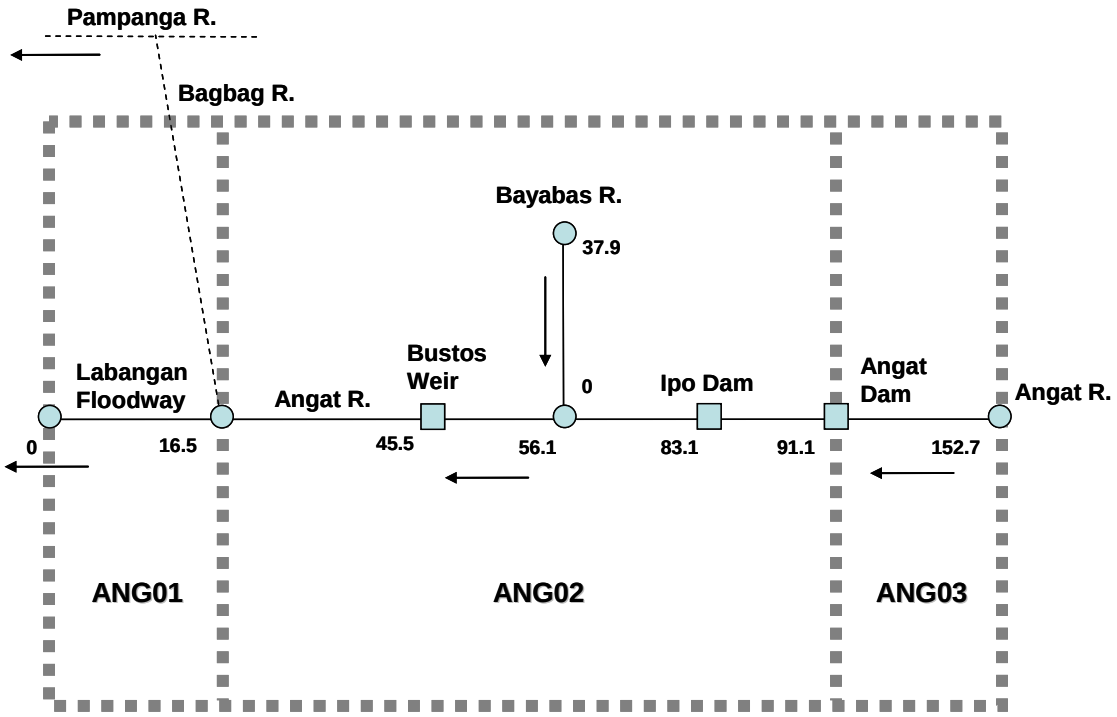
Source: JICA Study Team

付図 2.2.2　　Pampanga 本川システム概略図



Source: JICA Study Team

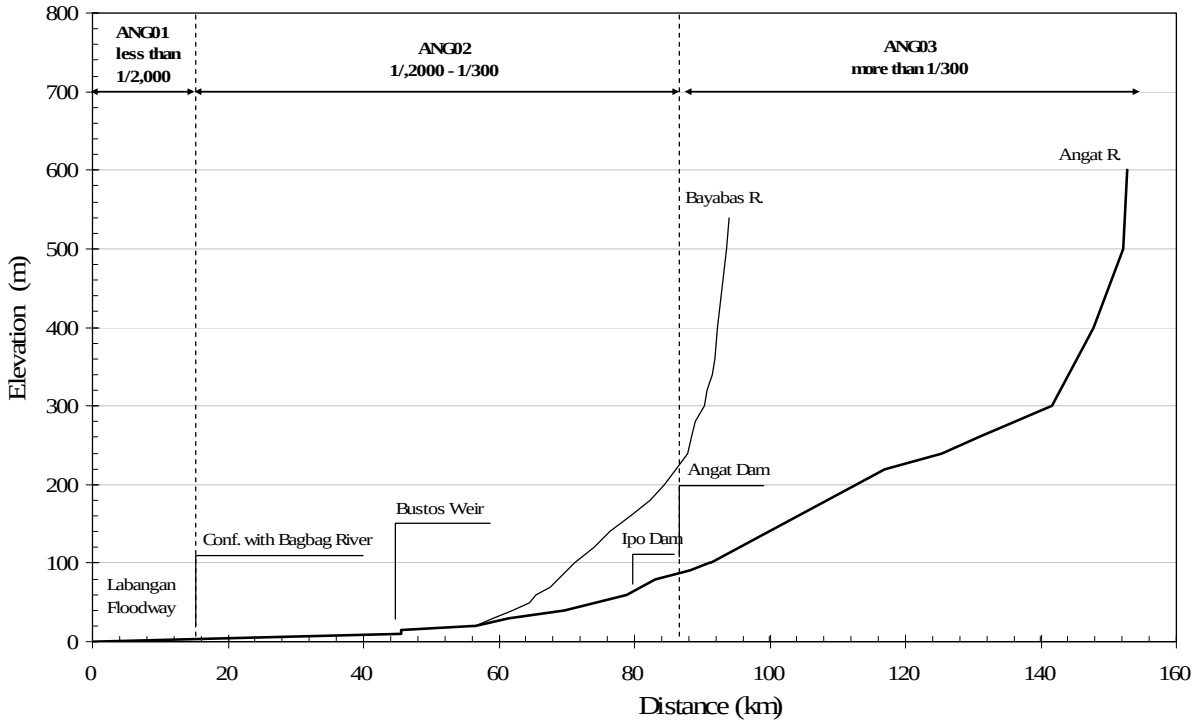
付図 2.2.3　　Pampanga 本川縦断図



Note: Number shows distance in km from downstream end of a river.

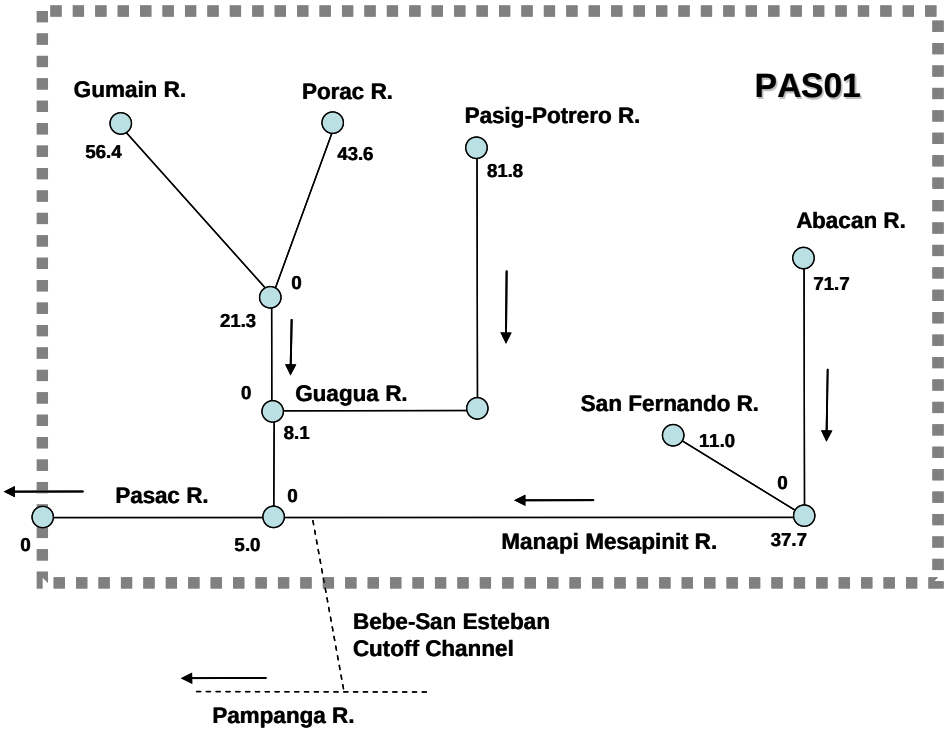
Source: JICA Study Team

付図 2.2.4　　Angat 川システム概略図



Source: JICA Study Team

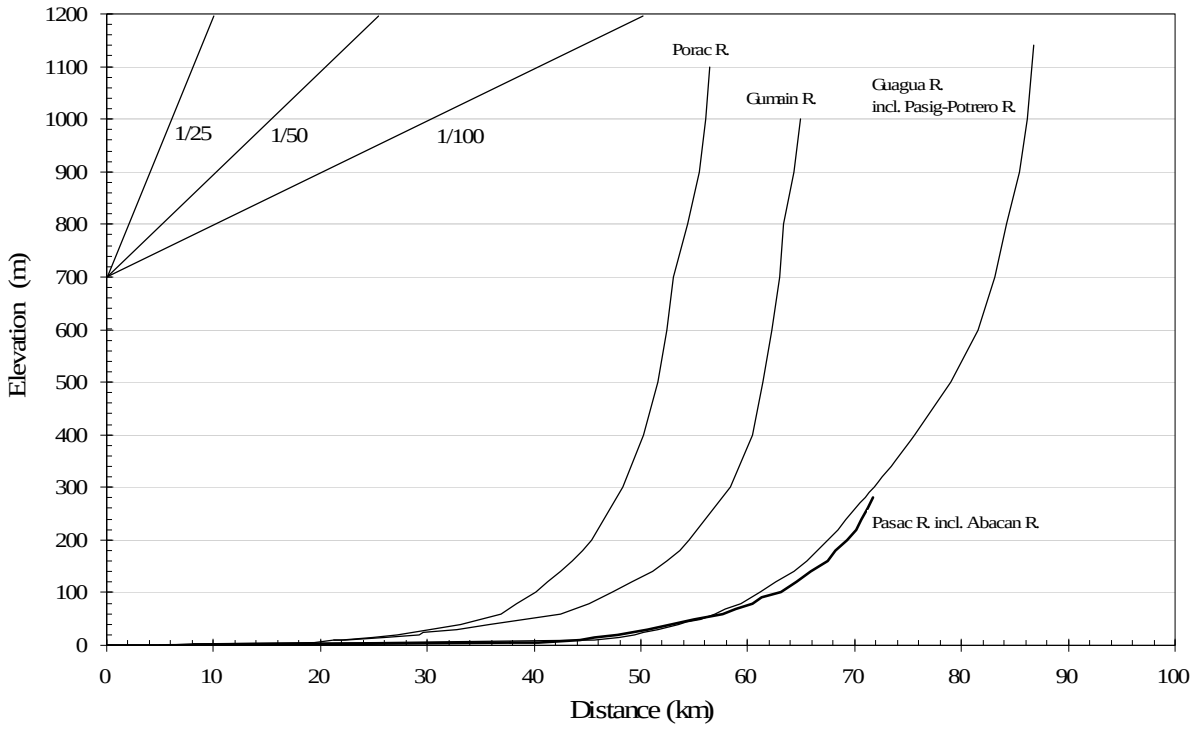
付図 2.2.5　　Angat 川縦断図



Note: Number shows distance in km from downstream end of a river.

