Table 5.3.3 INUNDATION AREA, DEPTH DURATION (1/8)

Unit ; ha

	Annual	Return Period (Year) 1.4	5	10	25	50	100
BLOCK NO. :A-1							
BUILDING							
H< 0.2	0.0	0.0	25.0	25.0	50.0	25.0	0.0
H<0.5	50.0	50.0	0.0	0.0	25.0	50.0	75.0
0.5=<H<1.0	100.0	100.0	150.0	50.0	50.0	25.0	0.0
1.0=<H<2.0	0.0	0.0	0.0	100.0	100.0	125.0	150.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	150.0	150.0	150.0	150.0	175.0	200.0	225.0
PADDY+POLDWIJD							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	300.0	250.0	250.0	200.0	225.0	250.0	150.0
SUB-TOTAL	300.0	250.0	250.0	200.0	225.0	250.0	150.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	125.0	275.0	375.0	400.0	425.0	400.0	425.0
5-6	0.0	0.0	0.0	50.0	25.0	25.0	125.0
7-	150.0	225.0	200.0	225.0	200.0	200.0	200.0
SUB-TOTAL	275.0	500.0	575.0	675.0	650.0	625.0	750.0
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	50.0	0.0	50.0	50.0	50.0
SUB-TOTAL	0.0	0.0	50.0	0.0	50.0	50.0	50.0
SUB-TOTAL	575.0	750.0	875.0	875.0	925.0	925.0	950.0
POLDWIJD							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	25.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	25.0	50.0	50.0	50.0	50.0	50.0	50.0
SUB-TOTAL	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	25.0	25.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	25.0	25.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	50.0	50.0	50.0	50.0	50.0	75.0	75.0
TOTAL	775.0	950.0	1075.0	1075.0	1150.0	1200.0	1250.0

Table 5.3. 3 INUNDATION AREA, DEPTH DURATION (2/8)

Unit ; ha

	Annual	Return Period (Year) 1.4	5	10	25	50	100
BLOCK NO. :A-2							
BUILDING							
H< 0.2	275.0	200.0	250.0	150.0	150.0	125.0	50.0
H<0.5	225.0	425.0	475.0	387.5	287.5	400.0	325.0
0.5=<H<1.0	25.0	50.0	150.0	475.0	675.0	412.5	387.5
1.0=<H<2.0	0.0	0.0	0.0	400.0	125.0	600.0	875.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	250.0	475.0	625.0	1262.5	1087.5	1412.5	1587.5
PADDY+POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	587.5	587.5	587.5	437.5	362.5	137.5	100.0
SUB-TOTAL	587.5	587.5	587.5	437.5	362.5	137.5	100.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	100.0	387.5	587.5	1525.0	1262.5	1625.0	1850.0
5-6	0.0	0.0	0.0	175.0	250.0	500.0	537.5
7-	25.0	25.0	25.0	25.0	25.0	25.0	25.0
SUB-TOTAL	125.0	412.5	612.5	1725.0	1537.5	2150.0	2412.5
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	712.5	1000.0	1200.0	2162.5	1900.0	2287.5	2512.5
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	25.0	75.0	100.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	25.0	75.0	100.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	50.0	75.0	350.0	300.0	300.0	475.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	50.0	75.0	350.0	300.0	300.0	475.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	50.0	75.0	350.0	325.0	375.0	575.0
TOTAL	962.5	1525.0	1900.0	3775.0	3312.5	4075.0	4675.0

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (3/8)

Unit ; ha

	Annual	Return Period (Year) 1.4	5	10	25	50	100
BLOCK NO. :8							
BUILDING							
H< 0.2	50.0	50.0	25.0	0.0	25.0	25.0	0.0
H<0.5	50.0	75.0	125.0	100.0	25.0	25.0	50.0
0.5=<H<1.0	0.0	50.0	75.0	75.0	125.0	125.0	100.0
1.0=<H<2.0	0.0	0.0	25.0	75.0	100.0	125.0	150.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	50.0	125.0	225.0	250.0	250.0	275.0	300.0
PADDY+POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	100.0	437.5	587.5	650.0	675.0	812.5	812.5
5-6	0.0	0.0	0.0	0.0	25.0	25.0	25.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	100.0	437.5	587.5	650.0	700.0	837.5	837.5
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	100.0	437.5	587.5	650.0	700.0	837.5	837.5
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	12.5	12.5	12.5	12.5	12.5	37.5
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	12.5	12.5	12.5	12.5	12.5	37.5
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	37.5	37.5	37.5	37.5	25.0	50.0	25.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	37.5	37.5	37.5	37.5	25.0	50.0	25.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	12.5	12.5	12.5
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	12.5	12.5	12.5
SUB-TOTAL	37.5	50.0	50.0	50.0	50.0	75.0	75.0
TOTAL	187.5	612.5	862.5	950.0	1000.0	1187.5	1212.5

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (4/8)

Unit ; ha

	Return Period (Year)						
	Annual	1.4	5	10	25	50	100
BLOCK NO. :C							
BUILDING							
H< 0.2	162.5	12.5	0.0	12.5	25.0	12.5	37.5
H<0.5	212.5	212.5	125.0	87.5	25.0	37.5	37.5
0.5=<H<1.0	50.0	212.5	250.0	212.5	212.5	125.0	112.5
1.0=<H<2.0	87.5	187.5	200.0	262.5	337.5	437.5	400.0
2.0=<H<3.0	0.0	25.0	75.0	87.5	87.5	87.5	137.5
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	350.0	637.5	650.0	650.0	662.5	687.5	687.5
PADDY+POLONIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	275.0	387.5	412.5	387.5	287.5	162.5	150.0
5-6	62.5	50.0	50.0	75.0	187.5	287.5	325.0
7-	0.0	37.5	37.5	37.5	25.0	25.0	25.0
SUB-TOTAL	337.5	475.0	500.0	500.0	500.0	475.0	500.0
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	37.5	62.5	37.5
SUB-TOTAL	0.0	0.0	0.0	0.0	37.5	62.5	37.5
SUB-TOTAL	337.5	475.0	500.0	500.0	537.5	537.5	537.5
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	687.5	1112.5	1150.0	1150.0	1200.0	1225.0	1225.0

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (5/8)

Unit ; ha

	Return Period (Year)						
	Annual	1.4	5	10	25	50	100
BLOCK NO. :D							
BUILDING							
H< 0.2	25.0	112.5	87.5	62.5	37.5	37.5	0.0
H<0.5	25.0	50.0	75.0	75.0	137.5	137.5	150.0
0.5=<H<1.0	0.0	0.0	0.0	25.0	25.0	25.0	50.0
1.0=<H<2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	25.0	50.0	75.0	100.0	162.5	162.5	200.0
PADDY+POLDWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	87.5	87.5	87.5	87.5	25.0	0.0	0.0
SUB-TOTAL	87.5	87.5	87.5	87.5	25.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	187.5	487.5	612.5	637.5	650.0	625.0	525.0
5-6	0.0	0.0	0.0	0.0	62.5	125.0	287.5
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	187.5	487.5	612.5	637.5	712.5	750.0	812.5
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	275.0	575.0	700.0	725.0	737.5	750.0	812.5
POLDWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	300.0	625.0	775.0	825.0	900.0	912.5	1012.5

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (6/8)

Unit ; ha

	Return Period (Year)						
	Annual	1.4	5	10	25	50	100
BLOCK NO. :E							
BUILDING							
H< 0.2	125.0	75.0	62.5	50.0	87.5	100.0	100.0
H<0.5	112.5	337.5	312.5	312.5	187.5	150.0	150.0
0.5=<H<1.0	125.0	112.5	175.0	187.5	337.5	325.0	325.0
1.0=<H<2.0	0.0	150.0	187.5	237.5	237.5	312.5	287.5
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	237.5	600.0	675.0	737.5	762.5	787.5	787.5
PADDY+POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	575.0	912.5	1062.5	1125.0	1125.0	1087.5	1037.5
5-6	0.0	0.0	0.0	87.5	137.5	225.0	275.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	575.0	912.5	1062.5	1212.5	1262.5	1312.5	1312.5
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	575.0	912.5	1062.5	1212.5	1262.5	1312.5	1312.5
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	25.0	25.0	25.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	25.0	25.0	25.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	25.0	25.0	62.5	87.5	87.5	87.5	87.5
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	25.0	25.0	62.5	87.5	87.5	87.5	87.5
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	25.0	25.0	62.5	87.5	112.5	112.5	112.5
TOTAL	837.5	1537.5	1800.0	2037.5	2137.5	2212.5	2212.5

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (7/8)

Unit ; ha

	Return Period (Year)						
	Annual	1.4	5	10	25	50	100
BLOCK NO. ;F							
BUILDING							
H< 0.2	0.0	25.0	75.0	75.0	75.0	25.0	25.0
H<0.5	100.0	75.0	50.0	75.0	125.0	150.0	150.0
0.5=<H<1.0	0.0	50.0	100.0	100.0	100.0	75.0	50.0
1.0=<H<2.0	0.0	0.0	0.0	0.0	0.0	50.0	100.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	100.0	125.0	150.0	175.0	225.0	275.0	300.0
PADDY+POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	12.5	12.5	12.5	0.0	0.0	0.0	0.0
SUB-TOTAL	12.5	12.5	12.5	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	137.5	275.0	325.0	350.0	350.0	200.0	125.0
5-6	0.0	0.0	0.0	12.5	50.0	200.0	275.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	137.5	275.0	325.0	362.5	400.0	400.0	400.0
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	150.0	287.5	337.5	362.5	400.0	400.0	400.0
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	250.0	412.5	487.5	537.5	625.0	675.0	700.0

Table 5.3.3 INUNDATION AREA, DEPTH DURATION (8/8)

Unit ; ha

	Annual	Return Period (Year) 1.4	5	10	25	50	100
BLOCK NO. :G							
BUILDING							
H< 0.2	200.0	50.0	100.0	75.0	150.0	125.0	50.0
H<0.5	225.0	425.0	325.0	225.0	200.0	225.0	250.0
0.5=<H<1.0	0.0	50.0	225.0	375.0	400.0	350.0	225.0
1.0=<H<2.0	0.0	0.0	0.0	50.0	125.0	250.0	425.0
2.0=<H<3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H>=3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	225.0	475.0	550.0	650.0	725.0	825.0	900.0
PADDY+POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	100.0	100.0	100.0	100.0	0.0	0.0	0.0
SUB-TOTAL	100.0	100.0	100.0	100.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	425.0	575.0	675.0	787.5	837.5	500.0	450.0
5-6	0.0	0.0	0.0	0.0	150.0	525.0	675.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	425.0	575.0	675.0	787.5	987.5	1025.0	1125.0
DEPTH 1.0-							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	525.0	675.0	775.0	887.5	987.5	1025.0	1125.0
POLOWIJO							
DEPTH 0.0-0.5							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEPTH 0.5-1.0							
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DURATION 1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	750.0	1150.0	1325.0	1537.5	1712.5	1850.0	2025.0

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK A-1

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	44.704	0.000	2.390	11.699	15.033	20.694	26.355
INDUSTRY	16.417	0.000	0.877	4.296	5.520	7.599	9.678
STORE	5.472	0.000	0.292	1.432	1.840	2.533	3.226
RESTAURANT	14.214	0.000	0.759	3.720	4.780	6.580	8.380
PUBLIC BLDG	97.369	0.000	5.205	25.482	32.743	45.073	57.403
HOUSEHOLD							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	28.238	0.000	4.179	15.323	17.034	21.531	26.029
INDUSTRY	17.284	0.000	2.566	6.351	7.753	10.101	12.448
STORE	7.217	0.000	1.071	2.652	3.237	4.218	5.198
RESTAURANT	5.888	0.000	0.874	2.163	2.641	3.441	4.240
PUBLIC BLDG	13.675	0.000	2.030	5.025	6.134	7.992	9.849
CROP							
- PADDY	64.345	26.917	42.117	41.068	52.237	53.157	59.495
- PALAWIJO	0.138	0.023	0.023	0.023	0.023	0.207	0.207
MOBILE	0.415	0.000	0.152	0.308	0.345	0.421	0.496
SUB-TOTAL	315.383	26.940	62.541	119.547	149.324	183.549	223.009
PABLIC FACILITY	94.614	8.082	18.762	35.864	44.797	55.064	66.902
INDIRECT DAMAGE	40.999	3.502	8.130	15.541	19.412	23.861	28.991
TOTAL	450.998	38.525	89.434	170.953	213.533	262.475	318.903
ANNUAL MEAN DAMAGE	450.998	456.584	489.214	502.233	513.768	518.528	524.624

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK A-2

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	73.405	36.108	64.792	246.391	185.603	298.698	369.168
INDUSTRY	4.839	2.380	4.272	16.245	12.237	19.694	24.340
STORE	10.083	4.960	8.900	33.845	25.495	41.030	50.710
RESTAURANT	20.166	9.920	17.800	67.690	50.990	82.060	101.420
PUBLIC BLDG	138.139	67.952	121.930	463.676	349.281	562.111	694.727
HOUSEHOLD							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	37.571	20.217	41.745	213.739	157.228	264.649	338.065
INDUSTRY	4.786	2.901	5.728	24.120	19.095	28.930	35.831
STORE	12.343	7.482	14.773	62.205	49.245	74.609	92.406
RESTAURANT	7.809	4.733	9.346	39.354	31.155	47.202	58.461
PUBLIC BLDG	20.656	12.521	24.723	104.099	82.410	124.857	154.639
CROP							
- PADDY	122.430	55.545	94.185	272.100	230.535	301.680	333.660
- PALAWIJO	0.000	0.216	0.280	1.620	1.484	1.838	2.912
MOBILE	1.426	1.012	2.319	11.681	9.414	14.041	17.632
SUB-TOTAL	453.659	225.951	410.795	1556.768	1204.174	1861.402	2273.975
PABLIC FACILITY	136.097	67.785	123.238	467.030	361.252	558.420	682.192
INDIRECT DAMAGE	58.975	29.373	53.403	202.379	156.542	241.982	295.616
TOTAL	648.733	323.110	587.437	2226.178	1721.969	2661.805	3251.785
ANNUAL MEAN DAMAGE	648.733	695.584	927.774	1068.454	1186.899	1230.737	1292.822

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK B

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	8.755	8.825	21.683	29.075	33.286	38.169	42.201
INDUSTRY	0.664	0.669	1.645	2.206	2.526	2.896	3.202
STORE	1.348	1.359	3.339	4.478	5.126	5.878	6.499
RESTAURANT	2.716	2.738	6.727	9.021	10.327	11.842	13.093
PUBLIC BLDG	20.072	20.231	49.706	66.652	76.306	87.500	96.743
HOUSEHOLD							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	4.272	6.645	16.500	24.679	31.140	35.840	39.050
INDUSTRY	0.625	0.967	2.269	3.107	3.792	4.310	4.646
STORE	1.635	2.529	5.936	8.126	9.917	11.274	12.151
RESTAURANT	1.058	1.636	3.841	5.258	6.417	7.295	7.862
PUBLIC BLDG	2.597	4.017	9.428	12.906	15.751	17.906	19.299
CROP							
- PADDY	17.704	65.205	94.185	106.260	117.300	143.865	143.865
- PALAWIJO	0.184	0.113	0.113	0.113	0.159	0.343	0.387
MOBILE	0.105	0.251	0.574	0.829	1.084	1.229	1.302
SUB-TOTAL	61.742	115.191	215.952	272.713	313.137	368.354	390.306
PABLIC FACILITY	18.522	34.557	64.785	81.813	93.941	110.506	117.091
INDIRECT DAMAGE	8.026	14.974	28.073	35.452	40.707	47.886	50.739
TOTAL	88.291	164.724	308.812	389.979	447.786	526.746	558.137
ANNUAL MEAN DAMAGE	88.291	112.176	232.928	267.868	293.001	302.746	313.752

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK C

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	32.543	27.026	46.657	53.271	56.928	60.885	77.198
INDUSTRY	5.020	4.169	7.197	8.217	8.781	9.391	11.908
STORE	5.366	4.456	7.693	8.784	9.387	10.039	12.729
RESTAURANT	10.732	8.913	15.387	17.568	18.774	20.079	25.459
PUBLIC BLDG	59.202	49.165	84.877	96.909	103.561	110.760	140.435
HOUSEHOLD							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	18.475	19.410	28.850	33.418	38.008	42.129	47.185
INDUSTRY	4.916	5.092	6.967	7.794	8.768	9.537	10.394
STORE	6.145	6.365	8.709	9.742	10.960	11.921	12.992
RESTAURANT	4.097	4.243	5.806	6.495	7.307	7.947	8.661
PUBLIC BLDG	7.374	7.638	10.451	11.691	13.153	14.306	15.591
CROP							
- PADDY	47.106	17.923	22.753	24.133	39.521	45.400	44.087
- PALAWIJO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MOBILE	0.849	1.609	2.129	2.391	2.773	3.014	3.113
SUB-TOTAL	201.831	156.013	247.481	280.417	317.925	345.414	409.756
PABLIC FACILITY	60.549	46.804	74.244	84.125	95.377	103.624	122.927
INDIRECT DAMAGE	26.238	20.281	32.172	36.454	41.330	44.903	53.268
TOTAL	288.618	223.099	353.898	400.997	454.633	493.942	585.952
ANNUAL MEAN DAMAGE	288.618	320.968	468.102	505.847	531.516	541.002	552.261

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK D

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	78.705	42.686	85.372	143.361	250.076	250.076	329.408
- RURAL	7.114	3.858	7.716	12.958	22.604	22.604	29.775
INDUSTRY	2.814	1.526	3.052	5.126	8.942	8.942	11.779
STORE	5.345	2.899	5.798	9.736	16.984	16.984	22.372
RESTAURANT	4.964	2.692	5.384	9.042	15.773	15.773	20.777
PUBLIC BLDG	40.134	21.767	43.534	73.104	127.522	127.522	167.976
HOUSEHOLD							
HOUSES							
- URBAN	13.224	7.559	15.118	31.907	50.806	50.806	71.374
- RURAL	3.460	1.978	3.956	8.349	13.294	13.294	18.676
INDUSTRY	2.741	1.755	3.511	6.874	11.263	11.263	15.504
STORE	6.493	4.158	8.316	16.281	26.676	26.676	36.720
RESTAURANT	1.924	1.232	2.464	4.824	7.904	7.904	10.880
PUBLIC BLDG	5.291	3.388	6.776	13.266	21.736	21.736	29.920
CROP							
- PADDY	47.378	56.616	80.766	85.596	89.113	94.058	114.911
- PALAWIJO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MOBILE	1.423	0.946	1.893	4.798	7.166	7.166	10.544
SUB-TOTAL	221.014	153.063	273.660	425.226	669.862	674.807	890.619
PABLIC FACILITY	66.304	45.919	82.098	127.567	200.958	202.442	267.185
INDIRECT DAMAGE	28.731	19.898	35.575	55.279	87.082	87.724	115.780
TOTAL	316.050	218.880	391.335	608.073	957.902	964.974	1273.585
ANNUAL MEAN DAMAGE	316.050	347.788	503.393	553.364	600.343	619.572	643.500

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK E

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	235.304	237.724	300.792	355.935	392.191	438.107	530.288
- RURAL	71.209	71.941	91.027	107.715	118.687	132.582	160.478
INDUSTRY	16.366	16.534	20.921	24.756	27.278	30.471	36.883
STORE	16.691	16.863	21.336	25.248	27.820	31.077	37.616
RESTAURANT	25.037	25.294	32.005	37.872	41.730	46.615	56.424
PUBLIC BLDG	129.845	131.181	165.982	196.412	216.418	241.756	292.623
HOUSEHOLD							
HOUSES							
- URBAN	49.168	63.148	84.194	102.147	119.116	137.329	146.654
- RURAL	42.945	55.155	73.536	89.217	104.038	119.946	128.090
INDUSTRY	17.131	21.795	28.887	34.560	40.560	45.471	47.456
STORE	21.699	27.607	36.590	43.776	51.376	57.596	60.111
RESTAURANT	10.278	13.077	17.332	20.736	24.336	27.282	28.474
PUBLIC BLDG	17.988	22.884	30.331	36.288	42.588	47.744	49.829
CROP							
- PADDY	80.268	63.861	92.169	124.299	134.397	148.215	148.383
- PALAWIJO	0.072	0.000	0.226	0.378	0.555	0.555	0.555
MOBILE	2.643	4.984	6.974	8.488	10.564	12.008	12.166
SUB-TOTAL	736.651	772.051	1002.307	1207.828	1351.656	1516.761	1736.036
PABLIC FACILITY	220.995	231.615	300.692	362.348	405.497	455.028	520.810
INDIRECT DAMAGE	95.764	100.366	130.299	157.017	175.715	197.178	225.684
TOTAL	1053.411	1104.034	1433.299	1727.195	1932.869	2168.968	2482.531
ANNUAL MEAN DAMAGE	1053.411	1213.496	1860.516	2018.540	2128.342	2169.361	2217.444

Table 5.3.4

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PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK F

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	196.225	45.682	91.364	117.970	171.182	271.080	344.372
- RURAL	29.629	6.897	13.795	17.813	25.847	40.932	51.998
INDUSTRY	5.237	1.219	2.438	3.149	4.569	7.236	9.192
STORE	15.049	3.503	7.007	9.047	13.128	20.790	26.411
RESTAURANT	16.847	3.922	7.844	10.128	14.697	23.274	29.566
PUBLIC BLDG	120.393	28.028	56.056	72.380	105.028	166.320	211.288
HOUSEHOLD							
HOUSES							
- URBAN	32.978	16.220	32.441	37.154	46.580	77.103	102.914
- RURAL	14.382	7.074	14.148	16.204	20.315	33.627	44.884
INDUSTRY	5.098	2.310	4.621	5.437	7.070	10.552	13.218
STORE	18.278	8.284	16.568	19.494	25.346	37.829	47.386
RESTAURANT	6.445	2.921	5.842	6.874	8.937	13.339	16.709
PUBLIC BLDG	15.584	7.063	14.126	16.621	21.610	32.254	40.402
CROP							
- PADDY	24.656	24.717	33.705	38.413	47.080	54.784	58.636
- PALAWIJO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MOBILE	1.936	1.654	3.308	3.630	4.274	6.262	7.927
SUB-TOTAL	502.743	159.498	303.268	374.317	515.667	795.384	1004.907
PABLIC FACILITY	150.823	47.849	90.980	112.295	154.700	238.615	301.472
INDIRECT DAMAGE	65.356	20.734	39.424	48.661	67.036	103.399	130.638
TOTAL	718.923	228.082	433.673	535.274	737.404	1137.399	1437.018
ANNUAL MEAN DAMAGE	718.923	751.995	920.743	969.191	1007.371	1026.119	1053.361

Table 5.3.4

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

BLOCK G

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	81.969	52.937	80.152	120.973	153.220	195.533	238.032
INDUSTRY	4.397	2.840	4.300	6.490	8.220	10.490	12.770
STORE	16.270	10.508	15.910	24.013	30.414	38.813	47.249
RESTAURANT	17.589	11.360	17.200	25.960	32.880	41.960	51.080
PUBLIC BLDG	75.284	48.620	73.616	111.108	140.726	179.588	218.622
HOUSEHOLD							
HOUSES							
- URBAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000
- RURAL	39.808	31.458	60.652	103.693	135.975	175.929	218.500
INDUSTRY	4.329	3.644	6.542	10.446	13.122	16.240	19.184
STORE	19.697	16.580	29.766	47.529	59.705	73.892	87.287
RESTAURANT	6.710	5.648	10.140	16.191	20.339	25.172	29.735
PUBLIC BLDG	9.740	8.199	14.719	23.503	29.524	36.540	43.164
CROP							
- PADDY	89.740	27.636	45.612	66.507	89.259	116.124	142.668
- PALAWIJO	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MOBILE	2.594	2.711	6.064	10.409	13.177	16.142	18.923
SUB-TOTAL	368.132	222.143	364.674	566.825	726.562	926.425	1127.216
PABLIC FACILITY	110.439	66.643	109.402	170.047	217.968	277.927	338.165
INDIRECT DAMAGE	47.857	28.878	47.407	73.687	94.453	120.435	146.538
TOTAL	526.429	317.665	521.484	810.560	1038.984	1324.789	1611.920
ANNUAL MEAN DAMAGE	526.429	572.491	786.474	853.076	908.563	932.201	963.003

