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	1	380 380 147	189	, 21152 1172 167 167	, % , , %		' ' 69 ' 69	4 I E	74
	Average	- <i>8</i> 8						·	T
1	00/ha) 1991/92 Progress	190 380 190	282	, 991 998 999 999 999 999	181 181, 181		- 189 189	• • •	210
	Unit Cost (Rp. 1,000/ha) 0 1990/91 1991/ ss Progress Progr		150	, 150 150 150 150 150 150	150 150	1 1 1 1 1	150 150	4 3 Å	150
D	Unit C 1989/90 Progress I		120	120 120 120		• • • • • •	i i i i i		120
			3,878 3,878 3,878	2,908 2,210 551 1,463 7,132	0,400 0,400000000	00000	300800 300800 3008000	000	11,774
)	Actual Budgetary Consumption (Million Rp.) 1989/90 1990/91 1991/92 Tota Progress Progress Progress	466 646 646 740 740 740	2,152 2,152	0 1,595 1,550 1,163 4,498	5600 2560 2560	00000	133 0 133 0 13 13 13 13 13 13 13 13 13 13 13 13 13	000	7,099
	ary Consum 1990/91 Progress	0000	000000	0 825 150 150 1,739	0 150 0 150 0 150	00000	0 165 165	000	2,954
	ctual Budget 1989/90 Progress	0000 8500	8500000 85	488 196 211 895 895	00000	00000	00000	000	1,721
ı	Total	1	0 0 20,513	0 17,968 3,769 8,124 8,124 8,124	2,413 2,413 2,413	00000	2,121 2,121 2,121	000	67,780
) 	(ha) 1991/92 Progress	1,227 2,474 3,927 0	0 0 7,628	8,395 8,140 8,124 6,124 6,124 23,64	1,413 1,413 0 1,413	00000	0 1,021 1,021	000	33,726
	Physical Realization (ha) 39/90 1990/91 19 gress Progress Pro	0000 9000 9	00000 90 9	2,500 3,096 1,000 11,590 11,590	1,000 1,000 1,000	00000	0 1,100 1,100	000	19,696
	Physical 1989/90 Progress	6,88,0 00,88,0 00,88,0	6,885 6,885	4,073 1,764 7,473	00000	00000	00000	000	14,358
	Province	D.I.Aceh Sumatera Utara Sumatera Barat Riau	Jambi Sumatera Selatan Bengkulu Lampung Sumatera	D.K.I Jakarta Jawa Barat Jawa Tengah D.I.Jogyakarta Jawa Timur Jawa	Bali Nusa Tenggara Barat Nusa Tenggara Timur Timur Bali/Nusa Tenggara	Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Kalimantan Timur Kalimantan	Sulawesi Utara Sulawesi Tengah Sulawesi Selatan Sulawesi Tenggara Sulawesi	Maluku Irian Jaya Maluku/Trian Jaya	INDONESIA Source: Mid Term Review
	Code	1282	15 117 18	874333 8743 874 873 873 873 873 873 873 873 873 873 873	2882	2882	12204	82	Sour