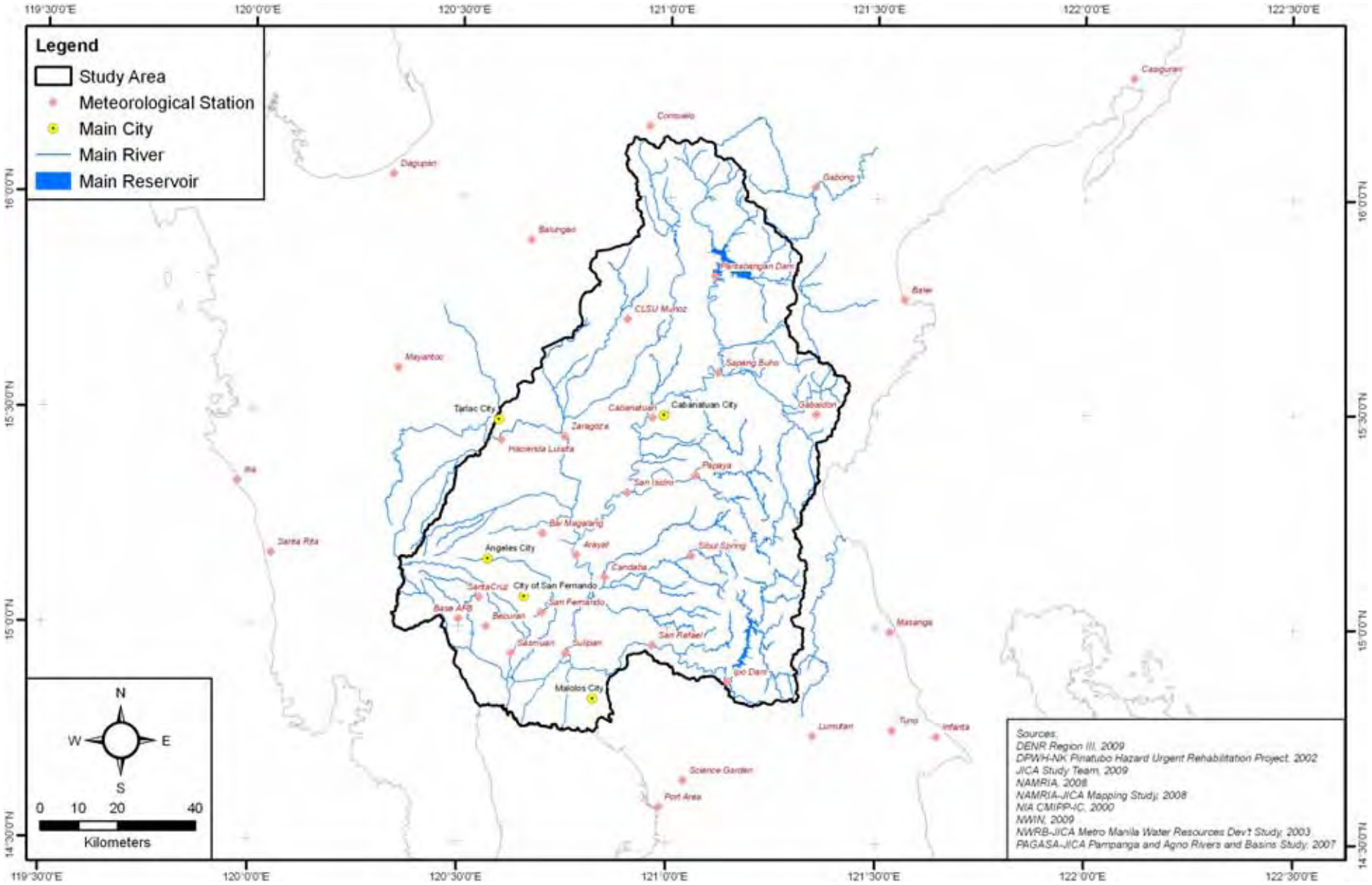
Source: JICA Study Team

付図 2.2.6　　Pasac 川システム概略図

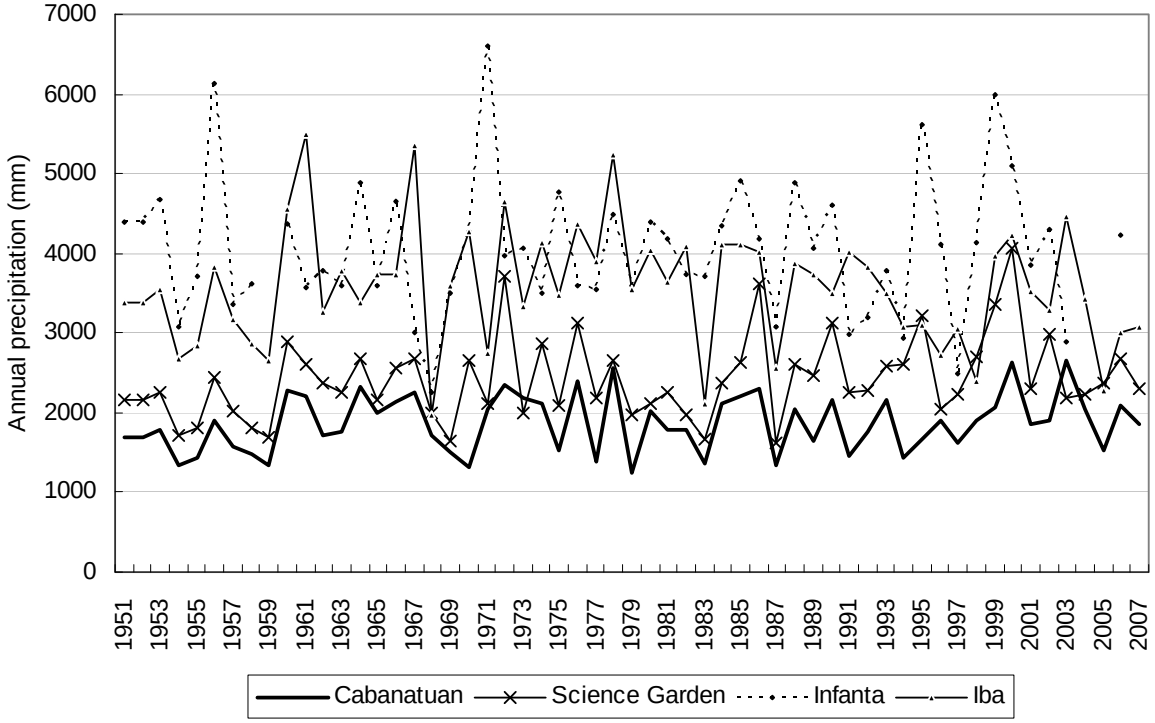


Source: JICA Study Team

付図 2.2.7　　Pasac 川縦断図

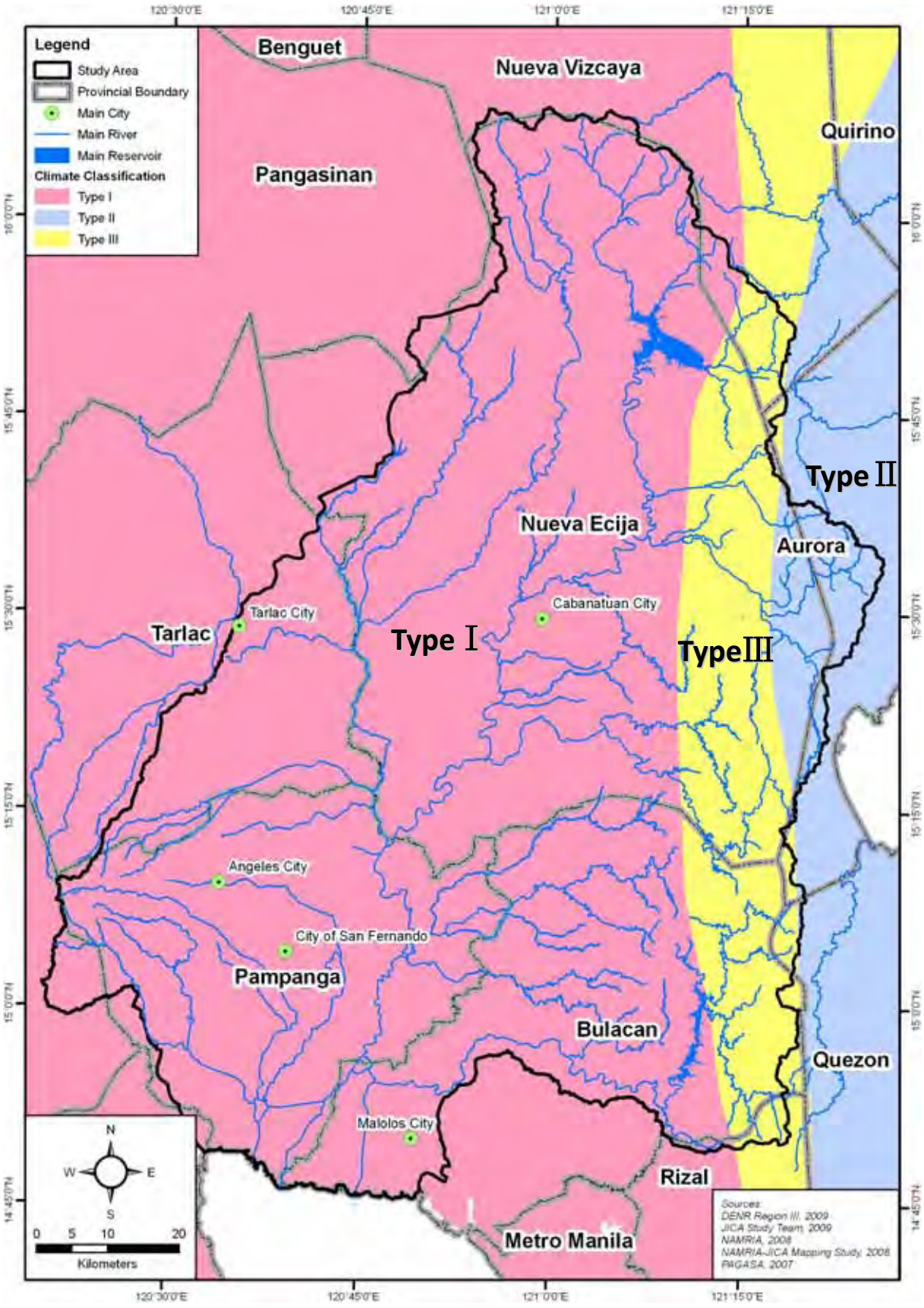


付図 2.3.1　　気象観測所位置図

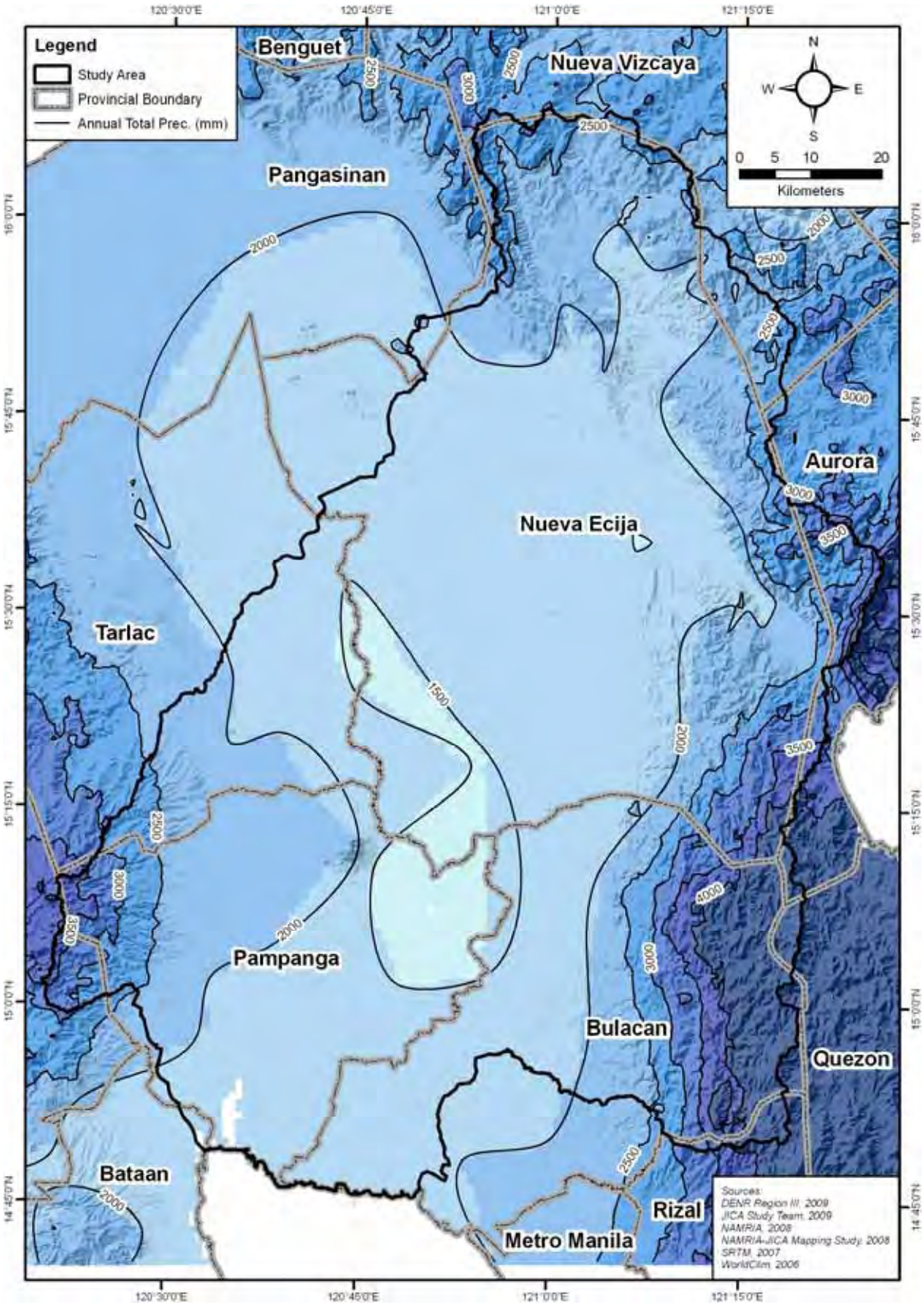


Source: JICA Study Team based on PAGASA data

