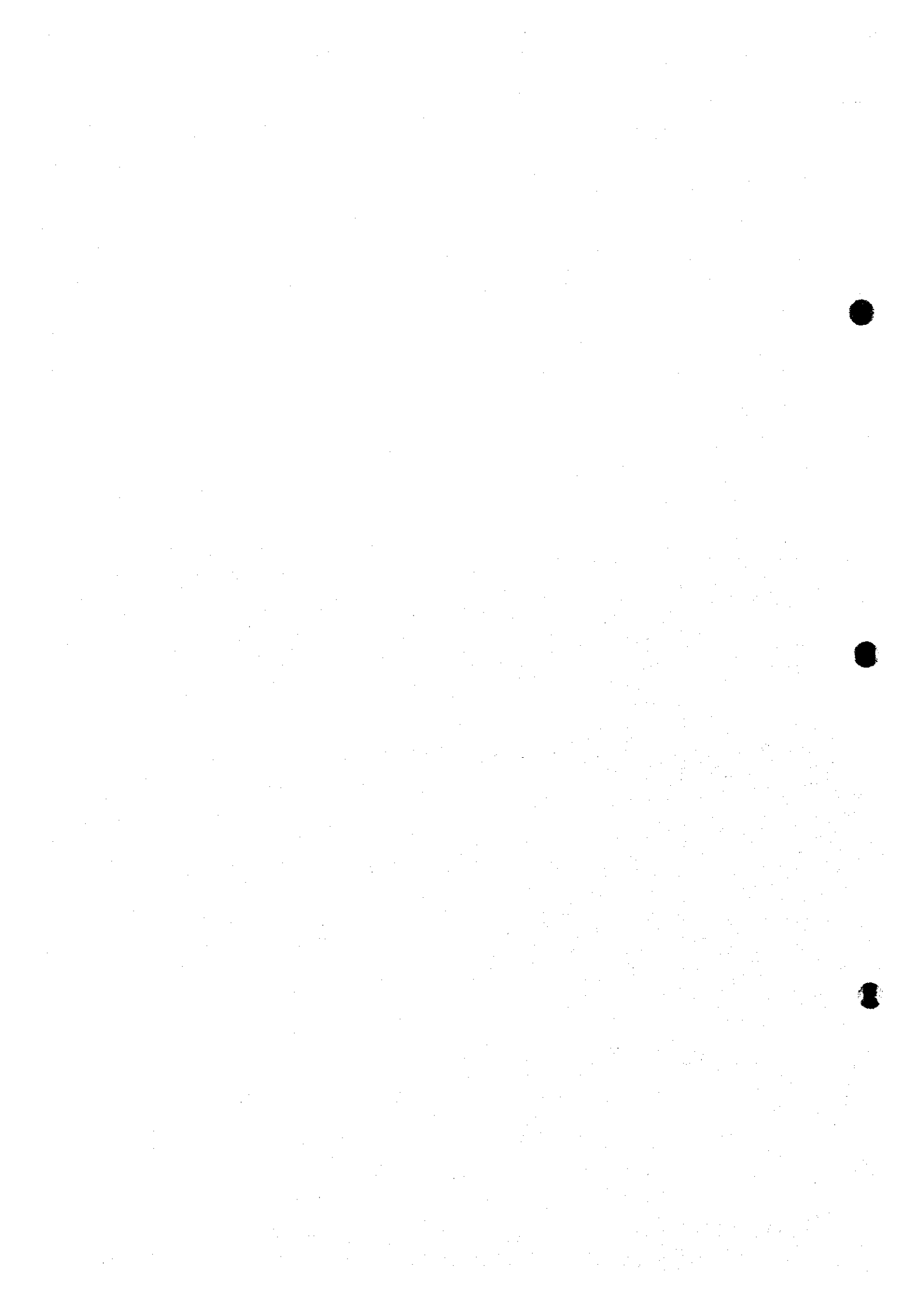


ANNEX - 5

WATER BALANCE STUDY



ANNEX – 5 WATER BALANCE STUDY

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1 Water Resources Available

Available water resources to meet respective water demands are the natural flow which is defined as the main river discharge to be estimated by assuming that there is no water supply from reservoir storage and no water intake to any water consumption on the main river of the Brantas river. In addition to the natural water resources available, the reservoir storage water could be considered as supplemental water resources during a drought season.

The natural flow computed from discharge records in 1977 which corresponds to a 10 year drought discharge have been used as a basic discharge to study necessary development and other measures. Besides, natural flow series obtained from discharge records of several years have been studied to consider various drought situations. Available water resources in terms of the natural flow(potential flow) are shown in Tables A5-1 and A5-2. As seen in Tables A5.1, annual total of the natural flow ranges from 5,808 million m³ to 10,400 million m³, while a range of 740 million m³ to 3,930 million m³ in drought season of 6 months period.

Manageable water resources are reservoir storage and some water saving measures which decrease water demand. Water resources presently available, to be available and proposed are summarized as follows, and discussed in Annex 6 in Volume III as well as V.6 of the Main Report.

- | | | | | |
|-----|--|----------------|--|-----|
| (a) | Natural Flow (1977; million m ³) | : Annual 5,808 | Drought Season | 819 |
| (b) | Existing | : | Sutami and Lahor Dams | |
| (c) | Under construction | : | Wonorejo Dam Project
(1) Wonorejo Dam
(2) Push-back Scheme | |
| (d) | Committed | : | Umbulan Bulk Water Supply | |
| (e) | Proposed Development | : | Beng Dam
Kedungwarak Dam
Genteng I Dam | |
| (f) | Proposed Water Saving Measure | : | Irrigation(Canal Lining)
Industry(Water Recycling) | |

2 Water Balance

2.1 Water Balance Study

2.1.1 Basic Condition

(1) Natural Flow

Natural flow is defined in the Study as the main river discharge assuming no intake water and no supply by reservoir storage on the main river stretch.

(2) Water Balance System

The water balance study is made incorporating various water intakes and return flows as shown in Figure A5-1

(3) Return Flow of Irrigation Water

- (i) Return flow from each irrigation area is assumed to be 30 % of demand.
- (ii) Return flow of a part of Lodoagung irrigation water would not come back to the Brantas river. While return flows of some irrigation areas would go to the Surabaya river directly and be available for downstream water demand.
- (iii) The return flow of irrigation and domestic water in the downstream area from Mojokerto go directly to the sea except for the fishery water from the Brantas Delta irrigation.

(4) Return Flow of Domestic and Industrial Waters

- (i) Return flow from the domestic and industrial water uses in the urban area is assumed to be 80 %.
- (ii) Return flow of the domestic water for Tulungagung and Trenggalek regencies would not come back to the Brantas river.

(5) Seasonal Distribution

Irrigation water demand will vary every 10 days. Other water demands are assumed to keep same amount throughout a year except industrial water demand of sugar factory which has big seasonal fluctuation. The water demand of sugar industry is assumed to be monthly variable.

2.1.2 Water Balance Analysis

Water balance analysis made in the Study is the combination of the following demands against natural flow for various years as follows:

- (a) Demand in present condition(1996) and in 2020; demand in 2010 is supplementally considered.
- (b) Demand without or with water saving measures in irrigation and industrial water uses.

Table A5-3 shows a summary of water balance calculation made for the above 5 cases and 1977 flow. Detailed calculation are presented in Table A5-4.

2.2 Water Balance in the Past 20 Years

2.2.1 Condition of 20 Years

In addition to the water balance analysis for 1977 which corresponds to a 10 year drought year, the other 11 years have been analyzed by making computation out of 20 years as shown in Table A5-5. The following table shows expected water deficit of water resources covered by the natural flow for the following 12 years against the water demand in 2020.

