

WATER BALANCE CALCULATION

Year : 1984

No.	Parameter	Unity	BULAN												Year
			Jan	Feb	Mar	Apr	Mei	Jun	Jul	Agust	Sep	Okt	Nop	Des	
	Temperatur (T)														
Meteorological Data															
1	Catchment precipitation (P)	mm/month	242,63	103,88	262,84	368,42	332,93	98,04	253,97	131,01	330,98	46,08	199,53	527,65	2897,96
2	Catchment Rain Days (n)	days	25	25	29	28	28	25	30	17	26	21	27	31	
3	Days of Month (Hr)	days	31	29	31	30	31	30	31	31	30	31	30	31	
4	Temperatur (T)	°C	25,8	25,93	26,25	26,59	26,45	26,03	25,62	25,95	25,79	26,66	26,8	26,39	
5	Sunshine (S)	%	38,39	24,75	42	50,2	41,26	34,97	31,29	51,71	40,8	45,97	53,6	36,74	
6	Relative Humidity (H)	%	86,29	86,28	86,26	86,83	86,84	87,53	89,52	85,13	85,93	85,68	85,13	84,16	
7	Wind Speed (w)	mile/day	39,11	47,47	36,41	33,45	20,23	26,48	24,95	47,2	36,23	40,46	39,02	29	
Potential Evapotranspiration (Ep)															
8	Epm hitungan Penman Modifikasi	mm/month	121,637	114,9343	143,53	142,2874	126,9913	112,1311	110,0028	148,9177	132,8593	146,3763	143,3867	126,4379	
Limited Evapotranspiration (Ea)															
9	Exposed Surface (m)	%	45	45	45	45	45	45	45	45	45	45	45	45	
10	Number of Rain Days (n)	days	25	25	29	28	28	25	30	17	26	21	27	31	
11	$\Delta E/Epm=(m/20)(18-n)$	%	-15,75	-15,75	-24,75	-22,5	-22,5	-15,75	-27	2,25	-18	-6,75	-20,25	-29,25	
12	ΔE	mm/month	-19,1578	-18,1021	-35,5237	-32,0147	-28,573	-17,6606	-29,7007	3,350648	-23,9147	-9,8804	-29,0358	-36,9831	
13	Eactual=Epm - ΔE	mm/month	140,7949	133,0364	179,0537	174,3021	155,5643	129,7917	139,7035	145,5671	156,774	156,2567	172,4225	163,421	1846,69
Water Surplus (WS)															
14	P - Ea	mm/month	101,8351	-29,16	83,78634	194,1179	177,3657	-31,75	114,2665	-14,56	174,206	-110,177	27,11	364,229	
15	SMS=ISMS+(P-Ea)	mm/month	301,8351	170,8436	283,7863	394,1179	377,3657	168,2483	314,2665	185,4429	374,206	89,82329	227,1075	564,229	
16	Soil Moisture Capacity (SMC), \rightarrow ISMC=200	mm/month	200	170,8436	200	200	200	168,2483	200	185,4429	200	89,82329	200	200	
17	Soil Storage (SS), if P-Ea \geq 0, SS=0	mm/month	0	29,16	0	0	0	31,75	0	14,55706	0	110,18	0	0	
18	Water Surplus (WS), WS=27+30	mm/month	101,8351	0	83,78634	194,1179	177,3657	0	114,2665	0	174,206	0	27,10747	364,229	

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	Total Run Off (TRO)														
19	Infiltration Coefficien (if)		0,3	0,4	0,3	0,27	0,3	0,4	0,3	0,35	0,25	0,5	0,35	0,3	
20	Infiltration (i), $i = 31 \times if$	mm/month	30,55	0,00	25,14	52,41	53,21	0,00	34,28	0,00	43,55	0,00	9,49	109,27	357,90
21	Monthly Flow Recession Constant (K)		0,94	0,9	0,822	0,879	0,954	0,9	0,77	0,89	0,79	0,92	0,73	0,91	
22	Percentage Factor (PF)		0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	
23	$\frac{1}{2} \times (1 + K) i$		29,63	0,00	22,90	49,24	51,99	0,00	30,34	0,00	38,98	0,00	8,21	104,35	
24	$K \times Gsom, \rightarrow Gsom = 229,14$	229,14	215,3916	220,5231	181,27	179,4643	218,1848	243,1536	187,2283	193,6338	152,9707	176,5934	128,9131	124,7791	
25	$GS = 23 + 24$	mm/month	245,03	220,52	204,17	228,71	270,17	243,15	217,57	193,63	191,95	176,59	137,12	229,13	
26	$\Delta GS = GS - Gsom$	mm/month	15,89	-24,50	-16,35	24,54	41,47	-27,02	-25,59	-23,93	-1,68	-15,36	-39,47	92,01	-0,01
27	Base Flow, $BF = i - \Delta GS$	mm/month	14,66	24,50	41,49	27,88	11,74	27,02	59,87	23,93	45,24	15,36	48,96	17,26	357,91
28	Direct Run Off, $DRO = WS - i$	mm/month	71,28	0,00	58,65	141,71	124,16	0,00	79,99	0,00	130,65	0,00	17,62	254,96	
29	Storm Run Off, if $P \geq 200, SRO=0; SRO=P \times PF$	mm/month	0	10,39	0	0	0	9,80	0	13,10	0	4,61	19,95	0	
30	Total Run Off (TRO)=BF+DRO+SRO	mm/month	85,95	34,89	100,14	169,58	135,90	36,82	139,85	37,03	175,89	19,96	86,53	272,22	1294,78
31	Catchment Area	km ²	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	72340,27	
32	Stream Flow (calculated discharge)	m³/second	2321,39	1007,34	2704,67	4732,86	3670,50	1027,64	3777,29	1000,22	4908,94	539,20	2415,08	7352,28	