		1. A.							

Table 3.48 Realization, Actual Expenditure and Unit Cost of Current O&M during 1989/90 to 1991/92

D.I. Acch D.I. Acch 121.147 378.073 1.340 1.340 Sumatera Utara 226.523 225.856 127.461 121.147 378.073 1.340 1.115 2.2 Sumatera Utara 226.523 225.656 188.056 188.056 188.055 2.574 3.2 Sumatera Bart 107.094 202.479 226.611 546.184 1.0115 2.2 Sumatera Bart 107.094 202.479 226.611 546.184 1.0115 2.7 Bengfoulu 114.265 116.122 109.921 350.312 1.551 1.551 1.155 Sumatera 1.347.082 1.215.239 1.298.316 2.053.36 36.336 4.06 5.51 Sumatera 6.230 15.053 1.5053 3.653.66 5.64 3.50 1.55 1.15 2.2 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55 1.55		-	Progress	Progress	Progress	þ
D.I. Acch 129,465 127,461 121,147 378,073 1,340 Sumatera Barat 236,523 225,855 213,246 665,632 2574 33 Sumatera Barat 107,094 226,533 225,855 213,246 665,632 2574 35 Sumatera Barat 107,094 226,533 236,511 386,051 105,53 2742 557,142 557,142 557,142 557,142 557,142 111,15 4067 386,050 101,15 596,53 257,423 556,353 257,743 152,04 11 115,204 11,15 406 780 11,15 4067 150,53 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,053 15,054 11,15 204 780 15,204 11 15,204 11 15,204 11 15,204 11 205 15,053 15,053 15,053 15,053 15,053 15,053 15,053 1):	
Sumatera Utara 226,523 225,855 213,246 665,625 2574 Sumatera Barat 107,094 202,479 296,111 546,111 546,111 546,111 Jambi 995,504 133,065 181,429 623,752 2742 782 Sumatera Barat 295,526 138,065 181,429 623,762 2742 4087 Sumatera Selatan 38,568 68,864 87,747 195,176 4087 780 Lampung 1,347,082 1,215,239 1,215,239 1,5053 36,336 470 Jawa Tengah 6,230 15,053 15,053 36,336 470 705 Jawa Tengah 65,5773 30,655 50,84,394 15,524 11 Jawa Tengah 65,374 33,635 470 5510 Jawa Tengah 65,374 33,366 569,4394 5510 Jawa Tengah 65,5773 30,665 569,4394 20,356 5510 Jawa Tengah 655,716 18,572 34,515 132,226 556 Jawa Tengah 655,716 157,		5,255	10,350	13,612	17,995	13,899
Sumatera Barat 259,268 183,065 181,429 623,752 2742 Rau 107,094 202,479 256,611 346,184 1115 Bengkulu 95,504 92,668 37,177 812,156 4.087 Bengkulu 38,568 68,864 87,747 195,179 780 Bengkulu 38,568 68,864 87,747 195,179 780 Lampung 1,247,062 116,122 109,921 350,331 15,04 1 Sumatera 616,177 602,312 557,702 1,76,191 5510 780 Jawa Finut 616,177 602,312 557,702 1,76,191 5510 Jawa Tengah 655,738 30,666 509,822 16,66,246 4864 D.K.LJaykarta 616,177 602,312 557,022 1,76,191 5510 Jawa Tengah 655,738 1,666,246 4864 4864 1666 Jawa Tengah 655,116 62,3116 203,356 5510 152,226		9,574	11,363	13,730	18,284	14,383
Rau 107,094 202,479 256,611 546,184 1.115 Jambi 99,504 92,698 97,198 289,400 1,015 Bengkolu 38,5391 198,748 27,107 812,156 4,087 Lampurg 134,269 116,112 199,921 15053 36,631 35,534 D.K.Llakarta 6,230 15,053 12,15,293 129,503 15,053 15,053 Jawa Barat 6,5,774 32,347 32,503 1,505,244 11,5204 11 Jawa Tengah 65,5,778 15,053 15,053 36,6,691 15,204 11 Jawa Tengah 65,5,774 32,347 34,515 132,226 470 Jawa Timur 2,064,878 1,877,288 1,772,238 5,694,394 20,326 2 Jawa Timur 2,064,877 86,867 86,867 86,467 166,62,46 654 Jawa Timur 7,21,359 67,6910 655,116 2,033,88 20,326 2 Jawa Timu		8,433	10,576	14,377	16.861	13.520