Table 5.3.5 AVERAGE ANNUAL FLOOD DAMAGE (YEAR FROM 1990 TO 2050)
UNIT : MILLION RUPIAH

Year	Annual	Return Period (Year) 1.4	5	10	25	50	100
	A						
1990	4868.90	5322.58	7377.00	8034.07	8550.54	8754.99	9019.66
1991	4960.83	5423.01	7516.09	8185.61	8711.91	8920.26	9190.01
1992	5054.56	5525.43	7657.92	8340.12	8876.44	9088.77	9363.71
1993	5150.13	5629.85	7802.53	8497.67	9044.20	9260.59	9540.83
1994	5247.58	5736.32	7949.98	8658.31	9215.26	9435.80	9721.43
1995	5346.95	5844.89	8100.32	8822.11	9389.69	9614.44	9905.58
1996	5448.28	5955.60	8253.63	8989.13	9567.54	9796.60	10093.36
1997	5551.59	6068.48	8409.94	9159.44	9748.90	9982.35	10284.83
1998	5656.94	6183.58	8569.34	9333.10	9933.82	10171.75	10480.08
1999	5764.37	6300.96	8731.87	9510.17	10122.39	10364.89	10679.17
2000	5873.92	6420.64	8897.60	9690.74	10314.67	10561.83	10882.19
2001	5985.62	6542.68	9066.60	9874.86	10510.74	10762.65	11089.20
2002	6099.18	6666.76	9238.40	10062.03	10710.06	10966.79	11299.64
2003	6214.98	6793.27	9413.57	10252.88	10913.29	11174.95	11514.22
2004	6333.06	6922.27	9592.19	10447.48	11120.52	11387.20	11733.02
2005	6453.46	7053.81	9774.32	10645.92	11331.83	11603.63	11956.13
2006	6576.23	7187.94	9960.04	10848.25	11547.29	11824.31	12183.63
2007	6701.42	7324.71	10149.41	11054.57	11767.00	12049.35	12415.61
2008	6829.07	7464.17	10342.51	11264.95	11991.04	12278.81	12652.17
2009	6959.24	7606.38	10539.41	11479.48	12219.49	12512.80	12893.39
2010	7091.98	7751.40	10740.19	11698.23	12452.45	12751.41	13139.36
2011	7227.34	7899.27	10944.94	11921.30	12690.00	12994.71	13390.18
2012	7359.57	8043.69	11144.81	12139.11	12922.03	13232.42	13635.31
2013	7491.07	8187.30	11343.51	12355.69	13152.79	13468.84	13879.17
2014	7625.27	8333.84	11546.28	12576.69	13388.27	13710.09	14128.01
2015	7762.21	8483.37	11753.18	12802.21	13628.55	13956.27	14381.93
2016	7901.94	8635.96	11964.31	13032.33	13873.75	14207.47	14641.04
2017	8044.53	8791.67	12179.76	13267.15	14123.95	14463.81	14905.44
2018	8190.03	8950.55	12399.61	13506.77	14379.26	14725.39	15175.24
2019	8338.51	9112.69	12623.94	13751.28	14639.79	14992.30	15450.55
2020	8490.02	9278.13	12852.87	14000.79	14905.64	15264.67	15731.48
2021	8640.99	9442.97	13080.90	14249.36	15170.52	15536.07	16011.46
2022	8795.10	9611.24	13313.69	14503.11	15440.92	15813.12	16297.27
2023	8952.43	9783.02	13551.32	14762.13	15716.94	16095.94	16589.02
2024	9113.02	9958.37	13793.90	15026.55	15998.71	16384.64	16886.83
2025	9276.96	10137.36	14041.53	15296.46	16286.34	16679.34	17190.84
2026	9444.30	10320.08	14294.30	15571.99	16579.94	16980.16	17501.17
2027	9615.12	10506.59	14552.32	15853.24	16879.64	17287.23	17817.93
2028	9789.49	10696.98	14815.71	16140.33	17185.56	17600.68	18141.28
2029	9967.47	10891.32	15084.56	16433.38	17497.83	17920.63	18471.33
2030	10149.15	11089.68	15358.99	16732.51	17816.58	18247.21	18808.22
2031	10334.60	11292.17	15639.12	17037.84	18141.94	18580.57	19152.10
2032	10523.88	11498.85	15925.05	17349.50	18474.04	18920.83	19503.10
2033	10717.09	11709.81	16216.90	17667.62	18813.02	19268.14	19861.37
2034	10914.31	11925.15	16514.81	17992.32	19159.02	19622.65	20227.06
2035	11115.60	12144.94	16818.88	18323.75	19512.18	19984.49	20600.31
2036	11321.06	12369.28	17129.24	18662.04	19872.65	20353.81	20981.29
2037	11530.77	12598.26	17446.03	19007.33	20240.57	20730.78	21370.14
2038	11744.81	12831.98	17769.37	19359.75	20616.10	21115.53	21767.03
2039	11963.28	13070.53	18099.39	19719.47	20999.39	21508.24	22172.13
2040	12186.27	13314.00	18436.24	20086.61	21390.60	21909.06	22585.59
2041	12413.86	13562.51	18780.04	20461.34	21789.90	22318.16	23007.58
2042	12646.15	13816.15	19130.95	20843.81	22197.43	22735.71	23438.29
2043	12883.23	14075.03	19489.10	21234.17	22613.38	23161.87	23877.89
2044	13125.21	14339.25	19854.64	21632.59	23037.91	23596.83	24326.56
2045	13372.18	14608.92	20227.72	22039.23	23471.19	24040.76	24784.48
2046	13624.24	14884.15	20608.50	22454.26	23913.42	24493.84	25251.84
2047	13881.50	15165.06	20997.14	22877.84	24364.75	24956.26	25728.83
2048	14144.06	15451.75	21393.78	23310.15	24825.39	25428.21	26215.65
2049	14412.03	15744.36	21798.60	23751.37	25295.52	25909.88	26712.50
2050	14685.52	16042.99	22211.76	24201.69	25775.33	26401.47	27219.58

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 1990

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	636.432	406.745	595.635	769.935	1014.640	1196.519	1501.871
- RURAL	400.174	237.810	375.983	687.207	700.167	928.003	1140.053
INDUSTRY	64.701	34.046	51.875	81.794	90.599	112.237	138.964
STORE	87.325	51.440	81.148	134.618	150.335	193.001	238.804
RESTAURANT	129.634	74.870	119.058	209.001	219.335	286.575	353.565
PUBLIC BLDG	782.971	422.238	691.454	1272.336	1325.108	1749.760	2163.070
HOUSEHOLD							
HOUSES							
- URBAN	129.025	117.603	178.247	231.623	292.899	358.834	434.195
- RURAL	234.673	176.095	302.181	626.057	641.453	877.070	1067.550
INDUSTRY	106.837	72.207	114.684	185.261	209.163	256.058	297.876
STORE	117.339	91.608	152.749	263.267	296.716	373.954	444.520
RESTAURANT	54.467	41.261	68.555	125.535	134.332	171.965	203.308
PUBLIC BLDG	129.708	91.739	157.179	311.884	325.158	423.480	506.351
CROP							
- PADDY	518.810	355.683	531.277	797.062	840.222	1006.114	1099.046
- PALAWIJO	0.416	0.371	0.678	2.244	2.336	3.095	4.269
MOBILE	12.312	14.230	25.302	45.960	52.727	65.138	77.910
SUB-TOTAL	3404.831	2187.952	3446.011	5743.791	6295.197	8001.809	9671.358
PABLIC FACILITY	1021.449	656.385	1033.803	1723.137	1888.559	2400.542	2901.407
INDIRECT DAMAGE	442.628	284.433	447.981	746.692	818.375	1040.235	1257.276
TOTAL	4868.908	3128.772	4927.796	8213.621	9002.132	11442.587	13830.042
ANNUAL MEAN DAMAGE	4868.908	5322.580	7377.005	8034.076	8550.549	8754.996	9019.660

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 1995

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	704.665	450.352	659.494	852.481	1123.421	1324.800	1662.889
- RURAL	442.571	263.005	415.817	760.014	774.347	1026.321	1260.837
INDUSTRY	71.600	37.675	57.406	90.514	100.258	124.203	153.780
STORE	96.599	56.903	89.766	148.915	166.300	213.497	264.165
RESTAURANT	143.397	82.818	131.698	231.189	242.621	317.000	391.101
PUBLIC BLDG	866.151	467.095	764.912	1407.504	1465.882	1935.649	2392.866
HOUSEHOLD							
HOUSES							
- URBAN	143.006	130.346	197.561	256.721	324.637	397.717	481.243
- RURAL	259.830	194.972	334.575	693.171	710.217	971.092	1181.991
INDUSTRY	118.599	80.157	127.310	205.658	232.191	284.249	330.671
STORE	129.936	101.443	169.148	291.531	328.572	414.101	492.243
RESTAURANT	60.318	45.694	75.920	139.021	148.763	190.439	225.149
PUBLIC BLDG	143.574	101.546	173.982	345.226	359.918	468.752	560.482
CROP							
- PADDY	545.275	373.826	558.378	837.720	883.081	1057.436	1155.109
- PALAWIJO	0.437	0.390	0.712	2.359	2.455	3.252	4.487
MOBILE	13.166	15.217	27.056	49.147	56.384	69.655	83.313
SUB-TOTAL	3739.131	2401.448	3783.741	6311.178	6919.056	8798.169	10640.333
PABLIC FACILITY	1121.739	720.434	1135.122	1893.353	2075.717	2639.450	3192.100
INDIRECT DAMAGE	486.087	312.188	491.886	820.453	899.477	1143.762	1383.243
TOTAL	5346.957	3434.071	5410.750	9024.984	9894.251	12581.383	15215.677
ANNUAL MEAN DAMAGE	5346.957	5844.897	8100.327	8022.114	9389.691	9614.447	9905.589

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2000

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	780.213	498.635	730.199	943.876	1243.865	1466.833	1841.170
- RURAL	489.459	290.869	459.872	840.535	856.386	1135.056	1394.418
INDUSTRY	79.233	41.692	63.527	100.164	110.947	137.445	170.175
STORE	106.858	62.946	99.299	164.729	183.961	236.170	292.219
RESTAURANT	158.621	91.611	145.679	255.734	268.379	350.654	432.623
PUBLIC BLDG	958.167	516.717	846.173	1557.032	1621.612	2141.285	2647.076
HOUSEHOLD							
HOUSES							
- URBAN	158.502	144.470	218.968	284.539	359.814	440.812	533.389
- RURAL	287.684	215.874	370.441	767.479	786.353	1075.194	1308.701
INDUSTRY	131.657	88.982	141.327	228.300	257.755	315.544	367.077
STORE	143.886	112.334	187.307	322.829	363.847	458.559	545.090
RESTAURANT	66.799	50.603	84.077	153.956	164.745	210.898	249.337
PUBLIC BLDG	158.923	112.402	192.581	382.132	398.395	518.864	620.400
CROP							
- PADDY	573.089	392.895	586.861	880.452	928.127	1111.376	1214.031
- PALAWIJO	0.460	0.410	0.749	2.479	2.581	3.418	4.716
MOBILE	14.079	16.272	28.933	52.556	60.294	74.485	89.091
SUB-TOTAL	4107.636	2636.720	4155.999	6936.800	7607.068	9676.600	11709.518
PABLIC FACILITY	1232.290	791.016	1246.799	2081.040	2282.120	2902.980	3512.855
INDIRECT DAMAGE	533.992	342.773	540.279	901.784	988.918	1257.958	1522.237
TOTAL	5873.920	3770.510	5943.078	9919.624	10878.107	13837.538	16744.611
ANNUAL MEAN DAMAGE	5873.920	6420.644	8897.609	9690.744	10314.676	10561.833	10882.190

Table 5.3.6

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PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2005

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	863.802	552.058	808.431	1045.000	1377.129	1623.985	2038.427
- RURAL	541.211	321.624	508.494	929.406	946.934	1255.067	1541.852
INDUSTRY	87.677	46.135	70.297	110.839	122.771	152.093	188.310
STORE	118.184	69.618	109.824	182.189	203.460	261.202	323.192
RESTAURANT	175.432	101.320	161.119	282.837	296.822	387.817	478.472
PUBLIC BLDG	1059.746	571.496	935.878	1722.098	1793.524	2368.289	2927.700
HOUSEHOLD							
HOUSES							
- URBAN	175.642	160.093	242.647	315.309	398.723	488.481	591.069
- RURAL	318.402	238.924	409.997	849.430	870.319	1190.002	1448.443
INDUSTRY	145.829	98.560	156.539	252.876	285.501	349.510	406.591
STORE	159.282	124.354	207.349	357.372	402.778	507.624	603.414
RESTAURANT	73.947	56.019	93.074	170.432	182.376	233.468	276.021
PUBLIC BLDG	175.948	124.443	213.212	423.069	441.075	574.449	686.862
CROP							
- PADDY	602.323	412.937	616.796	925.364	975.471	1168.067	1275.959
- PALAWIJA	0.483	0.431	0.787	2.605	2.712	3.593	4.956
MOBILE	14.996	17.332	30.817	55.979	64.221	79.337	94.893
SUB-TOTAL	4512.911	2895.351	4565.269	7624.812	8363.822	10642.991	12886.169
PABLIC FACILITY	1353.873	868.605	1369.580	2287.443	2509.146	3192.897	3865.850
INDIRECT DAMAGE	586.678	376.395	593.485	991.225	1087.296	1383.588	1675.202
TOTAL	6453.462	4140.352	6528.335	10903.481	11960.266	15219.477	18427.222
ANNUAL MEAN DAMAGE	6453.462	7053.813	9774.329	10645.920	11331.832	11603.630	11956.135

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2010

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	956.331	611.193	895.029	1156.939	1524.644	1797.944	2256.780
- RURAL	598.405	355.612	562.231	1027.624	1047.004	1387.700	1704.792
INDUSTRY	97.020	51.052	77.788	122.650	135.853	168.300	208.377
STORE	130.704	76.993	121.459	201.490	225.014	288.874	357.431
RESTAURANT	194.016	112.053	178.187	312.799	328.266	428.900	529.160
PUBLIC BLDG	1172.033	632.050	1035.041	1904.566	1983.561	2619.226	3237.911
HOUSEHOLD							
HOUSES							
- URBAN	194.626	177.396	268.873	349.388	441.819	541.277	654.953
- RURAL	352.368	264.412	453.733	940.042	963.160	1316.945	1602.955
INDUSTRY	161.437	109.109	173.294	279.941	316.058	386.919	450.108
STORE	176.311	137.649	229.517	395.579	445.840	561.894	667.925
RESTAURANT	81.853	62.008	103.025	188.654	201.874	258.429	305.531
PUBLIC BLDG	194.807	137.781	236.065	468.415	488.351	636.020	760.483
CROP							
- PADDY	633.047	434.001	648.259	972.567	1025.230	1227.650	1341.046
- PALAWIJO	0.508	0.453	0.827	2.738	2.851	3.776	5.209
MOBILE	15.957	18.443	32.792	59.566	68.336	84.421	100.974
SUB-TOTAL	4959.431	3180.213	5016.127	8382.967	9197.868	11708.283	14183.642
PABLIC FACILITY	1487.829	954.063	1504.838	2514.890	2759.360	3512.485	4255.092
INDIRECT DAMAGE	644.726	413.427	652.096	1089.785	1195.722	1522.076	1843.873
TOTAL	7091.986	4547.704	7173.061	11987.642	13152.951	16742.846	20282.608
ANNUAL MEAN DAMAGE	7091.986	7751.403	10740.199	11698.234	12452.452	12751.410	13139.363

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2015

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1058.772	676.663	990.902	1280.868	1687.962	1990.537	2498.522
- RURAL	661.643	393.192	621.647	1136.221	1157.649	1534.349	1884.951
INDUSTRY	107.359	56.492	86.077	135.720	150.330	186.234	230.581
STORE	144.551	85.150	134.326	222.836	248.852	319.478	395.298
RESTAURANT	214.570	123.924	197.063	345.935	363.041	474.336	585.216
PUBLIC BLDG	1296.219	699.020	1144.711	2106.369	2193.733	2896.752	3580.990
HOUSEHOLD							
HOUSES							
- URBAN	215.661	196.570	297.934	387.151	489.572	599.780	725.743
- RURAL	389.956	292.618	502.135	1040.321	1065.904	1457.429	1773.949
INDUSTRY	178.716	120.787	191.842	309.903	349.886	428.331	498.284
STORE	195.160	152.365	254.055	437.870	493.504	621.966	739.333
RESTAURANT	90.605	68.638	114.040	208.824	223.458	286.059	338.198
PUBLIC BLDG	215.687	152.549	261.368	518.622	540.694	704.192	841.995
CROP							
- PADDY	641.719	439.946	657.140	985.890	1039.275	1244.468	1359.417
- PALAWIJO	0.515	0.459	0.838	2.776	2.890	3.828	5.280
MOBILE	16.980	19.625	34.893	63.383	72.716	89.831	107.445
SUB-TOTAL	5428.119	3478.006	5488.978	9182.697	10079.472	12837.576	15565.208
PABLIC FACILITY	1628.435	1043.401	1646.693	2754.809	3023.841	3851.273	4669.562
INDIRECT DAMAGE	705.655	452.140	713.567	1193.750	1310.331	1668.884	2023.477
TOTAL	7762.211	4973.548	7849.238	13131.257	14413.646	18357.734	22258.248
ANNUAL MEAN DAMAGE	7762.211	8483.376	11753.186	12802.211	13628.558	13956.272	14381.935

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. MIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2020

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1172.186	749.146	1097.046	1418.073	1868.773	2203.759	2766.159
- RURAL	731.564	434.744	687.341	1256.294	1279.987	1696.496	2084.148
INDUSTRY	118.799	62.511	95.249	150.182	166.349	206.079	255.152
STORE	159.865	94.171	148.557	246.444	275.216	353.324	437.176
RESTAURANT	237.300	137.052	217.939	382.582	401.499	524.585	647.211
PUBLIC BLDG	1433.562	773.087	1266.002	2329.553	2426.175	3203.683	3960.422
HOUSEHOLD							
HOUSES							
- URBAN	238.971	217.816	330.135	428.996	542.486	664.606	804.183
- RURAL	431.555	323.832	555.699	1151.296	1179.609	1612.900	1963.184
INDUSTRY	197.844	133.715	212.375	343.072	387.334	474.175	551.615
STORE	216.025	168.654	281.215	484.683	546.265	688.461	818.375
RESTAURANT	100.292	75.976	126.233	231.151	247.349	316.643	374.356
PUBLIC BLDG	238.805	168.900	289.382	574.210	598.648	779.670	932.243
CROP							
- PADDY	641.719	439.946	657.140	985.890	1039.275	1244.468	1359.417
- PALAWIJO	0.515	0.459	0.838	2.776	2.890	3.928	5.280
MOBILE	18.068	20.882	37.130	67.445	77.375	95.587	114.330
SUB-TOTAL	5937.077	3800.900	6002.289	10052.655	11039.238	14068.271	17073.260
PABLIC FACILITY	1781.123	1140.270	1800.686	3015.796	3311.771	4220.481	5121.978
INDIRECT DAMAGE	771.820	494.117	780.297	1306.845	1435.101	1828.875	2219.523
TOTAL	8490.020	5435.288	8583.273	14375.296	15786.111	20117.628	24414.762
ANNUAL MEAN DAMAGE	8490.020	9278.136	12852.870	14000.798	14905.641	15264.678	15731.488

Table 5.3. 6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2025

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1297.748	829.394	1214.560	1569.974	2068.953	2439.822	3062.466
- RURAL	808.122	480.240	759.271	1387.765	1413.937	1874.033	2302.253
INDUSTRY	131.458	69.173	105.399	166.185	184.075	228.039	282.341
STORE	176.731	104.106	164.230	272.444	304.252	390.601	483.299
RESTAURANT	262.335	151.510	240.931	422.944	443.857	579.927	715.490
PUBLIC BLDG	1584.799	854.645	1399.562	2575.315	2682.130	3541.663	4378.236
HOUSEHOLD							
HOUSES							
- URBAN	264.799	241.358	365.817	475.363	601.120	736.439	891.102
- RURAL	477.146	358.044	614.406	1272.925	1304.229	1783.294	2170.584
INDUSTRY	219.019	148.027	235.105	379.792	428.791	524.927	610.655
STORE	239.025	186.611	311.157	536.288	604.427	761.762	905.509
RESTAURANT	110.971	84.066	139.674	255.763	273.686	350.359	414.217
PUBLIC BLDG	264.292	186.926	320.266	635.492	662.538	862.879	1031.735
CROP							
- PADDY	631.201	432.735	646.368	969.730	1022.240	1224.069	1337.134
- PALAWIJA	0.508	0.453	0.828	2.740	2.852	3.778	5.212
MOBILE	19.226	22.221	39.509	71.767	82.334	101.713	121.657
SUB-TOTAL	6487.388	4149.516	6557.090	10994.493	12079.426	15403.312	18711.896
PABLIC FACILITY	1946.216	1244.854	1967.127	3298.348	3623.827	4620.993	5613.569
INDIRECT DAMAGE	843.360	539.437	852.421	1429.284	1570.325	2002.430	2432.546
TOTAL	9276.964	5933.808	9376.639	15722.126	17273.580	22026.736	26758.012
ANNUAL MEAN DAMAGE	9276.964	10137.367	14041.531	15296.469	16286.340	16679.343	17190.847

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2030

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1436.761	918.237	1344.662	1738.147	2290.576	2701.172	3390.512
- RURAL	892.691	530.497	838.728	1532.993	1561.904	2070.150	2543.182
INDUSTRY	145.466	76.544	116.630	183.894	203.690	252.338	312.427
STORE	195.377	115.090	181.557	301.188	336.352	431.810	534.289
RESTAURANT	290.010	167.494	266.349	467.563	490.682	641.108	790.973
PUBLIC BLDG	1751.991	944.808	1547.212	2847.004	2965.088	3915.299	4840.128
HOUSEHOLD							
HOUSES							
- URBAN	293.420	267.445	405.356	526.742	666.091	816.035	987.415
- RURAL	527.554	395.869	679.315	1407.402	1442.013	1971.690	2399.895
INDUSTRY	242.461	163.871	260.269	420.441	474.685	581.110	676.014
STORE	264.475	206.480	344.286	593.387	668.781	842.869	1001.920
RESTAURANT	122.787	93.017	154.546	282.996	302.827	387.664	458.321
PUBLIC BLDG	292.498	206.876	354.446	703.314	733.246	954.968	1141.846
CROP							
- PADDY	620.854	425.642	635.773	953.835	1005.484	1204.005	1315.216
- PALAWIJO	0.501	0.447	0.817	2.705	2.815	3.729	5.145
MOBILE	20.458	23.645	42.041	76.366	87.610	108.231	129.453
SUB-TOTAL	7097.312	4535.967	7171.993	12037.984	13231.851	16882.185	20526.741
PABLIC FACILITY	2129.193	1360.790	2151.598	3611.395	3969.555	5064.655	6158.022
INDIRECT DAMAGE	922.650	589.675	932.359	1564.938	1720.140	2194.684	2668.476
TOTAL	10149.157	6486.433	10255.951	17214.318	18921.547	24141.524	29353.240
ANNUAL MEAN DAMAGE	10149.157	11089.689	15358.998	16732.511	17816.587	18247.218	18808.224

Table 5.3.6

(10/13)

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2035

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1590.664	1016.597	1488.700	1924.335	2535.938	2990.517	3753.698
- RURAL	986.110	586.013	926.500	1693.420	1725.356	2286.789	2809.324
INDUSTRY	160.967	84.700	129.058	203.490	225.395	279.227	345.719
STORE	215.990	127.232	200.712	332.964	371.838	477.367	590.658
RESTAURANT	320.606	185.165	294.448	516.890	542.448	708.743	874.418
PUBLIC BLDG	1936.822	1044.483	1710.438	3147.355	3277.897	4328.352	5350.748
HOUSEHOLD							
HOUSES							
- URBAN	325.134	296.351	449.168	583.673	738.084	904.235	1094.138
- RURAL	583.288	437.691	751.081	1556.987	1594.355	2179.988	2653.431
INDUSTRY	268.412	181.410	288.126	465.441	525.491	643.307	748.368
STORE	292.634	228.464	380.943	656.566	739.987	932.610	1108.596
RESTAURANT	135.861	102.921	171.002	313.128	335.072	428.941	507.122
PUBLIC BLDG	323.714	228.954	392.274	778.374	811.501	1056.886	1263.707
CROP							
- PADDY	610.678	418.665	625.352	938.200	989.002	1184.270	1293.658
- PALAWIJA	0.495	0.442	0.806	2.670	2.779	3.681	5.078
MOBILE	21.769	25.160	44.735	81.260	93.224	115.167	137.749
SUB-TOTAL	7773.150	4964.254	7853.350	13193.861	14508.373	18520.088	22536.419
PABLIC FACILITY	2331.945	1489.276	2356.005	3958.158	4352.512	5556.026	6760.925
INDIRECT DAMAGE	1010.509	645.353	1020.935	1715.201	1886.088	2407.611	2929.734
TOTAL	11115.604	7098.883	11230.290	18867.221	20746.974	26483.726	32227.079
ANNUAL MEAN DAMAGE	11115.604	12144.943	16818.882	18323.758	19512.184	19984.491	20600.315

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. MIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2040

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1761.054	1125.493	1648.166	2130.466	2807.583	3310.856	4155.787
- RURAL	1089.306	647.339	1023.458	1870,635	1905.913	2526.100	3103.318
INDUSTRY	178.119	93.726	142.810	225.174	249.414	308.982	382.559
STORE	238.778	140.656	221.887	368.093	411.068	527.731	652.974
RESTAURANT	354.429	204.699	325.511	571.420	599.675	783.514	966.667
PUBLIC BLDG	2141.151	1154.673	1890.885	3479.393	3623.706	4784.982	5915.238
HOUSEHOLD							
HOUSES							
- URBAN	360.275	328.382	497.716	646.759	817.859	1001.968	1212.395
- RURAL	644.909	483.930	830.429	1720.479	1762.790	2410.292	2933.752
INDUSTRY	297.140	200.826	318.964	515.258	581.734	712.160	828.466
STORE	323.791	252.789	421.503	726.472	818.775	1031.907	1226.630
RESTAURANT	150.327	113.880	189.210	346.469	370.749	474.614	561.119
PUBLIC BLDG	358.262	253.389	434.139	861.444	898.107	1169.680	1398.575
CROP							
- PADDY	600.668	411.802	615.102	922.822	972.791	1164.858	1272.453
- PALAWIJO	0.489	0.436	0.796	2.635	2.743	3.634	5.012
MOBILE	23.164	26.772	47.602	86.467	99.198	122.547	146.576
SUB-TOTAL	8521.869	5438.799	8608.185	14473.994	15922.111	20333.830	24761.528
PABLIC FACILITY	2556.560	1631.639	2582.455	4342.198	4776.633	6100.149	7428.458
INDIRECT DAMAGE	1107.843	707.043	1119.064	1881.619	2069.874	2643.397	3218.998
TOTAL	12186.273	7777.483	12309.704	20697.811	22768.620	29077.377	35408.986
ANNUAL MEAN DAMAGE	12186.273	13314.008	18436.241	20086.616	21390.609	21909.069	22585.591

Table 5.3. 6

(12/13)