	1982	1977	1987	1980	1994	1991	1988	1996	1979	1995	1981	1978	
Drought Probability	1/20	2/20	3/20	4/20	5/20	6/20	8/20	10/20	12/20	15/20	19/20	20/20	
Natural Flow in Drought Season (million m ³)	741	819	891	992	1,034	1,054	1,382	1,598	1,737	2,008	2,317	3,928	
Deficit in Drought Season (million m ³)	No Saving	609	624	532	563	328	341	333	168	215	176	114	0
	With Saving	536	565	467	497	263	273	280	121	178	144	91	0
Nos. of Days to Suffer Water Deficit	No Saving	210	160	170	170	170	170	140	120	110	80	60	0
	With Saving	(30)	(10)	(10)	(10)	(10)	(10)	150	120	110	80	50	0
		200	160	170	170	160	120	110	80	80	50	0	0
		(20)	(10)	(10)	(10)	(10)							

Note : A figure in a parenthesis shows a number of days to suffer water deficit in May or December.

Expected water deficit for the demands of the present(1996), 2010 and 2020 against 1977 natural flow are shown in Table A5-6, respectively.

It is observed in the above that the year 1977 suffered the most severe drought condition in terms of total water deficit in the 6 month of drought season, though 1977 has been defined as 10 year drought year (2nd in 20 years) since it was defined in terms of the natural flow quantity in the same period.

For the five severest years, water deficit occurred even in May or December. While, for most years except 1980, 1982, 1987, and 1991, have scarce water deficit in June according to Table A5-6.

No deficit was occurred at all by natural flow throughout 1978 which was the most ample

rainy year among the examined 20 years.

2.2.2 Present and Future Water Balance

Further to the analysis mentioned above, the water supply capacity in drought season and water saving measures are taken into consideration in the water balance analysis. Development and saving capacities to be available in the drought season considered in the analysis are as follows:

		(million m ³)		
Year		1996	2010	2020
Existing				
Sutami and Lahor dams	(WL: 272.5 - 260.0 m)	115.3	104.6	97.0
	(WL: 260.0 - 246.0 m)	57.8	46.8	39.0
On-going				
Wonorejo Dam Project	(Wonorejo dam)	-	89.4	89.4
	(Push-back Scheme)	-	35.3	35.3
Committed				
Umbulan Spring		-	60.7	60.7
Saving				
Irrigation Water (canal lining)		-	44.6	44.6
Industrial Water (water recycling)		-	16.9	28.9
Proposed dams				
Beng Dam		-	147.0	147.0
Genteng I		-	-	70.0
Kedungwarak Dam		-	-	54.0

The water balance analyses for the respective 12 years have been undertaken and results are summarized in Table A5-7. In the tables, water balance in 2010 and 2020 taking account of the proposed water resources developments are also incorporated therein for reference.

The main results of the water balance analysis are enumerated as follows:

- (1) Present demand
 - (a) No deficit is caused in 1978 without any storage water
 - (b) Water deficit would be expected every 2 years in case 20 m³/s of river maintenance flow is considered
 - (c) Water deficit would be expected every 5 years in case of no maintenance flow
 - (d) As long as the present result is concerned, the storage capacity of the Sutami and Lahor dams over 260.0 in water level seems to be almost sufficient enough for the normal year except for some drought years which might be encountered

once every 5 years.

- (2) Year 2010 (20 m³/s of river maintenance flow incorporated)
 - (a) Development of 2 dams will be necessary by 2010 if no water saving measures are realized to cover drought conditions which might be foreseen every 5 years
 - (b) Only one dam is necessary for construction if both water saving measures in irrigation and industry sectors are realized and storage up to El.246.0 m is used in the Sutami and Lahor dams.
- (3) Year 2020 (20 m³/s of river maintenance flow incorporated)
 - (a) Even development of 3 dams will not be enough for 2020 to cope with 10 year drought condition when no water saving measures are taken up
 - (b) By three dam constructions and realization of water saving measures, no water deficit might be expected at all.

Table A5-1 Annual Potential Flow at New Lengkong Dam Site and Water Levels in Sutami Dam

(period : 1977 - 1996)

Year	Potential Flow (million m3)			Water Level in Sutami Reservoir (El. m)		
	Annual	Drought Season	Rank in 20 years	1 June (Daily average)	30 November (Daily average)	Minimum Water Level in a Drought Season
1977	5,808.4	818.9	2	269.61	248.90	247.81
1978	10,429.5	3,928.0	20	273.05	261.21	260.84
1979	9,941.7	1,736.7	12	272.82	261.25	260.59
1980	6,640.1	992.2	4	271.92	N.A.	(257.54)
1981	8,549.5	2,316.8	19	271.13	262.96	257.87
1982	6,542.8	741.1	1	272.34	250.01	249.89
1983	7,952.0	1,846.5	13	272.21	258.82	256.66
1984	8,987.3	1,891.8	14	272.41	261.10	260.00
1985	7,217.5	1,656.4	11	272.44	260.90	260.62
1986	7,880.2	2,063.9	16	272.44	261.56	261.81
1987	6,702.5	891.3	3	270.84	264.03	259.29
1988	6,266.5	1,382.4	8	272.34	261.78	257.86
1989	7,085.1	2,254.4	18	272.80	N.A.	(262.81)
1990	6,351.3	1,211.6	7	272.23	259.91	259.83
1991	6,188.1	1,053.8	6	272.36	261.58	261.03
1992	8,752.9	2,135.9	17	272.34	262.74	260.73
1993	7,274.2	1,492.7	9	272.43	260.51	256.60
1994	6,750.5	1,033.8	5	272.50	259.18	257.86
1995	8,256.4	2,008.2	15	272.40	266.12	263.23
1996	6,664.9	1,597.6	10	272.42	259.64	259.42

Source : Potential flow is calculated by the Study Team. Water level is from PJT.

Remarks : Minimum water level in 1980 and 1989 are the lowest water level within the available data.

Table A5-3 Water Balance at the New Lengkong Dam (1 / 5)

DEMAND = 1996 (present condition)