Januti 99,504 92,698 97,198 289,400 1,015 Sumatera Selatan 362,391 198,748 251,017 812,156 4,087 Bengkulu 124,269 116,122 109,921 350,312 155,179 780 Sumatera Selatan 38,548 6,330 15,053 15,053 36,336 4,087 Sumatera 6,150 1,5053 15,053 15,053 36,336 470 Jawa Tengah 6,55,738 530,666 509,842 16,65,246 4,864 D.I.Jogyakarta 6,55,116 203,336 3,451,16 551,02 3,550,4 Jawa Tengah 6,55,116 203,338 1,772,228 5,694,394 20,326 2 Jawa Tenggara Barat 164,694 15,080 467,517 1,868 49 Nuss Tenggara Barat 164,694 15,080 467,517 1,868 46 Nuss Tenggara Barat 164,694 15,080 467,517 1,868 46 Nuss Tenggara Tinur 73,137 <td></td> <td>5,840</td> <td>10,411</td> <td>11.073</td> <td>10.494</td> <td>10.692</td>		5,840	10,411	11.073	10.494	10.692
Sumation Selation 362,391 198,748 251,017 812,156 4,087 Energkulu 13,47,082 116,122 109,921 350,511 1551 Sumateria 13,47,082 1,215,529 1,293,216 38,60,691 15,224 115 Sumateria 1,347,082 1,215,529 1,293,316 38,60,691 15,224 115 Jawa Barat 616,177 60,2312 5,57,702 1,776,191 5,510 Jawa Timur 7,213,38 530,666 50,942 1,66,5246 4,884 D.L.Jogvatarta 65,5778 35,0566 50,943 4,884 4,517 Jawa Timur 7,213,38 530,656 50,943 467,517 1,656,246 454 Jawa Timur 7,213,38 566,910 655,116 5,033,58 88,58 Jawa Tenggara Barat 166,6910 655,116 2,033,58 1,055 Jawa Tenggara Barat 166,6910 5,510 3,510 46,94 Nuss Tenggara Barat 166,6910 5,523 3,		3,282	10,201	9.752	14.023	11.341
Bengkulu 38.56 6.88.4 87.747 195.179 780 Lampung 1.347.082 1.215.208 1.5053 1.5053 1.551 1.551 Sumatera 1.347.082 1.215.208 1.5053 15.053 15.053 36.336 470 Jawa Tengu 1.24.269 116,122 109.921 35.016 5.510 Jawa Tengu 65.374 32.347 34.515 132.236 470 Jawa Timur 7.21.359 676.910 655.116 2.055.236 8.828 Jawa Timur 7.21.359 676.910 655.116 2.055.386 8.828 Jawa Tenggara Barat 7.21.359 676.910 655.116 2.03.326 2.03.366 Jawa Tenggara Barat 164.694 122.019 150.804 467.517 1.868 Nuss Tenggara Farmur 43.213 39.927 40.077 123.217 649 Nuss Tenggara Barat 164.694 123.019 150.804 467.517 1.065 Railinnut 5.952 7.312		0880	11 278	12.357	13 704	12.165
Liampung 12,42.06 116,122 109,921 350,312 1,551 Sumatera 1,347,082 1,215,229 1,5053 36,336 470 Jawa Tengah 616,177 602,312 557,702 1,776,191 5,510 Jawa Timur 655,734 32,347 34,515 1,505,346 4,864 4,864 D.J.Jogvakarta 655,734 32,347 34,515 1,696,246 4,864 4,64 Jawa Timur 7,21,359 676,910 655,116 2,053,385 8,828 8,828 Di.J.Jogvakarta 655,738 32,347 32,347 34,517 1,864 Jawa Timur 7,21,359 676,910 655,116 2,053,385 8,828 Bali 70.357 1,772,228 5,694,394 20,326 2 Nuss Tenggara Timur 4,5,517 8,687 80,123 20,571 1,665 Timor Timur 5,952 7,313 2,0584 4,67,517 1,668 Timor Timur 5,952 7,313 2,0,		2.867	20202	065 61	12.004	14 689
Lampung L.4.20 L10,122 L03,231 5500 15,053 36,0591 15,204 11 Jawa Tengah 65,374 53,066 50,3347 34,315 132,236 4,864 4,864 Jawa Timur 721,359 67,6910 655,116 2,033,385 8,828 8,828 Jawa Tengan 86,867 86,867 89,123 32,236 20,336 4,864 Nusa Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nusa Tenggara Timur 43,213 39,927 40,077 1123,217 649 Nusa Tenggara Timur 5,522 7,313 2,0,578 1,666 866 Kalimantan Tengah 25,523 1,31,005 287,317 847,4169 3,664 Kalimantan Tengah 22,6		000 2	107 01	1000	10001	100 F F