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2045

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	1949.695	1246.054	1824.715	2358.678	3108.327	3665.509	4600.948
- RURAL	1203.301	715.082	1130.562	2066.396	2105.366	2790.455	3428.078
INDUSTRY	197.100	103.713	158.028	249.168	275.991	341.907	423.324
STORE	263.969	155.495	245.297	406.928	454.437	583.408	721.864
RESTAURANT	391.820	226.294	359.852	631.704	662.939	866.173	1068.648
PUBLIC BLDG	2367.037	1276.488	2090.368	3846.459	4005.997	5289.785	6539.280
HOUSEHOLD							
HOUSES							
- URBAN	399.215	363.874	551.510	716.662	906.255	1110.263	1343.435
- RURAL	713.040	535.055	918.159	1902.239	1949.019	2664.927	3243.687
INDUSTRY	328.944	222.321	353.103	570.406	643.998	788.383	917.137
STORE	358.266	279.704	466.381	803.821	905.951	1141.776	1357.232
RESTAURANT	166.333	126.006	209.356	383.361	410.226	525.149	620.865
PUBLIC BLDG	396.497	280.431	480.471	953.381	993.956	1294.513	1547.836
CROP							
- PADDY	590.822	405.052	605.019	907.695	956.845	1145.764	1251.596
- POLOWIJO	0.482	0.430	0.786	2.601	2.708	3.587	4.948
MOBILE	24.648	28.488	50.652	92.008	105.555	130.400	155.969
SUB-TOTAL	9351.177	5964.496	9444.268	15891.514	17487.576	22342.004	27224.853
PABLIC FACILITY	2805.353	1789.348	2833.280	4767.454	5246.273	6702.601	8167.455
INDIRECT DAMAGE	1215.653	775.384	1227.754	2065.896	2273.384	2904.460	3539.230
TOTAL	13372.183	8529.229	13505.304	22724.865	25007.234	31949.066	38931.540
ANNUAL MEAN DAMAGE	13372.183	14608.921	20227.727	22039.236	23471.199	24040.762	24784.480

Table 5.3.6

PROBABLE FLOOD DAMAGE IN K. WIDAS BASIN IN MILLION RUPIAH

DAMAGE IN 2050

PROPERTY	ANNUAL	RECURRENCE PERIOD (YEAR) 1.4	5	10	25	50	100
BUILDING							
HOUSES							
- URBAN	2158.543	1379.529	2020.176	2611.336	3441.285	4058.152	5093.793
- RURAL	1329.226	789.915	1248.875	2282.643	2325.691	3082.474	3786.824
INDUSTRY	218.103	114.765	174.868	275.719	305.401	378.340	468.433
STORE	291.819	171.900	271.177	449.860	502.381	644.959	798.023
RESTAURANT	433.156	250.168	397.815	698.347	732.877	957.552	1181.387
PUBLIC BLDG	2616.753	1411.154	2310.897	4252.250	4428.619	5847.843	7229.156
HOUSEHOLD							
HOUSES							
- URBAN	442.363	403.203	611.119	794.121	1004.206	1230.264	1488.637
- RURAL	788.369	591.581	1015.158	2103.201	2154.923	2946.462	3586.366
INDUSTRY	364.151	246.116	390.896	631.457	712.925	872.764	1015.299
STORE	396.411	309.484	516.037	889.405	1002.409	1263.342	1501.738
RESTAURANT	184.044	139.422	231.648	424.180	453.905	581.066	686.973
PUBLIC BLDG	438.813	310.360	531.749	1055.129	1100.035	1432.668	1713.026
CROP							
- PADDY	581.137	398.413	595.102	892.817	941.161	1126.983	1231.080
- PALAWIJO	0.476	0.425	0.775	2.567	2.673	3.540	4.884
MOBILE	26.228	30.313	53.898	97.904	112.319	138.756	165.964
SUB-TOTAL	10269.599	6546.757	10370.197	17460.943	19220.817	24565.172	29951.591
PABLIC FACILITY	3080.879	1964.027	3111.059	5238.283	5766.245	7369.551	8985.477
INDIRECT DAMAGE	1335.047	851.078	1348.125	2269.922	2498.706	3193.472	3893.706
TOTAL	14685.526	9361.862	14829.382	24969.149	27485.769	35128.196	42830.776
ANNUAL MEAN DAMAGE	14685.526	16042.996	22211.764	24201.690	25775.338	26401.478	27219.580

Fig. 5.1.1 CROP DAMAGE (1/3)

KEDUNGSOKO RETARDING BASIN SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern							SOYBEAN					
(B) Planted area (%)												
1st crop (x 0.21)							33	83	100	66	16.5	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)							12.34	43.68	73.25	91.05	99.13	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E)	Yield	ton/ha	0.81
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	167,554
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	461

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.1 CROP DAMAGE (2/3)

KEDUNGSOKO RETARDING BASIN — PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.025)	100	100	50								50	100
2nd crop (x 0.545)				50	100	100	100	50				
3rd crop ( )												
(C) Accumulated cost (%)												
	68.96	85.18	96.49								15.22	45.50
				15.22	45.50	68.96	85.18	96.49				
(D) Flood frequency												
	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E) Yield	ton/ha	4.64
(F) Price	Rp./ton	143,142
(G) Production cost	Rp./ha	306,390
(H) Net income	Rp./ha	357,788
(I) Damageable cost	Rp./ha	285,010
(J) Damageable value	Rp./ha	19,972

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.1 CROP DAMAGE (3/3)

KEDUNGSOKO RETARDING BASIN MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern			MAIZE					MAIZE				
(B) Planted area (%)												
1st crop (x 0.11)			25	75	100	75	25					
2nd crop (x 0.43)								25	75	100	75	25
3rd crop ( )												
(C) Accumulated cost (%)			14.06	49.68	80.45	94.3	99.46					
								14.06	49.68	80.45	94.3	99.46
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E) Yield	ton/ha	2.84
(F) Price	Rp./ton	185,660
(G) Production cost	Rp./ha	125,370
(H) Net income	Rp./ha	401,905
(I) Damageable cost	Rp./ha	107,060
(J) Damageable value	Rp./ha	23,033

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.2 CROP DAMAGE (1/2)

WIDAS RETARDING BASIN — MAIZE

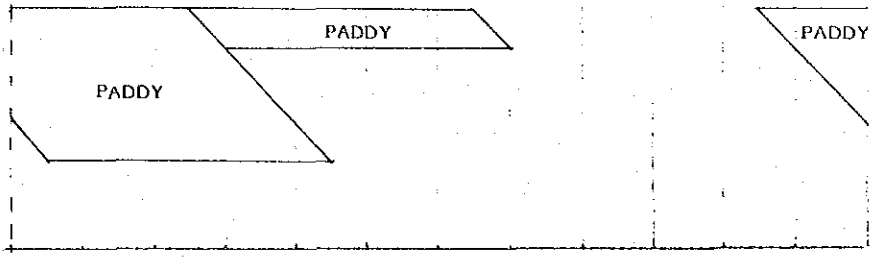
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern				MAIZE			MAIZE					
(B) Planted area (%)												
1st crop (x 0.18)				25	75	100	75	25				
2nd crop (x 0.10)							19	50	87.5	87.5	50	19
3rd crop ( )												
(C) Accumulated cost (%)												
				7.03	36.56	71.87	90.77	98.42				
							8.62	14.06	49.68	80.45	94.3	99.46
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	1.89
(F)	Price	Rp./ton	185.660
(G)	Production cost	Rp./ha	125,370
(H)	Net income	Rp./ha	225,527
(I)	Damageable cost	Rp/ha	107,060
(J)	Damageable value	Rp./ha	3,210

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.2 CROP DAMAGE (2/2)

WIDAS RETARDING BASIN — PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.40)	87.5	100	87.5	44	12.5						12.5	44
2nd crop (x 0.05)			50	100	100	100	50					
3rd crop ( )												
(C) Accumulated cost (%)												
	36.09	62.26	80.15	93.64	99.40						4.9	9.75
			15.22	45.5	68.96	85.18	96.49					
(D) Flood frequency												
	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	3.91
(F)	Price	Rp./ton	143,142
(G)	Production cost	Rp./ha	306,390
(H)	Net income	Rp./ha	253,295
(I)	Damageable cost	Rp./ha	285,010
(J)	Damageable value	Rp./ha	85,840

Remark : $j = \frac{DEC}{\sum JAN} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.3 CROP DAMAGE (1/5)

WIDAS SOUTH — SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern					POL - I							
(B) Planted area (%)												
1st crop (x 0.21)			10	50	90	90	50	10				
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			6	32	64	86	97					
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E)	Yield	ton/ha	0.75
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	147,240
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	2,390

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.13 CROP DAMAGE (2/5)

WIDAS SOUTH MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern			POL - I									
(B) Planted area (%)												
1st crop (x 0.108)			10	50	90	90	50	10				
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			2	23	60	84.5	94	100				
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	2.63
(F)	Price	Rp./ton	185,660
(G)	Production cost	Rp./ha	125,370
(H)	Net income	Rp./ha	362,916
(I)	Damageable cost	Rp./ha	107,060
(J)	Damageable value	Rp./ha	2,133

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.3 CROP DAMAGE (3/5)

WIDAS SOUTH — MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern							POL - II					
(B) Planted area (%)												
1st crop (x 0.222)							20	70	100	80	30	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)							7	36.5	71.5	90	97.5	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E) Yield	ton/ha	2.63
(F) Price	Rp./ton	185,660
(G) Production cost	Rp./ha	125,370
(H) Net income	Rp./ha	362,916
(I) Damageable cost	Rp./ha	107,060
(J) Damageable value	Rp./ha	1,617

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.3 CROP DAMAGE (4/5)

WIDAS SOUTH — SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern							POL - II					
(B) Planted area (%)												
1st crop (x 0.432)							20	70	100	80	30	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)							6	31.5	63.5	84.5	95.5	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E)	Yield	ton/ha	0.75
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	147,240
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	1,528

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.3 CROP DAMAGE (5/5)

WIDAS SOUTH PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.965)	100	100	80	30							10	50
2nd crop (x 0.589)			12.5	62.5	100	100	75	25				
3rd crop (x 0.143)							33	83	100	100	50	
(C) Accumulated cost (%)												
	45.52	68.98	85.19	96.50							1.63	16.85
			1.72	17.88	48.31	73.22	85.74	98.11				
							5.17	27.78	57.79	79.17	93.97	
(D) Flood frequency												
	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

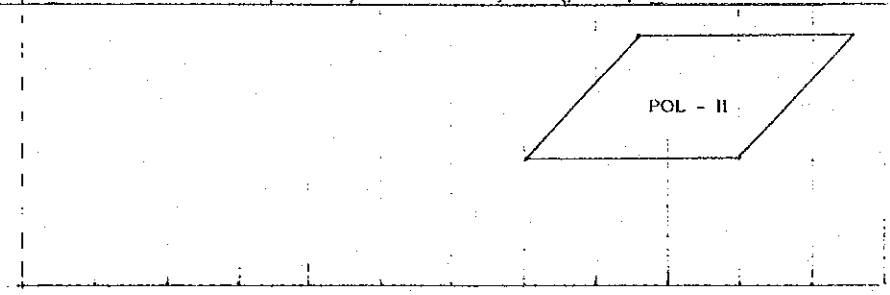
(E)	Yield	ton/ha	4.82
(F)	Price	Rp./ton	143,142
(G)	Production cost	Rp./ha	306,390
(H)	Net income	Rp./ha	383,554
(I)	Damageable cost	Rp./ha	285,010
(J)	Damageable value	Rp./ha	287,015

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.4 CROP DAMAGE (1/5)

WIDAS EXTENSION SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.064)								37.5	87.5	100	62.5	12.5
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)								12.34	43.68	73.25	91.05	99.13
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186



1985

(E) Yield	ton/ha	0.75
(F) Price	Rp./ton	338,560
(G) Production cost	Rp./ha	106,680
(H) Net income	Rp./ha	147,240
(I) Damageable cost	Rp./ha	85,600
(J) Damageable value	Rp./ha	792

Remark : $j = \frac{\sum_{JAN}^{DEC}}{} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.4 CROP DAMAGE (2/5)

WIDAS EXTENSIONS — PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.907)	75	100	87.5	37.5								25
2nd crop (x 0.135)				37.5	87.5	100	87.5	37.5				
3rd crop (												
(C) Accumulated cost (%)												
	29.61	61.59	83.72	96.21								5.51
				10.35	38.31	66.1	84.47	96.32				
(D) Flood frequency												
	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	4.75
(F)	Price	Rp./ton	143,142
(G)	Production cost	Rp./ha	306,390
(H)	Net income	Rp./ha	373,534
(I)	Damageable cost	Rp./ha	285,010
(J)	Damageable value	Rp./ha	214,716

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.4 CROP DAMAGE (3/5)

WIDAS EXTENSION SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.111)				12.5	62.5	100	87.5	37.5				
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)				2.05	20.98	54.45	80.41	94.87				
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

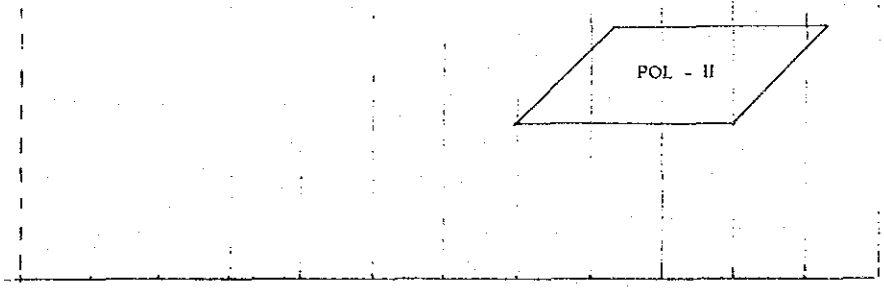
1985

(E)	Yield	ton/ha	0.75
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	147,240
(I)	Damageable cost	Rp.ha	85,600
(J)	Damageable value	Rp./ha	282

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.4 CROP DAMAGE (4/5)

WIDAS EXTENSION — MAIZE



(A) Cropping pattern

(B) Planted area (%)

	Aug.	Sept.	Oct.	Nov.	Dec.
1st crop (x 0.108)	37.5	87.5	100	62.5	12.5
2nd crop ( )					
3rd crop ( )					

(C) Accumulated cost (%)

Aug.	Sept.	Oct.	Nov.	Dec.
14.06	49.68	80.45	94.30	99.46

(D) Flood frequency

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

		1985
(E) Yield	ton/ha	2.35
(F) Price	Rp./ton	185,660
(G) Production cost	Rp./ha	125,370
(H) Net income	Rp./ha	310,931
(I) Damageable cost	Rp./ha	107,060
(J) Damageable value	Rp./ha	2,454

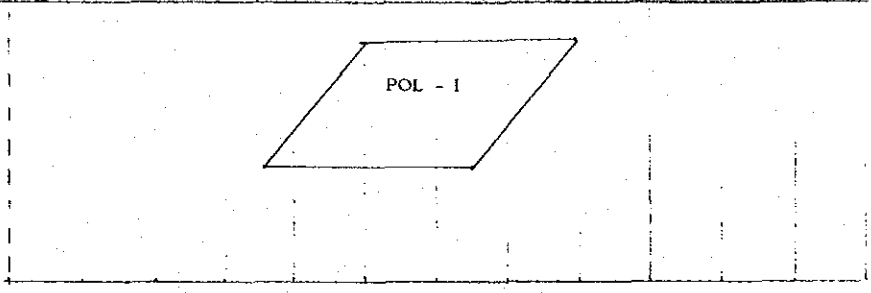
Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.4

CROP DAMAGE (5/5)

WIDAS EXTENSION — MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.19)				12.5	62.5	100	87.5	37.5				
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)				2.34	23.89	61.44	86.74	96.84				
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186



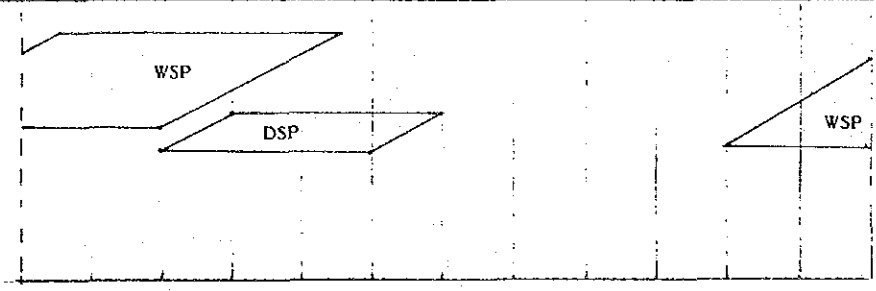
1985

(E) Yield	ton/ha	2.35
(F) Price	Rp./ton	185,660
(G) Production cost	Rp./ha	125,370
(H) Net income	Rp./ha	310,931
(I) Damageable cost	Rp./ha	107,060
(J) Damageable value	Rp./ha	984

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.5 CROP DAMAGE (1/3)

ULO RETARDING BASIN — PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.41)	90	100	80	40	10						20	60
2nd crop (x 0.05)			50	100	100	50						
3rd crop ( )												
(C) Accumulated cost (%)	48,42	71.04	86.48	96.0	99.6						6.09	23.56
			19.68	56.46	83.57	96.78						
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

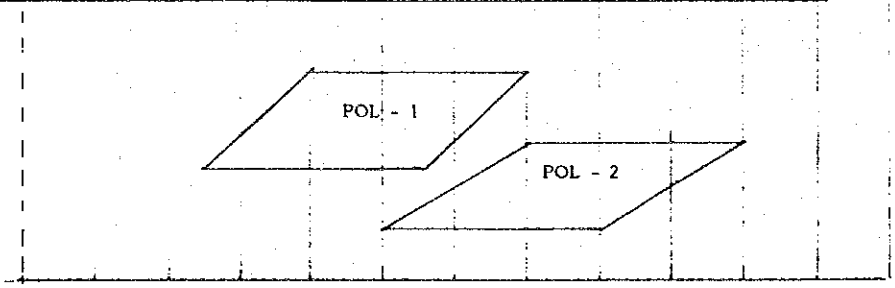
(E)	Yield	ton/ha	4.82
(F)	Price	Rp./ton	143,142
(G)	Production cost	Rp./ha	306,390
(H)	Net income	Rp./ha	383,554
(I)	Damageable cost	Rp./ha	285,010
(J)	Damageable value	Rp./ha	125,550

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.5 CROP DAMAGE (2/3)

ULO RETARDING BASIN — MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.25)			16.5	66	100	83	33					
2nd crop (x 0.14)						25	75	100	75	25		
3rd crop ( )												
(C) Accumulated cost (%)			7.03	36.56	71.87	90.77	98.42					
						11.71	43.35	75.24	92.29	98.67		
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186



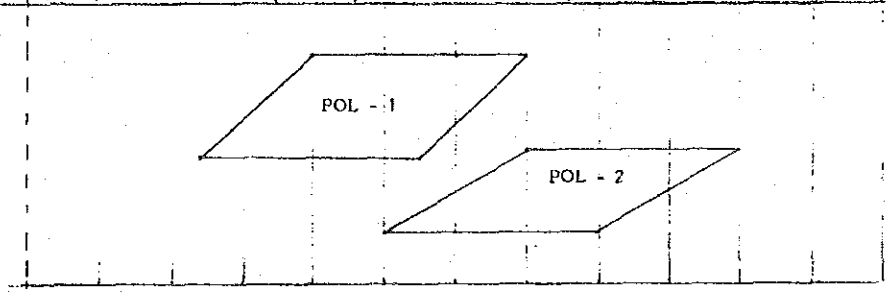
1985

(E)	Yield	ton/ha	2.34
(F)	Price	Rp/ton	185,660
(G)	Production cost	Rp/ha	125,370
(H)	Net income	Rp/ha	309,074
(I)	Damageable cost	Rp/ha	107,060
(J)	Damageable value	Rp/ha	6,658

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.5 CROP DAMAGE (3/3)

ULO RETARDING BASIN — SOYBEANS



(A) Cropping pattern

(B) Planted area (%)

1st crop (x 0.22)		16.5	66	100	83	33				
2nd crop (x 0.12)					25	75	100	75	25	
3rd crop ( )										

(C) Accumulated cost (%)

		6.17	32.12	64.46	85.94	97.43				
					10.28	38.11	68.2	88.27	97.84	

(D) Flood frequency

	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

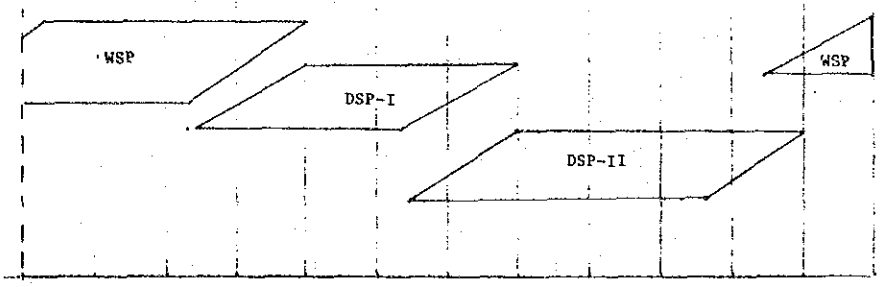
(E) Yield	ton/ha	0.67
(F) Price	Rp./ton	338,560
(G) Production cost	Rp./ha	106,680
(H) Net income	Rp./ha	120,155
(I) Damageable cost	Rp./ha	85,600
(J) Damageable value	Rp./ha	2,592

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.6 CROP DAMAGE (1/5)

WARUJAYENG - KERTOSONO

PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.943)	1. 90	100	80	30							10	50
2nd crop (x 0.727)	2.		20	70	100	80	30					
3rd crop (x 0.271)	3.					10	50	90	100	80	30	
(C) Accumulated cost (%)	1. 45.5	69	85	96.5							1.6	1.7
	2.		6.7	35.0	69.7	89.7	98.2					
	3.					1.6	17	45.5	69	85	96.5	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

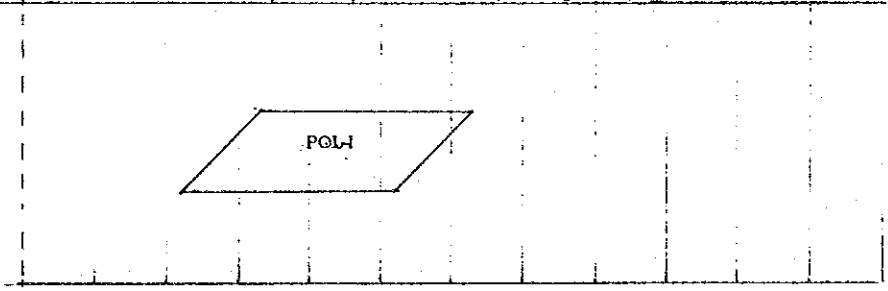
	1985
(E) Yield	5.10
(F) Price	143,142
(G) Production cost	306,390
(H) Net income	423,634
(I) Damageable cost	285,010
(J) Damageable value	307,629

Remark : $j = \frac{\sum_{JAN}^{DEC}}{} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.6 CROP DAMAGE (2/5)

WARUJAYENG - KERTOSONO MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x0.092)			33	83	100	66	16.5					
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			11.5	49	82.5	95	98					



(D) Flood frequency

	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E) Yield	3.30
(F) Price	185,660
(G) Production cost	125,370
(H) Net income	487,308
(I) Damageable cost	107,060
(J) Damageable value	4,817

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1. 6 CROP DAMAGE (3/5)

WARUJAYENG - KERTOSONO SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern			POL-I									
(B) Planted area (%)												
1st crop (x0.102)			33	83	100	66	16.5					
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			10.5	43.5	74.5	91.5	98					
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

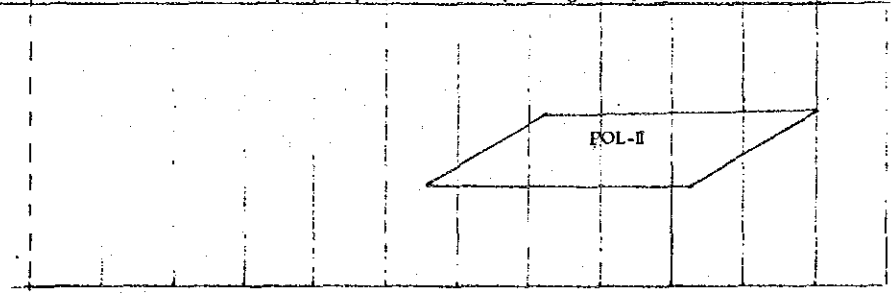
(E) Yield	0.87
(F) Price	338,560
(G) Production cost	106.680
(H) Net income	187,867
(I) Damageable cost	85,600
(J) Damageable value	2,212

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.6 CROP DAMAGE (4/5)

WARUJAYENG MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop ( )												
2nd crop ('x0.325)						10	50	90	100	80	30	
3rd crop ( )												
(C) Accumulated cost (%)						2.5	24	59	79	88.5	97	



(D) Flood frequency

	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E) Yield	3.30
(F) Price	185,660
(G) Production cost	125,370
(H) Net Income	487,308
(I) Damageable cost	107,060
(J) Damageable value	2,983

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + \beta \times D \times H)$

Fig. 5.1.6 CROP DAMAGE (5/5)

WARUJAYENG

SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern								POL - II				
(B) Planted area (%)												
1st crop (x 0.358)						10	50	90	100	80	30	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)						2	20.5	51.5	70	82	95	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	0.87
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	187,867
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	1,480

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.7 CROP DAMAGE (1/5)

WIDAS NORTH AREA, EXCEPT EXTENSION AREA — MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern							POL - II					
(B) Planted area (%)												
1st crop (x 0.129)							30	80	100	70	20	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)							14	49.5	80	93.5	97.5	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

1985

(E)	Yield	ton/ha	2.51
(F)	Price	Rp./ton	185,660
(G)	Production cost	Rp./ha	125,370
(H)	Net income	Rp./ha	340,637
(I)	Damageable cost	Rp./ha	107,060
(J)	Damageable value	Rp./ha	597

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

$(E \times F) - G = H$

Fig. 5.1.7 CROP DAMAGE (2/5)

WIDAS NORTH AREA, EXCEPT EXTENSION AREA SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern							POL-11					
(B) Planted area (%)												
1st crop (x 0.342)							30	80	100	70	20	
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)							12	43	72.5	90	97.5	
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