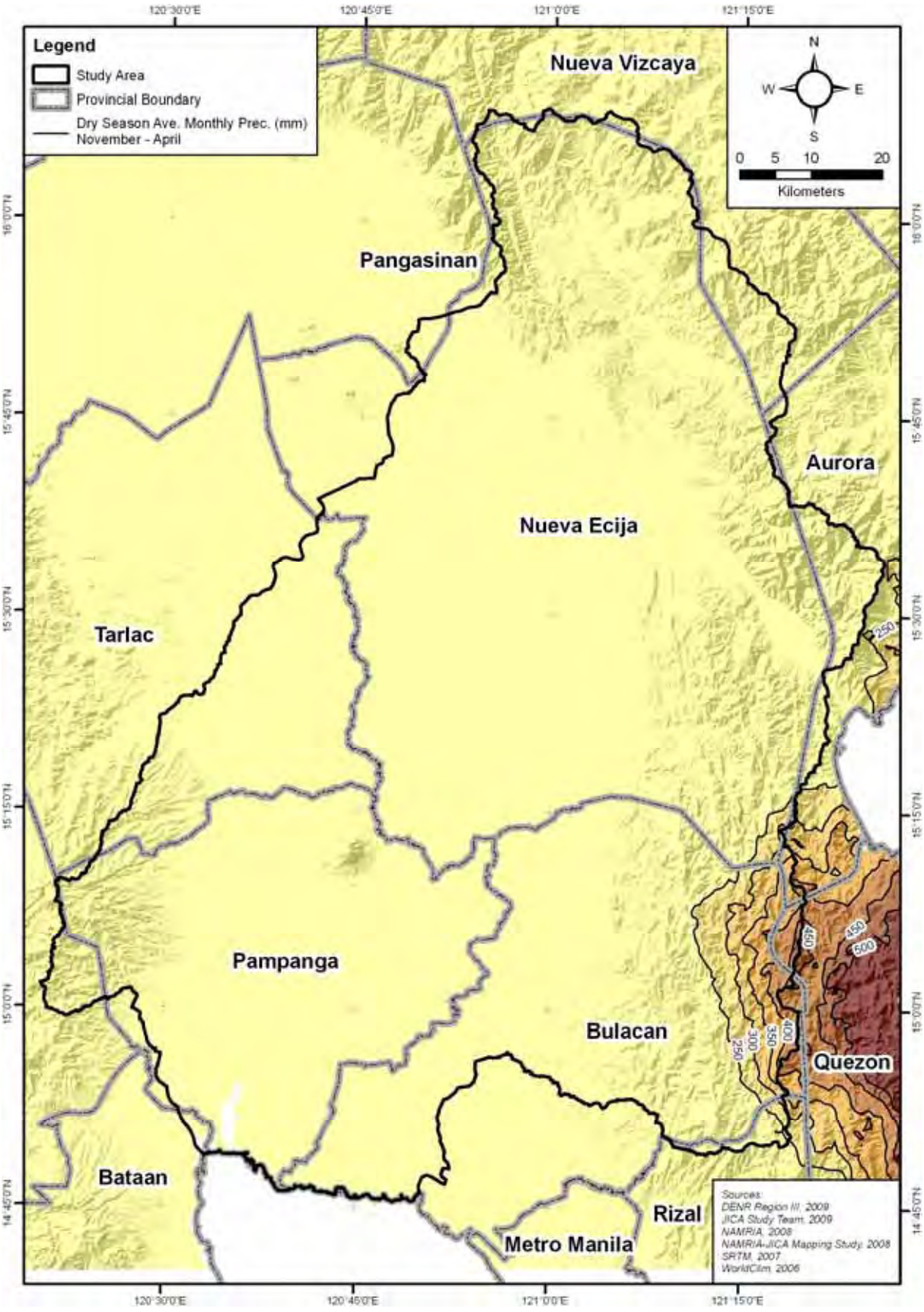
付図 2.3.2　　主要観測所の年降雨量変化



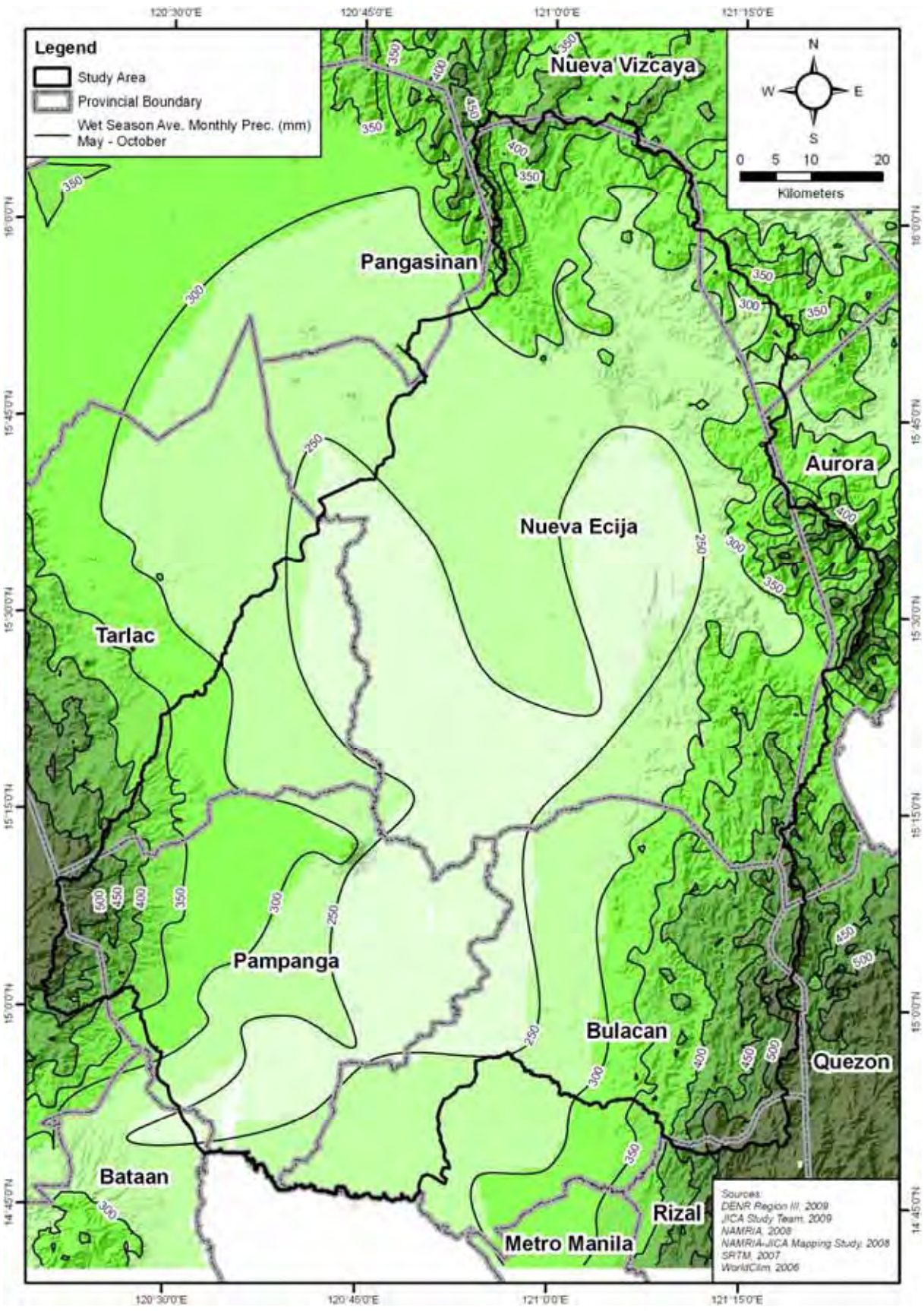
付図 2.3.3　　フィリピン国における気候区分



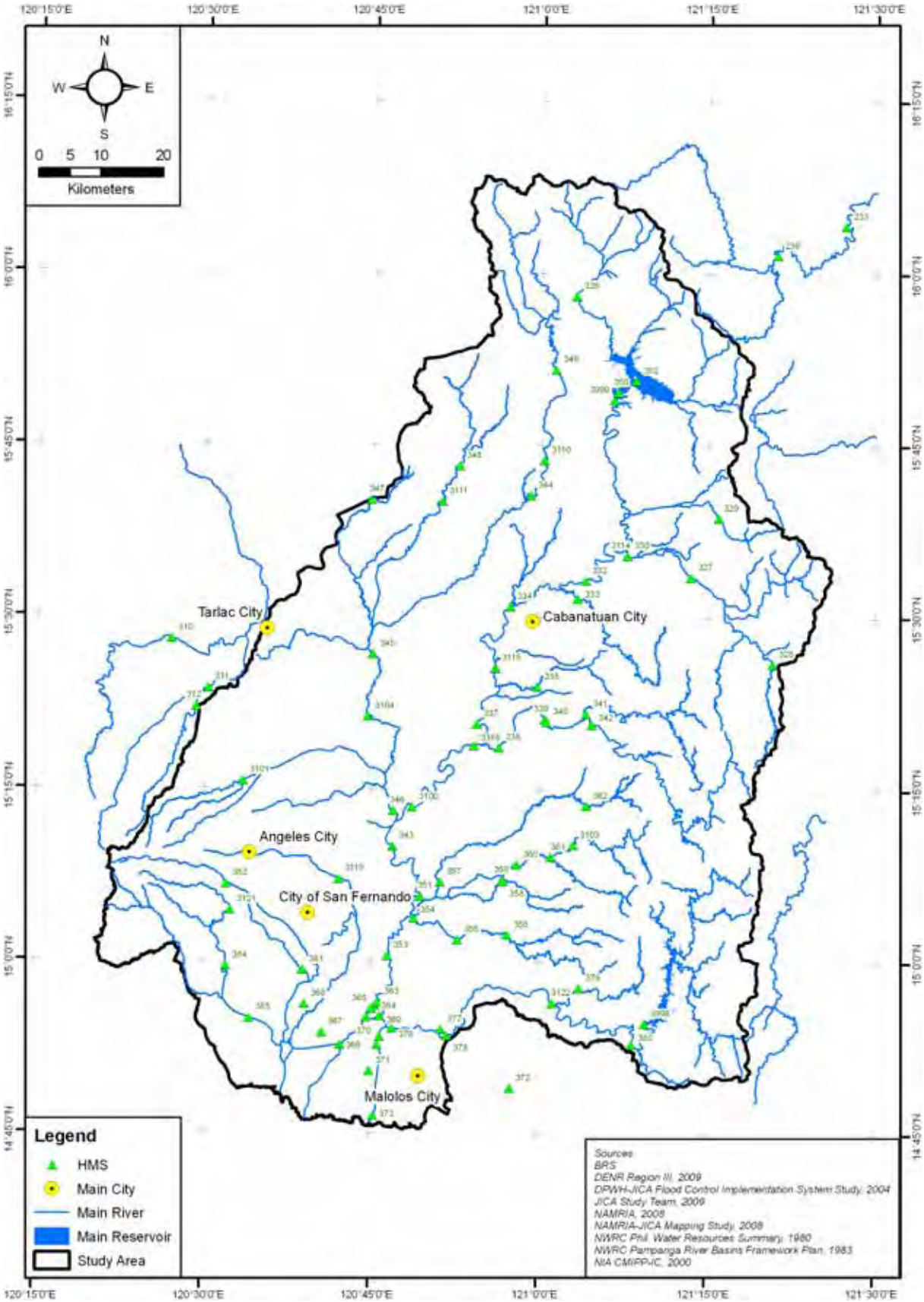
付図 2.3.4　　年降雨量の空間分布



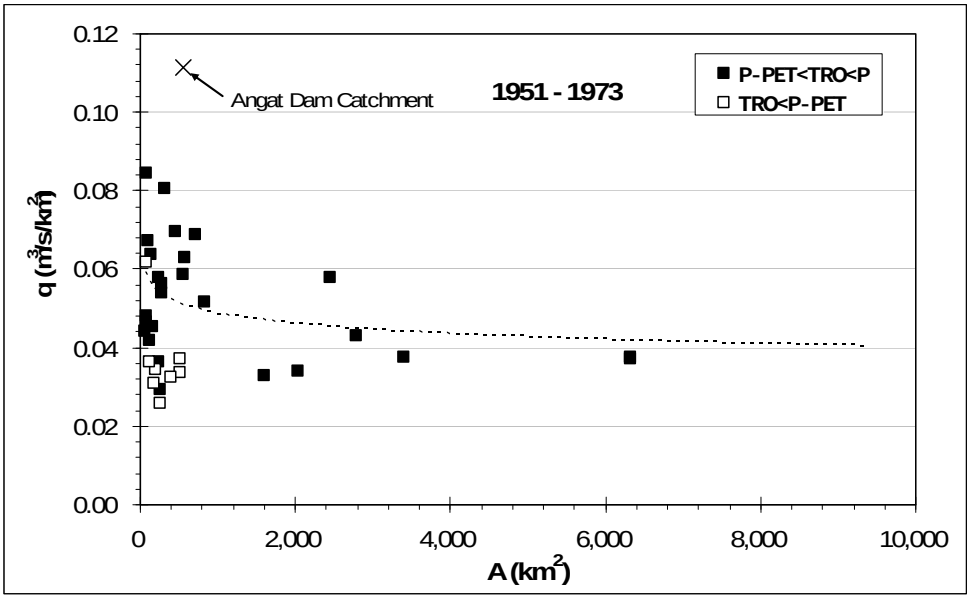
付図 2.3.5　　乾期の降雨量の空間分布

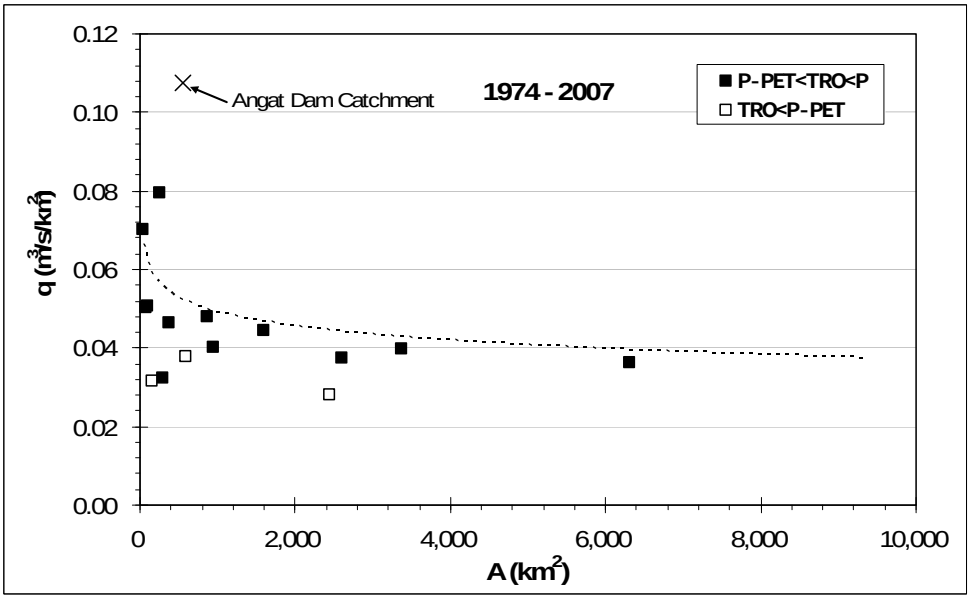