NATURAL FLOW : 10 YEAR DROUGHT YEAR ; 1977

Unit : m³/s

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
		irrigation	return	water	brakes	net	total	return	industrial	return	total	total	net	available	surplus	required	net	total	
		demand	flow	demand	delta	demand	domestic	flow	demand	flow	demand	available	demand	water	deficit	maintenance	deficit	demand	
		from	from	in the	in	on the	demand	from	demand	from	without	return	without	at the		flow		including	
		upstream	upstream	fishpond	flow	fishpond		upstream	industrial	industrial	flow	flow	flow	N.L. Dam				flow	
		of	of					of	demand	demand	for	except	for						
		Moekens	Moekens					Moekens			Fishpond	Fishpond	Maintenance						
						Else if d < 0											Else if p < 0		
January	1st	48.70	7.89	1.29	3.90	0.00	3.42	0.00	1.48	1.19	53.60	9.08	44.52	258.34	213.82	20.00	0.00	61.52	
	2nd	70.90	13.01	1.29	4.98	0.00	3.42	0.00	1.48	1.19	75.80	14.20	61.60	248.04	186.44	20.00	0.00	81.60	
	3rd	72.20	10.14	1.29	7.59	0.00	3.42	0.00	1.48	1.19	77.10	11.32	65.77	458.07	392.29	20.00	0.00	85.77	
February	1st	43.70	6.23	1.29	4.86	0.00	3.42	0.00	1.47	1.17	53.58	7.40	46.18	397.80	351.62	20.00	0.00	66.18	
	2nd	51.30	9.46	1.29	2.64	0.00	3.42	0.00	1.47	1.17	56.18	10.63	45.55	388.23	342.68	20.00	0.00	65.55	
	3rd	42.90	7.97	1.29	1.50	0.00	3.42	0.00	1.47	1.17	47.78	9.15	38.64	404.65	366.01	20.00	0.00	58.64	
March	1st	40.40	7.84	1.29	1.59	0.00	3.42	0.00	1.49	1.19	45.30	9.03	36.28	461.41	425.14	20.00	0.00	56.28	
	2nd	43.90	7.13	1.29	3.03	0.00	3.42	0.00	1.49	1.19	48.80	8.32	40.48	550.96	510.48	20.00	0.00	60.48	
	3rd	46.10	8.35	1.29	1.83	0.00	3.42	0.00	1.49	1.19	51.00	9.54	41.46	592.30	550.84	20.00	0.00	61.46	
April	1st	60.00	10.05	1.29	4.80	0.00	3.42	0.00	1.49	1.19	64.90	11.24	53.66	477.03	423.37	20.00	0.00	73.66	
	2nd	35.30	6.43	1.29	0.90	0.39	3.42	0.00	1.49	1.19	40.59	7.67	32.92	306.98	274.06	20.00	0.00	52.92	
	3rd	48.50	9.98	1.29	1.65	0.00	3.42	0.00	1.49	1.19	53.40	11.17	42.24	259.72	217.48	20.00	0.00	62.24	
May	1st	64.20	11.69	1.29	2.97	0.00	3.42	0.00	2.01	1.61	69.62	13.29	56.33	137.36	81.03	20.00	0.00	76.33	
	2nd	80.70	14.69	1.29	5.79	0.00	3.42	0.00	2.01	1.61	86.12	16.30	69.82	101.26	31.43	20.00	0.00	89.82	
	3rd	86.60	14.56	1.29	7.32	0.00	3.42	0.00	2.01	1.61	92.02	16.17	75.86	84.81	8.95	20.00	-11.05	95.85	
June	1st	76.20	13.34	1.29	6.42	0.00	3.42	0.00	5.08	4.07	84.70	17.41	67.29	128.55	61.26	20.00	0.00	87.29	
	2nd	80.30	12.13	1.29	9.72	0.00	3.42	0.00	5.08	4.07	88.80	16.20	72.60	139.28	66.68	20.00	0.00	92.60	
	3rd	86.60	11.98	1.29	10.56	0.00	3.42	0.00	5.08	4.07	95.10	16.05	79.05	130.58	51.53	20.00	0.00	99.05	
July	1st	83.20	12.09	1.29	9.66	0.00	3.42	0.00	5.37	4.29	91.98	16.38	75.60	60.98	-14.63	20.00	-34.63	95.60	
	2nd	74.50	10.43	1.29	9.00	0.00	3.42	0.00	5.37	4.29	83.28	14.72	68.56	42.10	-26.46	20.00	-46.46	88.56	
	3rd	71.90	9.46	1.29	9.63	0.00	3.42	0.00	5.37	4.29	80.68	13.76	66.93	50.06	-16.87	20.00	-36.87	86.93	
August	1st	71.50	9.34	1.29	9.45	0.00	3.42	0.00	5.36	4.29	80.28	13.63	66.65	40.92	-25.73	20.00	-45.73	86.65	
	2nd	65.90	7.92	1.29	9.84	0.00	3.42	0.00	5.36	4.29	74.68	12.21	62.46	35.53	-26.94	20.00	-46.94	82.46	
	3rd	59.80	7.98	1.29	7.89	0.00	3.42	0.00	5.36	4.29	68.58	12.27	56.31	34.08	-22.23	20.00	-42.23	76.31	
September	1st	59.40	7.06	1.29	8.64	0.00	3.42	0.00	5.23	4.19	68.05	11.24	56.80	34.08	-22.73	20.00	-42.73	76.80	
	2nd	60.00	7.52	1.29	8.25	0.00	3.42	0.00	5.23	4.19	68.65	11.71	56.94	30.84	-26.10	20.00	-46.10	76.94	
	3rd	59.00	7.20	1.29	7.26	0.00	3.42	0.00	5.23	4.19	67.65	11.38	56.27	23.71	-32.56	20.00	-52.56	76.27	
October	1st	60.80	8.61	1.29	6.21	0.00	3.42	0.00	5.35	4.28	69.57	12.89	56.68	21.03	-35.65	20.00	-55.65	76.68	
	2nd	42.40	4.49	1.29	5.04	0.00	3.42	0.00	5.35	4.28	51.17	8.78	42.39	17.67	-24.73	20.00	-44.73	62.39	
	3rd	52.90	4.67	1.29	7.89	0.00	3.42	0.00	5.35	4.28	61.67	8.95	52.72	25.24	-27.48	20.00	-47.48	72.72	
November	1st	55.10	5.18	1.29	7.23	0.00	3.42	0.00	3.47	2.77	61.98	7.95	54.03	23.37	-30.67	20.00	-50.67	74.03	
	2nd	55.90	7.62	1.29	5.70	0.00	3.42	0.00	3.47	2.77	62.78	10.40	52.38	36.00	-16.39	20.00	-36.39	72.38	
	3rd	64.20	13.55	1.29	2.19	0.00	3.42	0.00	3.47	2.77	71.08	16.32	54.76	62.87	8.11	20.00	-11.89	74.76	
December	1st	65.40	16.97	1.29	0.43	0.81	3.42	0.00	1.61	1.29	71.24	18.27	52.97	120.35	67.38	20.00	0.00	72.97	
	2nd	68.00	13.17	1.29	3.06	0.00	3.42	0.00	1.61	1.29	73.03	14.46	58.57	136.94	78.37	20.00	0.00	78.57	
	3rd	55.70	10.72	1.29	2.64	0.00	3.42	0.00	1.61	1.29	60.73	12.01	48.72	288.78	240.06	20.00	0.00	68.72	
Total (million m ³)		1,943.4	304.7	40.8	178.4	1.0	108.0	0.0	104.0	83.2	2,156.5	387.9	1,768.5	5,808.4	4,039.9	632.4	-575.3	2,401.0	
Total in the drought season (million m ³)		1,035.1	140.6	20.4	123.7	0.0	54.0	0.0	78.8	63.0	1,167.9	203.7	964.2	818.9	-145.3	316.2	-564.8	1,280.5	
													Total for July to November (million m ³):		474.7			-564.8	1,039.5

☐ : Drought season

Table A5-3 Water Balance at the New Lengkong Dam (2 / 5)