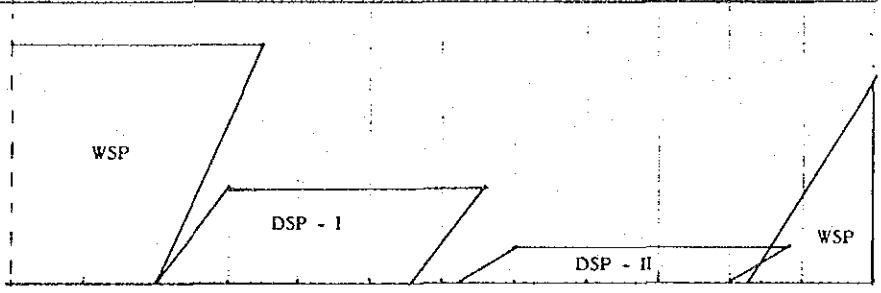
			1985
(E)	Yield	ton/ha	0.83
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	174,325
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	919

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.7 CROP DAMAGE (3/5)

WIDAS NORTH AREA, EXCEPT EXTENSION AREA — PADDY

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.912)	100	100	80	30							20	70
2nd crop (x 0.312)			50	100	100	83	33					
3rd crop (x 0.082)							50	100	100	100	50	
(C) Accumulated cost (%)												
	54.4	74.6	89.7	98.3							4.9	26.2
			17.0	48.0	70.0	86.5	97.5					
							12.0	40.5	65.5	82.0	94.5	
(D) Flood frequency												
	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186



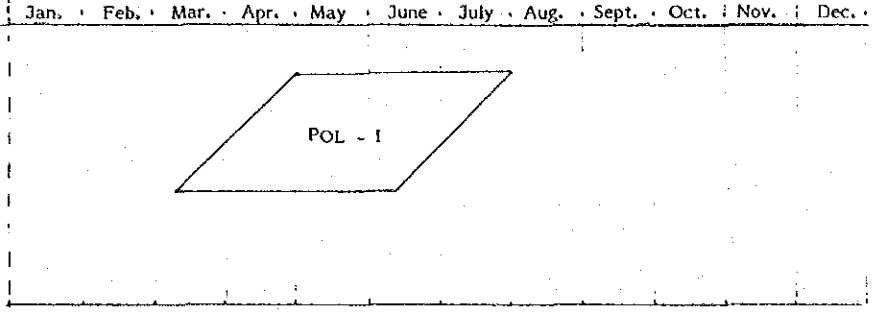
1985

(E)	Yield	ton/ha	4.79
(F)	Price	Rp./ton	143,142
(G)	Production cost	Rp./ha	306,390
(H)	Net income	Rp./ha	379,260
(I)	Damageable cost	Rp./ha	285,010
(J)	Damageable value	Rp./ha	309,297

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.7 CROP DAMAGE (4/5)

WIDAS NORTH AREA, EXCEPT EXTENSION AREA MAIZE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x0.144)			20	70	100	80	30					
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			7	36.5	71.5	90	97.5					
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

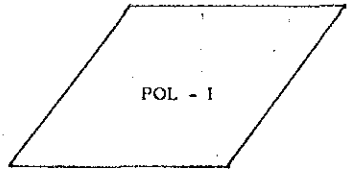
1985

(E)	Yield	ton/ha	2.51
(F)	Price	Rp./ton	185,660
(G)	Production cost	Rp./ha	125,370
(H)	Net income	Rp./ha	340,637
(I)	Damageable cost	Rp./ha	107,060
(J)	Damageable value	Rp./ha	4,203

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.1.7 CROP DAMAGE (5/5)

WIDAS NORTH AREA, EXCEPT EXTENSION AREA SOYBEAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(A) Cropping pattern												
(B) Planted area (%)												
1st crop (x 0.379)			20	70	100	80	30					
2nd crop ( )												
3rd crop ( )												
(C) Accumulated cost (%)			6	46	64.5	86	97.5					
(D) Flood frequency	0.204	0.23	0.177	0.097	0.044	0.009	0	0	0	0	0.053	0.186

			1985
(E)	Yield	ton/ha	0.83
(F)	Price	Rp./ton	338,560
(G)	Production cost	Rp./ha	106,680
(H)	Net income	Rp./ha	174,325
(I)	Damageable cost	Rp./ha	85,600
(J)	Damageable value	Rp./ha	6,692

Remark : $j = \sum_{JAN}^{DEC} (B \times C \times D \times I + B \times D \times H)$

Fig. 5.3.1 DISTRIBUTION OF RESIDENTIAL AREA IN FLOOD PLAIN

ANNEX - 6

AGRICULTURE

ANNEX - 6

AGRICULTURE

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6.1 Soil Survey

6.1.1. Procedure of the Soil Survey

The soil survey was carried out for two areas of Lengkong area and Gondang area. The survey area is about 9,100 ha consisting of 1,600 ha of Lengkong area and 7,500 ha of Gondang area. The soil survey work has carried out during the following period :

Lengkong area : 15 July to 25 July 1985
Gondang area : 20 December 1984 to 5 March 1985

a) Field work

The field survey was carried out by using aerial photograps and topographic maps as follows :

	Lengkong Area	Gondang Area
Aerial photo	1/10,000	1/1,000
Topographic map	1/5,00	1/10,000

Soil pits were dug at the density of one pit per 110 to 140 ha and 69 pits were dug at the representative soils in total. The pit was made by one meter wider, two meters long and 1.8 meters deep in general. The soil profiles were described according to the standards defined in the Soil Survey Manual of the United States Department of Agriculture, Handbook 18, 1951. In addition auger borings were made to determine the accurate soil boundary. Soil boring was made to a depth of 120 cm in general. Total number of auger boring accounted for about 1,050. Further about 310 soil aamples were taken from the representative soils for assessment of physical nature and chemical properties. Number of pits, auger boring and soil samples is summarized below :

Number	Lengkong Area	Gendong Area	Total
Pit	14	55	69
Auger boring	150	897	1,047
Soil sample	63	251	314

b) Laboratory work

Physio-chemical properties of the soils sampled were analysed in the Departement of Soil Science, Faculty of University. Items of soil analyses and methods of analyses are as follows :

(i) Particle size distribution : Pipette method

(ii) pF : Pressure plate apparatus and a sand box method
(iii) Atterberg value : Criteria of the British Standard Institute
(iv) pH : glass electrode method
(v) Organic matter : Walkey and Black method
(vi) Total nitrogen : Kjeldahl method
(vii) P_2O_5 : Olsen method
(viii) K_2O : 25% HCl method
(ix) Cation exchange capacity : NH_4OAc (pH 7) method

6.1.2. Soil Classification

(a) General

Soil classification of the Soil Tanonomy prepared by the United States Department of Agriculture was adopted. Soils in the survey area were broadly classified into Vertisols, Inceptisols and Entisols in Order basis. Soils in the survey area are further divided into 6 classes in Suborder basis, into 7 classes in Great group, into 7 classes in Sub group and 23 soil series & 3 soil associations.

(b) Main features of major soils

Details of features of major soils are described in Soil Tanonomy (U.S.D.A. Agricultural Handbook No. 436). The outline of description of major soils is summarized below.

(i) Vertisols

Vertisols are characterized by high clay content (more than 30%) at the first 50 cm depth. In general, the typical structure of the soils may only be seen in the dry season where the (B) horizon has fairly large vertical construction of cracks (1-5 cm wide) delimiting large prisms lower down this horizon is replaced by a (B) horizon of more irregular structure where slickensides, those large oblique, polished surfaces caused by vertic movement, are dominant. Despite the small amount of organic matter, the colour is generally dark which is related ; to the quality of this very transformed organic matter. The swelling clays (montmorillonites), often mixed with small amount of illites and interstratified clays, account for some 40 - 60% of the total mass. In particular, their expansion and contraction cause vertic movement and the frequent occurence of a mammelated surface relief known as gilgai. Verticals in the survey area mostly found on sloping terrain and the plain systems. They,are generally imperfectly drained and they vary with regard to calcareousness. The great group of Pellusterts seems to dominate the major part of these soils in the survey area. Pellusterts are Vertisols that have cracks than open and close more than once in most year and that remain open and close for between 90 - 150 cumulative days. They usually have chromas of less than 3 when moist and less than 5 when dry throughout the upper 30 cm in more than half of each pedon. The low chroma generally extends to a considerable depth. The only subgroup can derived from Pellusterts is Typic Pellusterts.

(ii) Entisols (Aquents and Fluvents)

Entisols are recent valley deposits near the rivers where they are very often flooded. These soils have no or slight horizon differentiation within the profile. The stratification differs from clear to indistinct. The colour ranges from dark gray to grayish brown, with very fine clay to fine loam textures. Most of Entisols in the survey area have low chromas, especially in the upper layer (30 cm). In the southeastern part, especially in the young river belt there is a clear indication, that is shown by different colours and supported by differencies in a common phenomenon but usually not deep enough to satisfy Vertisol criteria. Fluvaquents are primarily the wet soils of flood plain of low latitudes. Most of them have either fine or coarse stratifications that reflect deposition of sediments under changing currents and shifting channels. A subgroup derived from Fluvaquents is Vertic Fluvaquents. Ustifluvents are Fluvents that have an ustic moisture regime and normally a mesic, isomesic, or warmer temperature regimes. These soils are on flood plains or rivers or streams in middle to low latitudes. Floods mostly come in the rainy season. A Subgroup derived from Ustifluvents is Typic Ustifluvents.

(iii) Inceptisols (Troperts and Aquepts)

Inceptisols generally have a cambic horizon. These soils extend over poorly to well drained land. The parent materials of the soils are old and young clayey alluvium deposits in general.

Aquepts are soils that have an aquic moisture regime; and either a histic epipedon, a sulfic horizon, an ochric or umbric epipedon undelined by gley colours; or a cambic horizon of sandy textures with sodium saturation of 15% or more in the upper 50 cm and decreasing with depth below 50 cm. Tropaquepts are wet Inceptisols with the natural drainage is poor or very poor and if they have not been artificially drained, water stands close to the surface sometime during each year but not all seasons. They have little or no plinthite. They are mostly gray at the surface and mottled in deeper layers. These soils mainly formed on Holocene Alluvium.

Tropepts are Inceptisols that have an isomeric or warmer iso temperature regime. Eutropepts are soils that are more or less freely drained and that do not have a significant amount of active amorphous clay or pyroclastic materials. Most of them have high base saturation. Eutropepts are soils that are rarely dry for long periods. The primary minerals are only slightly weathered or the soils receive bases from higher lying soils. These soils in the survey area are formed from basic parent materials. Ustropepts are Inceptisols that have brownish or reddish colours, and more or less freely drained. They are rich in bases, having a base saturation that is 50% or more in all subhorizons between 25 cm to 100 cm. They have an ustic moisture regime and have a CEC or 24 or more me/100 g clay in all horizons above a lithic contact. They have no lithic contact within 50 cm of the surface. They have a cambic horizon and a content of organic carbon that decreases regularly with depth and reaches 0.2% or less within 125 cm. They have no mottle with chromas of 2 or less within 1 m. A calcic horizon or

secondary lime may occur below the cambic horizon. Cracking is quite common, but it is not deep enough to satisfy the criterion of Vertisols.

6.1.3 Land Capability

(a) General

Three major land classification systems have been applied for the agricultural and irrigation development projects in Indonesia. There are :

- USDA land capability classification system /1
- USBR land classification system /2
- FAO land suitability classification system /3

The USDA system is most widely used, but it does not meet the particular requirement for irrigation project. It is mainly used for rainfed agriculture in general. The USBR system was devised originally for irrigated land use. However, the basic concept of the USBR system is generally to assess the lands under arid climate and/or to assess land productivity for dry field crops like wheat, barley, cotton, etc. Some modification of this system is required under Indonesian condition due to the different requirements for irrigated paddy cultivation under humid climate. Although several approaches to the modification have been made by various study groups, none of them has been fully authorized at present. The FAO system is more flexible than the US ones and can be applied to the full range of environments. This system is, however, still under development and does not serve the detailed criteria for suitability assessment on the irrigated paddy cultivation.

Considering all these, it is conceived that the Japanese land classification standard /4 for paddy can be applied to the feasibility study on the Widas flood control and drainage project. The Japanese system is devised originally for paddy cultivation and its classification criteria are detailed enough for land capability assessment on a feasibility study level. Therefore, the Japanese land classification system seems to be most suitable for land capability for paddy field. In the Japanese system, lands are classified into 4 cabability classes, i.e., I, II, III and IV. Each class is defined as follows :

/1 : Land Capability classification, Agricultural Handbook No. 210, 1961, Soil Conservation Services, USDA

/2 : Bureau of Reclamation Manual Vol.5 Irrigated Land Use, Part 2 : Land Classification, 1953, US Bureau of Reclamation

/3 : A framework for Land Evaluation, 1976, FAO

/4 : Outline of Land Classification based on Soil Survey in Japan, 1977, National Institute of Agricultural Science, Tokyo.

Class I : Land has almost no limitation for crop production and/or no risk of soil conservation. It is naturally fertile and has a great potential for crop production without any improvement practices of soils.

Class II : Land has some limitation for crop production and/or some risks of soil conservation, and requires some soil improvement practices for normal crop production.

Class III: Land has many limitations for crop production and/or is likely subject to risks of soil conservation, and fairly intensive improvement practices are required.

Class V : Land has great natural limitations than these in Class III, but can be utilized for cultivation of some specific crops under very carefull management.

(b) Specification of land capability classification

In the Japanese system, there are 13 factors for assessment of land capability as shown below :

1. thickness of top soil
2. effective soil depth
3. gravel content in top soil
4. easiness of plowing
5. permeability under submerged condition
6. state of redox potentiality
7. wetness of land /1
8. inherent fertility
9. content of available nutrient
10. degree of hazard
11. frequency of hazard
12. slope /2
13. erosion

The specification of land capability class are explained as follows:

(1) Thickness of top soil (code : t)

Top soil is the first horizon where plant roots can easily penetrate, and generally corresponds to the plowed layer. The classes are grouped according to the thickness of top soils as follows (when effective depth of soil (d) is placed to class IV, this factor also is placed to class IV) :

/1 : factors for upland crops only

/2 : factors for upland crops only

t (cm)	Class	
	Paddy	Upland
above 25	I	I
25 - 15	I	II
less 15	II	III

(2) Effective depth of soil (code: d)

Effective depth of soil is the depth upto bedrock, hard pan and gravel layer which plant roots cannot penetrate. The classes are grouped according to thickness of the effective soil depth as follows:

t (cm)	Class	
	Paddy	Upland
above 100	I	I
100 - 50	I	II
50 - 25	II	III
25 - 15	III	III
below 15	IV	IV

(3) Gravel content in top soil (code: g)

Gravel contents in top soil are expressed by the percentage of the exposed surface area of gravel on the soil profile, and graded into thhe following classes :

g (cm)	Class	
	Paddy	Upland
below 5	I	I
5 - 10	I	II
10 - 20	I	II - III
20 - 50	I - II	III - IV
above 50	IV	V

(4) Easiness of plowing (code: p)

Easiness of plowing largely depends upon the quantity and quality of clay and organic matter and moisture condition. In order to estimate the class of this factor, the following 4 sub-factors are used:

a. Soil texture of top soil : 3 grades, coarse to very fine

b. Stickness of top soil : 3 grades, non sticky to very sticky

c. Consistency when dry : 3 grades, loose to very hard

d. Moisture condition : 4 grades, dry (2), moderate 1 to wet 3

These sub-factors are combined together to determine capability classes for paddy and for upland crops as follows :

Sub-factors a	b	c	d	Class	Criteria
For paddy					
1	1	(2)	1	I	Easy to slightly difficult
2	2	2	1	I	
2	2	2	2	I	
2	2	3	2	II	
3	3	3	1	II	Moderately difficult
2	2	3	2	II	
3	3	3	2	II	
3	3	3	3	II	
For upland crop					
1	1	2	1	I	Easy to slightly difficult
2	2	2	1	I	
2	2	2	2	I	
2	2	3	2	II	Moderately difficult
3	3	2	1	II	
2	2	3	3	III	
3	3	3	2	III	Very difficult
3	3	3	1	III	
3	3	3	3	III	

(5) Permeability under submerged condition (code: 1)

This factor affects irrigation water requirement, soil temperature, and leaching of the nutrients or development of reduced condition of the soil. This standard factor is evaluated mainly by the combination of soil texture and the presence of compact layer within 50 cm of the surface, as sub-factors.

a. Soil texture : 3 grades, very fine to coarse

b. Compactness : 3 grades, compact to loose

Sub-factors a	Sub-factors b	Class Paddy	Criteria
1	1	I	Poorly to imperfectly permeable
1	2	I	
2	2	II	Moderately to well permeable
3	2	II	
3	3	III	Well to excessively permeable

(6) State of redox potentiality (code: r)

This factor indicates the risk of root damage owing to the strong reduction of soil, resulting in low rice production. The following sub-factors are used for the evaluation of this factor.

a. Contents of easily decomposable organic matter in top soil :

3 grades, low to high

b. Contents of free iron oxides in top soil :
3 grades, high to low

c. Degree of gleyzation : 3 grades, weak to strong

Sub - Factor a	Sub - Factor b	Sub - Factor c	Class	Criteria (risk of root damage)
1	1	2	I	
1	3	2	I	none to weak
2	1	2	I	
1	1-2	3	II	
1	3	3	II	Moderate to strong
2	1-2	3	II	
3	1	2	II	
2	3	3	III	
3	2	2	III	Very strong
3	1	3	III	
3	3	2	III	

(7) Wetness of land (code: w; wet condition,
(w); dry condition)

This factor is only applied to upland. This factor is used for the estimation of wet or drought injury of upland crops, and is evaluated by the combination of the following three sub-factors:

a. Permeability : 3 grades, high to low

b. Water-holding capacity : 3 grades, high to low

c. Moisture condition : 4 grades, dry (2) to wet (3)

Sub - factor			Class	Criteria (risk of drought or wetness)
a	b	c		
1	3	(2)	(IV)	High possibility of drought
1	3	1	(III)	Possibility of drought
1	2	1	(II)	Low possibility of drought
1	1	1	I	None
2	2	2	II	Low possibility of overwetness
1-3	1	3	III	Possibility of overwetness
3	2	3	IV	High possibility of overwetness

(8) Inherent fertility (code: f)

Inherent fertility is evaluated by the combination of the following three sub-factors.

a. Nutrient holding capacity (evaluated by CEC) :
3 grades, hig to low

b. Nutrient fixation power (evaluated by coefficient of P_2O_5 absorption) :
4 grades, very low to high

c. Base status in soil (evaluated by base saturation degree:
3 grades, good to poor

Sub-factor			Class	Criteria
a	b	c		
For paddy				
1	1-2	2	I	Fertile
2	1-2	1	I	
1	1-2	3	II	
1	3-4	2	II	Medium
2	1-2	2	II	
3	1	2	II	
2	3-4	3	III	
3	2	2	III	Infertile
3	3-4	3	III	
For upland				
1	2	1	I	Fertile
2	1	2	I	
1	2	3	II	
2	1	3	II	Medium
1	3	1	II	
1	3	2	II	
1	3	3	III	
3	1	1	III	Infertile
2	4	2	II - III	

(9) Content of available nutrients (code : n)

Content of available nutrients in soil are closely related to the inherent soil fertility, and are evidently influenced by cultivation practices. The value of the class is evaluated by the combination of the following sub-factors:

a. Content of exchangeable Ca : 3 grades, high to low

b. Content of exchangeable Mg : 3 grades, high to low

c. Content of available K : 3 grades, high to low

d. Content of available phosphate : 3 grades, high to low

e. Content of available nitrogen : 3 grades, high to low

f. Content of available silica : 3 grades, high to low

g. Content of micro-elements (evaluated by the risk of deficiency) : 3 grades, none and/or weak to serious.

h. Acidity (evaluated by pH and ex. acidity) :

3 grades for paddy, 4 grades for upland and orchard, weak to very strong.

Class	Criteria
I	High
II	Medium
III	Low

(10) Degree of hazard (code : i)

This factor means limitation caused by the presence in excess of substances such as sulphur compounds, soluble salts, heavy metals, etc. Dependent sub-factors for this factor are as follows :

a. Presence of harmfull substances :

1) Harmfull sulphur compounds : 4 grades, none to seriously

2) Salts content (evaluated by chlorine content as an indicator) : 3 grades, low to high

3) Heavy metals : 4 grades, none to seriously

4) Irrigation water quality : 4 grades, good to polluted

b. Physical hazard : Presence of bedrock, pan, compact layer or gravel layer that disturb root development within 50 cm of the surface, and difficulty of their removal :
3 grades, none to very difficult.

The class of this factor is decided by the lowest grade among the dependent sub-factors.

Class	Criteria
I	None
II	Slightly
III	Moderately
IV	Seriously

(11) Frequency of hazard (code : a)

This factor is mainly influenced by natural environmental condition. The class of this factor is determined by the combination of the following two dependent sub-factors:

a. Risk of overhead flooding inundation :
   3 grades, non and/or rarely to frequency

b. Risk of land creep:

   3 grades, none and/or rarely to frequency

The class of this factor is determined by the lowest grade of two dependent sub-factors.

Class	Criteria
I	None to rarely
II	Moderately
III	Frequently

(12) Slope (code: s)

This factor is applied to upland only. The class of this factor is decided by the combination of the following sub-factors :

a. Slope as a main dependent sub-factors :

   5 grades as shown in the following table

Steepness of Slope (°)	Class Upland
3	I
3 - 18	II
8 - 15	III
15 - 25	IV
25	IV

(13) Erosion (code: e)

The class of this factor is determined by the combination of the following sub-factors:

a. Occurrence of rill or qully :

4 grades, none to frequently

b. Resisting power to water erosion :

3 grades, strong to weak

c. Resisting power to wind erosion :

2 grades, strong or weak

Class	Criteria
I	None or very slightly
II	Slightly
III	Seriously
IV	Very seriously

(c) Land capability

The land is evaluated by using the assessment factors mentioned above. The land capability class is determined at the lowest class of the factors, as shown in the following example.

Code :	t	d	g	p	l	r	f	n	i	q
Class :	I	I	I	II332	II13	II213	I112	II11222	I11	I11

Land capability class: II pln

The land caapability class is generally expressed with the code(s) of factors which lower the capability class.

6.2 Supporting Data for Agriculture

Supporting data for agriculture are compiled in this section with contains following items.

(1) Basic socio-economic data
(2) Employment of composition
(3) Average farm size
(4) Distribution of land holding size
(5) Land tenure composition
(6) Livestock Population
(7) Criteria of BIMAS PACKET
(8) Sugarcane Credit
(9) Economic price of crops and fertilizer
(10) Primary profit of crops without and with project

Table 6.1.1 ANALYTICAL DATA OF WATER OF THE WIDAS EXTENSION AREA

(a) Gondang District

No.	Rivers/Sites	pH	E.C 10^3 (mmhos/cm)	Cation (me/li)				SAR	Anions			Sediment (mg/l)
				Ca	Mg	Na	K		NO_3	Cl	P_2O_5	
1.	Ngrembek (Boro)	8.0	0.840	6.67	0.80	2.63	0.28	1.36	0.08	1.50	0.02	340
2.	Ngujung (Ngujung)	7.9	0.600	2.59	1.57	2.07	0.10	1.44	0.01	0.37	0.01	380
3.	Tretes (Sanggrahan)	7.9	1.386	1.45	1.08	2.18	0.16	1.94	0.01	0.26	0.00	199
4.	Widas (Banjardowo)	7.6	0.600	4.20	0.97	1.52	0.31	0.95	0.00	0.89	0.02	470
5.	Dawuhan (Balonggebang)	7.6	0.528	2.80	0.81	0.91	0.08	0.68	0.01	0.85	0.01	310
6.	Ngrembek (Campur)	7.9	0.554	3.81	1.25	1.08	0.15	0.68	0.02	0.87	0.00	430
7.	Tretes (Kedungglugu)	7.4	0.510	3.54	1.17	0.51	0.16	1.54	0.00	1.08	0.01	170
8.	Widas (Sumberejo)	8.0	0.590	3.50	1.80	1.84	0.24	1.13	0.01	1.05	0.01	630
9.	Nglempoh (Banjardowo)	7.7	0.400	1.96	1.68	0.96	0.11	0.71	0.04	0.47	0.00	130
10.	Jaan (Jaan)	7.9	0.620	3.29	1.21	1.71	0.16	1.14	0.02	0.78	0.01	180
11.	Tukliwet (Sumberagung)	7.5	0.950	5.75	1.62	2.09	0.13	1.09	0.06	1.48	0.02	340

Note: All water samples were collected on 25 February, 1985.

(b) Lengkong District

No.	Rivers/Sites	pH	E.C 10^3 (mmhos/cm)	Cation (me/li)				SAR	Anions			Sediment (mg/l)
				Ca	Mg	Na	K		NO_3	Cl	P_2O_5	
1.	River Ketandan (Ketandan)	7.6	0.540	3.08	1.28	2.00	-	1.35	-	-	-	40
2.	River Ketandan (Ngringin)	7.5	1.200	3.40	1.40	1.70	-	1.16	-	-	-	172
3.	River Nglempoh (Nglempoh)	7.8	1.450	2.96	1.08	1.80	-	1.27	-	-	-	552
4.	River Widas (Jegreg)	7.2	0.560	3.20	1.02	1.60	-	1.10	-	-	-	470
5.	Sumberkepuh dam	7.1	0.400	1.40	1.20	2.20	-	1.93	-	-	-	40
6.	Kedungrejo dam	7.4	0.500	3.28	1.25	1.10	-	0.73	-	-	-	28
7.	Perning dam	7.6	0.385	1.91	0.83	0.90	-	0.77	-	-	-	65
8.	Prayyungan well	7.1	1.050	2.60	1.37	2.30	-	1.63	-	-	-	10
9.	Jatipungur well	7.5	0.780	2.92	1.42	2.20	-	1.50	-	-	-	30
10.	Kedungmulaten well	7.7	0.800	4.87	1.81	1.10	-	0.81	-	-	-	22

Note: Water samples were collected from the survey area in August, 1985.