付図 2.3.6　　雨期の降雨量の空間分布



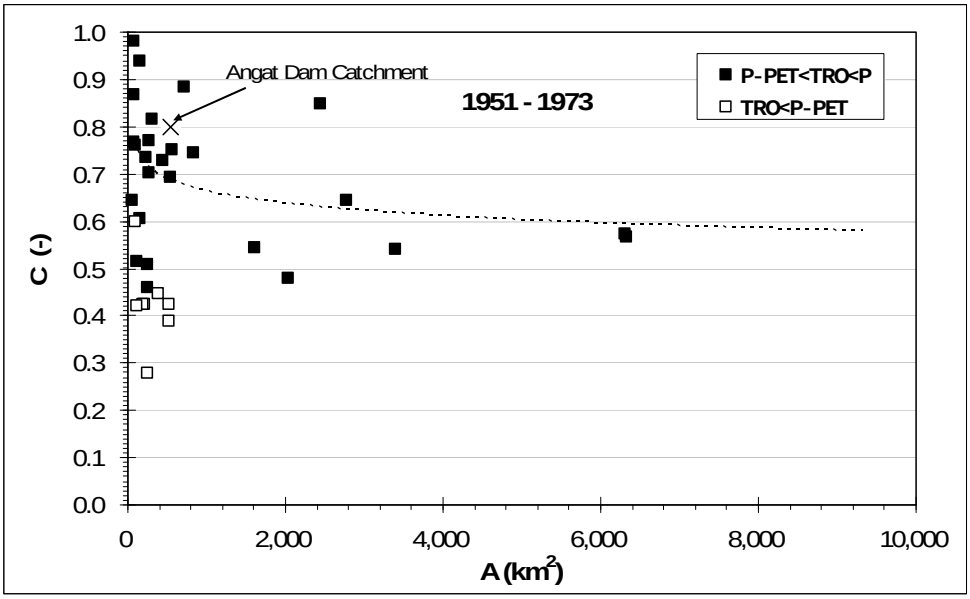
付図 2.4.1　　水文観測所位置図

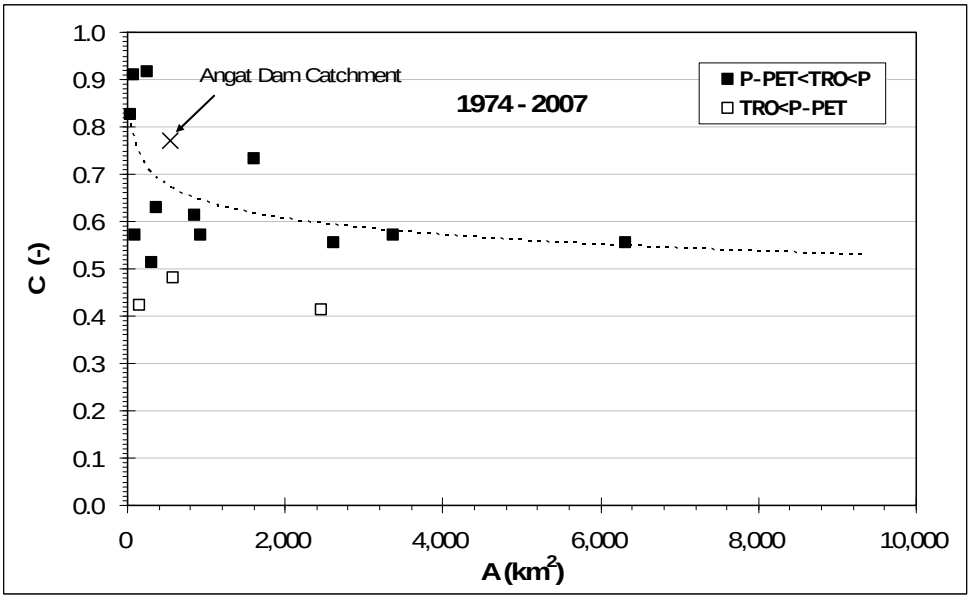




Source: JICA Study Team

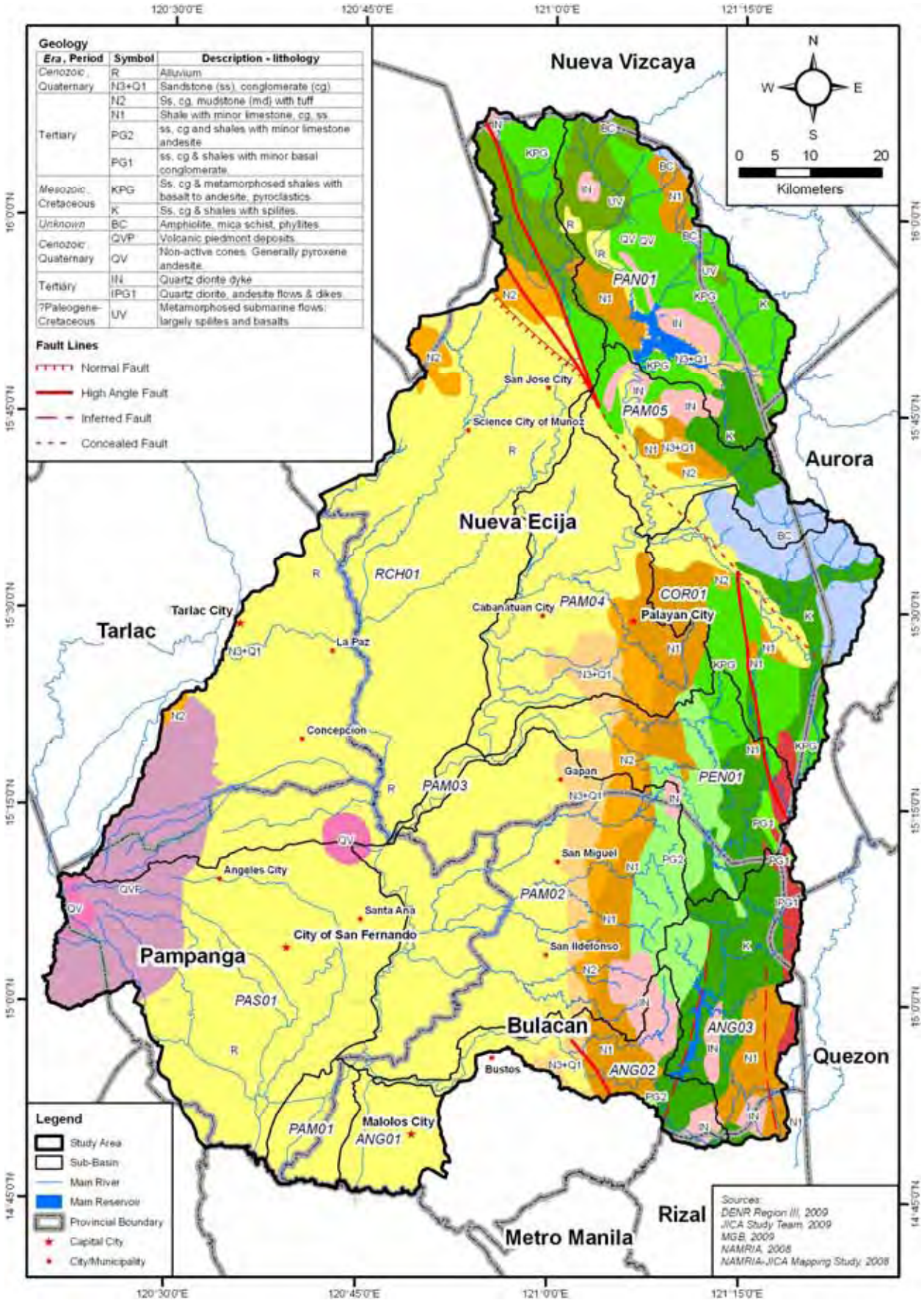
付図 2.4.2　　比流量と集水面積の関係



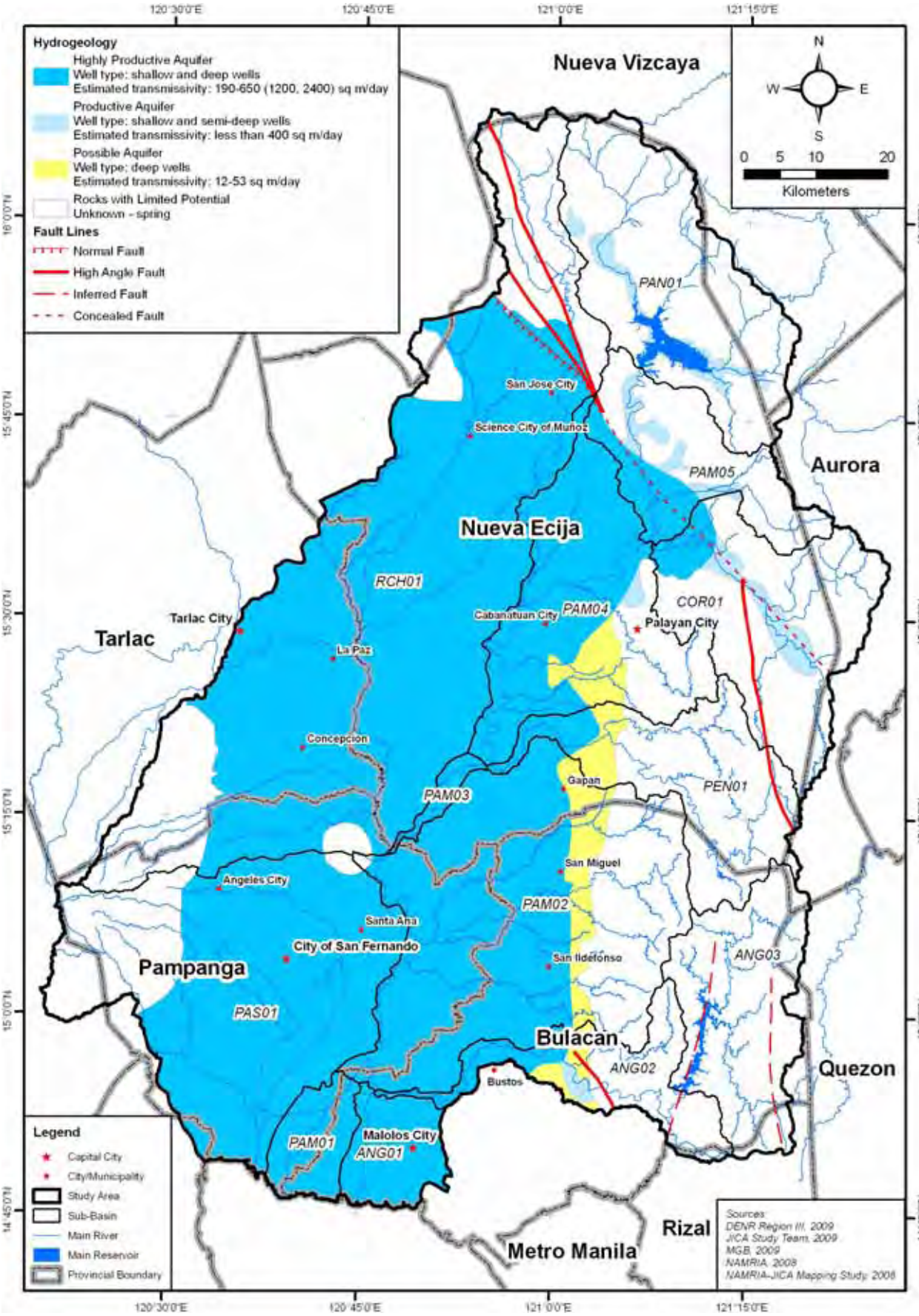


Source: JICA Study Team

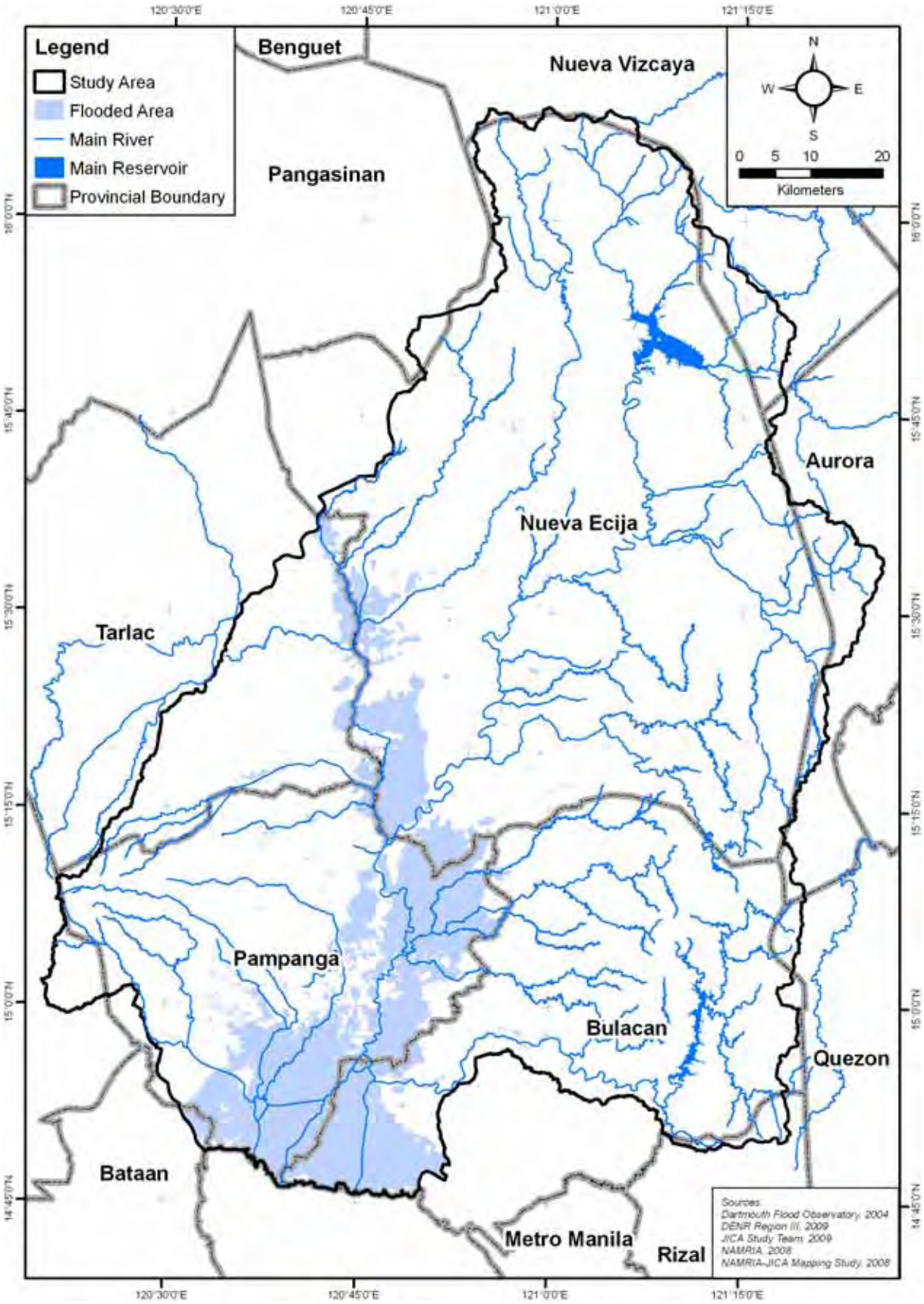