DEMAND = 2010 (WITHOUT SAVING MEASURE)
 NATURAL FLOW : 10 YEAR DROUGHT YEAR ; 1977

Unit : m³/s

		Irrigation	Return	Water	Brants	Net	Total	Return	Industrial	Return	Total	Total	Net	Natural	Surplus	Required	Net	Total					
		Demand	Flow	Demand	Delta	Water	Domestic	Flow	Demand	Flow	Demand	Utilizable	Total	Flow	at the	Deficit	Sluiceway	Deficit	Demand				
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q					
						If cod e-es Ete d d-6																	
January	1st	53.86	8.90	5.49	4.44	1.05	18.58	4.13	6.21	4.97	79.70	18.00	61.70	258.34	176.63	20.00	0.00	81.70					
	2nd	67.18	11.68	5.49	5.41	0.08	18.58	4.13	6.21	4.97	92.05	20.98	71.07	248.04	176.96	20.00	0.00	91.07					
	3rd	62.96	9.34	5.49	6.44	0.00	18.58	4.13	6.21	4.97	87.75	18.44	69.31	458.07	388.75	20.00	0.00	89.31					
February	1st	46.66	6.81	5.49	4.30	1.19	18.58	4.13	6.19	4.95	72.62	15.90	56.72	397.80	341.08	20.00	0.00	76.72					
	2nd	45.84	8.34	5.49	2.87	2.62	18.58	4.13	6.19	4.95	73.23	17.42	55.81	388.23	332.42	20.00	0.00	75.81					
	3rd	32.58	5.61	5.49	1.84	3.65	18.58	4.13	6.19	4.95	61.00	14.69	46.31	404.65	358.34	20.00	0.00	66.31					
March	1st	26.84	5.24	5.49	1.34	4.16	18.58	4.13	6.22	4.97	55.79	14.35	41.44	461.41	419.97	20.00	0.00	61.44					
	2nd	27.40	4.12	5.49	2.26	3.24	18.58	4.13	6.22	4.97	55.43	13.22	42.21	550.96	508.75	20.00	0.00	62.21					
	3rd	29.06	5.19	5.49	1.24	4.26	18.58	4.13	6.22	4.97	58.11	14.30	43.82	592.30	548.48	20.00	0.00	63.82					
April	1st	46.32	8.01	5.49	3.76	1.74	18.58	4.13	6.22	4.97	72.85	17.11	55.74	477.03	421.29	20.00	0.00	75.74					
	2nd	32.84	5.56	5.49	1.82	3.68	18.58	4.13	6.22	4.97	61.31	14.67	46.64	306.98	260.34	20.00	0.00	66.64					
	3rd	48.68	9.55	5.49	2.66	2.84	18.58	4.13	6.22	4.97	76.31	18.65	57.66	259.72	202.06	20.00	0.00	77.66					
May	1st	60.72	10.64	5.49	4.16	1.34	18.58	4.13	6.88	5.51	87.52	20.28	67.24	137.36	70.12	20.00	0.00	87.24					
	2nd	71.88	12.23	5.49	6.58	0.00	18.58	4.13	6.88	5.51	97.34	21.87	75.47	101.26	25.78	20.00	0.00	95.47					
	3rd	71.96	11.79	5.49	6.78	0.00	18.58	4.13	6.88	5.51	97.42	21.43	75.99	84.81	8.82	20.00	-11.18	95.99					
June	1st	64.32	11.46	5.49	5.52	0.00	18.58	4.13	10.83	8.66	93.73	24.25	69.47	128.55	59.08	20.00	0.00	89.47					
	2nd	68.00	10.91	5.49	7.85	0.00	18.58	4.13	10.83	8.66	97.41	23.70	73.71	139.28	65.57	20.00	0.00	93.71					
	3rd	72.68	10.93	5.49	8.24	0.00	18.58	4.13	10.83	8.66	102.09	23.72	78.36	130.58	52.21	20.00	0.00	98.36					
July	1st	68.68	11.02	5.49	7.23	0.00	18.58	4.13	11.19	8.96	98.45	24.10	74.35	60.98	-13.37	20.00	-33.37	94.35					
	2nd	61.60	9.70	5.49	6.70	0.00	18.58	4.13	11.19	8.96	91.37	22.79	68.58	42.10	-26.48	20.00	-46.48	88.58					
	3rd	56.96	8.58	5.49	6.80	0.00	18.58	4.13	11.19	8.96	86.73	21.67	65.06	50.06	-15.00	20.00	-35.00	85.06					
August	1st	53.56	8.37	5.49	5.85	0.00	18.58	4.13	11.19	8.95	83.33	21.45	61.88	40.92	-20.96	20.00	-40.96	81.88					
	2nd	48.62	7.11	5.49	5.95	0.00	18.58	4.13	11.19	8.95	78.39	20.19	58.20	35.53	-22.67	20.00	-42.67	78.20					
	3rd	46.72	7.75	5.49	4.51	0.99	18.58	4.13	11.19	8.95	77.47	20.84	56.64	34.08	-22.56	20.00	-42.56	76.64					
September	1st	49.38	7.57	5.49	5.22	0.27	18.58	4.13	11.02	8.82	79.25	20.52	58.74	34.08	-24.66	20.00	-44.66	78.74					
	2nd	52.08	8.38	5.49	5.19	0.30	18.58	4.13	11.02	8.82	81.98	21.33	60.65	30.84	-29.81	20.00	-49.81	80.65					
	3rd	49.94	7.70	5.49	4.81	0.68	18.58	4.13	11.02	8.82	80.22	20.64	59.58	23.71	-35.87	20.00	-55.87	79.58					
October	1st	49.94	8.34	5.49	4.27	1.23	18.58	4.13	11.18	8.94	80.92	21.42	59.51	21.03	-38.48	20.00	-58.48	79.51					
	2nd	32.92	4.30	5.49	3.44	2.06	18.58	4.13	11.18	8.94	64.73	17.37	47.36	17.67	-29.69	20.00	-49.69	67.36					
	3rd	37.06	4.18	5.49	5.03	0.47	18.58	4.13	11.18	8.94	67.28	17.26	50.02	25.24	-24.79	20.00	-44.79	70.02					
November	1st	39.44	4.42	5.49	4.58	0.91	18.58	4.13	8.76	7.01	67.69	15.56	52.13	23.37	-28.76	20.00	-48.76	72.13					
	2nd	39.40	5.76	5.49	3.54	1.95	18.58	4.13	8.76	7.01	68.69	16.90	51.79	36.00	-15.79	20.00	-35.79	71.79					
	3rd	48.48	10.24	5.49	1.49	4.01	18.58	4.13	8.76	7.01	79.82	21.38	58.44	62.87	4.43	20.00	-15.57	78.44					
December	1st	52.86	12.89	5.49	1.20	4.29	18.58	4.13	6.38	5.10	82.11	22.13	59.98	120.35	60.37	20.00	0.00	79.98					
	2nd	64.94	11.60	5.49	4.01	1.48	18.58	4.13	6.38	5.10	91.38	20.84	70.54	136.94	66.40	20.00	0.00	90.54					
	3rd	62.60	11.44	5.49	3.95	1.54	18.58	4.13	6.38	5.10	89.10	20.67	68.43	288.78	220.36	20.00	0.00	88.43					
Total (million m ³)		1,623.0	268.8	173.7	142.2	43.5	587.5	130.7	262.7	215.7	2,523.6	615.2	1,908.4	5,808.4	3,900.0	632.4	-578.0	2,540.9					
Total in the drought season (million m ³)		824.1	128.5	86.9	84.5	11.2	293.7	65.3	169.2	135.4	1,298.3	329.2	969.1	818.9	-150.2	316.2	-567.4	1,285.3					
														Total from July to November (million m ³) :		474.7				-567.4		1,042.1	

☐ : Drought season

Table A5-3 Water Balance at the New Lengkong Dam (3/5)