Table 6.2.1 BASIC SOCIO DATA IN DESA RELATED TO WIDAS EXTENSION AREA

Kec. Desa	Population 1980	Land Area (km^2)	Population Density (person/km^2)
Kec. Gondang			
1. Balonggebang	5,822	7.58	768
2. Ngujung	3,144	7.46	421
3. Ketawang	2,860	3.86	740
4. Sumberagung	1,920	6.58	292
5. Kedungglugu	1,371	2.16	635
6. Jaan	3,652	7.24	504
Kec. Lengkong			
7. Lengkong	2,207	2.09	1,056
8. Jatipunggur	1,703	1.85	921
9. Kedungmlaten	1,686	2.40	703
10. Jegreg	1,371	1.40	979
11. Ngringin	3,002	2.82	1,064
12. Ketandan	4,764	21.90	218
13. Sumberkepuh	1,328	9.04	147
14. Prayungan	2,670	11.18	239
15. Sumbersono	1,042	6.87	152
16. Sawahan	2,519	1.89	1,333
17. Banjardowo	2,109	6.53	323
Kec. Ngluyu			
1. Ngluyu	2,317	9.89	234
Total	45,487	112.74	403
Widas Basin	1,038,208	1,471.3	705

Table 6.2.2 BASIC SOCIO DATA IN DESA RELATED TO WIDAS EXTENSION AREA

Kec.	Desa	Total Household	Family Size	No. of Farm Household	Percentage of Farm Household (%)
Kec.	Gondang				
1.	Balonggebang	1,200	4.77	1,049	86.0
2.	Ngujung	590	5.32	537	91.0
3.	Ketawang	651	4.39	612	94.0
4.	Sumberagung	403	4.76	375	93.1
5.	Kedungglugu	258	5.31	243	94.2
6.	Jaan	736	4.96	692	94.0
Kec.	Lengkong				
7.	Lengkong	458	4.81	229	50.0
8.	Jatipunggur	396	4.30	364	91.9
9.	Kedungmlaten	367	4.59	345	94.0
10.	Jegreg	316	4.33	297	94.0
11.	Ngringin	666	4.50	626	94.0
12.	Ketandan	1,078	4.41	992	92.0
13.	Sumberkepuh	289	4.59	254	87.9
14.	Prayungan	631	4.23	530	84.0
15.	Sumbersono	223	4.67	183	82.1
16.	Sawahan	519	4.85	493	95.0
17.	Banjardowo	443	4.76	403	91.0
Kec.	Ngluyu				
1.	Ngluyu	515	4.49	474	92.0
Total		9,755	4.66	8,698	90.0

Table 6.2.3 EMPLOYMENT COMPOSITION IN DESA RELATED TO WIDAS EXTENSION AREA

Kec.	Desa	Government or Private Sector	Agriculture		Trade	Manu-facturing	Others	Total
			Farmer	Labourer	Sector	Sector		
KEC. GONDANG								
1.	Balonggebang	181	1,929	670	178	30	26	3,014
2.	Ngujung	38	729	229	21	12	16	1,045
3.	Ketawang	34	990	213	17	6	10	1,270
4.	Sumberagung	18	564	135	14	8	5	744
5.	Kedungglugu	15	408	131	10	5	4	573
6.	Jaan	32	989	286	21	10	10	1,348
Kec. LENGKONG								
7.	Lengkong	108	91	173	92	12	49	525
8.	Jatipungkur	22	345	163	10	5	4	549
9.	Kedungmlaten	12	331	161	8	6	4	522
10.	Jegreg	13	419	143	3	5	13	596
11.	Ngringin	31	749	231	6	10	5	1,032
12.	Ketandan	43	1,147	287	34	25	7	1,543
13.	Sumberkepuh	23	364	64	8	8	18	485
14.	Prayungan	47	531	169	66	11	4	828
15.	Sumbersono	12	125	104	25	6	4	276
16.	Sawahan	26	1,093	297	30	7	4	1,457
17.	Banjardowo	23	578	187	5	27	12	832
Kec. NGLUYU								
1.	Ngluyu	34	673	133	15	14	3	872
	Total	712	12,055	3,776	563	207	198	17,511
	Percentage (%)	4.06 %	68.84%	21.56%	3.21%	1.18 %	1.13%	100%

Table 6.2.4 AVERAGE FARM SIZE

NAME OF DESA	FARM LAND			TOTAL FARM HOUSEHOLD	AVERAGE FARM SIZE PER HOUSE HOLD		
	PADDY-FIELD	UPLAND-FIELD	TOTAL		PADDY FIELD	UPLAND FIELD	TOTAL
I. KECAMATAN GONDANG							
1. Balonggebang	261.00	56.00	317.00	1049.00	0.25	0.05	0.30
2. Ngujung	208.00	86.00	294.00	537.00	0.39	0.16	0.55
3. Ketawang	334.00	-	334.00	612.00	0.55	-	0.55
4. Sumberagung	146.00	18.00	164.00	375.00	0.39	0.05	0.44
5. Kedungglugu	179.00	15.00	194.00	243.00	0.74	0.06	0.80
6. Jaan	333.00	76.00	409.00	692.00	0.48	0.11	0.59
II. KECAMATAN LENGKONG							
7. Lengkong	129.00	17.00	146.00	229.00	0.56	0.07	0.64
8. Jatipunggur	158.00	-	158.00	364.00	0.43	-	0.43
9. Kedungmlaten	96.00	75.00	171.00	345.00	0.28	0.22	0.50
10. Jegreg	86.00	18.00	104.00	297.00	0.29	0.06	0.35
11. Ngringin	186.00	15.00	201.00	626.00	0.30	0.02	0.32
12. Ketandan	301.00	60.00	361.00	992.00	0.30	0.06	0.36
13. Sumberkepuh	81.00	36.00	117.00	254.00	0.32	0.14	0.46
14. Prayungan	146.00	75.00	221.00	530.00	0.28	0.14	0.42
15. Sumbersono	49.00	34.00	83.00	183.00	0.27	0.19	0.45
16. Sawahan	132.00	-	132.00	493.00	0.27	-	0.27
17. Banjardowo	147.00	95.00	242.00	403.00	0.36	0.24	0.60
III. KECAMATAN NGLUYU							
18. Ngluyu	190.00	70.00	260.00	474.00	0.40	0.15	0.55
TOTAL	3162.00	746.00	3908.00	8698.00	0.36	0.09	0.45

Table 6.2.5 THE DISTRIBUTION OF LAND HOLDING SIZE IN DESAS RELATED TO WIDAS EXTENSION AREA

UNIT: ha

VILLAGES/DESAS	LAND HOLDING SIZE								TOTAL
	Less than 0.25	0.26 Up to 0.50	0.50 Up to 0.75	0.76 Up to 1.00	1.01 Up to 1.50	1.51 Up to 2.00	2.01 Up to 2.50	More than 2.51	
Jatipunggur	20	59	94	12	11	11	1	2	210
Prayungan	125	110	118	17	17	7	6	4	404
Lengkong	13	27	15	7	15	7	1	3	88
Banjardowo	131	117	74	26	20	8	4	6	386
Ketandan	162	219	78	49	59	18	8	5	598
Ngringin	57	158	48	15	18	13	3	4	316
Kedungmlaten	150	63	84	28	20	6	1	-	352
Sumberkepuh	51	81	22	16	13	2	3	3	191
TOTAL	709	834	533	170	173	72	27	27	2545
(%)	27.9	32.8	20.8	6.7	6.8	2.8	1.1	1.1	100

Table 6.2.6 LAND TENURE CONDITION IN DESAS RELATED TO WIDAS EXTENSION AREA

VILLAGES/DESAS	No. of Owner By Land Holding Size (ha)				No. of Partially By Land Holding Size (ha)				No. of Tenant By Land Holding Size (ha)			
	Less than 0.25	0.25 Up to 0.50	More than 0.50	TOTAL	Less than 0.25	0.25 Up to 0.50	More than 0.50	TOTAL	Less than 0.25	0.25 Up to 0.50	More than 0.50	TOTAL
Jegreg	3	71	59	133	-	15	5	20	1	2	20	23
Ngringin	10	92	44	146	8	56	26	90	-	2	39	44
T O T A L	13	163	103	279	8	71	31	110	1	4	59	67
(%)	4.66	58.42	36.92	100	7.27	64.55	28.18	100	1.49	10.45	88.06	100
				(61%)				(24%)				(15%)

Source : Data office of JEGREG and NGRINGIN

Remarks: Total number of samples are 456 ha. Parentheses shows the percentage share by land tenure condition interms of the number of farmers.

Table 6.2.7 LIVESTOCK POPULATION IN DESA RELATED TO WIDAS EXTENSION AREA

NAME OF KECAMATAN	KIND OF LIVESTOCK								
	CASTLE	COW	BUFFALO	HORSE	PIG	GOAT	CHICKEN	FOWL	DUCK
I. KECAMATAN GONDANG									
1. Balonggebang	540	13	45	-	36	526	2,253	500	231
2. Ngujung	240	-	15	-	-	397	2,036	-	231
3. Ketawang	267	-	27	-	-	814	2,310	-	240
4. Sumberagung	174	-	-	-	-	360	2,021	-	206
5. Kedungglugu	235	-	12	-	-	192	2,012	-	211
6. Jaan	613	-	-	-	-	515	2,139	-	234
II. KECAMATAN LENGKONG									
7. Lengkong	94	-	-	17	-	124	665	-	107
8. Jatipunggur	154	-	28	2	-	97	1,436	-	16
9. Kedungmlaten	91	-	32	-	-	34	1,082	-	92
10. Jegreg	77	-	29	1	-	108	2,145	-	108
11. Ngringin	129	-	-	5	-	223	1,189	-	450
12. Ketandan	347	-	117	9	-	382	4,568	-	2,585
13. Sumberkepuh	150	-	8	2	-	135	1,500	-	161
14. Prayungan	272	-	6	1	-	184	1,098	-	43
15. Sumbersono	113	-	-	2	-	98	1,423	-	18
16. Sawahan	68	-	-	8	37	105	2,024	20	47
17. Banjardowo	86	-	-	9	-	98	919	-	37
III. KECAMATAN NGLUYU									
18. Ngluyu	94	-	65	-	-	360	1,988	58	47
T O T A L	3,744	13	384	56	73	4,752	32,808	578	5,064
Number of Lives Stock per Farm Household	.43	.001	.04	.01	.01	.55	3.77	.07	.58

Source : Statistical books of Kecamatan Gondang, Lengkong, and Ngluyu.

Remarks: Livestock population of Kecamatan Gondang taken from statistical book 1983. Livestock population of Kecamatan Lengkong and Kecamatan Ngluyu taken from statistical book 1980.

TABLE 6.2.8 CRITERIA OF BIMAS CREDIT PACKET FOR PADDY PER HECTARE IN 1984/1985

No.	Description	Packet A		Packet B		Packet C		Remarks
		Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)	
1.	Urea	200 kg	18,000	100 kg	9,000	300 kg	27,000	
2.	Triple soper phosphate	100 kg	9,000	50 kg	4,500	150 kg	13,500	
3.	Insecticide	2 lt	3,000	2 lt	3,000	2 lt	3,000	
4.	Rodenticide	2 kg	1,000	2 kg	1,000	2 kg	1,000	
5.	Seed	-	6,875	-	-	-	6,875	
6.	Spraying fee/ purchase of sprayer	-	2,000	-	2,000	-	2,000	
7.	Intensification additional cost	-	20,000	-	20,000	-	20,000	
8.	Fertilizer : KCl	50 kg	4,500	50 kg	4,500	50 kg	4,500	
	Total	-	64,375	-	44,000	-	77,875	

TABLE 6.2.9 CRITERIA OF BIMAS CREDIT PACKET (BY USING GRANULE AND LIQUID/POWDER) FOR PADDY PER HECTARE IN 1984/1985

		Packet A		Packet B		Packet C		Remarks
		Total (kg)	Value (Rp)	Total (kg)	Value (Rp)	Total (kg)	Value (Rp)	
1.	Urea	200 kg	18,000	100 kg	9,000	300 kg	27,000	
2.	Triple Super phosphate	100 kg	9,000	50 kg	4,500	150 kg	13,000	
3.	Insecticide	-	9,900	-	9,900	-	9,900	
4.	Rodenticide	2 kg	1,000	2 kg	1,000	2 kg	1,000	
5.	Seed	-	6,875	-	-	-	6,875	
6.	Spraying Fee/ purchase of sprayer	-	1,000	-	1,000	-	1,000	
7.	Intensification additional cost	-	20,000	-	20,000	-	20,000	
8.	Fertilizer : KCl	50 kg	4,500	50 kg	4,500	50 kg	4,500	
	Total	-	70,275	-	49,900	-	83,275	

TABLE 6.2.10 CRITERIA OF BIMAS CREDIT PACKET FOR POLOWIJO PER HECTARE IN 1984/1985

No.	Description	Maize		Soybean		Peanot		Green peanot		Sorghum		Cassava		Sweet Potato	
		Total (kg)	Value (Rp)	Total (kg)	Value (Rp)	Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)	Total (kg/lt)	Value (Rp)
1.	Urea	250 kg	22,500	75 kg	6,750	100 kg	9,000	50 kg	4,500	150 kg	13,500	200 kg	18,000	50 kg	4,500
2.	Triple Soper phosphate	100 kg	9,000	100 kg	9,000	100 kg	9,000	50 kg	4,500	100 kg	9,000	75 kg	6,750	50 kg	4,500
3.	Insecticide/ fungicide	0.5 kg	750	4 kg	6,000	2 lt	3,000	2 lt	3,000	1 lt	1,500	-	-	-	-
4.	Rodenticide	-	-	-	-	-	-	-	-	-	-	2 lt	1,000	-	-
5.	Seed	-	5,000	-	24,000	-	60,000	-	16,250	-	3,000	-	7,000	-	5,000
6.	Spraying fee/ purchase of sprayer	-	-	-	2,000	-	1,000	-	1,000	-	500	-	-	-	-
7.	Intensification additional cost	-	4,000	-	4,000	-	4,000	-	4,000	-	5,000	-	4,000	-	4,000
	Total	-	41,250	-	51,750	-	86,000	-	33,250	-	32,500	-	36,750	-	18,000

Table 6.2.11 SUGARCANE CREDIT PACKET PLANNING PERIOD (1985/1986), TRIT PROGRAMME

Unit : Rp/ha.

NO.	COMPONENT	STEP 0	STEP 1	STEP 2	STEP 3	STEP 4	T O T A L
1.	Land Preparation	(-)	(132,000)	(90,000)	(58,000)	(-)	(280,000)
	Maintenance Cost	-	310,000	224,000	186,000	-	720,000
2.	Harvesting, trans-	(-)	(-)	(-)	(-)	(50,000)	(50,000)
	portation	-	-	-	-	225,000	225,000
3.	Living Cost	(-)	(40,000)	(-)	(120,000)	(-)	(160,000)
		50,000	25,000	-	225,000	-	300,000
4.	Sub Total	(-)	(172,000)	(90,000)	(178,000)	(50,000)	(490,000)
		50,000	335,000	224,000	411,000	225,000	1,254,000
5.	Farm inputs						
	(a) Seed	(-)	(175,000)	(-)	(-)	(-)	(175,000)
		-	175,000	-	-	-	175,000
	(b) Fertilizer						
	-ZA 7 Ku	(-)	(40,000)	(20,000)	(-)	(-)	(60,000)
		-	50,000	20,000	-	-	70,000
	-TSP 1.5 Ku	(-)	(30,000)	(-)	(-)	(-)	(10,000)
		-	15,000	-	-	-	15,000
6.	Sub Total	(-)	(225,000)	(20,000)	(-)	(-)	(245,000)
		-	240,000	20,000	-	-	260,000
7.	T O T A L	(-)	(397,000)	(110,000)	(178,000)	(50,000)	(735,000)
		50,000	575,000	244,000	411,000	225,000	1,505,000
8.	Pest Control	(-)	(-)	(-)	(-)	(-)	(60,000)
		-	-	-	-	-	60,000
9.	KCL	(-)	(-)	(-)	(-)	(-)	(15,000)
		-	-	-	-	-	15,000

Remarks : /1 Credit for pest control: If necessary, credit for pest control and Kcl is required.

/2 Step 0: Transplantings cost (Dec. - Feb.)
Step 1: Land preparation
Step 2: Fertilizer
Step 3: Piling up soil
Step 4: Harvesting

/3 TRI (Intensification Programme)
TRIS ..... Sugarcane Intensification Programme in Paddy Field.
TRIT ..... Sugarcane Intensification Programme in Upland Field.
( ) Shows TRIT Programme.

Table 6.2.12 ECONOMIC PRICE OF CROPS

RRICE(FOR EXPORT)

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Thai 5% broken, FOB Bangkok	235		346	
2.	Indonesia 15% broken, FOB Surabaya	208,75	229,625	318,64	350,504
3.	Handling charge and warehouse cost		- 7,600		- 7,600
4.	Inland Transportation cost (Surabaya-Nganjuk)		- 2,750		- 2,750
5.	Selling Price of rice at Ex-mill gate		219,275		340,154
6.	Billing charge		- 5,875		- 5,875
7.	Selling price of Paddy (1 : 0.68)		145,112		227,309
8.	Transporation cost		- 1,970		- 1,970
9.	Farm gate price		143,142		225,340

SOYBEAN (FOR IMPORT)

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Projected Price	265		253	
2.	External Trasportation cost	34		34	
3.	CIF Surabaya	299	328,900	287	315,700
4.	Port handling and warehouse cost		8,870		8,870
5.	Inland transportation cost		2,750		2,750
6.	Market price		340,520		327,320
7.	Transportation cost to market		- 1,960		- 1,960
8.	Farm gate price		338,560		325,360

SUGAR (CRYSTAL)

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Projected Price	130		322	
2.	External transportation cost	34		34	
3.	CIF Surabaya	164	180,400	356	391,600
4.	Port handling charge and warehouse cost		8,870		8,870
5.	Inland transportation cost		2,750		2,750
6.	Market Price		192,020		403,220
7.	Marketing Cost		-165,900		-165,900
8.	Transportation cost to market		- 1,960		- 1,960
9.	Farm gate price		24,160		235,360

MAIZE (FOR IMPORT)

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Projected Price	126		115	
2.	External transportation cost	34		34	
3.	CIF Surabaya	160	176,000	149	163,900
4.	Port handling and warehouse cost		8,870		8,870
5.	Inland transportation cost		2,750		2,750
6.	Market Price		187,620		175,520
7.	Transportation cost		- 1,960		- 1,960
8.	Farm gate price		185,660		173,560

Table 6.2.13 ECONOMIC PRICE OF FERTILIZER

KCL

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Projected Price	90		102	
2.	External transportation cost	50		50	
3.	CIF Surabaya	140	154,000	152	167,200
4.	Port Handling and distribution to retail market		27,500		27,500
5.	Market price		181,500		194,700
6.	Inland transport-tation cost		4,400		4,400
7.	Farm gate price		185,900		199,100

UREA

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	Ex-factory Price, FOB Palembang	190	209,000	225	280,500
2.	Handling and Distri-bution to retail market		27,500		27,500
3.	Transportation cost to market		4,400		4,400
4.	Farm gate price		177,100		248,600

TSP

		1985		1990	
		US $/TON	RP/TON	US $/TON	RP/TON
1.	World Export price FOB Florida	150		173	
2.	Ocean freight and insurance to East Java	50		50	
3.	CIF Surabaya	200	220,000	223	245,300
4.	Port handling and distribution to retail market		27,500		27,500
5.	Market price		247,500		272,800
6.	Inland transport-tation cost		4,400		4,400
7.	Farm gate price		243,100		268,400

Table 6.2.14 PRIMARY PROFIT FOR HECTARE OF PADDY AND POLOWIJO CROPS IN WIDAS EXTENSION AREA AT PRESENT (Without Project)

ITEMS	UNIT	PADDY			MAIZE			SOYBEAN		
		AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)	AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)	AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)
I. GROSS INCOME										
1. Yield	Ton/ha	3.91			2.23			.68		
2. Price	Rp/Ton		225,340			173,560			325,360	
Total Gross Income	Rp.			881,079			387,040			221,245
II. PRODUCTION COST										
1. Seed	Kg	42	326	13,692	26	260	6,760	53	483	25,599
2. Fertilizer										
Urea	Kg	300	260	78,000	100	260	26,000	43	260	11,180
TSP	Kg	130	268	34,840	65	268	17,420	68	268	18,224
3. Agro-Chemical										
Pesticide	l	3.7	7,900	29,230	1.8	7,900	14,220	7.4	7,900	58,460
4. Labour										
Nursery bed	Man-day	2	500	1,000	-	-	-	-	-	-
Land preparation	Man-day	30	500	15,000	6	500	3,000	-	-	-
Transplanting /sowing	Man-day	48	375	18,000	12	375	4,500	20	375	7,500
Irrigation	Man-day	2	500	1,000	4	500	2,000	2	500	1,000
Fertilizing	Man-day	5	500	2,500	4	500	2,000	2	500	1,000
Weeding	Man-day	46	375	17,250	15	375	5,625	4	375	1,500
Spraying	Man-day	2	500	1,000	2	500	1,000	1	500	500
Harvesting /Threshing	Man-day	57	500	28,500	7	500	3,500	23	500	11,500
Drying	Man-day	16	500	8,000	7	500	3,500	15	500	7,500
5. Animal power	Animal/day	21	1,800	37,800	19	1,800	34,200	-	-	-
6. Miscellaneous 5% of (II)	Rp.			14,640			6,630			7,198
Total Production Cost	Rp.			277,890			139,330			151,160
III. Primary profit (I-II)	Rp.			603,819			247,710			70,085

Table 6.2.15 PRIMARY PROFIT PER Ha OF SUGARCANE IN WIDAS EXISTING AREA AT PRESENT (Without Project)

	UNIT	AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)
I. GROSS INCOME				
1. Yield	Ton/hr	5.69/1		
2. Price	Rp./ton		235,360	
Total Gross Income	Rp.			1,339,198
II. PRODUCTION COST				
1. Seed	Stalk	7,296	10	72,960
2. Fertilizer				
Urea/Za	Kg	795	260	206,700
TSP	Kg	170	268	45,560
3. Labour				
Land Preparation	Man-day	115	500	57,500
Planting	Man-day	47	375	17,625
Replacing	Man-day	7	375	2,625
Fertilizing	Man-day	10	500	5,000
Irrigation	Man-day	64	500	32,000
Weeding	Man-day	35	500	17,500
Spraying	Man-day	-	-	-
Tyning		42	500	21,000
Pilling Up		35	500	17,500
Stripping		76	375	28,500
Maintaining		19	500	9,500
Harvesting		170	500	85,000
4. Animal Power	Animal-day	-	-	-
5. Miscellaneous 5% of (II)	Rp.	-	-	39,420
Total Production Cost	Rp.	-	-	827,850
III. Primary Profit (I-II)	Rp.	-	-	511,348

REMARKS: /1 The redentment rate from sugarcane to sugar is around 10%.