付図 2.4.3　　流出率と集水面積の関係



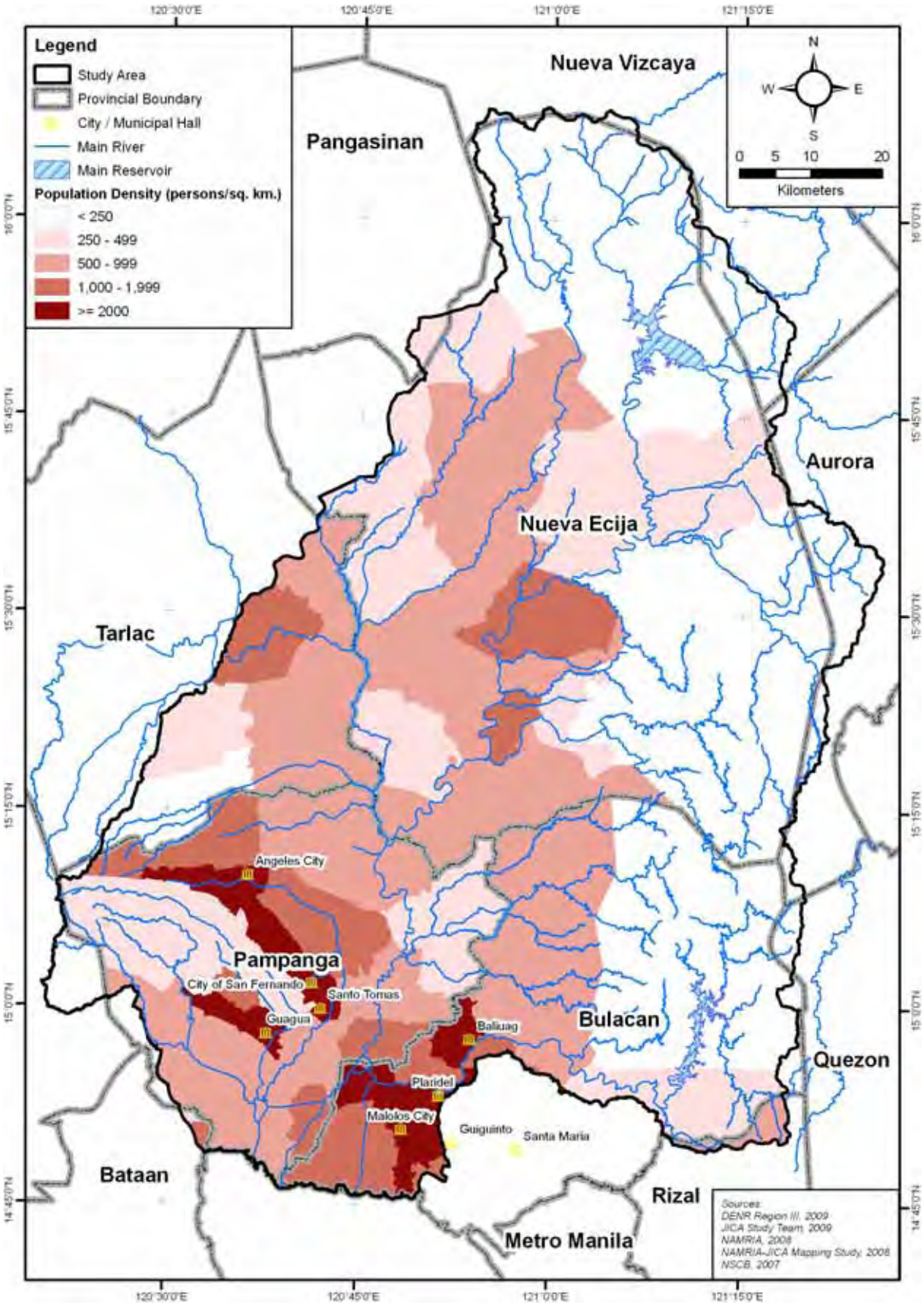
付図 2.5.1　　調査地域の地質図



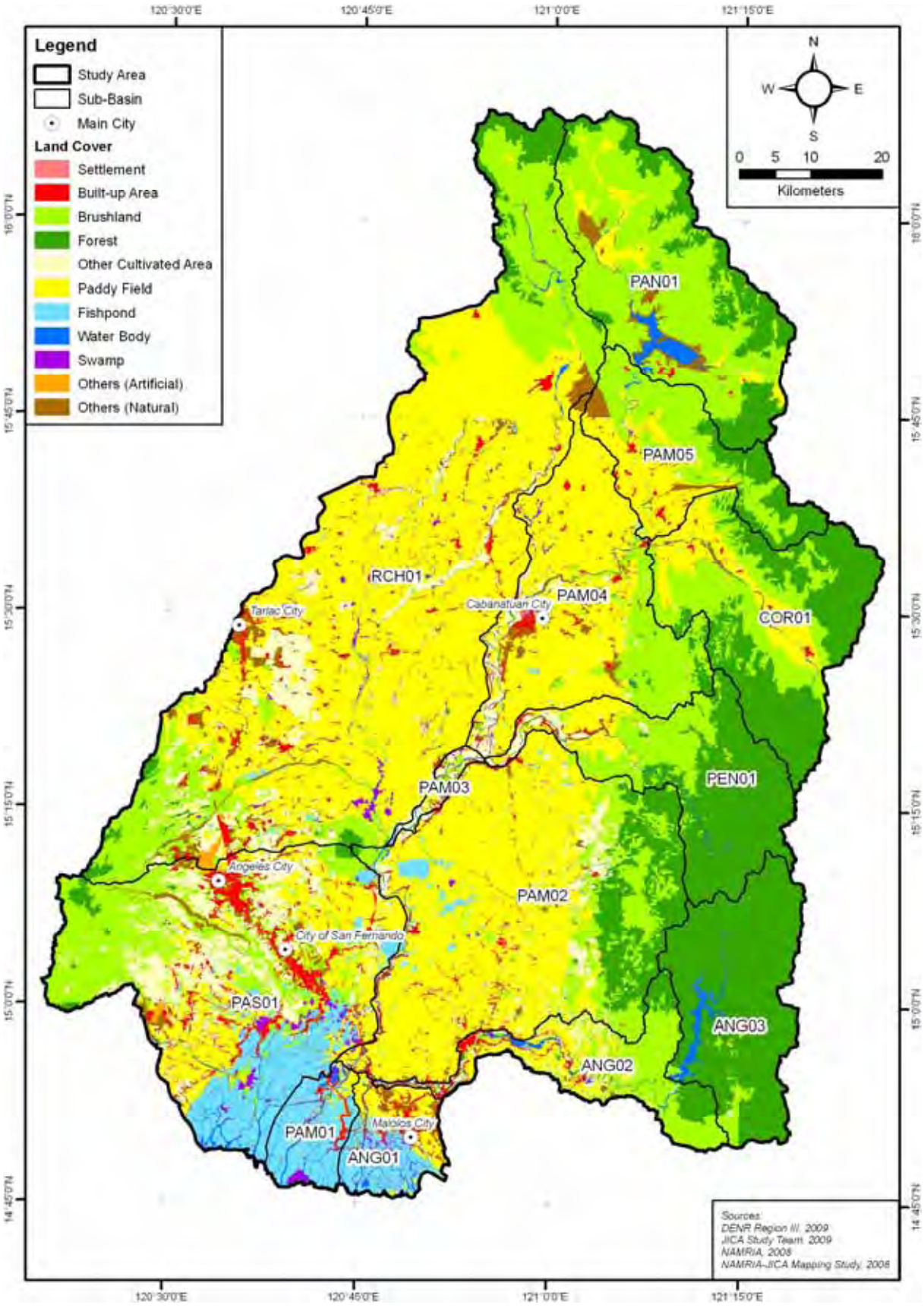
付図 2.6.1　　調査地域の水理地質図



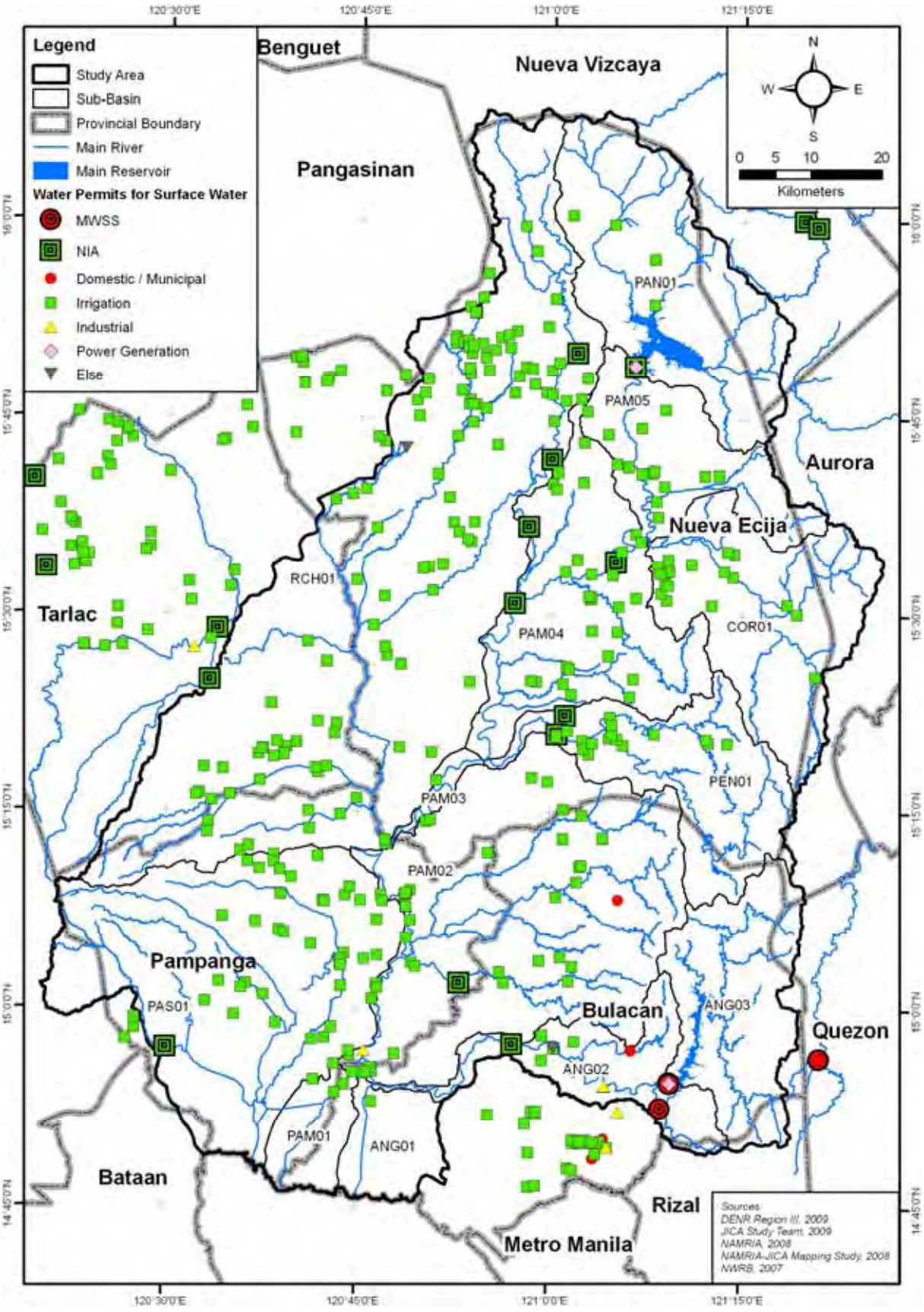
付図 2.10.1　　2004 年 8 月台風 Marce による洪水氾濫域



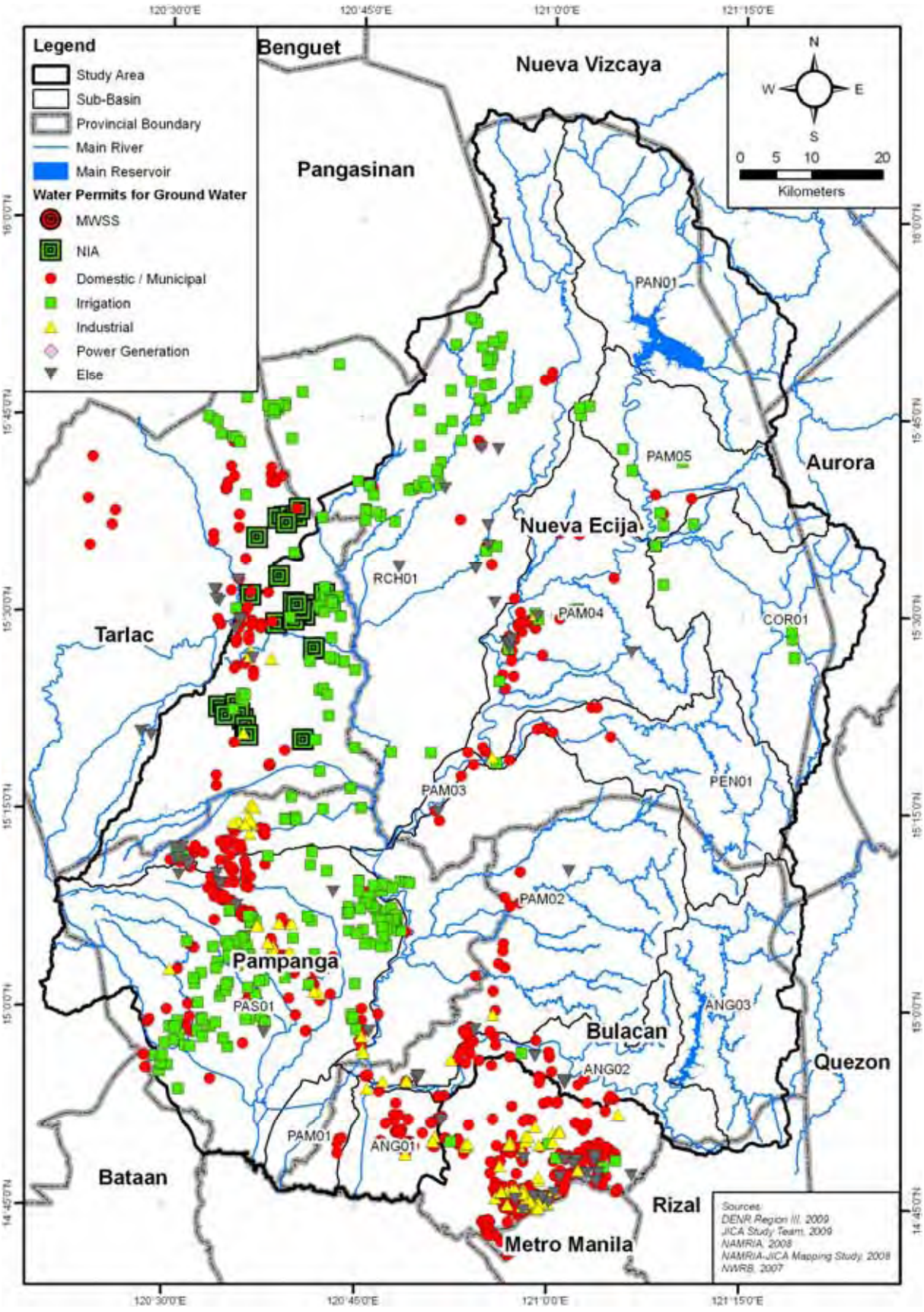
付図 3.1.1　　各市町の人口密度