DEMAND = 2010 (SAVING MEASURES)
 NATURAL FLOW : 10 YEAR DROUGHT YEAR ; 1977

Unit : m³/s

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	
		Irrigation Water Demand		Water Demand in the Fishpond	Branch Delta Irrigation Water Return Flow	Net Water Demand in the Fishpond	Total Domestic Water Demand	Return Flow from Domestic Water Upstream of Mogkeng	Industrial Water Demand	Return Flow from Industrial Water	Total Demand without Maintenance Flow	Total Utilizable Return Flow except for Fishpond	Net Total Demand without Maintenance Flow	Natural Flow at the N.L. Dam	Surplus/Deficit with Maintenance Flow	Required Maintenance Flow	Net Deficit	Total Demand including Maintenance Flow		
		a		c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	
January	1st	49.95	8.10	5.49	4.27	1.23	18.58	4.13	2.67	2.14	72.42	14.37	58.06	258.34	200.28	20.00	0.00	78.06		
	2nd	62.22	10.80	5.49	5.20	0.29	18.58	4.13	2.67	2.14	83.77	17.07	66.69	248.04	181.35	20.00	0.00	86.69		
	3rd	58.55	8.50	5.49	6.19	0.00	18.58	4.13	2.67	2.14	79.83	14.77	65.06	458.07	393.00	20.00	0.00	85.06		
February	1st	43.38	6.20	5.49	4.13	1.36	18.58	4.13	2.66	2.13	65.98	12.46	53.52	397.80	344.28	20.00	0.00	73.52		
	2nd	42.36	7.59	5.49	2.76	2.73	18.58	4.13	2.66	2.13	66.33	13.85	52.48	388.23	335.74	20.00	0.00	72.48		
	3rd	30.11	5.10	5.49	1.77	3.72	18.58	4.13	2.66	2.13	55.08	11.36	43.71	404.65	360.93	20.00	0.00	63.71		
March	1st	24.74	4.77	5.49	1.29	4.21	18.58	4.13	2.68	2.14	50.21	11.04	39.16	461.41	422.25	20.00	0.00	59.16		
	2nd	25.44	3.75	5.49	2.17	3.33	18.58	4.13	2.68	2.14	50.02	10.02	40.00	550.96	510.95	20.00	0.00	60.00		
	3rd	26.82	4.72	5.49	1.19	4.31	18.58	4.13	2.68	2.14	52.38	11.00	41.38	592.30	550.92	20.00	0.00	61.38		
April	1st	42.92	7.29	5.49	3.61	1.88	18.58	4.13	2.68	2.14	66.06	13.56	52.50	477.03	424.53	20.00	0.00	72.50		
	2nd	30.37	5.07	5.49	1.75	3.75	18.58	4.13	2.68	2.14	55.37	11.34	44.03	306.98	262.95	20.00	0.00	64.03		
	3rd	44.91	8.69	5.49	2.55	2.94	18.58	4.13	2.68	2.14	69.10	14.96	54.14	259.72	205.58	20.00	0.00	74.14		
May	1st	56.19	9.69	5.49	3.99	1.50	18.58	4.13	3.08	2.46	79.35	16.28	63.07	137.36	74.29	20.00	0.00	83.07		
	2nd	66.70	11.13	5.49	6.32	0.00	18.58	4.13	3.08	2.46	83.35	17.72	70.63	101.26	30.62	20.00	0.00	90.63		
	3rd	66.82	10.73	5.49	6.51	0.00	18.58	4.13	3.08	2.46	83.48	17.32	71.15	84.81	13.65	20.00	-6.35	91.15		
June	1st	59.60	10.42	5.49	5.30	0.19	18.58	4.13	5.45	4.36	83.82	18.91	64.91	128.55	63.65	20.00	0.00	84.91		
	2nd	63.29	9.92	5.49	7.54	0.00	18.58	4.13	5.45	4.36	87.32	18.41	68.91	139.28	70.37	20.00	0.00	88.91		
	3rd	67.70	9.94	5.49	7.91	0.00	18.58	4.13	5.45	4.36	91.73	18.43	73.29	130.58	57.28	20.00	0.00	93.29		
July	1st	63.87	10.02	5.49	6.95	0.00	18.58	4.13	5.67	4.53	88.11	18.69	69.42	60.98	-8.45	20.00	-28.45	89.42		
	2nd	57.32	8.83	5.49	6.43	0.00	18.58	4.13	5.67	4.53	81.56	17.49	64.07	42.10	-21.97	20.00	-41.97	84.07		
	3rd	53.09	7.81	5.49	6.54	0.00	18.58	4.13	5.67	4.53	77.33	16.47	60.86	50.06	-10.80	20.00	-30.80	80.86		
August	1st	49.84	7.61	5.49	5.62	0.00	18.58	4.13	5.66	4.53	74.09	16.27	57.81	40.92	-16.89	20.00	-36.89	77.81		
	2nd	45.35	6.47	5.49	5.72	0.00	18.58	4.13	5.66	4.53	69.59	15.13	54.46	35.53	-18.93	20.00	-38.93	74.46		
	3rd	43.39	7.05	5.49	4.33	1.16	18.58	4.13	5.66	4.53	68.80	15.72	53.08	34.08	-19.00	20.00	-39.00	73.08		
September	1st	45.96	6.89	5.49	5.02	0.48	18.58	4.13	5.56	4.45	70.57	15.47	55.11	34.08	-21.03	20.00	-41.03	75.11		
	2nd	48.41	7.63	5.49	4.99	0.51	18.58	4.13	5.56	4.45	73.05	16.21	56.85	30.84	-26.01	20.00	-46.01	76.85		
	3rd	46.43	7.00	5.49	4.62	0.87	18.58	4.13	5.56	4.45	71.44	15.59	55.86	23.71	-32.15	20.00	-52.15	75.86		
October	1st	46.33	7.59	5.49	4.10	1.39	18.58	4.13	5.66	4.53	71.96	16.25	55.71	21.03	-34.68	20.00	-54.68	75.71		
	2nd	30.70	3.92	5.49	3.30	2.19	18.58	4.13	5.66	4.53	57.12	12.57	44.55	17.67	-26.88	20.00	-46.88	64.55		
	3rd	34.72	3.81	5.49	4.83	0.66	18.58	4.13	5.66	4.53	59.61	12.47	47.15	25.24	-21.91	20.00	-41.91	67.15		
November	1st	36.88	4.03	5.49	4.40	1.09	18.58	4.13	4.20	3.36	60.75	11.52	49.23	23.37	-25.86	20.00	-45.86	69.23		
	2nd	36.64	5.24	5.49	3.40	2.09	18.58	4.13	4.20	3.36	61.51	12.74	48.77	36.00	-12.78	20.00	-32.78	68.77		
	3rd	44.56	9.32	5.49	1.43	4.06	18.58	4.13	4.20	3.36	71.40	16.81	54.59	62.87	8.28	20.00	-11.72	74.59		
December	1st	48.40	11.73	5.49	1.15	4.34	18.58	4.13	2.77	2.22	74.09	18.08	56.01	120.35	64.34	20.00	0.00	76.01		
	2nd	60.02	10.56	5.49	3.86	1.64	18.58	4.13	2.77	2.22	83.01	16.91	66.10	136.94	70.84	20.00	0.00	86.10		
	3rd	57.85	10.41	5.49	3.80	1.69	18.58	4.13	2.77	2.22	80.89	16.76	64.13	288.78	224.65	20.00	0.00	84.13		
Total (million m ³)		1,505.9	244.6	173.7	136.6	46.7	587.5	130.7	128.5	102.8	2,268.6	478.1	1,790.5	5,808.4	4,017.9	632.4	-524.6	2,423.0		
Total in the drought season (million m ³)		766.5	117.0	86.9	81.2	12.9	293.7	65.3	84.9	67.9	1,158.1	250.2	907.8	818.9	-88.9	316.2	-518.6	1,224.1		
													Total from July to November (million m ³) :		474.7				-518.6	993.3

☐ : Drought season

Table A5-3 Water Balance at the New Lengkong Dam (4/5)

DEMAND = 2020 (WITHOUT SAVING MEASURE)