Table 6.2.16 PRIMARY PROFIT PER HECTARE OF PADDY AND POLOWIJO CROPS IN WIDAS EXTENSION AREA
(With Project)

ITEM	UNIT	PADDY			MAIZE			SOYBEAN		
		AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)	AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)	AMOUNT	UNIT PRICE (Rp.)	TOTAL (Rp.)
I. GORSS INCOME										
1. Yield	Ton/ha	5.5			4			1.4		
2. Price	Rp/Ton		225,340			173,560			325,360	
Total Gross Income	Rp			1,239,370			694,240			455,504
II. PRODUCTION COST										
1. Seed	kg	35	326	11,410	30	260	7,800	30	483	14,490
2. Fertilizer										
Urea	kg	300	260	78,000	160	260	41,600	70	260	18,200
TSP	kg	140	268	37,520	180	268	48,240	50	268	13,400
KCL	kg	130	199	25,870	245	199	48,755	40	199	7,960
3. Agro-Chemical										
Pesticide	l	4	7,900	31,600	3	7,900	23,700	6	7,900	47,400
Herbicides	kg	3								
4. Labour										
Nursery bed	Man - day	15	500	7,500	-	500	-	-	500	-
Land preparation	Man - day	30	500	15,000	16	500	8,000	16	500	8,000
Transplanting/sowing	Man - day	37	375	13,875	17	375	6,375	9	375	3,375
Irrigation	Man - day	7	500	3,500	2	500	1,000	3	500	1,500
Fertilizing	Man - day	6	500	3,000	4	500	2,000	4	500	2,000
Weeding	Man - day	27	375	10,125	16	375	6,000	-	375	-
Spraying	Man - day	6	500	3,000	6	500	3,000	12	500	6,000
Harvesting/Threshing	Man - day	106	500	53,000	13	500	6,500	27	500	13,500
Drying	Man - day	27	500	13,500	-	500	-	-	500	-
5. Animal Power	Animal/day	21	1,800	37,800	19	1,800	34,200	-	1,800	-
6. Miscellaneous 5% of (II)	Rp			17,250			11,870			6,795
Total Production Cost	Rp			362,230			249,250			142,620
III. PRIMARY PROFIT (I - II)	Rp			877,140			444,990			312,880

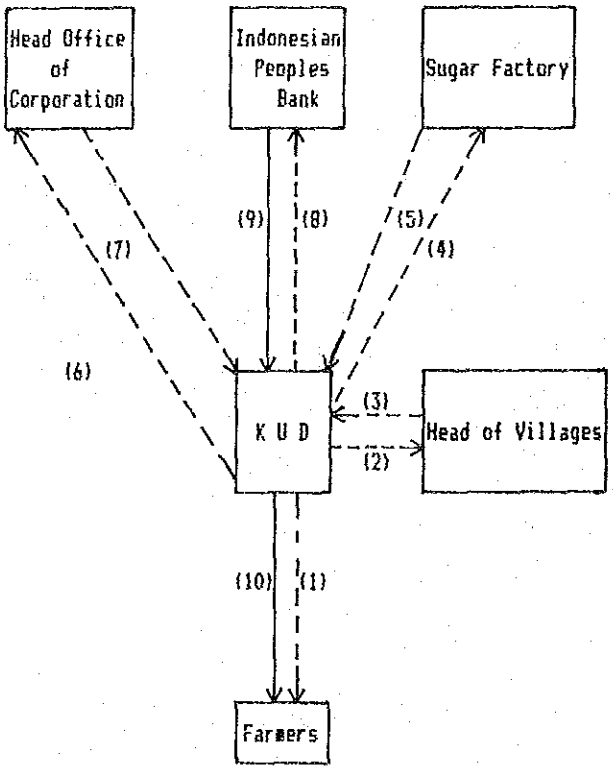
Table 6.2.17 PRIMARY PROFIT Per Ha Of RED ONION IN WIDAS EXTENSION AREA (With Project)

	Item	Unit	Amount	Unit Price (Rp.)	Total (Rp.)
I.	Gross Incame				
	1. Yield	ton/ha	8		
	2. Price	Rp/Ton		385	
	Total Gross Income	Rp			3,080,000
II.	Production Cost				
	1. Seed	Kg	600	1,000	600,000
	2. Fertilizer				
	Urea	Kg	300	260	78,000
	TSP	Kg	200	268	53,600
	KCL	Kg	150	199	29,850
	Manure	m^3	20	300	6,000
	3. Agro-Chemicals				
	Fungicides	Kg	20	1,500	30,000
	Insecticides	l	20	1,500	30,000
	4. Labour requirement				
	Land Preparation	Man - day	220	500	110,000
	Seed selection	Man - day	10	500	5,000
	Planting	Man - day	60	375	22,500
	Irrigation	Man - day	150	500	75,000
	Fertilizing	Man - day	30	500	15,000
	Weeding	Man - day	100	375	37,500
	Spraying	Man - day	40	500	20,000
	Harvesting/Processing	Man - day	60	500	30,000
	5. Miscellaneous 5% of (II)	Rp	-	-	57,125
	Total Production Cost	Rp	-	-	1,199,575
III.	Primary profit (I-II)	rP	-	-	1,880,425

Table 6.2.18 PRIMARY PROFIT Per Ha Of SUGARCANE (With Project)

	Item	Unit	Amount	Unit Price (Rp.)	Total (Rp.)
I.	Gross Incame				
	1. Yield	Ton/ha	99		
	2. Price	Rp/Ton		235,360	
	Total Gross Income	Rp			2,118,240
II.	Production Cost				
	1. Seed	Stalk	22,500	10	225,000
	2. Fertilizer				
	Urea/Za	Kg	600	260	156,000
	TSP	Kg	100	268	26,800
	3. Labour	Man - Day	800	500	400,000
	4. Miscellaneous 5% of (II)	Rp	-	-	40,390
	Total Production Cost	Rp	-	-	848,190
III.	Primary profit (I-II)	Rp	-	-	1,270,050

Fig. 6.2.1 MECHANISM OF CREDIT FOR SUGARCANE PRODUCTION



NOTE ——→ Flow of Credit

(1) KUD has to register farmers who wish to obtain credit.
(2) Registered farmer are informed to Head of Villages from KUD
(3) The admission of KEPALA DESA sent to KUD
(4) KUD requests Sugarfactory to investigate that soil condition is feasible for sugarcane production.
(5) The answer of Sugarfactory about (4)
(6) Proposal from KUD to Head Office of Corporation in order to get the approval of credit.
(7) The letter of recommendation from Head Office of - Corporation to KUD.
(8) KUD's proposal for credit to Bank.

ANNEX - 7

DAM AND IRRIGATION

ANNEX - 7

DAM AND IRRIGATION

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7.1 Assessment of Present Water Resources in the Widas Basin

1. General

To assess the present available water resources in the Widas basin, the comparison between the intake discharge and the potential irrigation requirement is made.

The comparison is made in each of hydrologically independent area such as Widas South Kedungsoko basin, Widas south Kuncir - Ulo basin, Widas north area and Widas extension area.

2. Input data

(1) Intake discharge

Intake discharge records and groundwater irrigation discharge records are collected every irrigation units from the Irrigation Service and P2AT respectively and classified into the above four areas. Name of irrigation units belong to each of the above four areas are as follows.

Name of Irrigation Unit	Name of basin
Genjeng, Bakung, Kolokoso Hardi Singat, Bendo Mongal Bendo Krosok, Kedungsoko	Kedungsoko basin
Kedungpedet, Kuncir, Bodor	Kuncir-Ulo basin
Widas, Kedunggupit, Kedungmaron Rejoso, Wengkol, Senggowar	Widas north area
Tretes, Ketandan, Sumberkepuh Jurang Dandang	Widas extension area

Table 7.1.1 and 7.1.5 shows the intake discharge of every irrigation units and groundwater records, respectively.

(2) Cropping pattern and intensity

To estimate the irrigation water requirement for each of the four areas, crop data for recent four years are collected from the Irrigation service and compiled. Fig. 7.1.1 shows present cropping status, According to these cropping status, cropping patterns are made. The present cropping pattern of the Widas extension area is shown in Fig. 12.3 of the Main Report, and others are shown in Fig. 7.1.2 . Cropping intensities of each area are shown in Table 7.1.6 to 7.1.8 except that of the Widas extension area which is shown in Table 12.4 of Main Report.

(3) Rainfall

Rainfall data to estimate the effective rainfall are derived from

following stations.

Name of station	Objective Area
Mrican, Pace	Kedungsoko basin
Milir, Nganjuk	Kuncir-Ulo basin
Nganjuk, Rejoso	Widas north
Tretes	Widas extension

Effective rainfalls estimated by the method stated in Chapter 15 are tabulated in Table 7.1.9.

3. Results

The results of the comparison are shown in the Main Report Section 12.10.

Table 7.1.1 INTAKE DISCHARGE IN EACH IRRIGATION UNIT IN KEDUNGSOKO BASIN (1/3)
YEAR : 1981

UNIT : l/Sec.

DI/NO.	GENJENG	BAKUNG	KOLOKOSO	HARDI-SINGAT	BENDO-MONGAL	BENDO-KROSOK	K.BODOR	KEDUNG-SOKO	TOTAL
MONTH	13-91-05	13-92-05	13-93-05	13-94-05	13-95-05	13-96-05	13-188-08	13-189-08	
JAN 1	2179	297	171	850	574	477	3116	226	7890
2	2079	361	199	1070	626	627	3299	294	8555
3	2079	332	263	937	631	595	3208	294	8339
FEB 1	2184	382	312	947	711	434	2905	312	8187
2	2184	436	339	947	696	338	2905	312	8157
3	2099	314	371	823	1274	392	2905	311	8489
MAR 1	2083	427	379	849	808	411	2900	317	8174
2	2022	486	397	820	817	410	2991	309	8252
3	1104	423	318	761	769	395	1974	309	6053
APR 1	570	336	284	627	767	361	2015	239	5199
2	312	178	211	264	620	247	1182	185	3199
3	527	93	160	194	275	162	1018	173	2602
MAY 1	421	120	55	156	240	153	1255	165	2565
2	434	127	64	189	219	128	813	199	2173
3	434	127	55	189	184	125	783	135	2032
JUN 1	386	121	36	179	156	121	777	159	1935
2	265	103	36	143	170	135	726	159	1737
3	270	125	36	171	190	147	339	173	1451
JUL 1	296	87	28	163	221	130	353	173	1451
2	296	97	35	150	192	112	353	172	1407
3	296	109	29	135	195	128	388	148	1428
AUG 1	287	109	25	70	192	139	389	140	1351
2	257	94	25	70	173	132	454	78	1283
3	240	100	26	68	168	153	385	83	1223
SEP 1	233	100	21	68	165	142	383	82	1194
2	155	76	21	68	131	144	319	80	994
3	149	60	24	66	88	89	319	80	875
OCT 1	191	60	45	67	172	151	190	50	926
2	203	97	86	60	164	104	194	50	958
3	165	84	86	57	92	110	192	50	836
NOV 1	188	86	84	57	75	73	152	45	760
2	238	143	100	57	193	72	368	44	1215
3	540	115	-	160	156	127	1405	530	3033
DEC 1	1256	156	121	545	402	188	-	-	2668
2	2217	171	82	522	577	259	-	-	3828
3	2711	173	202	463	550	317	-	-	4416
TOTAL	31550	6705	4726	12962	13633	8228	40955	6076	124835
AVERAGE	876	186	135	360	379	229	1241	184	3468

Table 7.1.1 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
IN KEDUNGSOKO BASIN (2/3)
YEAR : 1982

UNIT : l/Sec.

DI/NO.	GENJENG	BAKUNG	KOLOKOSO	HARDI-SINGAT	BENDO-MONGAL	BENDO-KROSOK	K.BODOR	KEDUNG-SOKO	TOTAL
MONTH	13-91-05	13-92-05	13-93-05	13-94-05	13-95-05	13-96-05	13-188-08	13-189-08	
JAN 1	2332	245	253	996	524	355	2868	434	8007
2	3016	221	422	1113	620	393	3692	434	9911
3	3077	350	535	1141	652	353	3712	434	10254
FEB 1	3069	399	535	1141	890	358	3722	411	10525
2	2731	399	535	1133	705	270	3416	434	9623
3	2473	533	438	899	624	389	3174	449	8979
MAR 1	2768	418	349	655	631	418	3103	346	8688
2	2730	399	310	389	633	383	2434	320	7598
3	1909	393	247	389	590	363	1617	333	5841
APR 1	1507	370	267	170	467	339	1291	277	4688
2	694	335	234	5	388	262	1141	277	3336
3	1124	336	257	120	365	308	1015	310	3835
MAY 1	1047	290	218	171	208	247	874	210	3265
2	1501	270	218	135	134	247	691	210	3406
3	1483	285	220	135	112	260	627	210	3332
JUN 1	1255	308	220	137	131	259	597	187	3094
2	957	257	220	129	188	274	450	211	2686
3	1020	196	217	113	502	250	377	195	2870
JUL 1	1005	201	187	118	398	162	358	211	2640
2	1013	257	162	114	313	178	358	174	2569
3	1083	185	162	102	230	171	312	79	2324
AUG 1	1076	205	140	102	242	171	279	59	2274
2	1010	211	140	91	248	161	317	68	2246
3	933	197	140	89	69	169	226	71	1894
SEP 1	928	346	140	86	158	162	206	53	2079
2	920	154	140	86	101	138	121	43	1703
3	568	137	69	62	64	110	138	-	1148
OCT 1	562	98	38	60	48	75	130	-	1011
2	569	107	49	60	48	56	84	-	973
3	569	123	49	50	53	42	105	-	991
NOV 1	564	116	30	49	50	43	54	-	906
2	345	128	30	47	55	38	80	-	723
3	327	127	30	43	59	38	64	-	688
DEC 1	435	148	31	43	86	40	-	-	783
2	664	128	35	122	442	102	1157	1222	3872
3	1600	264	93	316	750	138	2163	252	5576
TOTAL	48864	9136	7360	10611	11778	7722	40953	7914	144338
AVERAGE	1357	254	204	295	327	215	1170	283	4009

Table 7.1.1 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
IN KEDUNGSOKO BASIN (3/3)
YEAR : 1983

UNIT : l/Sec.

DI/NO.	GENJENG	BAKUNG	KOLOKOSO	HARDI-SINGAT	BENDO-MONGAL	BENDO-KROSOK	K.BODOR	KEDUNG-SOKO	TOTAL
MONTH	13-91-05	13-92-05	13-93-05	13-94-05	13-95-05	13-96-05	13-188-08	13-189-08	
JAN 1	2085	311	186	528	1569	269	2510	368	7826
2	2520	540	144	1016	1788	283	3177	333	9801
3	2476	343	277	1013	1427	278	2964	337	9115
FEB 1	2727	308	380	1013	1994	282	2890	309	9903
2	3075	309	456	1013	1541	288	3028	380	10090
3	3072	310	456	1013	1674	285	3009	-	9819
MAR 1	2872	309	404	722	1602	288	2997	285	9479
2	2726	354	448	722	983	278	2720	224	8455
3	2429	347	434	392	1359	282	2275	215	7733
APR 1	2086	850	408	373	1675	262	235	235	6124
2	1983	300	248	307	861	274	1361	192	5526
3	1976	315	375	176	995	232	1272	215	5556
MAY 1	1983	351	234	136	1261	202	1062	170	5399
2	1892	328	277	182	1204	182	881	226	5172
3	1982	227	355	76	1150	241	1260	212	5503
JUN 1	1969	222	243	138	1283	170	215	211	4451
2	1901	222	177	138	887	189	760	174	4448
3	1100	250	226	138	809	203	592	203	3521
JUL 1	1115	318	143	134	750	203	530	169	3362
2	991	323	96	131	650	170	550	140	3051
3	787	307	92	120	650	190	495	133	2774
AUG 1	750	289	82	115	584	180	367	157	2524
2	975	322	76	113	558	313	347	127	2831
3	702	277	65	110	462	117	337	125	2195
SEP 1	554	291	39	108	375	108	226	98	1799
2	549	291	55	104	285	99	120	96	1599
3	512	273	43	102	175	73	102	91	1371
OCT 1	496	271	43	91	148	69	97	85	1300
2	473	195	43	88	150	58	64	86	1157
3	476	203	34	89	159	60	96	68	1185
NOV 1	705	218	138	94	174	94	100	219	1742
2	705	225	147	138	429	77	847	94	2662
3	1178	318	104	878	737	86	1498	153	4952
DEC 1	1089	314	176	666	523	69	1794	249	4880
2	1230	341	167	559	562	99	1654	333	4945
3	2375	411	350	589	1068	158	2221	374	7546
TOTAL	56516	11383	7621	13325	32501	6711	44653	7086	179796
AVERAGE	1570	316	212	370	903	186	1240	202	4994

Table 7.1.2 INTAKE DISCHARGE IN EACH IRRIGATION UNIT IN KUNCIR and ULO BASIN

UNIT : l/Sec.

YEAR :	1981			1982			1983		
DI/NO.	KEDUNG-PEDET	K.KUNCIR		KEDUNG-PEDET	K.KUNCIR		KEDUNG-PEDET	K.KUNCIR	
MONTH	13-186-08	13-187-08	TOTAL	13-186-08	13-187-08	TOTAL	13-186-08	13-187-08	TOTAL
JAN 1	1688	3794	5482	1600	3888	5488	1954	3899	5853
2	1591	4012	5603	2036	3942	5978	1658	4023	5681
3	1644	3938	5582	2036	3825	5861	1954	2684	4638
FEB 1	1603	4065	5668	2052	4079	6131	1744	4118	5862
2	1607	3994	5601	1840	4100	5940	1684	3847	5531
3	1614	4022	5636	1703	4190	5893	1860	3689	5549
MAR 1	1474	3817	5291	216	1680	1896	2019	3796	5815
2	1238	3243	4481	1615	2290	3905	1698	3796	5494
3	1123	2323	3446	1156	2597	3753	1590	3419	5009
APR 1	1222	1875	3097	900	636	1536	1204	2581	3785
2	907	1680	2587	1081	2365	3446	1163	2369	3532
3	861	1671	2532	1134	2309	3443	1371	2300	3671
MAY 1	988	1625	2613	1002	2252	3254	1341	2349	3690
2	1026	1608	2634	750	1772	2522	1330	2212	3542
3	943	1075	2018	658	1710	2368	1494	2263	3757
JUN 1	952	1503	2455	779	1539	2318	1353	814	2167
2	757	1334	2091	649	1239	1888	1353	2028	3381
3	628	1386	2014	627	1529	2156	911	1492	2403
JUL 1	549	1246	1795	321	1231	1552	765	1286	2051
2	472	1236	1708	334	1362	1696	732	1183	1915
3	539	1300	1839	381	1223	1604	587	710	1297
AUG 1	419	1235	1654	478	835	1313	507	653	1160
2	464	1050	1514	478	721	1199	430	627	1057
3	498	605	1103	261	724	985	392	633	1025
SEP 1	495	669	1164	232	479	711	316	552	868
2	274	447	721	158	436	594	297	392	689
3	404	639	1043	280	360	640	163	255	418
OCT 1	372	590	962	94	514	608	160	222	382
2	345	590	935	138	461	599	288	181	469
3	341	590	931	179	463	642	737	609	1346
NOV 1	192	494	686	77	469	546	920	1084	2004
2	885	1980	2865	175	356	531	1004	1517	2521
3	1091	3055	4146	140	531	671	1463	2919	4382
DEC 1				947	850	1797	1162	2063	3225
2				1450	2191	3641	1025	3003	4028
3				1606	2971	4577	1373	3460	4833
TOTAL	29206	62691	91897	29563	62119	91682	40002	73028	113030
AVERAGE	885	1900	2785	821	1726	2547	1111	2029	3140

Table 7.1.3 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
WIDAS NORTH AREA EXCEPT EXTENSION AREA (1/3)
YEAR : 1981

UNIT : l/Sec.

DI/NO.	K.WIDAS	KEDUNG-GIPIT	KEDUNG-MARON	REJOSO	KEDUNG-PADANG	SENGGO-WAR	PERNING	TOTAL
MONTH	13-175-08	13-176-08	13-177-08	13-178-08	13-179-08	13-180-08	13-185-08	
JAN 1	3368	673	270	236	138	1099	357	6141
2	3023	535	270	236	108	1123	286	5581
3	3026	324	263	233	104	972	224	5146
FEB 1	2804	541	276	244	104	796	212	4977
2	2416	306	220	220	90	890	189	4331
3	2451	441	122	236	99	909	210	4468
MAR 1	2621	296	114	187	98	877	210	4403
2	2031	228	73	173	85	742	174	3506
3	1815	63	35	77	64	712	122	2888
APR 1	1786	33	45	80	54	680	73	2751
2	1566	84	45	80	58	636	90	2559
3	1423	70	36	84	58	362	-	2033
MAY 1	1807	-	66	84	76	487	-	2520
2	1807	-	45	84	85	488	-	2509
3	1235	91	32	84	61	439	74	2016
JUN 1	1046	119	10	87	68	360	19	1709
2	1069	5	-	73	62	169	39	1417
3	1416	5	28	149	68	357	-	2023
JUL 1	1146	67	28	117	61	300	32	1751
2	710	52	28	125	82	238	19	1254
3	691	47	28	125	88	249	14	1242
AUG 1	677	37	13	104	55	174	14	1074
2	506	33	-	44	55	68	19	725
3	607	26	-	48	33	66	5	785
SEP 1	457	34	9	86	21	39	11	657
2	265	9	2	52	21	33	11	393
3	264	13	3	77	22	47	14	440
OCT 1	382	13	-	52	24	69	9	549
2	328	13	-	60	23	62	-	486
3	502	13	-	52	24	60	-	651
NOV 1	326	9	8	37	8	37	-	425
2	2296	20	159	161	30	79	-	2745
3	1844	39	159	202	60	349	-	2653
DEC 1	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-
TOTAL	47711	4239	2387	3989	2087	13968	2427	76808
AVERAGE	1446	137	88	121	63	423	101	2328

Table 7.1.3 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
WIDAS NORTH AREA EXCEPT EXTENSION AREA (2/3)
YEAR : 1982

UNIT : l/Sec.

DI/NO.		K.WIDAS	KEDUNG-GIPIT	KEDUNG-MARON	REJOSO	KEDUNG-PADANG	SENGGO-WAR	PERNING	TOTAL
MONTH		13-175-08	13-176-08	13-177-08	13-178-08	13-179-08	13-180-08	13-185-08	
JAN	1	3352	259	174	402	162	1108	374	5831
	2	2445	303	161	494	174	1158	239	4974
	3	3225	494	161	451	213	1053	258	5855
FEB	1	3412	303	131	446	254	1158	282	5986
	2	3262	303	113	454	543	450	265	5390
	3	3262	303	98	437	254	1424	212	5990
MAR	1	2203	130	130	130	376	254	71	3294
	2	2118	39	130	240	283	895	130	3835
	3	1628	39	130	123	123	847	81	2971
APR	1	1665	185	110	79	54	1020	74	3187
	2	1810	79	86	179	150	655	72	3031
	3	1553	79	86	179	150	655	72	2774
MAY	1	1366	65	86	153	156	688	44	2558
	2	1241	45	23	148	132	480	67	2136
	3	1916	92	36	178	100	287	62	2671
JUN	1	1576	113	16	178	273	263	57	2476
	2	1144	51	11	121	54	155	57	1593
	3	1331	46	11	121	54	157	39	1759
JUL	1	768	89	-	44	54	70	14	1039
	2	655	78	-	50	40	71	14	908
	3	788	54	-	44	28	52	16	982
AUG	1	850	54	-	57	18	52	7	1038
	2	370	46	-	53	20	44	-	533
	3	331	41	-	42	8	36	-	458
SEP	1	393	28	-	24	9	18	-	472
	2	295	28	-	22	9	27	-	381
	3	-	27	-	28	8	18	-	81
OCT	1	207	21	-	28	-	18	-	274
	2	215	25	-	13	2	16	-	271
	3	210	27	-	13	8	16	-	274
NOV	1	376	25	-	13	8	12	-	434
	2	924	20	-	13	10	12	-	979
	3	1845	32	-	42	12	21	-	1952
DEC	1	2375	266	-	42	12	20	-	-
	2	1500	300	66	117	65	495	-	-
	3	2467	187	292	266	159	490	-	-
TOTAL		53078	4276	2051	5424	3975	14195	2507	85506
AVERAGE		1517	119	103	151	114	394	114	2315

Table 7.1.3 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
WIDAS NORTH AREA EXCEPT EXTENSION AREA (3/3)
YEAR : 1983

UNIT : l/Sec.

DI/NO.	K.WIDAS	KEDUNG-GIPIT	KEDUNG-MARON	REJOSO	KEDUNG-PADANG	SENGGO-WAR	PERNING	TOTAL
MONTH	13-175-08	13-176-08	13-177-08	13-178-08	13-179-08	13-180-08	13-185-08	
JAN 1	3196	191	250	427	31	785	52	4932
2	2833	291	292	369	129	807	144	4865
3	1986	104	195	279	107	424	144	3239
FEB 1	3749	186	222	376	143	594	144	5414
2	3760	191	195	384	144	391	181	5246
3	2832	186	232	376	125	768	258	4777
MAR 1	2431	491	232	378	164	697	305	4698
2	3609	577	232	378	169	801	171	5937
3	3604	465	238	336	283	654	86	5666
APR 1	3214	207	238	338	142	648	89	4876
2	3307	148	63	119	107	815	66	4625
3	2402	318	65	166	93	731	-	3775
MAY 1	2701	318	86	166	93	565	25	3954
2	2760	328	78	183	81	281	35	3746
3	2762	318	78	143	73	261	51	3686
JUN 1	1517	163	78	166	81	302	47	2354
2	1517	163	89	181	75	361	49	2435
3	1783	271	89	185	38	253	51	2670
JUL 1	1334	271	89	163	29	249	39	2174
2	1237	52	89	145	29	232	39	1823
3	1034	126	57	97	82	229	-	1625
AUG 1	1252	126	60	70	29	80	-	1617
2	1227	149	73	71	24	53	-	1597
3	1000	140	105	93	24	71	-	1433
SEP 1	962	149	103	93	24	66	-	1397
2	857	124	126	72	24	72	-	1275
3	729	143	78	98	30	67	-	1145
OCT 1	691	142	78	99	23	43	-	1076
2	492	91	126	50	21	91	-	871
3	613	110	200	220	81	98	-	1322
NOV 1	3736	175	200	292	57	147	-	4607
2	3736	283	130	1994	181	184	-	6508
3	3389	283	348	561	154	347	53	5135
DEC 1	-	519	185	561	164	348	53	-
2	825	282	63	441	164	203	53	-
3	-	624	292	608	147	388	84	-
TOTAL	73077	8705	5354	10678	3365	13106	2219	116504
AVERAGE	2149	242	149	297	93	364	96	3348

Table 7.1.4 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
WIDAS EXTENSION AREA (1/2)

	1981				UNIT : l/Sec.		1982				UNIT : l/Sec.
DI/NO.	K.TRETES	K.JURANG DANDANG	KETANDAN	SUMBER-KEPUH	TOTAL	DI/NO.	K.TRETES	K.JURANG DANDANG	KETANDAN	SUMBER-KEPUH	TOTAL
MONTH	13-181-08	13-182-08	13-183-08	13-184-08		MONTH	13-181-08	13-182-08	13-183-08	13-184-08	
JAN 1	224	270	551	97	1142	JAN 1	241	316	488	91	1136
2	205	380	320	86	991	2	199	250	376	71	896
3	204	206	301	78	789	3	163	216	294	81	754
FEB 1	237	193	441	78	949	FEB 1	161	185	400	71	817
2	239	183	302	71	795	2	126	115	331	76	648
3	246	216	551	71	1084	3	126	125	304	81	636
MAR 1	140	218	489	81	926	MAR 1	202	100	109	61	472
2	277	173	438	78	966	2	206	67	361	61	695
3	282	124	302	76	784	3	206	75	325	57	663
APR 1	203	100	181	38	522	APR 1	130	25	108	47	310
2	145	82	82	16	325	2	130	86	90	-	306
3	145	-	62	-	207	3	167	15	23	38	243
MAY 1	279	-	32	23	334	MAY 1	110	14	72	30	226
2	182	-	71	19	272	2	91	19	40	30	180
3	125	33	81	19	258	3	66	60	62	28	216
JUN 1	101	19	95	28	243	JUN 1	50	36	67	23	176
2	101	24	55	23	203	2	66	36	67	23	192
3	46	-	94	-	140	3	66	33	82	24	205
JUL 1	54	14	121	-	189	JUL 1	56	0	0	0	56
2	88	-	75	33	196	2	40	0	0	0	40
3	66	19	35	36	156	3	40	0	0	0	40
AUG 1	28	40	25	23	116	AUG 1	36	-	-	-	36
2	28	43	60	19	150	2	36	-	-	-	36
3	28	19	25	19	91	3	36	-	-	-	36
SEP 1	26	19	22	10	77	SEP 1	36	-	-	-	36
2	23	19	22	10	74	2	28	-	-	-	28
3	49	24	-	-	73	3	-	-	-	-	-
OCT 1	40	14	30	23	107	OCT 1	16	-	-	-	16
2	45	17	40	28	130	2	10	-	-	-	10
3	40	14	36	23	113	3	10	-	-	-	10
NOV 1	46	-	25	-	71	NOV 1	10	-	-	-	10
2	46	-	-	-	46	2	10	-	-	-	10
3	96	-	-	-	96	3	26	-	-	-	26
DEC 1	120	36	172	76	404	DEC 1	95	-	-	-	95
2	120	117	786	86	1109	2	78	59	105	27	269
3	284	233	568	91	1176	3	110	74	52	56	292
TOTAL	4608	2847	6490	1359	15304	TOTAL	3179	1906	3756	976	9817
AVERAGE	128	102	197	47	425	AVERAGE	91	83	163	44	280