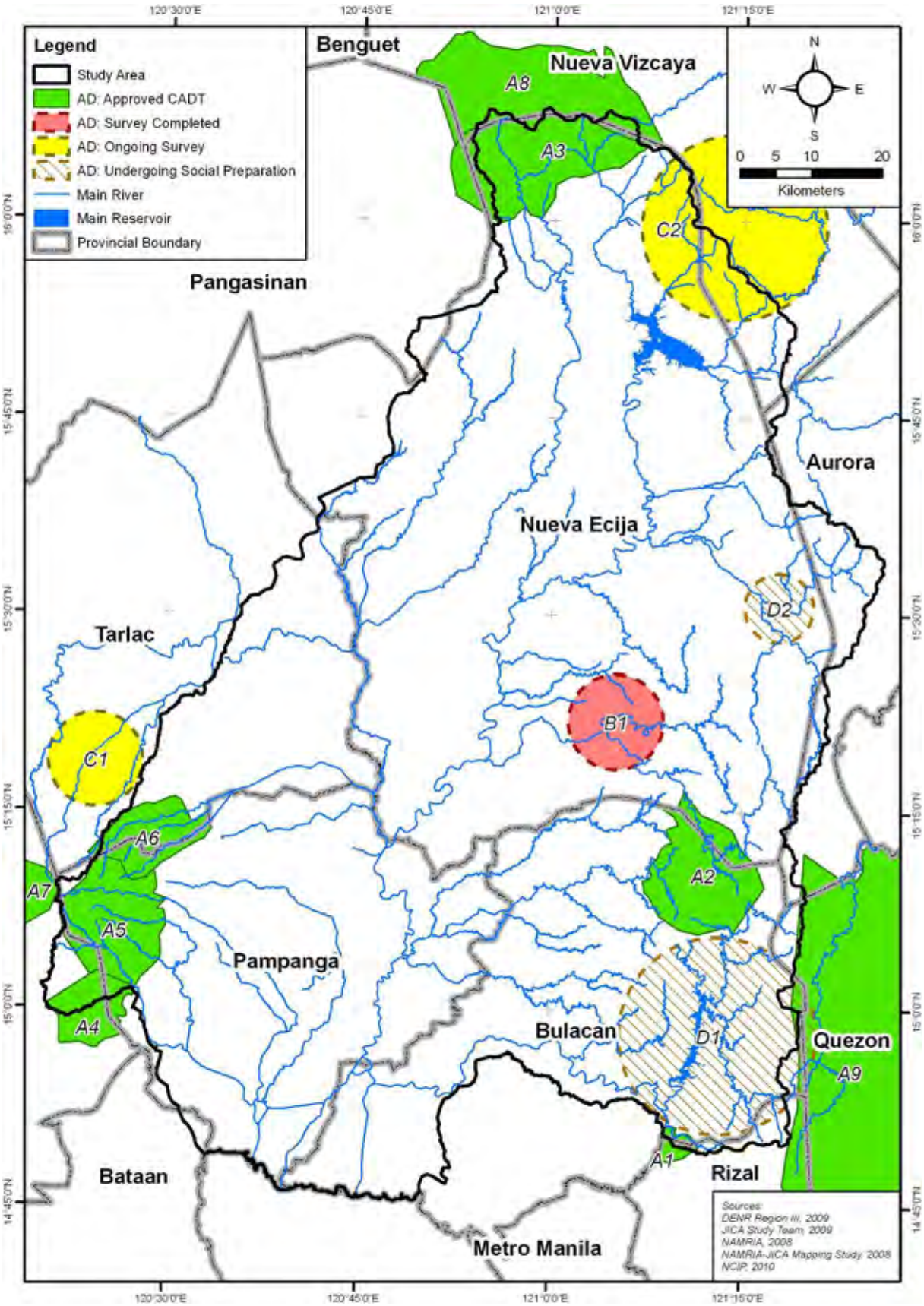
付図 3.3.1　　調査地域の現況土地利用



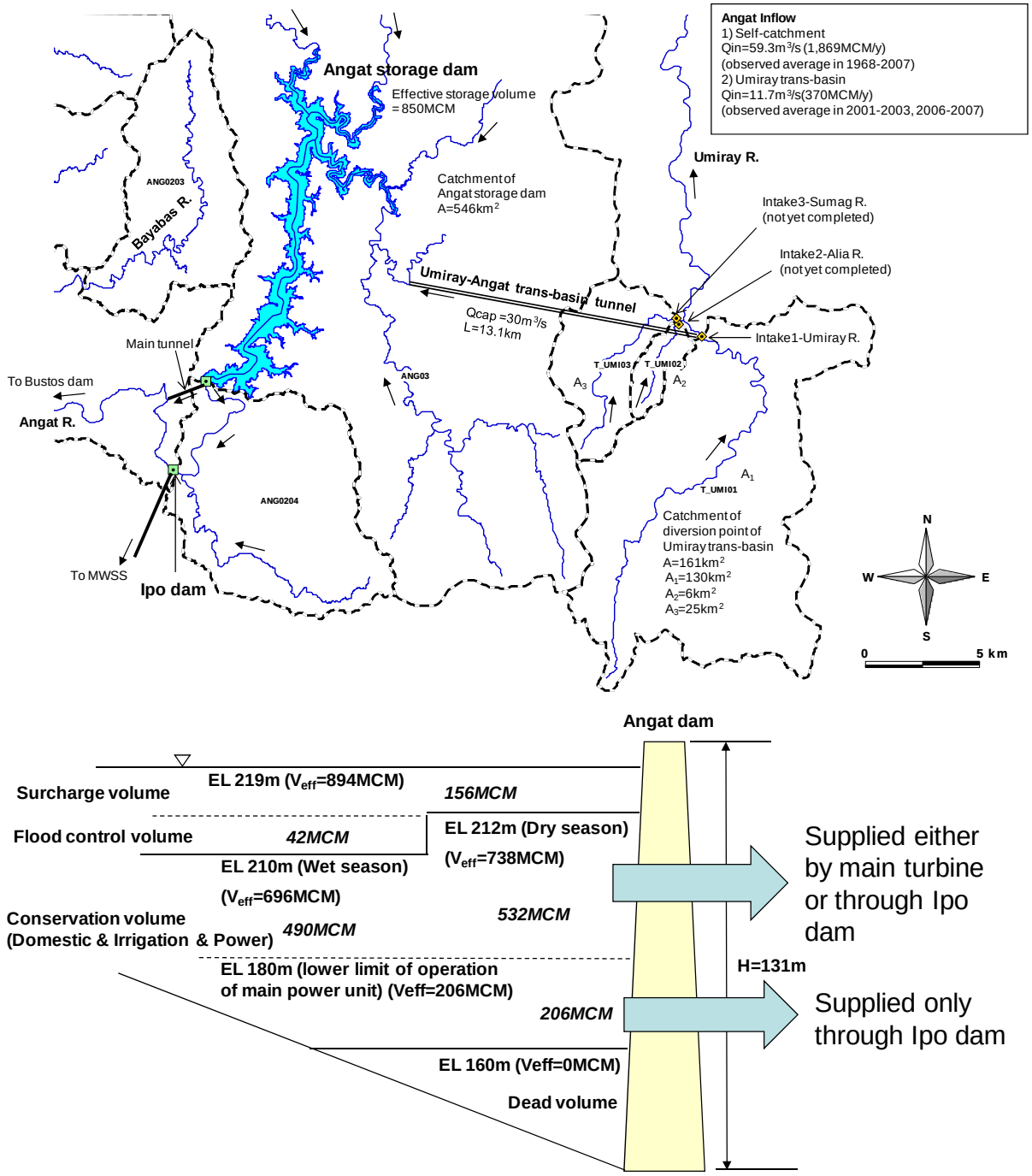
付図 3.4.1　　表流水を水源とする水利権の取水施設位置図



付図 3.4.2　　地下水を水源とする水利権の取水施設位置図

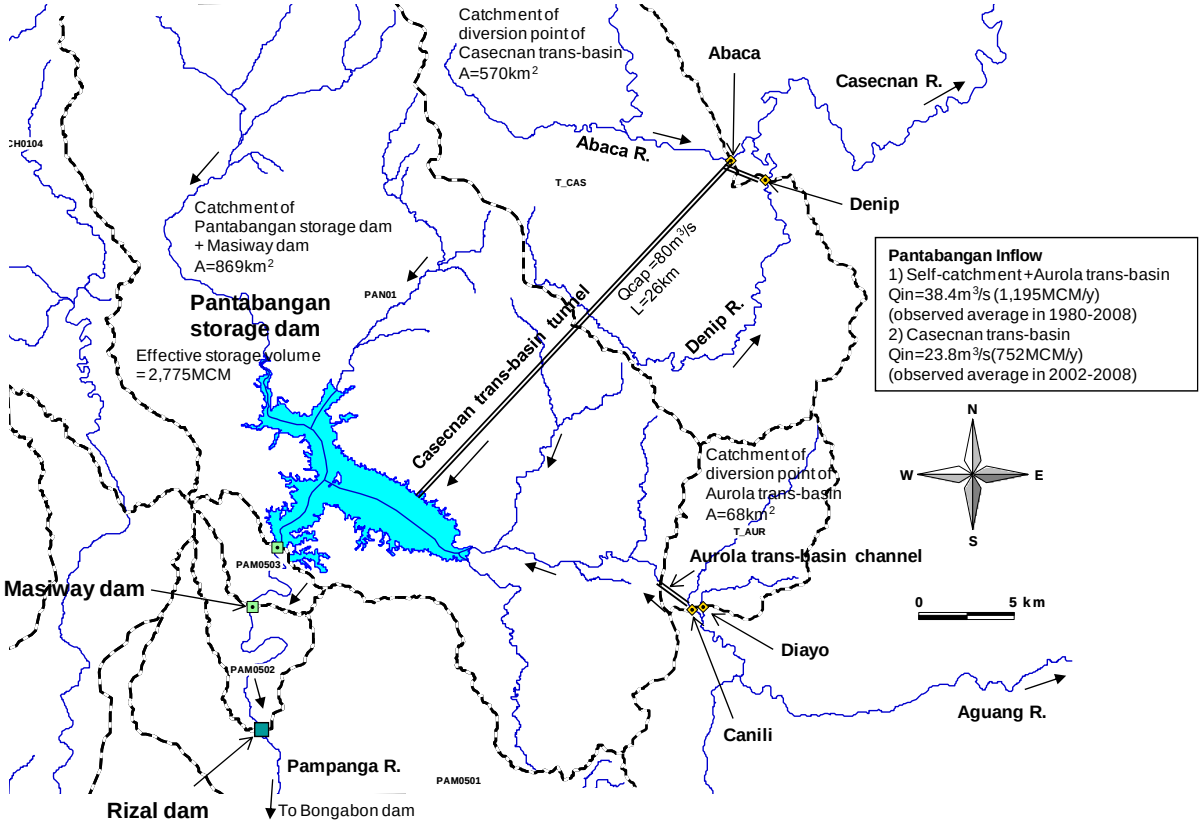


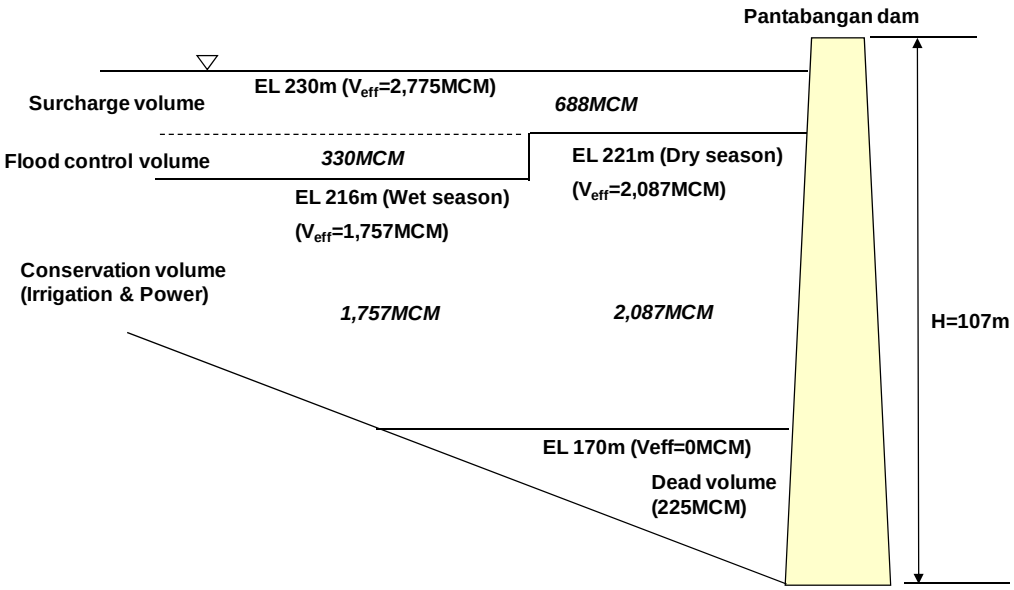
付図 3.6.1　　調査地域及び周辺における先祖代々の土地として認識された土地(AD/AL)の状況（2010 年 3 月 9 日時点）