NATURAL FLOW : 10 YEAR DROUGHT YEAR ; 1977

Unit : m³/s

		Irigation Water Demand	Return Flow from Irigation Area Upstream of Majkene	Water Demand in the Fishpond	Brantas Delta Irigation Water Return Flow	Net Water Demand in the Fishpond	Total Domestic Water Demand	Return Flow from Domestic Water Upstream of Majkene	Industrial Water Demand	Return Flow from Industrial Water	Total Demand without Maintenance Flow	Total Utilizable Return Flow except for Fishpond	Net Total Demand without Maintenance Flow	Natural Flow at the N.L. Dam	Surplus Deficit without Maintenance Flow	Required Maintenance Flow	Net Deficit	Total Demand including Maintenance Flow
		a	b	c	d	e If e > d-c Else d-c	f	g	h	i	j a+c-e-h	k b+g-i	l j-k	m	n m-l	o	p If n > 0 Else 0	q
January	1st	57.30	9.57	8.50	4.80	3.70	29.41	7.05	9.59	7.67	99.99	24.32	75.67	258.34	182.66	20.00	0.00	95.67
	2nd	64.70	11.12	8.50	5.70	2.80	29.41	7.05	9.59	7.67	106.49	25.87	80.62	248.04	167.42	20.00	0.00	100.62
	3rd	56.80	8.80	8.50	5.67	2.83	29.41	7.05	9.59	7.67	98.62	23.56	75.07	458.07	383.00	20.00	0.00	95.07
February	1st	45.30	7.20	8.50	3.93	4.57	29.41	7.05	9.57	7.65	88.84	21.94	66.90	397.80	330.90	20.00	0.00	86.90
	2nd	42.20	7.59	8.50	3.03	5.47	29.41	7.05	9.57	7.65	86.64	22.33	64.32	388.23	323.91	20.00	0.00	84.32
	3rd	25.70	4.03	8.50	2.07	6.43	29.41	7.05	9.57	7.65	71.10	18.72	52.34	404.65	352.31	20.00	0.00	72.34
March	1st	17.80	3.51	8.50	1.17	7.33	29.41	7.05	9.60	7.68	64.13	18.28	45.86	461.41	415.56	20.00	0.00	65.86
	2nd	16.40	2.11	8.50	1.74	6.76	29.41	7.05	9.60	7.68	62.16	16.87	45.29	550.96	505.66	20.00	0.00	65.29
	3rd	17.70	3.08	8.50	0.84	7.66	29.41	7.05	9.60	7.68	64.36	17.84	46.52	592.30	545.78	20.00	0.00	66.52
April	1st	37.20	6.65	8.50	3.06	5.44	29.41	7.05	9.60	7.68	81.64	21.41	60.24	477.03	416.79	20.00	0.00	80.24
	2nd	31.20	4.95	8.50	2.43	6.07	29.41	7.05	9.60	7.68	76.27	19.71	56.56	306.93	250.42	20.00	0.00	76.56
	3rd	48.80	9.26	8.50	3.33	5.17	29.41	7.05	9.60	7.68	92.97	24.02	68.95	259.72	190.77	20.00	0.00	88.95
May	1st	58.40	9.94	8.50	4.95	3.55	29.41	7.05	10.37	8.29	101.72	25.32	76.40	137.35	60.96	20.00	0.00	96.40
	2nd	66.00	10.59	8.50	7.11	1.39	29.41	7.05	10.37	8.29	107.16	25.96	81.20	101.25	20.00	0.00	101.20	
	3rd	62.20	9.95	8.50	6.42	2.08	29.41	7.05	10.37	8.29	104.05	25.33	78.72	84.81	6.08	20.00	-13.92	98.72
June	1st	56.40	10.21	8.50	4.92	3.58	29.41	7.05	14.93	11.95	104.32	29.23	75.08	128.55	53.47	20.00	0.00	95.08
	2nd	59.80	10.09	8.50	6.60	1.90	29.41	7.05	14.93	11.95	106.04	29.12	76.92	139.28	62.36	20.00	0.00	96.92
	3rd	63.40	10.23	8.50	6.69	1.81	29.41	7.05	14.93	11.95	109.55	29.26	80.29	130.58	50.29	20.00	0.00	100.29
July	1st	59.00	10.30	8.50	5.61	2.89	29.41	7.05	15.36	12.29	106.65	29.67	76.98	60.98	-16.01	20.00	-36.01	96.98
	2nd	53.00	9.21	8.50	5.16	3.34	29.41	7.05	15.36	12.29	101.10	28.58	72.52	42.10	-30.42	20.00	-50.42	92.52
	3rd	47.00	8.00	8.50	4.92	3.58	29.41	7.05	15.36	12.29	95.34	27.37	67.97	50.06	-17.91	20.00	-37.91	87.97
August	1st	41.60	7.72	8.50	3.45	5.05	29.41	7.05	15.35	12.28	91.40	27.08	64.32	40.92	-23.40	20.00	-43.40	84.32
	2nd	37.10	6.57	8.50	3.36	5.14	29.41	7.05	15.35	12.28	86.99	25.93	61.07	35.53	-25.54	20.00	-45.54	81.07
	3rd	38.00	7.61	8.50	2.25	6.25	29.41	7.05	15.35	12.28	89.00	26.97	62.03	34.08	-27.96	20.00	-47.96	82.03
September	1st	42.70	7.91	8.50	2.94	5.56	29.41	7.05	15.16	12.12	92.82	27.12	65.70	34.08	-31.63	20.00	-51.63	85.70
	2nd	46.80	8.95	8.50	3.15	5.35	29.41	7.05	15.16	12.12	96.71	28.16	68.55	30.84	-37.71	20.00	-57.71	88.55
	3rd	43.90	8.03	8.50	3.18	5.32	29.41	7.05	15.16	12.12	93.78	27.24	66.54	23.71	-42.84	20.00	-62.84	86.54
October	1st	42.70	8.17	8.50	2.97	5.53	29.41	7.05	15.34	12.27	92.97	27.52	65.45	21.03	-44.42	20.00	-64.42	85.45
	2nd	26.60	4.17	8.50	2.37	6.13	29.41	7.05	15.34	12.27	77.47	23.52	53.95	17.67	-36.28	20.00	-56.28	73.95
	3rd	26.50	3.86	8.50	3.12	5.38	29.41	7.05	15.34	12.27	76.62	23.21	53.41	25.24	-28.17	20.00	-48.17	73.41
November	1st	29.00	3.92	8.50	2.82	5.68	29.41	7.05	12.54	10.03	76.62	21.03	55.59	23.37	-32.22	20.00	-52.22	75.59
	2nd	28.40	4.51	8.50	2.10	6.40	29.41	7.05	12.54	10.03	76.74	21.63	55.11	36.00	-19.12	20.00	-39.12	75.11
	3rd	38.00	8.03	8.50	1.02	7.48	29.41	7.05	12.54	10.03	87.42	25.15	62.27	62.87	0.60	20.00	-19.40	82.27
December	1st	44.50	10.17	8.50	1.68	6.82	29.41	7.05	9.78	7.83	90.51	25.08	65.42	120.35	54.93	20.00	0.00	85.42
	2nd	62.90	10.56	8.50	4.65	3.85	29.41	7.05	9.78	7.83	105.94	25.47	80.47	136.94	56.47	20.00	0.00	100.47
	3rd	67.20	11.92	8.50	4.83	3.67	29.41	7.05	9.78	7.83	110.06	26.83	83.23	288.78	205.55	20.00	0.00	103.23
Total (million m ³)		1,409.3	244.8	268.6	118.1	150.6	930.0	224.0	338.0	310.4	2,877.9	779.3	2,098.7	5,808.4	3,709.8	632.4	-640.9	2,731.1
Total in the drought season (million m ³)		683.5	120.5	134.3	58.5	75.9	465.0	112.0	233.8	187.0	1,458.1	419.5	1,038.6	818.9	-219.7	316.2	-627.6	1,354.8
Total from July to November (million m ³):														474.7			-627.6	1,102.3

: Drought season

Table A5-3 Water Balance at the New Lengkong Dam (5/5)

DEMAND = 2020 (SAVING MEASURE)