Table 7.1.4 INTAKE DISCHARGE IN EACH IRRIGATION UNIT
WIDAS EXTENSION AREA (2/2)

1983 UNIT : l/Sec.

DI/NO.		K.TRETES	K.JURANG DANDANG	KETANDAN	SUMBER-KEPUH	TOTAL
MONTH		13-181-08	13-182-08	13-183-08	13-184-08	
JAN	1	142	74	182	56	454
	2	150	187	453	103	893
	3	110	78	296	92	576
FEB	1	184	78	292	92	646
	2	290	62	308	86	746
	3	258	191	322	76	847
MAR	1	258	280	305	76	919
	2	184	410	305	66	965
	3	184	408	211	76	959
APR	1	184	-	192	81	457
	2	145	-	177	57	379
	3	135	-	73	33	241
MAY	1	345	25	44	39	453
	2	118	25	44	39	226
	3	145	23	39	26	233
JUN	1	110	16	43	38	207
	2	108	23	68	38	237
	3	78	28	65	37	208
JUL	1	78	15	69	48	210
	2	50	15	55	43	163
	3	50	27	65	42	184
AUG	1	58	34	53	30	175
	2	28	34	59	11	132
	3	28	-	44	13	85
SEP	1	28	-	9	-	37
	2	28	-	-	-	28
	3	28	-	-	-	28
OCT	1	28	-	-	-	28
	2	28	-	-	-	28
	3	28	-	-	-	28
NOV	1	28	-	-	-	28
	2	78	-	-	-	78
	3	108	55	105	58	326
DEC	1	108	66	176	108	458
	2	110	32	306	97	545
	3	145	141	419	91	796
TOTAL		4165	2407	4779	1652	13003
AVERAGE		116	100	165	59	361

TABLE 7.1.5 TUBEWELL IRRIGATION AT PRESENT

UNIT: 1000CM

NUMBER	AREA HA	Q L/SEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
EXTEN A															
105	47.18	38	21.23	11.8	11.8	24.06	44.82	48.12	50.48	42.46	49.07	41.99	18.4	24.53	388.76
150	29.94	43	10.18	1.5	7.19	8.08	22.46	31.74	42.52	49.4	55.39	44.31	43.41	19.76	292.53
151	41.13	32	10.69	0	2.47	10.28	20.98	30.85	37.84	42.36	44.42	47.3	25.5	16.86	289.55
152	43.93	27	7.03	4.39	6.59	14.06	12.74	26.36	15.82	35.66	47.88	43.93	24.16	14.06	255.68
SUB TOT	162.18	140	49.13	17.69	28.05	56.48	101	137.07	146.66	169.88	196.76	177.53	111.47	75.21	1226.5
IN L/SEC			18.964	6.8283	10.827	21.801	38.986	52.909	56.611	65.574	75.949	68.527	43.027	29.031	473.44
SOUTH K.SOKO															
017	21	14	.42	.42	.21	.84	2.88	8.61	11.13	16.38	18.27	18.9	12.18	2.94	96.18
036	3.8	6	.08	.3	.11	.27	1.67	1.79	1.44	3.23	4.03	3.91	2.58	1.18	20.59
037	6.2	9	.12	.31	.12	.56	3.16	2.98	5.46	7.25	8.25	7.87	5.95	2.48	44.51
065	20.2	16	3.03	1.62	.2	12.93	9.29	15.15	13.94	19.8	12.73	18.39	15.35	11.72	134.14
078	20.9	16	0	0	0	0	7.11	18.18	14.12	20.48	16.51	18.6	16.51	11.29	123.1
079	19.52	16	1.17	0	0	0	10.93	18.93	14.83	17.18	20.89	16.98	11.32	8.39	120.62
080	16.5	12	0	0	0	0	0	0	7.92	5.61	10.56	10.23	2.31	4.79	41.42
081	17.9	10	0	0	0	0	1.79	7.7	6.09	10.38	9.31	9.67	9.67	4.65	59.26
082	18	12	0	0	0	0	4.14	18.72	12.06	16.2	13.14	13.68	10.62	9.18	97.74
116	20.14	21	1.41	0	0	0	.2	0	5.84	20.74	15.11	14.5	14.9	15.11	87.81
117	21.56	14	0	0	0	0	1.73	0	4.31	3.67	9.06	4.53	.43	3.67	27.4
119	19.99	21	0	0	0	0	0	0	.2	.4	3.4	3.8	0	1.6	9.4
153	32.97	54	5.93	.33	.33	.33	.33	.33	34.62	53.08	64.29	51.43	31.98	17.14	260.12
155	45.51	43	0	0	0	0	0	0	0	0	0	0	0	0	0
SUB TOT	284.19	264	12.16	2.98	.97	14.93	43.23	92.39	131.96	194.4	205.55	192.48	133.8	94.14	1122.3
IN L/SEC			4.6938	1.1503	.37442	5.7630	16.687	35.663	50.937	75.038	79.342	74.297	51.647	36.338	433.20
SOUTH KUNCIR-ULO															
038	21	33	.84	1.26	.21	.84	13.02	19.11	28.56	38.22	38.35	38.22	22.89	9.66	211.68
118	20.58	20	1.65	0	.21	.21	.21	.21	4.53	7.41	1.94	10.7	8.85	7.82	53.74
135	27.46	27	22.52	0	0	0	0	1.65	15.1	14	37.9	25.54	50	19.5	186.21
138	24.75	27	19.8	.25	.25	.25	.25	24.5	52.97	21.78	29.95	29.95	6.48	16.34	222.77
139	20.48	14	4.51	.21	.21	0	0	0	6.55	13.72	7.58	6.14	2.46	5.33	46.71
154	46.66	55	.93	.47	.47	0	0	0	27.53	67.19	92.39	76.52	51.79	53.66	370.95
156	30.61	39	21.73	0	0	0	.92	14.69	41.2	33.98	48.67	43.47	27.24	30.92	262.64
159	28.44	50	0	0	0	0	0	0	0	37.02	35.55	19.34	1.99	12.23	96.13
SUB TOT	219.98	265	71.98	2.19	1.35	1.3	14.4	60.16	176.44	233.32	292.33	249.88	171.7	155.46	1450.8
IN L/SEC			27.784	.84534	.5211	.5018	5.5584	23.222	68.106	90.062	112.84	96.454	66.276	60.008	560.02
NORTH															
007	14.35		.14	0	0	0	1	2.15	2.15	4.59	7.61	5.02	2.73	.14	26.53
SUB TOT	14.35	0	.14	0	0	0	1	2.15	2.15	4.59	7.61	5.02	2.73	.14	26.53
IN L/SEC			.05404	0	0	0	.386	.8299	.8299	1.7717	2.9375	1.9377	1.0538	.05404	10.241
TOTAL	680.7	669	133.41	22.86	30.37	72.71	159.63	291.77	457.21	602.19	702.25	624.91	419.7	324.95	3826.2
IN L/SEC			51.496	8.8240	11.723	28.066	61.617	112.62	176.48	232.45	271.07	241.22	162.00	125.43	1476.9

SOURCE:P2AT SURABAYA

Table 7.1.6 PRESENT CROPPING AREA AND INTENSITY IN IRRIGATION SECTION KEDIRI, RELATED TO MIDAS BASIN

AREA : 6057 ha

(Upper Kedungsoko Basin)

C R O P P I N G		1981	1982	1983	1984	AVERAGE
Wet Season Paddy	(ha)	4921.00	4814.00	4780.00	4773.00	4822.00
	(%)	81.24	79.48	78.92	78.80	79.61
Dry Season Paddy I	(ha)	1102.00	1139.00	1482.00	1634.00	1339.25
	(%)	18.19	18.80	24.47	26.98	22.11
Dry Season Paddy II	(ha)	146.00	170.00	106.00	70.00	123.00
	(%)	2.41	2.81	1.75	1.16	2.03
Polowijo I	(ha)	3805.00	3244.00	2931.00	2710.00	3172.50
	(%)	62.82	53.56	48.39	44.74	52.38
Polowijo II	(ha)	4189.00	3415.00	4133.00	4290.00	4006.75
	(%)	69.16	56.38	68.24	70.83	66.15
Sugarcane	(ha)	681.00	883.00	949.00	898.00	852.75
		11.24	14.58	15.67	14.83	14.08
Tobacco	(ha)	-	-	-	-	-
	(%)	-	-	-	-	-
T O T A L	(ha)	14844.00	13665.00	14381.00	14375.00	14316.25
	(%)	245.07	225.61	237.43	237.33	236.36

Table 7.1.7 PRESENT CROPPING INTENSITY IN MIDAS SOUTH

AREA :11924 ha

(Lower Kedungsoko Basin 4962 ha and Kuncir-Ulo Basin 6962 ha)

C R O P P I N G		1981	1982	1983	1984	AVERAGE
Wet Season Paddy	(ha)	10954.00	10623.00	10173.00	10540.00	10572.50
	(%)	91.87	89.09	85.32	88.39	88.67
Dry Season Paddy I	(ha)	6017.00	5380.00	6409.00	6562.00	6092.00
	(%)	50.46	45.12	53.75	55.03	51.09
Dry Season Paddy II	(ha)	700.00	728.00	845.00	787.00	765.00
	(%)	5.87	6.11	7.09	6.60	6.42
Polowijo I	(ha)	3980.00	4215.00	3625.00	3301.00	3780.25
	(%)	33.38	35.35	30.40	27.68	31.70
Polowijo II	(ha)	8956.00	7102.00	7563.00	7742.00	7840.75
	(%)	75.11	59.56	63.43	64.93	65.76
Sugarcane	(ha)	539.00	976.00	1312.00	936.00	940.75
		4.52	8.19	11.00	7.85	7.89
Tobacco	(ha)	0.00	0.00	0.00	0.00	0.00
	(%)	0.00	0.00	0.00	0.00	0.00
T O T A L	(ha)	31146.00	29024.00	29927.00	29868.00	29991.25
	(%)	261.20	243.41	250.98	250.49	251.52

Table 7.1.8

PRESENT CROPPING INTENSITY IN WIDAS NORTH
IRRIGATION AREA EXCEPT WIDAS EXTENSION
AREA : 10246 ha

C R O P P I N G		1981	1982	1983	1984	AVERAGE
Wet Season Paddy	(ha)	9620.00	8574.00	8953.00	9288.00	9108.75
	(%)	93.89	83.68	87.38	90.65	88.90
Dry Season Paddy I	(ha)	2494.00	2494.00	2999.00	3792.00	2944.75
	(%)	24.34	24.34	29.27	37.01	28.74
Dry Season Paddy II	(ha)	467.00	747.00	326.00	580.00	530.00
	(%)	4.56	7.29	3.18	5.66	5.17
Polowijo I	(ha)	6473.00	6241.00	4323.00	4280.00	5329.25
	(%)	63.18	60.91	42.19	41.77	52.01
Polowijo II	(ha)	3976.00	3638.00	5101.00	6578.00	4823.25
	(%)	38.81	35.51	49.79	64.20	47.07
Sugarcane	(ha)	6.00	267.00	547.00	492.00	328.00
		0.06	2.61	5.34	4.80	3.20
Tobacco	(ha)	53.00	173.00	427.00	290.00	235.75
	(%)	0.52	1.69	4.17	2.83	2.30
T O T A L	(ha)	23089.00	22134.00	22676.00	25300.00	23299.75
	(%)	225.35	216.03	221.32	246.93	227.40

SOURCE : Keadaan irrigasi

Table 7.1.9 EFFECTIVE RAINFALL (1/5)

MRICAN

For Paddy

Month		1981	1982	1983	Mean
Jan.	1st	149.60	87.20	204.00	146.93
	2nd	81.60	81.60	62.40	75.20
	3rd	86.40	245.60	28.80	120.26
Feb.	1st	185.60	99.20	74.40	119.73
	2nd	57.60	62.40	152.80	90.93
	3rd	80.00	152.80	80.80	104.53
Mar.	1st	112.00	90.40	95.20	99.20
	2nd	68.00	15.20	137.60	73.60
	3rd	117.60	48.00	83.20	82.93
Apr.	1st	44.80	30.40	24.80	33.33
	2nd	73.60	52.00	88.80	71.46
	3rd	112.80	6.40	79.20	66.13
May	1st	5.60	0.00	50.40	18.66
	2nd	20.80	0.00	85.60	35.46
	3rd	0.00	0.00	76.00	25.33
June	1st	0.00	5.60	0.00	1.86
	2nd	28.00	0.00	0.00	9.33
	3rd	16.80	0.00	0.00	5.60
July	1st	58.40	0.00	0.00	19.46
	2nd	32.80	0.00	0.00	10.93
	3rd	43.20	0.00	0.00	14.40
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	16.80	0.00	0.00	5.60
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	15.20	0.00	0.00	5.06
Oct.	1st	0.00	0.00	0.00	0.00
	2nd	10.40	0.00	24.00	11.46
	3rd	7.20	0.00	62.40	23.20
Nov.	1st	54.40	0.00	13.60	22.66
	2nd	72.80	0.00	7.20	26.66
	3rd	76.80	0.00	37.60	38.13
Dec.	1st	151.20	39.20	20.00	70.13
	2nd	138.40	116.80	9.60	88.26
	3rd	44.00	28.00	220.80	97.60
Totl	1st	1962.40	1160.80	1719.20	1614.13

For Upland Crop

Month		1981	1982	1983	Mean
Jan.	1st	92.80	70.00	156.00	106.26
	2nd	81.60	78.80	62.40	74.26
	3rd	74.40	177.60	28.80	93.60
Feb.	1st	136.80	99.20	74.40	103.46
	2nd	43.60	62.40	91.20	65.73
	3rd	75.60	112.00	79.60	89.06
Mar.	1st	100.80	75.60	94.00	90.13
	2nd	65.20	15.20	125.60	68.66
	3rd	88.00	30.00	79.60	65.86
Apr.	1st	30.00	30.40	24.80	28.40
	2nd	72.00	46.00	78.80	65.60
	3rd	78.80	6.40	45.20	43.46
May	1st	5.60	0.00	50.40	18.66
	2nd	20.80	0.00	85.60	35.46
	3rd	0.00	0.00	76.00	25.33
June	1st	0.00	5.60	0.00	1.86
	2nd	28.00	0.00	0.00	9.33
	3rd	16.80	0.00	0.00	5.60
July	1st	30.00	0.00	0.00	10.00
	2nd	32.80	0.00	0.00	10.93
	3rd	43.20	0.00	0.00	14.40
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	16.80	0.00	0.00	5.60
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	15.20	0.00	0.00	5.06
Oct.	1st	0.00	0.00	0.00	0.00
	2nd	10.40	0.00	24.00	11.46
	3rd	7.20	0.00	62.40	23.20
Nov.	1st	37.20	0.00	13.60	16.93
	2nd	63.60	0.00	7.20	23.60
	3rd	60.40	0.00	37.60	32.66
Dec.	1st	114.40	39.20	20.00	57.86
	2nd	80.80	103.60	9.60	64.66
	3rd	43.60	28.00	140.40	70.66
Totl	1st	1566.40	980.00	1467.20	1337.86

Table 7.1.9 EFFECTIVE RAINFALL (2/5)

PACE

For Paddy

Month		1981	1982	1983	Mean
Jan.	1st	25.60	9.60	129.60	54.93
	2nd	34.40	47.20	90.40	57.33
	3rd	98.40	116.00	19.20	77.86
Feb.	1st	96.00	104.80	88.00	96.26
	2nd	49.60	37.60	85.60	57.60
	3rd	77.60	53.60	124.00	85.06
Mar.	1st	169.60	49.60	41.60	86.93
	2nd	118.40	120.80	130.40	123.20
	3rd	75.20	11.20	119.20	68.53
Apr.	1st	27.20	29.60	80.80	45.86
	2nd	31.20	24.00	59.20	38.13
	3rd	64.00	54.40	80.00	66.13
May	1st	61.60	0.00	86.40	49.33
	2nd	19.20	0.00	118.40	45.86
	3rd	0.00	0.00	28.80	9.60
June	1st	0.00	0.00	0.00	0.00
	2nd	4.80	0.00	0.00	1.60
	3rd	66.40	0.00	0.00	22.13
July	1st	5.60	0.00	0.00	1.86
	2nd	21.60	0.00	0.00	7.20
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	5.60	0.00	0.00	1.86
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	73.60	0.00	0.00	24.53
Oct.	1st	0.00	0.00	0.00	0.00
	2nd	6.40	0.00	38.40	14.93
	3rd	0.00	0.00	50.40	16.80
Nov.	1st	0.00	0.00	34.40	11.46
	2nd	89.60	0.00	38.40	42.66
	3rd	130.40	0.00	52.00	60.80
Dec.	1st	128.80	56.00	39.20	74.66
	2nd	73.60	112.80	0.00	62.13
	3rd	26.40	68.00	150.40	81.60
Totl	1st	1580.80	895.20	1684.80	1386.93

For Upland Crop

Month		1981	1982	1983	Mean
Jan.	1st	25.60	9.60	111.60	48.93
	2nd	34.40	47.20	84.40	55.33
	3rd	95.60	76.00	19.20	63.60
Feb.	1st	95.60	96.40	86.80	92.93
	2nd	39.60	37.60	85.20	54.13
	3rd	43.60	30.00	116.80	63.46
Mar.	1st	138.80	49.60	41.60	76.66
	2nd	96.80	110.40	117.60	108.26
	3rd	47.60	11.20	99.20	52.66
Apr.	1st	27.20	29.60	64.40	40.40
	2nd	30.00	24.00	49.20	34.40
	3rd	30.00	54.40	71.60	52.00
May	1st	50.80	0.00	52.40	34.40
	2nd	19.20	0.00	84.40	34.53
	3rd	0.00	0.00	28.80	9.60
June	1st	0.00	0.00	0.00	0.00
	2nd	4.80	0.00	0.00	1.60
	3rd	51.60	0.00	0.00	17.20
July	1st	5.60	0.00	0.00	1.86
	2nd	21.60	0.00	0.00	7.20
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	5.60	0.00	0.00	1.86
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	65.20	0.00	0.00	21.73
Oct.	1st	0.00	0.00	0.00	0.00
	2nd	6.40	0.00	38.40	14.93
	3rd	0.00	0.00	43.60	14.53
Nov.	1st	0.00	0.00	30.00	10.00
	2nd	55.60	0.00	38.40	31.33
	3rd	112.80	0.00	50.00	54.26
Dec.	1st	94.80	35.60	39.20	56.53
	2nd	39.60	101.20	0.00	46.93
	3rd	26.40	68.00	124.00	72.80
Totl	1st	1264.80	780.80	1476.80	1174.13

Table 7.1.9 EFFECTIVE RAINFAL (3/5)

MLIRIP

For Paddy

Month		1981	1982	1983	Mean
Jan.	1st	25.60	57.60	60.00	47.73
	2nd	34.40	72.00	60.80	55.73
	3rd	89.60	100.80	23.20	71.20
Feb.	1st	72.80	73.60	159.20	101.86
	2nd	60.80	31.20	117.60	69.86
	3rd	14.40	25.60	102.40	47.46
Mar.	1st	112.00	98.40	18.40	76.26
	2nd	69.60	100.00	116.00	95.20
	3rd	68.80	51.20	152.00	90.66
Apr.	1st	40.00	36.00	152.00	76.00
	2nd	11.20	28.00	69.60	36.26
	3rd	53.60	48.80	68.80	57.06
May	1st	42.40	0.00	112.00	51.46
	2nd	0.00	0.00	116.80	38.93
	3rd	0.00	0.00	43.20	14.40
June	1st	0.00	0.00	0.00	0.00
	2nd	51.20	0.00	0.00	17.06
	3rd	45.60	0.00	0.00	15.20
July	1st	0.00	0.00	0.00	0.00
	2nd	10.40	0.00	0.00	3.46
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	0.00	0.00	0.00	0.00
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	70.40	0.00	0.00	23.46
Oct.	1st	8.00	0.00	0.00	2.66
	2nd	0.00	0.00	12.80	4.26
	3rd	0.00	0.00	0.00	0.00
Nov.	1st	0.00	0.00	84.00	28.00
	2nd	90.40	0.00	0.00	30.13
	3rd	56.80	0.00	22.40	26.40
Dec.	1st	82.40	44.00	34.40	53.60
	2nd	33.60	124.80	0.00	52.80
	3rd	37.60	48.80	111.20	65.86
Totl	1st	1181.60	940.80	1636.80	1253.06

For Upland Crop

Month		1981	1982	1983	Mean
Jan.	1st	25.60	57.60	60.00	47.73
	2nd	34.40	72.00	60.80	55.73
	3rd	86.80	64.80	23.20	58.26
Feb.	1st	68.40	73.60	118.00	86.66
	2nd	53.20	31.20	94.40	59.60
	3rd	14.40	25.60	102.40	47.46
Mar.	1st	98.80	82.00	18.40	66.40
	2nd	60.00	100.00	82.00	80.66
	3rd	60.00	46.80	134.00	80.26
Apr.	1st	37.20	36.00	112.00	61.73
	2nd	11.20	28.00	61.20	33.46
	3rd	30.00	46.00	68.80	48.26
May	1st	42.40	0.00	78.00	40.13
	2nd	0.00	0.00	82.80	27.60
	3rd	0.00	0.00	43.20	14.40
June	1st	0.00	0.00	0.00	0.00
	2nd	30.00	0.00	0.00	10.00
	3rd	41.20	0.00	0.00	13.73
July	1st	0.00	0.00	0.00	0.00
	2nd	10.40	0.00	0.00	3.46
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	0.00	0.00	0.00	0.00
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	62.80	0.00	0.00	20.93
Oct.	1st	8.00	0.00	0.00	2.66
	2nd	0.00	0.00	12.80	4.26
	3rd	0.00	0.00	0.00	0.00
Nov.	1st	0.00	0.00	54.00	18.00
	2nd	56.40	0.00	0.00	18.80
	3rd	49.20	0.00	22.40	23.86
Dec.	1st	69.60	35.60	34.40	46.53
	2nd	33.60	114.80	0.00	49.46
	3rd	34.80	40.40	77.20	50.80
Totl	1st	1018.40	854.40	1340.00	1070.93

Table 7.1.9 EFFECTIVE RAINFALL (4/5)

NGANJUK

For Paddy

Month		1981	1982	1983	Mean
Jan.	1st	64.80	58.40	92.80	72.00
	2nd	49.60	45.60	84.00	59.73
	3rd	108.00	40.80	72.80	73.86
Feb.	1st	47.20	89.60	80.80	72.53
	2nd	91.20	46.40	66.40	68.00
	3rd	20.80	57.60	195.20	91.20
Mar.	1st	84.80	112.00	43.20	80.00
	2nd	28.80	92.80	77.60	66.40
	3rd	96.80	52.00	72.80	73.86
Apr.	1st	42.40	24.00	74.40	46.93
	2nd	13.60	32.00	40.00	28.53
	3rd	39.20	70.40	34.40	48.00
May	1st	90.40	0.00	76.00	55.46
	2nd	0.00	0.00	95.20	31.73
	3rd	0.00	0.00	71.20	23.73
June	1st	9.60	0.00	0.00	3.20
	2nd	23.20	0.00	4.80	9.33
	3rd	78.40	0.00	0.00	26.13
July	1st	4.80	0.00	0.00	1.60
	2nd	21.60	0.00	0.00	7.20
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	11.20	0.00	0.00	3.73
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	82.40	0.00	0.00	27.46
Oct.	1st	4.00	0.00	0.00	1.33
	2nd	30.40	0.00	68.80	33.06
	3rd	0.00	0.00	29.60	9.86
Nov.	1st	0.00	0.00	101.60	33.86
	2nd	124.80	0.00	24.80	49.86
	3rd	60.00	0.00	112.80	57.60
Dec.	1st	52.00	39.20	38.40	43.20
	2nd	28.00	60.00	0.00	29.33
	3rd	74.40	129.60	175.20	126.40
Totl	1st	1382.40	950.40	1732.80	1355.20

For Upland Crop

Month		1981	1982	1983	Mean
Jan.	1st	64.80	58.40	88.80	70.66
	2nd	49.60	45.60	55.60	50.26
	3rd	81.20	40.80	42.00	54.66
Feb.	1st	47.20	89.60	46.80	61.20
	2nd	57.20	46.40	66.40	56.66
	3rd	20.80	43.60	145.20	69.86
Mar.	1st	77.20	112.00	34.80	74.66
	2nd	28.80	78.80	70.80	59.46
	3rd	86.80	52.00	72.40	70.40
Apr.	1st	42.40	24.00	74.40	46.93
	2nd	13.60	32.00	40.00	28.53
	3rd	39.20	68.40	34.40	47.33
May	1st	70.80	0.00	54.00	41.60
	2nd	0.00	0.00	83.60	27.86
	3rd	0.00	0.00	66.80	22.26
June	1st	9.60	0.00	0.00	3.20
	2nd	23.20	0.00	4.80	9.33
	3rd	44.40	0.00	0.00	14.80
July	1st	4.80	0.00	0.00	1.60
	2nd	21.60	0.00	0.00	7.20
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	11.20	0.00	0.00	3.73
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	74.40	0.00	0.00	24.80
Oct.	1st	4.00	0.00	0.00	1.33
	2nd	30.40	0.00	45.20	25.20
	3rd	0.00	0.00	29.60	9.86
Nov.	1st	0.00	0.00	72.00	24.00
	2nd	88.00	0.00	24.80	37.60
	3rd	60.00	0.00	96.40	52.13
Dec.	1st	49.20	39.20	38.40	42.26
	2nd	28.00	45.20	0.00	24.40
	3rd	74.40	92.00	116.40	94.26
Totl	1st	1202.80	868.00	1403.60	1158.13