Source: JICA Study Team

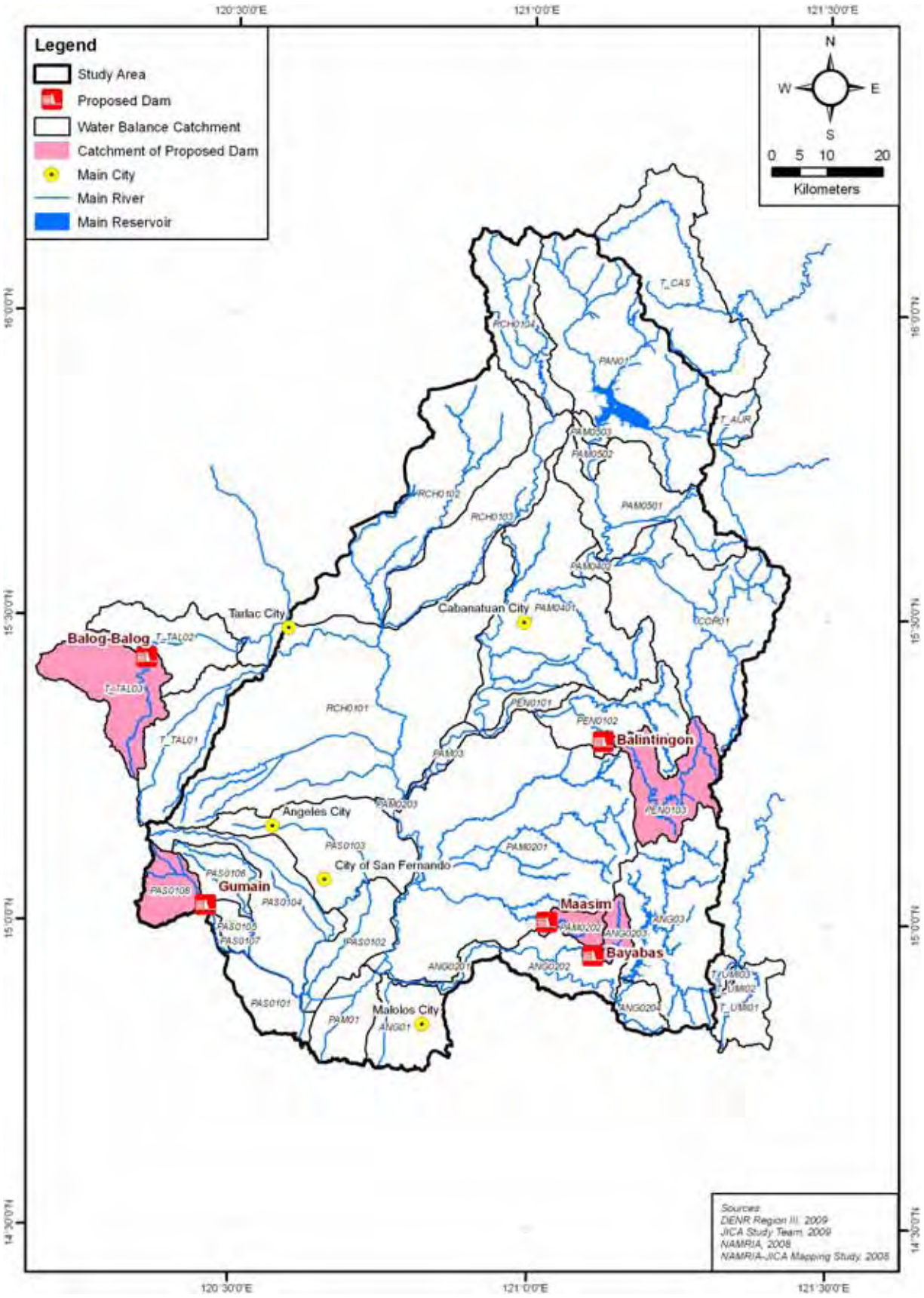
付図 4.1.1　　Angat 貯水ダムの位置と形状



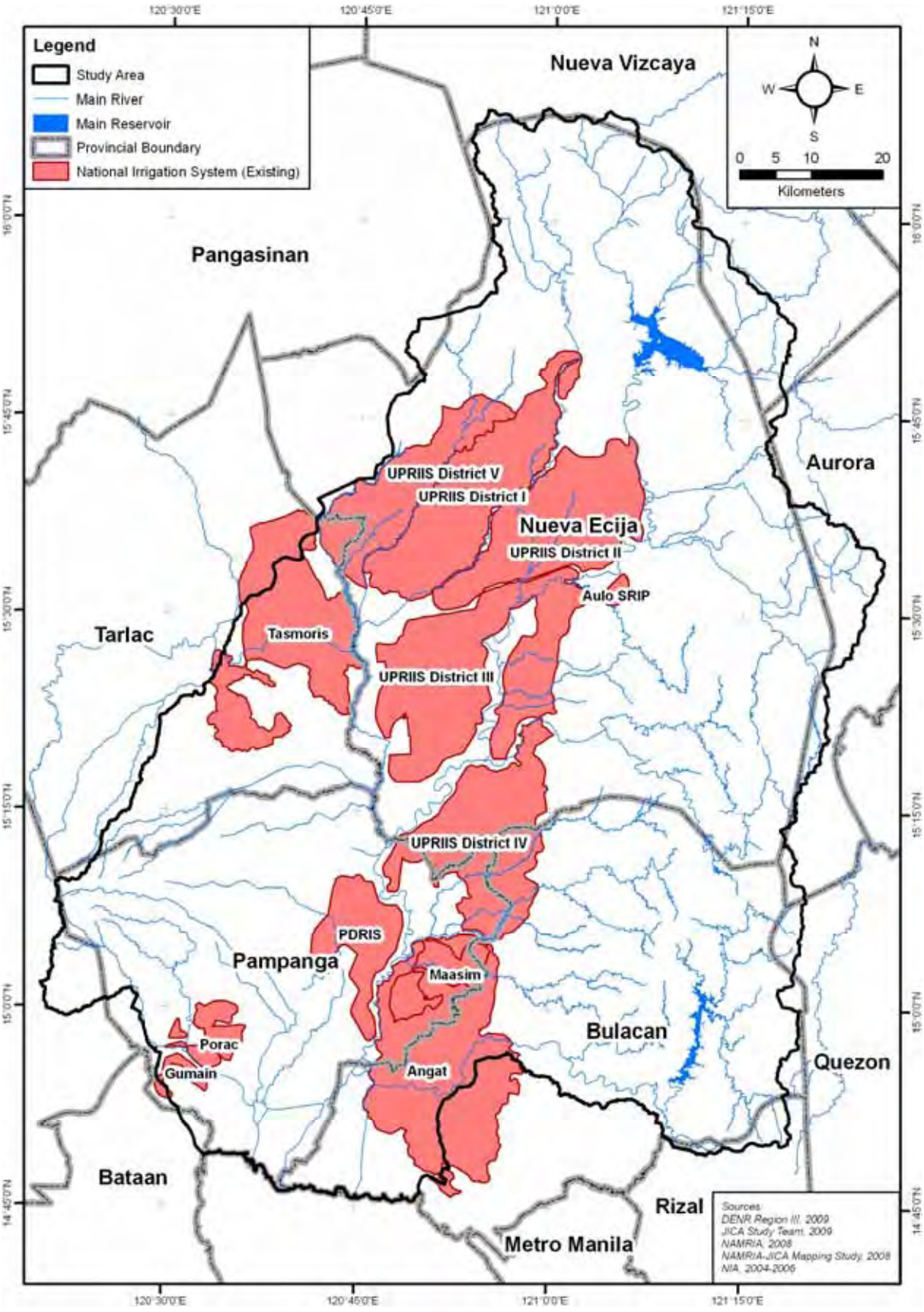


Source: JICA Study Team

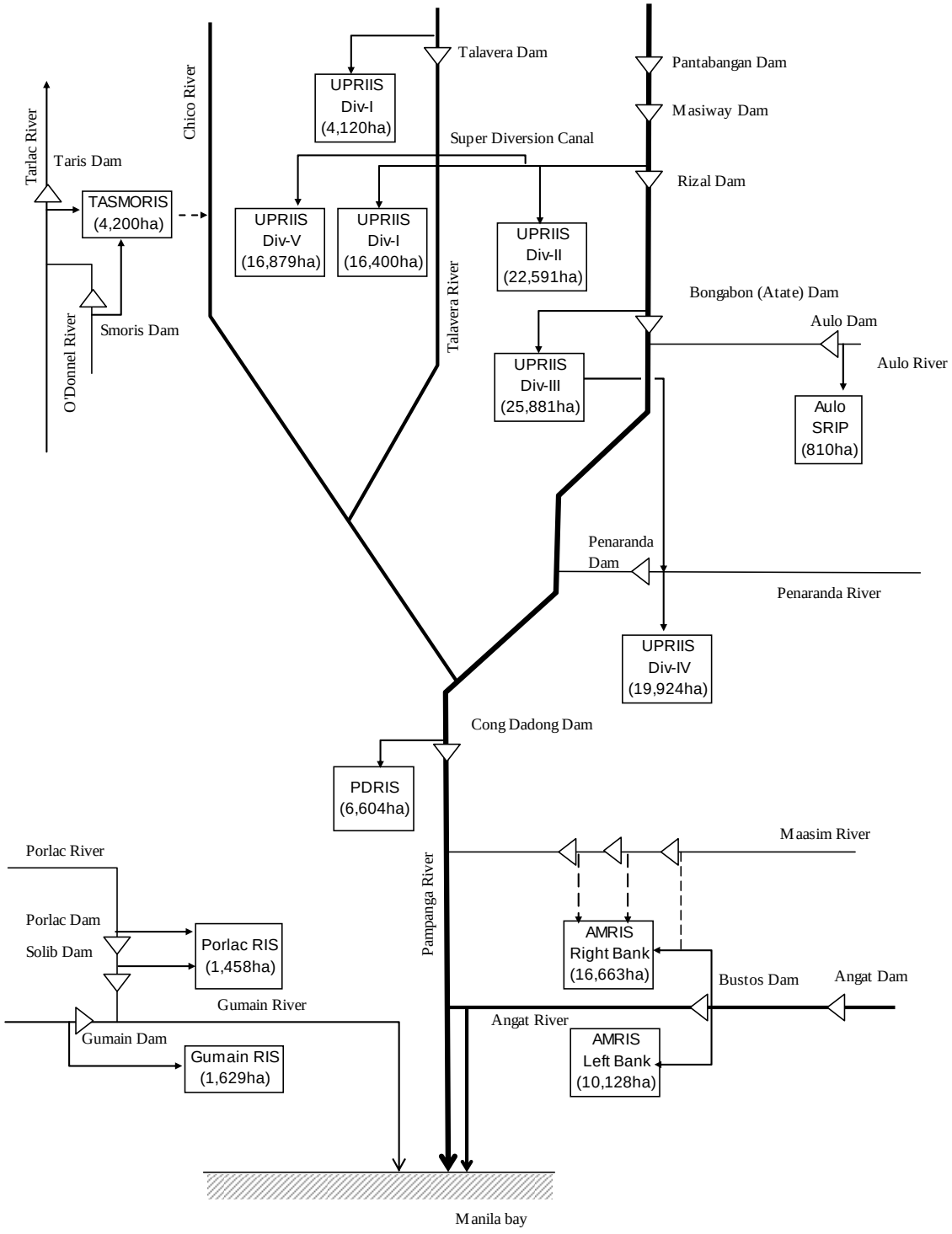
付図 4.1.2　　Pantabangan 貯水ダムの位置と形状



付図 4.1.3　　提案されている大規模貯水ダム位置図

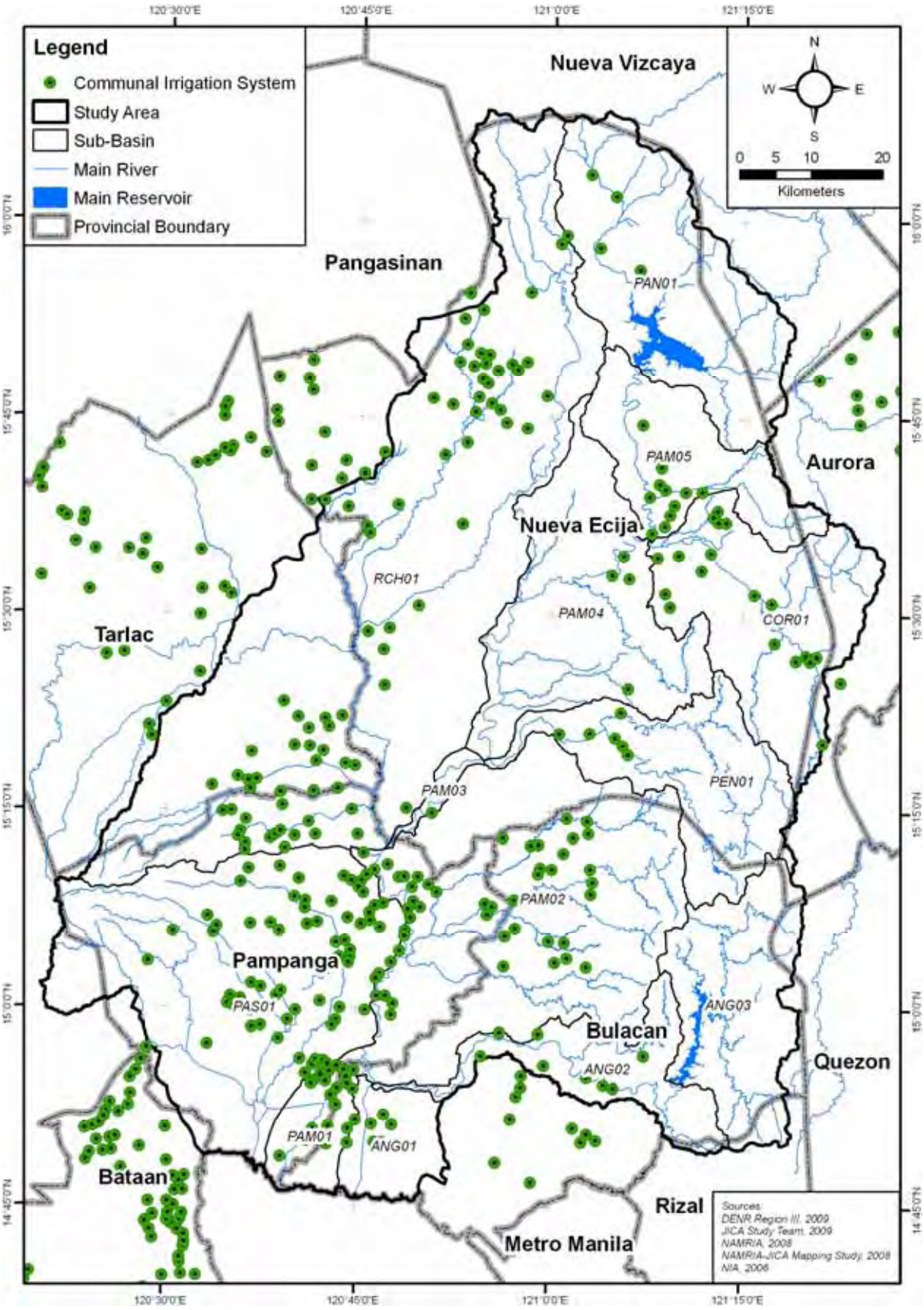


付図 4.2.1　　国営灌漑システム（NIS）位置図