D.K.I.Jakarta 6.230 15,053 15,053 36,336 470 Jawa Tengah 6.65,778 557,702 1776,191 5,510 Jawa Tengah 6.55,738 530,666 557,702 1,776,191 5,510 Jawa Timur 6.55,738 530,666 557,116 2,024,674 4,864 D.I.Jogyakarta 6.55,738 33,666 5,694,394 4,864 Jawa 721,359 665,910 5,694,394 20,326 2 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Jawa 7,019 1,577,288 1,677,228 5,694,394 20,326 2 Nues Tenggara 1,64,694 1,55,019 15,007 4,57,517 1,868 Nues Tenggara 1,64,694 1,55,019 1,50,804 46,7517 1,868 Nues Tenggara 3,007726 2,86,126 2,854,394 20,326 2 Timor Timur 3,5,953 <t< td=""><td></td><td>50,529</td><td>12,401</td><td>12,889</td><td>15,143</td><td>13,088</td></t<>		50,529	12,401	12,889	15,143	13,088
D.K.I.Jakarta 6,230 15,053 15,053 36,336 470 Jawa Tengah 655,738 530,666 509,842 1,656,246 4864 Jawa Tengah 655,738 530,666 509,842 1,656,246 4864 Jawa Timur 721,359 676,910 655,116 2,053,385 8828 Jawa Timur 721,359 676,910 655,116 2,053,385 8828 Jawa Timur 721,359 676,910 655,116 2,053,385 8828 Jawa Timur 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Jawa Tenggara Barat 164,694 152,019 150,0804 467,517 1,665 Nuss Tenggara Barat 164,694 152,019 150,0804 467,517 1,665 Nuss Tenggara Timur 43,213 39,927 40,077 123,217 649 Nuss Tenggara 300,726 286,126 3,664 455 460 467,517 1,668 Kalimantan Tenggara 300,726 154,677 123,217 874,169 3,664 Kalimantan Tenggar						
Jawa Barat 616,177 602,312 557,702 1,776,191 5,510 Jawa Tengah 655,378 530,666 509,842 1696,246 4,864 D.I.Jogyakarta 65,374 32,347 34,515 132,236 654 Jawa Timur 721,359 676,910 655,116 2,033,385 8,828 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Nuss Tenggara Barat 164,694 1,857,288 1,772,228 5,694,394 20,326 2 Nuss Tenggara Barat 164,694 15,019 15,0804 467,517 1,868 Nuss Tenggara Barat 164,694 15,0007 133,217 649 Nuss Tenggara Barat 164,694 15,0007 123,217 649 Nuss Tenggara Barat 164,694 15,0007 133,217 649 Nuss Tenggara Barat 164,694 15,0007 133,217 649 Kalimantan Tenggara 30,726 286,126 267,212		2,045	75,441	49,824	\$4,806	56,280
Jawa Tengah 655,738 530,666 509,842 1,696,246 4,864 D.I.Jogyakarta 65,374 32,347 34,515 132,236 654 Jawa Timur 721,359 676,910 655,116 2,053,385 8,828 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Bali 86,867 86,867 86,867 89,123 26,694,394 20,326 2 Nuss Tenggara Barat 164,694 152,019 155,0804 467,517 1,868 Nuss Tenggara Timur 3,59,227 7,313 2,634 467,517 1,868 Nuss Tenggara Timur 5,952 7,313 7,313 20,3741 864 Kalimantan Tengah 5,952 1,57,871 874,169 3,664 Kalimantan Selatan 2,055 162,030 542,928 1,668 Kalimantan Selatan 7,058 3,5,035 77,128 255 Kalimantan 226,225 154,673 162,030 542,928 1,684 Kalimantan 129,567 286,126 287,312 490		19,154	8,942	9,867	13,808	10,784