Table 7.1.9 EFFECTIVE RAINFALL (5/5)

REJOSO

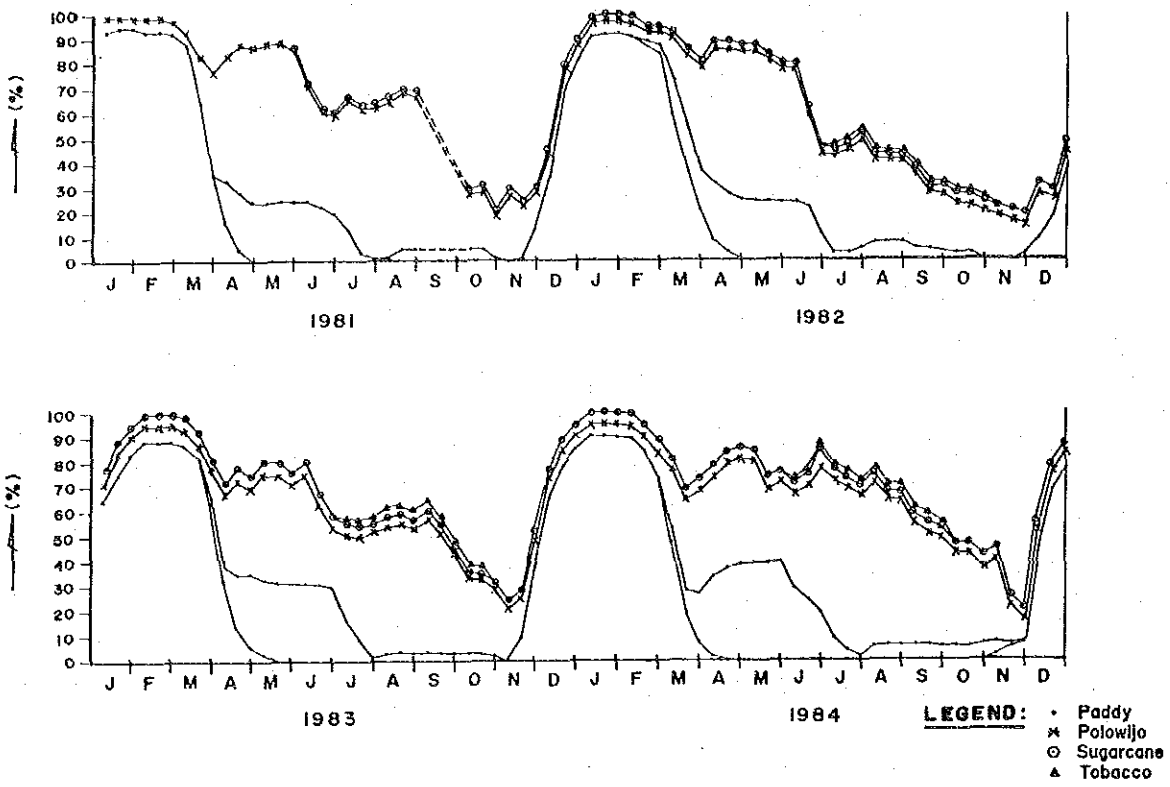
For Paddy

Month		1981	1982	1983	Mean
Jan.	1st	37.60	36.00	72.80	48.80
	2nd	33.60	76.00	80.00	63.20
	3rd	80.80	77.60	95.20	84.53
Feb.	1st	96.00	168.80	100.00	121.60
	2nd	36.80	47.20	36.80	40.26
	3rd	21.60	63.20	84.00	56.26
Mar.	1st	44.00	85.60	4.80	44.80
	2nd	0.00	96.00	135.20	77.06
	3rd	52.00	38.40	72.80	54.40
Apr.	1st	4.00	57.60	112.80	58.13
	2nd	11.20	16.80	27.20	18.40
	3rd	23.20	42.40	39.20	34.93
May	1st	140.00	17.60	125.60	94.40
	2nd	28.80	0.00	84.00	37.60
	3rd	0.00	0.00	103.20	34.40
June	1st	0.00	0.00	13.60	4.53
	2nd	42.40	0.00	0.00	14.13
	3rd	27.20	0.00	0.00	9.06
July	1st	8.00	0.00	0.00	2.66
	2nd	25.60	4.80	0.00	10.13
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	11.20	0.00	0.00	3.73
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	6.40	0.00	0.00	2.13
	3rd	47.20	0.00	0.00	15.73
Oct.	1st	22.40	0.00	0.00	7.46
	2nd	0.00	0.00	36.80	12.26
	3rd	19.20	0.00	69.60	29.60
Nov.	1st	56.80	0.00	105.60	54.13
	2nd	52.00	8.80	96.00	52.26
	3rd	31.20	0.00	40.00	23.73
Dec.	1st	64.00	96.00	31.20	63.73
	2nd	44.80	81.60	13.60	46.66
	3rd	76.00	76.00	108.00	86.66
Totl	1st	1144.00	1090.40	1688.00	1307.46

For Upland Crop

Month		1981	1982	1983	Mean
Jan.	1st	34.00	36.00	66.00	45.33
	2nd	33.60	42.00	66.00	47.20
	3rd	71.60	66.00	60.00	65.86
Feb.	1st	69.20	136.80	67.20	91.06
	2nd	30.00	47.20	36.80	38.00
	3rd	21.60	54.00	66.00	47.20
Mar.	1st	44.00	85.60	4.80	44.80
	2nd	0.00	96.00	130.00	75.33
	3rd	52.00	38.40	71.60	54.00
Apr.	1st	4.00	57.60	103.20	54.93
	2nd	11.20	16.80	27.20	18.40
	3rd	23.20	42.40	39.20	34.93
May	1st	78.40	17.60	85.60	60.53
	2nd	28.80	0.00	60.40	29.73
	3rd	0.00	0.00	85.20	28.40
June	1st	0.00	0.00	13.60	4.53
	2nd	35.60	0.00	0.00	11.86
	3rd	27.20	0.00	0.00	9.06
July	1st	8.00	0.00	0.00	2.66
	2nd	25.60	4.80	0.00	10.13
	3rd	0.00	0.00	0.00	0.00
Aug.	1st	0.00	0.00	0.00	0.00
	2nd	0.00	0.00	0.00	0.00
	3rd	11.20	0.00	0.00	3.73
Sep.	1st	0.00	0.00	0.00	0.00
	2nd	6.40	0.00	0.00	2.13
	3rd	47.20	0.00	0.00	15.73
Oct.	1st	22.40	0.00	0.00	7.46
	2nd	0.00	0.00	36.80	12.26
	3rd	19.20	0.00	63.60	27.60
Nov.	1st	39.60	0.00	87.20	42.26
	2nd	50.00	8.80	73.60	44.13
	3rd	31.20	0.00	40.00	23.73
Dec.	1st	58.80	86.00	31.20	58.66
	2nd	30.00	60.40	13.60	34.66
	3rd	76.00	42.00	108.00	75.33
Totl	1st	990.00	938.40	1436.80	1121.73

(1) WIDAS NORTH AREA EXCEPT EXTENSION AREA



(2) WIDAS SOUTH ARE A IN IRRIGATION NGANJUK

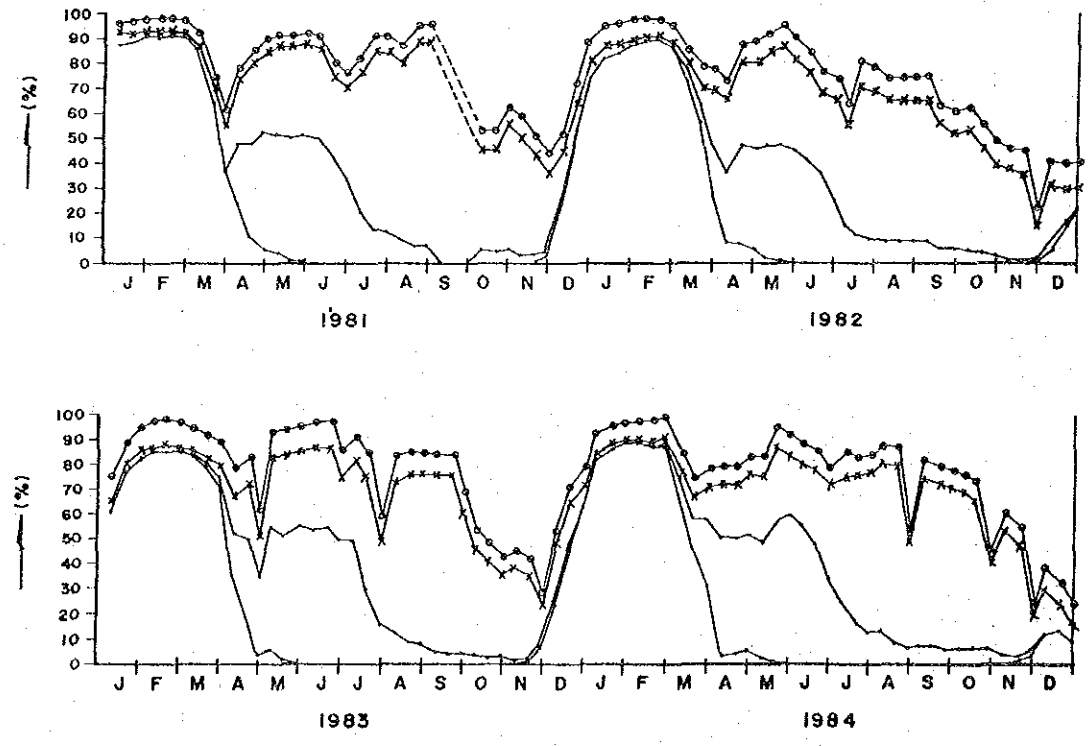
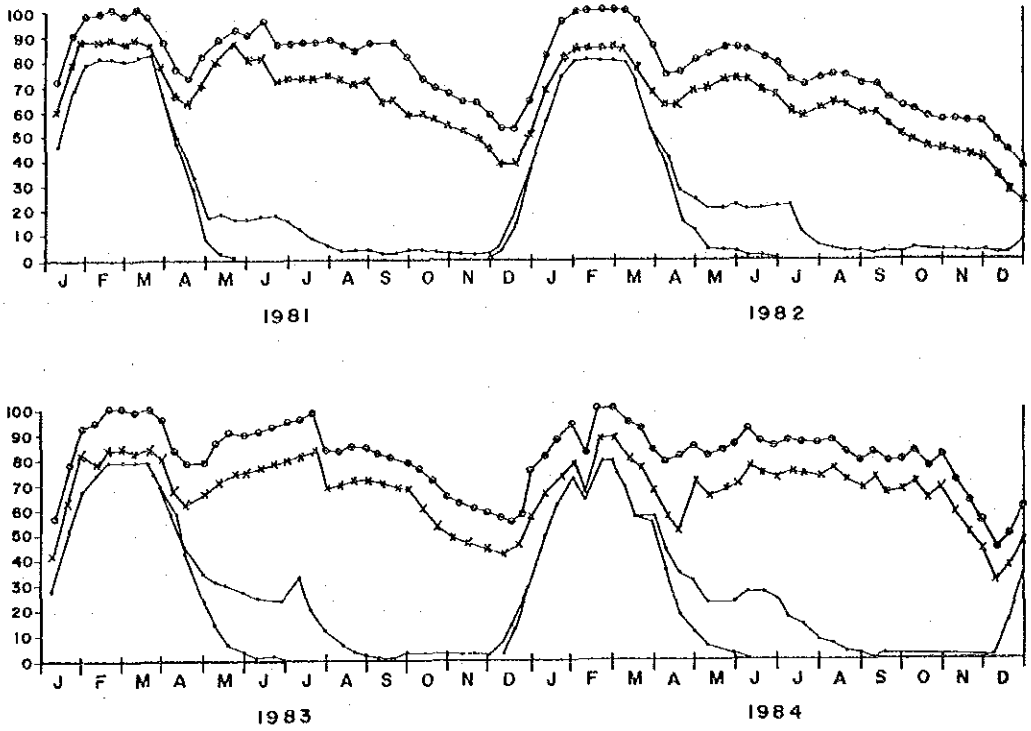


Fig. 7.1.1 PRESENT CROPPING STATUS IN WIDAS BASIN (1/2)

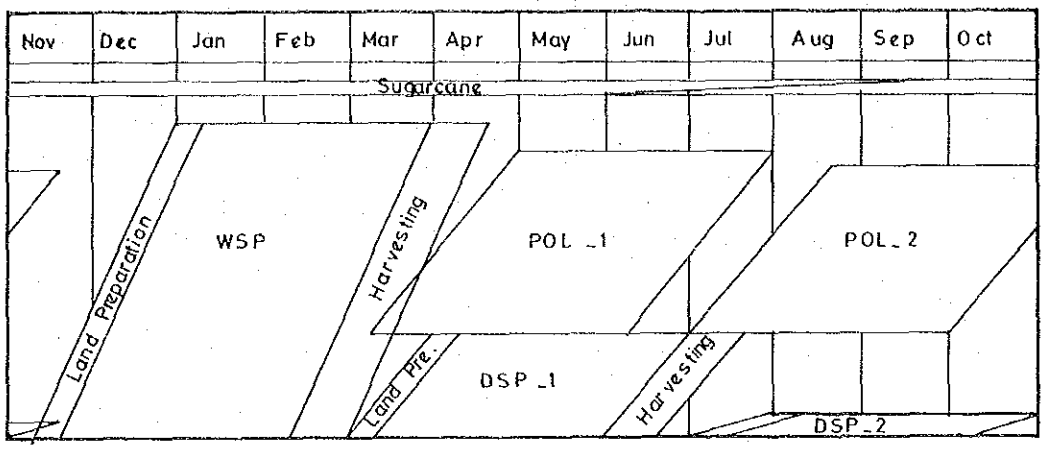
(3) WIDAS SOUTH AREA IN IRRIGATION KEDIRI



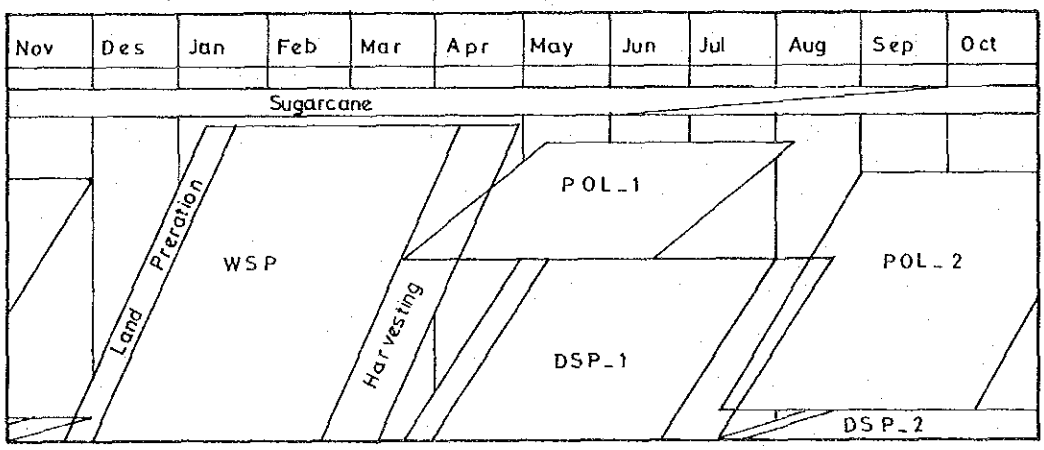
Source : Laporan bulanan keadaan irigasi

Fig. 7.1.1 PRESENT CROPPING STATUS IN WIDAS BASIN (2/2)

(1) Widas North Area Except Extension Area



(2) Widas South Nganjuk



(3) Widas South Kediri

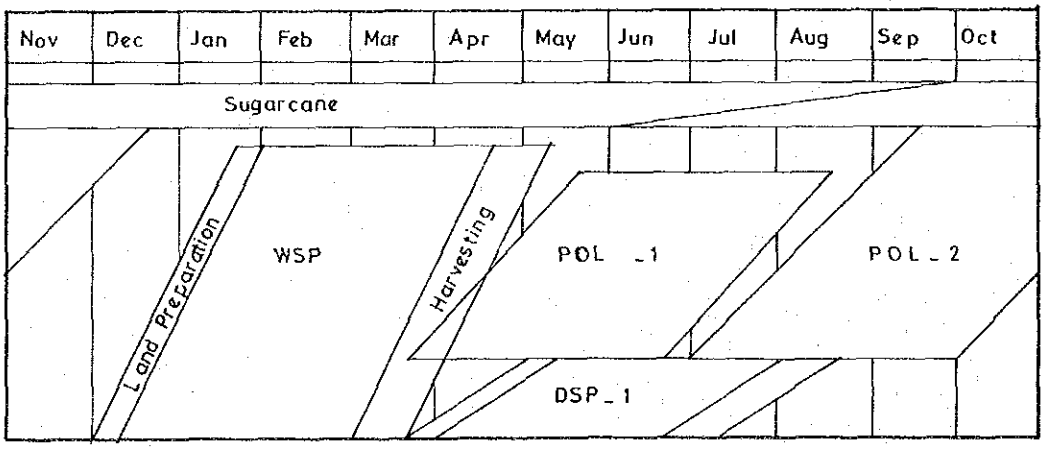


Fig. 7.1.2 PRESENT CROPPING PATTERN IN WIDAS BASIN

7.2 Study of Distribution Canal Density and Effective Rainfall for paddy

7.2.1 Introduction

A plot-plot irrigation method through paddy ridges is commonly practiced in Indonesia. The Widas area is also not the exception from this irrigation practice.
The size of the paddy plots in the area mostly ranges from 0.1 ha to 0.4 ha and the average size is around 0.2 ha. The shape of plots is often irregular. Accordingly, this plot-to-plot irrigation practice is inevitable even in future with project condition.

However, the amount of rainfall effectively used for paddy cultivation in relation between the number of continuous paddy plots to be irrigated through paddy ridges is not well known yet.

In order to make clear the effective rainfall on the plot-to-plot irrigation practice, a simulation model is prepared and the relation between the number of continuous plots and effective rainfall is analysed on daily basis under following conditions and requirements as explained in the succeeding sections.

7.2.2 Basic Equation

The simulation model is made based on the following relation.

$$R + Ii = CU + P + Qi + hi$$

Where ;
- R : rainfall directly reached to plot
- Ii : supply from i - 1 plot
- CU : crop consumptive use of water (refer to Chapter 15)
- P : percolation rate (refer to Chapter 15)
- Qi : Outflow to i + 1 plot
- hi : water depth change

7.2.3 Condition and Requirements

The amount of effective rainfalls closely relates to the many factors; not only the number of continuous plots, but also the irrigation supply, operation rules, height of spillway and so on.

1. Operation rules

If the water depth in the terminal plot is high, the irrigation supply can be reduced. On the contrary, when the water depth is low, the irrigation supply should be increased so as not to cause water shortage more than a certain period. According to the consideration above, the operation rules are tentatively set for the analysis as follows.

Interval of irrigation discharge control : 5 days
Irrigation discharge is controlled by measuring the water depth on the terminal plot in accordance with the following rules.

$h \geq h_1$: $Q = 0.0$

$H_1 > h \geq H_2$: $Q = 0.5\ (CU + P) \times A$

$H_2 > h \geq H_3$: $Q = 1.0\ (CU + P) \times A$

$H_3 > h$: $Q = 1.5\ (CU + P) \times A$

where ;

h	:	water depth on terminal plot
H_1, H_2, H_3	:	Standard water depth to decided the irrigation discharge
Q	:	irrigation discharge
CU	:	crop consumptive use of water
P	:	percolation
A	:	total irrigation area of one continuous plot

The index of water depth, H_1 H_2 and H_3 are fixed by trial and error method so that the water shortage does not exceed a certain period at any time of the paddy growing period. According to the Japanese refference "Natsusaku Gensyu Suitei Shakudo. 1975", Ministry of Agriculture and Forestry, the water shortage for the period of less than 10 days generally does not cause any significant damage to paddy yield. Therefore, in this study, five to seven days of water shortage period is assumed to be allowable.

2. Height of Spillway

The height of spillway is set at 10 cm above the field surface elevation in accordance with the field survey in the well-irrigated fields in the Brantas basin.

3. Cropping Pattern

With refference to the basic cropping pattern the simulation is made for the paddy planted in the middle of the proposed planting period in both wet and dry season paddys as illustrated below.

Wet season Paddy Irrigation Period		Dry Season Paddy Irrigation Period	
Puddling	End of irrigation	Puddling	End of irrigation
Dec.21	Mar. 20	Apr.21	Jul.20

4. Evapo-transpiration

Evapo-transpiration during the irrigation period is estimated the same as that in overall irrigation water requirement calculation, i.e. as the products of crop coefficient and potential evapo-transpiration. However after the irrigation period or harvesting, the paddy field is gradually dried up with no irrigation water supply and finally, no evapo-transpiration occurs in a certain limit of water content in soil. It is generally assumed that the evapo-transpiration does not occur that the water content in the soil layer is less than or equal to the hydro-scopic point. According to the relation between the water content and pF (see Fig. 15.2 in Main Report), the difference of water content

between the saturated soil condition and hydro-scopic condition is 150 mm on the top-soil layer of 60 cm in depth. Therefore in this model, it is assumed that no evapo-transpiration occurs when the water content reaches - 150 mm level.

5. Percolation

Percolation rate in the paddy field is estimated at 2 mm/day, the same as that of the overall water requirement calculation, according to the field capacity. However, when the water content in soil reaches to the field capacity, no or little percolation appears. According to the relation between water content and pF (see Fig. 15.2 in Main Report) the difference of water content between the saturated condition and field capacity is 15mm on the top soil, which supported to be root zone, thus in this model no percolation is supposed when the water content in soil is field capacity or lees.

6. Rainfall

Daily rainfall data is derived from the Lengkong station. In this model, the daily rainfall minus 2 mm is supposed to reach the paddy field surface.

7. Initial Water Supply for puddling and land preparation

The initial water for puddling and land preparation is supplied so that the average standing water depth is 70 mm for two continuous plot case and 80 mm for three or four continuous plot case.

7.2.4 Calculation Method of Effective Rainfall

The calculation method of effective rainfall is explained by the following equations.

$$ER = \sum_{i=1}^{n} ERi / n$$

When $h_1 \leqq Hmax$, $ERi = R + RIi$

When $h_2 \leqq Hmax < h_1$, $ERi = Hmax - h_2$

When $Hmax \lesseqgtr h_2$, $ERi = 0.0$

Where, ER : effective rainfall
n : number of continuous plot
ERi : effective rainfall in i-plot
Hmax : height of spillway
h_1 : WLi + QIi - (CU + P)
h_2 : h_1 + RIi + R

WLi : water depth at one day before on i-plot
QIi : irrigation supply to i-plot
CU+P : crop water requirement
RIi : inflow to i-plot caused by the excess of rainfall reached to the upsream plot

R : rainfall directly reached to i-plot

7.2.5 Calculation Case and Results

1. Calculation Case and Period

To make clear the relation between the number of continuous plots and effective rainfall amount, three cases are calculated;

Case 1 : Four continuous plots
Case 2 : Three continuous plots
Case 3 : Two continuous plots

The calculation is made on dailybases for continuous 5 years from 1979 to 1983 for each of cases.

2. Results

Table 7.2.1 to 7.2.3 show the calculation results of effective rainfall for each of cases on the 10 days basis.

Table 7.2.4 to 7.2.6 show the irrigation water supply, the outflow from the terminal field plot and the water level in the terminal plot for each of cases on daily basin.

The relation between the actual rainfall and effective rainfall is shown in Fig. 7.2.1 for each of cases and summarized below.

	Effective Rainfall			Rainfall
	Case 1 (4 plot)	Case 2 (3 plot)	Case 3 (2 plot)	
1979	630	662	756	1,245
1980	462	507	522	845
1981	573	611	676	1,103
1982	400	460	505	1,046
1983	717	776	789	1,615
Average	558	603	650	1,171
Average Effective Rainfall Rate (%)	48	51	55	100

From the above table, Case 2 can use the rainfall more effectively than Case 1 by 45 mm and further Case 3 can use the rainfall more than Case 2 by 47 mm.

7.2.6 Benefit and Cost

1. Benefit Increase

The increase of the effective rainfall amount can be recognized as the saving of irrigation water supply and saved amount can be used for irrigation in the dry season through the storing it in the reservoir. One polowijo crop consumes water of around 350 mm in one cropping season. Net incremental benefit which is the difference between without and with irrigation conditions is estimated at Rp. 214 x 10^3/ha in polowijo crops. Therefore, the benefit increase due to the increase of usable irrigation water are estimated at Rp. 27.5 x 10^3/ha/year if case 2 is adopted instead of Case 1 and further Rp. 28.7 x 10^3/ha/year if case 3 is adopted instead of Case 2.

2. Cost increase

While the cost also increases according to the change of Cases from Case 1 to Case 3, since the interval between the distribution canals reduces in accordance with the decrease of number of continuous plots and the reservoir capacity increases as the storage volume increases.

The cost increases are estimated as follows.

(1) Canal Cost

The density of distribution canals is estimated as follows.

Case	Interval (m)	Distribution Canal Density (m/ha)
Case 1 (4 plots)	200 - 300	42
Case 2 (3 plots)	150 - 250	56
Case 3 (2plots)	100 - 200	83

The construction cost increases are as follows.

	Increase of lenght (m/ha)	Unit Cost (Pp/m)	Cost Increase (Rp.x10^3/ha)
Case 1 to Case 2	14	3,600	50
Case 2 to Case 3	27	"	97
T o t a l	41	"	147.6

(2) Dam Cost

The increase of storage volume is estimated by dividing the net irrigation water increase to be used in the dry season by irrigation efficiency. The irrigation efficiency is assumed to be 0.64. The storage efficiency (effective storage volume/dam embankment volume) is nearly 44 in Ketandan dam. Thus the increase of construction cost is estimated as follows.