NATURAL FLOW : 10 YEAR DROUGHT YEAR ; 1977

Unit : m³/s

		Impignation Water Demand	Return Flow From Impignation Area Upstream of Mojokerto	Water Demand in the Fishpond	Brantas Delta Impignation Water Return Flow	Net Water Demand in the Fishpond	Total Domestic Water Demand	Return Flow From Dams Upstream of Mojokerto	Industrial Water Demand	Return Flow from Industrial Water	Total Demand without Maintenance Flow	Total Unusable Return Flow except for Fishpond	Net Total Demand without Maintenance Flow	Natural Flow at the N.L. Dam	Surplus /Deficit without Maintenance Flow	Required Maintenance Flow	Net Deficit	Total Demand including Maintenance Flow	
		a	b	c	d	e If e > d = e Else if d > e	f	g	h	i -h * 0.5	j +e + f - h	k -b + g + i	l + j - k	m	n -m + l	o	p If n > 0 Else if n < 0	q -p + o	
January	1st	52.26	8.69	8.50	4.49	4.01	29.41	7.08	3.52	2.82	89.20	18.59	70.61	258.34	182.72	20.00	0.00	90.61	
	2nd	59.09	10.10	8.50	5.33	3.17	29.41	7.08	3.52	2.82	95.19	20.00	75.19	248.04	172.85	20.00	0.00	95.19	
	3rd	51.91	7.99	8.50	5.30	3.20	29.41	7.08	3.52	2.82	88.03	17.89	70.14	458.07	387.93	20.00	0.00	90.14	
February	1st	41.31	6.54	8.50	3.67	4.82	29.41	7.08	3.51	2.81	79.05	16.43	62.62	397.80	335.18	20.00	0.00	82.62	
	2nd	38.45	6.89	8.50	2.83	5.66	29.41	7.08	3.51	2.81	77.04	16.79	60.25	388.23	327.97	20.00	0.00	80.25	
	3rd	23.40	3.66	8.50	1.93	6.56	29.41	7.08	3.51	2.81	62.89	13.55	49.34	404.65	355.31	20.00	0.00	69.34	
March	1st	16.22	3.19	8.50	1.09	7.40	29.41	7.08	3.52	2.82	56.56	13.09	43.46	461.41	417.95	20.00	0.00	63.46	
	2nd	14.96	1.91	8.50	1.63	6.87	29.41	7.08	3.52	2.82	54.76	11.81	42.95	550.96	508.01	20.00	0.00	62.95	
	3rd	16.04	2.79	8.50	0.79	7.71	29.41	7.08	3.52	2.82	56.68	12.70	43.99	592.30	548.31	20.00	0.00	63.99	
April	1st	33.96	6.04	8.50	2.86	5.64	29.41	7.08	3.52	2.82	72.53	15.94	56.59	477.03	420.44	20.00	0.00	76.59	
	2nd	28.40	4.50	8.50	2.27	6.22	29.41	7.08	3.52	2.82	67.56	14.40	53.16	306.98	253.82	20.00	0.00	73.16	
	3rd	44.47	8.41	8.50	3.11	5.38	29.41	7.08	3.52	2.82	82.78	18.31	64.47	259.72	195.25	20.00	0.00	84.47	
May	1st	53.28	9.03	8.50	4.63	3.87	29.41	7.08	3.84	3.07	90.40	19.19	71.21	137.36	66.15	20.00	0.00	91.21	
	2nd	60.42	9.62	8.50	6.64	1.85	29.41	7.08	3.84	3.07	95.52	19.77	75.75	101.26	25.51	20.00	0.00	95.75	
	3rd	56.89	9.04	8.50	6.00	2.50	29.41	7.08	3.84	3.07	92.64	19.19	73.44	84.81	11.36	20.00	-8.64	93.44	
June	1st	51.54	9.27	8.50	4.60	3.90	29.41	7.08	5.71	4.56	90.55	20.92	69.63	128.55	58.92	20.00	0.00	89.63	
	2nd	54.83	9.17	8.50	6.17	2.33	29.41	7.08	5.71	4.56	92.27	20.82	71.45	139.28	67.83	20.00	0.00	91.45	
	3rd	58.02	9.29	8.50	6.25	2.24	29.41	7.08	5.71	4.56	95.38	20.94	74.44	130.58	56.14	20.00	0.00	94.44	
July	1st	53.96	9.36	8.50	5.24	3.25	29.41	7.08	5.88	4.70	92.50	21.14	71.36	60.98	-10.38	20.00	-30.38	91.36	
	2nd	48.49	8.37	8.50	4.82	3.67	29.41	7.08	5.88	4.70	87.45	20.16	67.29	42.10	-25.19	20.00	-45.19	87.29	
	3rd	43.04	7.27	8.50	4.60	3.90	29.41	7.08	5.88	4.70	82.23	19.05	63.17	50.06	-13.11	20.00	-33.11	83.17	
August	1st	38.00	7.01	8.50	3.22	5.27	29.41	7.08	5.88	4.70	78.55	18.80	59.76	40.92	-18.84	20.00	-38.84	79.76	
	2nd	33.90	5.96	8.50	3.14	5.36	29.41	7.08	5.88	4.70	74.55	17.75	56.80	35.53	-21.27	20.00	-41.27	76.80	
	3rd	34.60	6.91	8.50	2.10	6.39	29.41	7.08	5.88	4.70	76.28	18.69	57.58	34.08	-23.50	20.00	-43.50	77.58	
September	1st	38.89	7.18	8.50	2.75	5.75	29.41	7.08	5.80	4.64	79.84	18.90	60.94	34.08	-26.86	20.00	-46.86	80.94	
	2nd	42.64	8.13	8.50	2.94	5.55	29.41	7.08	5.80	4.64	83.40	19.86	63.54	30.84	-32.70	20.00	-52.70	83.54	
	3rd	40.00	7.29	8.50	2.97	5.52	29.41	7.08	5.80	4.64	80.73	19.01	61.72	23.71	-38.01	20.00	-58.01	81.72	
October	1st	38.92	7.42	8.50	2.78	5.72	29.41	7.08	5.87	4.70	79.92	19.20	60.72	21.03	-39.69	20.00	-59.69	80.72	
	2nd	24.25	3.79	8.50	2.21	6.28	29.41	7.08	5.87	4.70	65.81	15.57	50.25	17.67	-32.58	20.00	-52.58	70.25	
	3rd	24.27	3.51	8.50	2.92	5.58	29.41	7.08	5.87	4.70	65.13	15.29	49.84	25.24	-24.61	20.00	-44.61	69.84	
November	1st	26.42	3.56	8.50	2.64	5.86	29.41	7.08	4.73	3.78	66.42	14.42	52.00	23.37	-28.63	20.00	-48.63	72.00	
	2nd	25.82	4.10	8.50	1.96	6.53	29.41	7.08	4.73	3.78	66.49	14.96	51.53	36.00	-15.53	20.00	-35.53	71.53	
	3rd	34.43	7.30	8.50	0.95	7.54	29.41	7.08	4.73	3.78	76.11	18.16	57.95	62.87	4.92	20.00	-15.08	77.95	
December	1st	40.48	9.24	8.50	1.57	6.93	29.41	7.08	3.60	2.88	80.42	19.21	61.21	120.35	59.14	20.00	0.00	81.21	
	2nd	57.28	9.59	8.50	4.35	4.15	29.41	7.08	3.60	2.88	94.44	19.55	74.89	136.94	62.05	20.00	0.00	94.89	
	3rd	61.22	10.82	8.50	4.51	3.98	29.41	7.08	3.60	2.88	98.21	20.79	77.42	288.78	211.36	20.00	0.00	97.42	
Total (million m ³)		1,266.1	222.4	268.6	110.3	158.3	930.0	224.0	146.0	116.8	2,520.4	563.2	1,957.2	5,808.4	3,851.2	632.4	-576.8	2,589.6	
Total in the drought season (million m ³)		624.0	109.4	134.3	54.6	79.7	465.0	112.0	89.3	71.4	1,258.0	292.8	965.1	818.9	-146.2	316.2	-568.6	1,281.3	
Total from July to November (million m ³) :														474.7		-568.6		1,043.3	

☐ : Drought season

Unit : m³/s

Table A5-4 Water Balance Calculation at the New Lengkung Dam (5/15)
(Demand=2010, Year=1977, No Saving Water; (2/3))

Table with 25 columns and 108 rows. Columns include Return Flow from various sources (Blitar Regency, Domestic Water, Kediri Municipality, etc.), Domestic Water for various uses (Jalanpau, Kediri Municipality, etc.), Turun Net, Various Irrigation (Keresopo, Tunjoro, Waru, etc.), and various Return Flows. Rows are grouped by month (January to December) and then Total. A final row shows 'Total' and 'Total in the drought season'. A small box at the bottom left contains '0.00'.