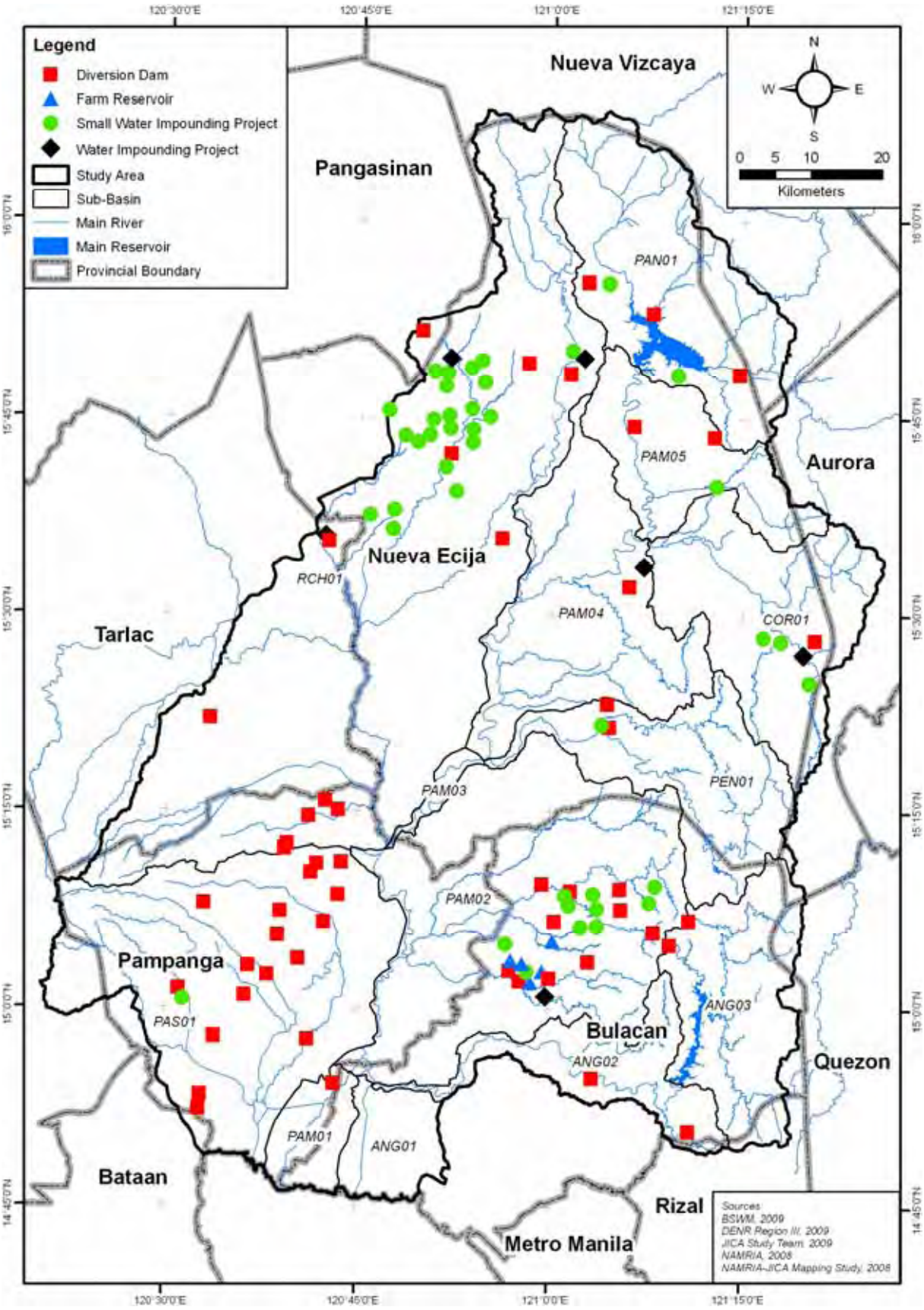


Source : JICA Study Team

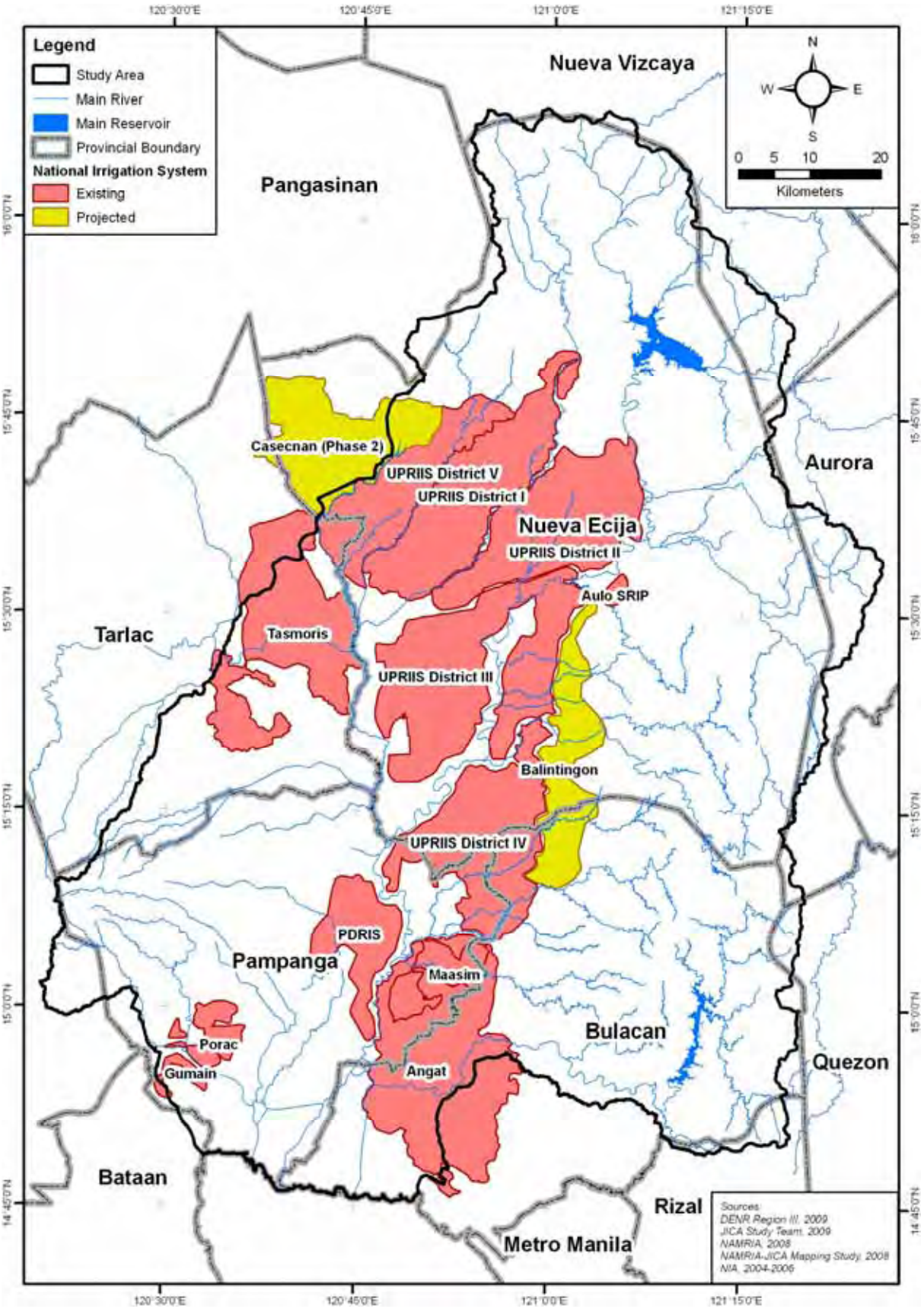
付図 4.2.2　　既存国営灌漑システム（NIS）系統図



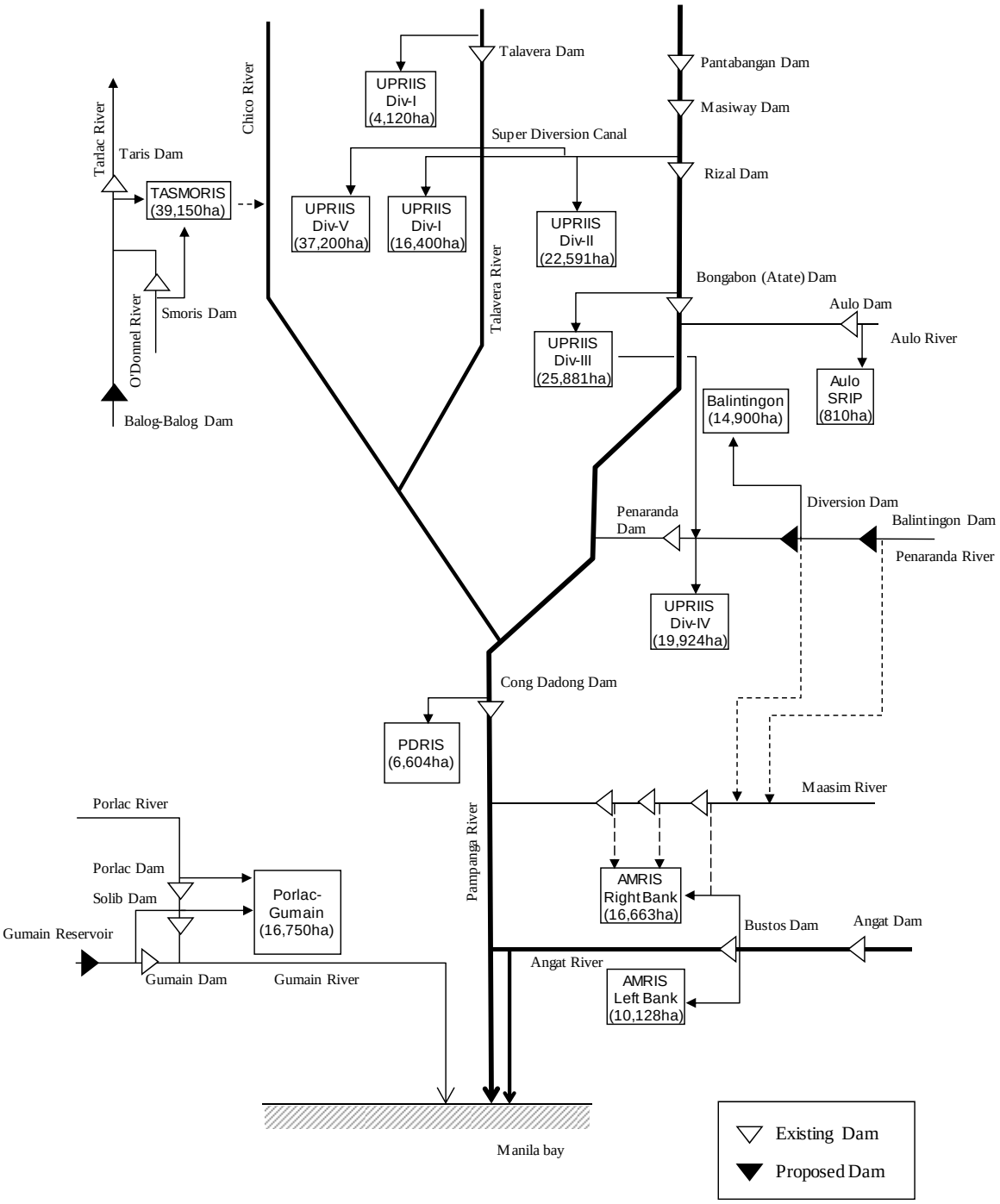
付図 4.2.3　　共同灌漑システム（CIS）位置図



付図 4.2.4　　BSWM 管轄の小規模灌漑システム位置図



付図 4.2.5　　計画されている国営灌漑システム（NIS）位置図



Source : JICA Study Team

付図 4.2.6　　計画されている国営灌漑システム（NIS）系統図