: Drought season

Table A5-4 Water Balance Calculation at the New Lenglong Dam (10 / 15)
(Demand=2010, Year=1977, No Saving Water; (1 / 3))

Unit : m³/s

	Potential Flow at the New Lenglong Dam	Brantas Aias Irrigation	Brantas Bawah Irrigation	Net Brantas Bawah Irrigation	Domestic Water for Malang Muhammadiyah	Return Flow from Brantas Aias Irrigation	Return Flow from Brantas Bawah Irrigation	Net Return Flow from Brantas Bawah Irrigation	Return Flow from Malang Muhammadiyah Domestic Water	Net Return Flow from Malang Muhammadiyah Domestic Water	Return Flow from Moek Irrigation	Net Return Flow from Moek Irrigation	Loobang Irrigation	Return Flow from Loobang Irrigation	Net Return Flow from Loobang Irrigation	Domestic Water for Blitar Regency	Domestic Water for Blitar Municipality	Net Domestic Water for Blitar Regency	Net Domestic Water for Blitar Municipality					
January	1st	258.34	0.20	288.14	0.70	252.44	3.09	284.34	2.65	251.69	2.47	254.44	2.12	256.44	2.12	247.44	2.12	247.44	2.12	247.44				
	2nd	248.04	0.30	247.74	1.50	246.24	3.09	243.15	2.65	240.49	2.47	243.31	2.12	245.93	2.12	245.93	2.12	245.93	2.12	245.93				
	3rd	458.07	0.20	457.87	0.60	456.97	3.09	453.87	2.65	451.23	2.47	453.31	2.12	455.93	2.12	455.93	2.12	455.93	2.12	455.93				
February	1st	397.80	0.20	397.60	0.20	396.60	3.09	393.51	2.65	390.86	2.47	393.09	2.12	395.81	2.12	395.81	2.12	395.81	2.12	395.81				
	2nd	388.23	0.00	388.23	0.30	387.93	3.09	384.83	2.65	382.18	2.47	384.71	2.12	387.47	2.12	387.47	2.12	387.47	2.12	387.47				
	3rd	404.65	0.00	404.65	0.00	404.65	3.09	401.55	2.65	398.90	2.47	401.33	2.12	404.03	2.12	404.03	2.12	404.03	2.12	404.03				
March	1st	461.41	0.00	461.41	0.00	461.41	3.09	458.31	2.65	455.67	2.47	458.14	2.12	460.79	2.12	460.79	2.12	460.79	2.12	460.79				
	2nd	550.96	0.20	550.76	0.30	550.46	3.09	547.36	2.65	544.71	2.47	547.34	2.12	549.86	2.12	549.86	2.12	549.86	2.12	549.86				
	3rd	592.30	0.40	591.90	0.50	591.40	3.09	588.31	2.65	585.71	2.47	588.40	2.12	590.95	2.12	590.95	2.12	590.95	2.12	590.95				
April	1st	577.03	0.20	576.83	0.20	575.83	3.09	572.73	2.65	570.08	2.47	572.41	2.12	574.93	2.12	574.93	2.12	574.93	2.12	574.93				
	2nd	306.98	0.20	306.78	0.20	305.78	3.09	302.68	2.65	300.03	2.47	302.43	2.12	304.95	2.12	304.95	2.12	304.95	2.12	304.95				
	3rd	250.72	0.40	250.32	0.40	249.92	3.09	246.82	2.65	244.17	2.47	246.53	2.12	249.05	2.12	249.05	2.12	249.05	2.12	249.05				
May	1st	171.36	0.20	171.16	0.20	170.16	3.09	167.06	2.65	164.41	2.47	166.81	2.12	169.33	2.12	169.33	2.12	169.33	2.12	169.33				
	2nd	101.26	0.20	101.06	0.20	100.06	3.09	95.96	2.65	93.31	2.47	95.71	2.12	98.23	2.12	98.23	2.12	98.23	2.12	98.23				
	3rd	84.81	0.20	84.61	0.20	83.61	3.09	79.31	2.65	76.66	2.47	78.51	2.12	81.03	2.12	81.03	2.12	81.03	2.12	81.03				
June	1st	126.55	0.80	125.75	0.80	124.95	3.09	121.85	2.65	119.20	2.47	121.61	2.12	124.13	2.12	124.13	2.12	124.13	2.12	124.13				
	2nd	130.28	0.80	129.48	0.80	128.68	3.09	125.58	2.65	122.93	2.47	124.74	2.12	127.26	2.12	127.26	2.12	127.26	2.12	127.26				
	3rd	130.38	0.70	129.58	0.60	128.78	3.09	125.68	2.65	123.03	2.47	124.84	2.12	127.36	2.12	127.36	2.12	127.36	2.12	127.36				
July	1st	60.98	0.70	60.28	0.70	59.58	3.09	56.48	2.65	53.83	2.47	56.23	2.12	58.75	2.12	58.75	2.12	58.75	2.12	58.75				
	2nd	42.10	0.50	41.60	0.60	41.00	3.09	37.90	2.65	35.25	2.47	37.60	2.12	40.12	2.12	40.12	2.12	40.12	2.12	40.12				
	3rd	50.06	0.70	49.36	0.50	48.86	3.09	45.76	2.65	43.11	2.47	45.51	2.12	48.03	2.12	48.03	2.12	48.03	2.12	48.03				
August	1st	40.92	0.70	40.22	0.60	39.62	3.09	36.52	2.65	33.87	2.47	36.24	2.12	38.76	2.12	38.76	2.12	38.76	2.12	38.76				
	2nd	33.53	0.80	32.73	0.60	32.13	3.09	29.03	2.65	26.38	2.47	29.00	2.12	31.52	2.12	31.52	2.12	31.52	2.12	31.52				
	3rd	34.08	0.70	33.38	0.50	32.78	3.09	29.08	2.65	26.43	2.47	29.00	2.12	31.52	2.12	31.52	2.12	31.52	2.12	31.52				
September	1st	34.08	0.80	33.18	0.60	32.58	3.09	29.48	2.65	26.83	2.47	29.40	2.12	31.92	2.12	31.92	2.12	31.92	2.12	31.92				
	2nd	30.84	0.90	29.94	0.60	29.34	3.09	26.24	2.65	23.59	2.47	26.24	2.12	28.76	2.12	28.76	2.12	28.76	2.12	28.76				
	3rd	23.71	0.80	22.91	0.60	22.31	3.09	19.21	2.65	16.56	2.47	19.46	2.12	21.98	2.12	21.98	2.12	21.98	2.12	21.98				
October	1st	21.03	0.70	20.33	0.40	19.93	3.09	16.84	2.65	14.19	2.47	16.89	2.12	19.41	2.12	19.41	2.12	19.41	2.12	19.41				
	2nd	17.67	0.60	17.07	0.40	16.67	3.09	13.57	2.65	10.92	2.47	13.69	2.12	16.21	2.12	16.21	2.12	16.21	2.12	16.21				
	3rd	23.24	0.80	22.64	0.30	22.34	3.09	19.24	2.65	16.59	2.47	19.35	2.12	21.99	2.12	21.99	2.12	21.99	2.12	21.99				
November	1st	23.37	0.10	23.27	0.00	23.27	3.09	20.17	2.65	17.52	2.47	20.03	2.12	22.55	2.12	22.55	2.12	22.55	2.12	22.55				
	2nd	30.00	0.30	29.70	0.60	29.40	3.09	26.20	2.65	23.55	2.47	26.10	2.12	28.62	2.12	28.62	2.12	28.62	2.12	28.62				
	3rd	63.87	0.30	63.57	0.00	63.27	3.09	59.97	2.65	57.32	2.47	59.19	2.12	61.71	2.12	61.71	2.12	61.71	2.12	61.71				
December	1st	170.35	0.80	169.55	0.20	168.75	3.09	165.65	2.65	163.00	2.47	165.81	2.12	168.33	2.12	168.33	2.12	168.33	2.12	168.33				
	2nd	136.94	0.30	136.64	0.20	136.34	3.09	133.24	2.65	130.59	2.47	132.81	2.12	135.33	2.12	135.33	2.12	135.33	2.12	135.33				
	3rd	285.78	0.20	285.58	1.30	284.28	3.09	281.18	2.65	278.53	2.47	280.40	2.12	282.92	2.12	282.92	2.12	282.92	2.12	282.92				
Total	5808.44	14.18	5804.27	19.66	5784.60	97.81	5676.79	83.86	5592.93	4.25	5597.18	78.25	5681.33	67.09	5748.42	65.21	5660.21	18.66	5764.87	213.83	5601.04	8.34	5499.78	
Total in the drought season (million m ³)	818.90	10.08	808.82	9.11	799.71	48.91	750.80	41.03	708.97	3.02	714.63	39.12	733.75	33.55	789.30	24.92	762.38	7.48	769.86	95.96	673.89	3.74	677.63	688.56

Drought season