D.I.Jogyakarta 65,374 32,347 34,515 132,236 654 Jawa Timur 721,359 676,910 655,116 2,053,385 8,8228 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Jawa 2,054,878 1,857,288 1,772,228 5,694,394 20,326 2 Bali Nues Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nues Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nues Tenggara Timur 43,213 39,927 40,077 123,217 649 Nues Tenggara Jimur 5,952 7,313 20,578 82 Kalimantan Tengah 129,365 116,787 154,673 162,030 542,928 1,668 Kalimantan Selatan 206,225 154,673 162,030 542,928 1,684 Kalimantan Selatan 7,058 35,035 77,128 255 54,473 543,923 1,684 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,686<		21,958	7 418	16,195	16,672	12,945
Jawa Timur 721,359 676,910 655,116 2.053,385 8,828 Jawa 2,064,878 1,857,288 1,772,228 5,694,394 20,326 2 Bali 3wa Tenggara Barat 164,694 1857,288 1,772,228 5,694,394 20,326 2 Nusa Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nusa Tenggara Timur 5,952 7,313 3,0,077 123,217 649 Nusa Tenggara Barat 164,694 150,005 467,517 1,868 82 Nusa Tenggara Timur 5,952 7,313 20,578 82 82 Ralimartan Tengah 129,363 199,006 217,511 545,880 965 Kalimartan Tengah 129,363 195,006 217,511 545,880 965 Kalimartan Selatan 7,058 162,030 542,928 1,608 82 Kalimartan Selatan 20,6501 563,711 545,880 965 Kalimartan Selatan 20,6501 563,771 846 255 Kalimartan 210,765 162,030		2,354	10,004	25,350	25,496	17,802
Jawa 2,064,878 1,857,238 1,772,228 5,694,394 20,326 2 Bali 84,867 86,867 89,123 262,857 1,065 Nuss Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nuss Tenggara Timur 3,213 39,927 40,077 123,217 1,868 Nuss Tenggara Timur 5,952 7,313 20,578 82 Nuss Tenggara Barat 164,694 152,019 150,804 467,517 1,868 Nuss Tenggara Timur 5,952 7,313 20,578 82 49 Kalimantan Tenggh 129,565 116,787 154,212 490,764 1,608 Kalimantan Tengah 129,565 199,006 217,511 545,880 965 Kalimantan Tengah 129,561 162,030 542,928 1,608 1,684 Kalimantan Tengah 129,561 566,700 4,511 545,880 965 Kalimantan Tengah 129,561 166,035 166,035 77,128 255 Kalimantan 582,411 505,501 568,788		30,022	12,238	14,404	17,469	14.621
Bali 86,867 86,867 89,123 262,857 1,065 Nuss Tenggara Barat 164,694 152,019 150,804 467,517 1,065 Nuss Tenggara Timur 43,213 39,927 40,077 123,217 649 Timor Timur 5,952 7,313 20,578 82 Falimartan Barat 5,952 7,313 20,578 82 Kalimantan Tengah 219,765 116,787 154,212 490,764 1,608 Kalimantan Selatan 206,725 154,673 154,212 490,764 1,608 Kalimantan Selatan 7,058 35,035 77,128 255 162,030 542,928 1,684 Kalimantan Selatan 7,058 35,035 77,128 255 162,030 542,928 1,684 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 582,413 505,501 568,788 1,656,700 4,512 Sulawesi Tengah 200,822 174,374 172,000 547,195 2739 Sulawesi Tengah 200,822 <	57 29,350	75,533	9,844	13,922	16,561	13,264
Date 00,000 05,112 05,804 467,517 1,868 Nuss Tenggara Timur 43,213 39,227 40,077 123,217 649 Nuss Tenggara Timur 43,213 7,313 7,313 20,578 82 Ralimartan Barat 164,674 152,019 150,804 467,517 1,868 Ralimartan Barat 239,277 7,313 7,313 20,578 82 Kalimantan Tengar 300,726 286,126 287,317 874,169 3,664 Kalimantan Tengar 219,765 116,787 154,212 490,764 1,608 Kalimantan Selatan 219,765 116,787 154,212 490,764 1,608 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan Selatan 236,501 568,788 1,668 77,128 255 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 64,856 64,490 66,		3 570	10 260	12 251	14 100	72 K1K
Nuss lenggara barat 10-4,0-4 1.32,019 1.30,004 4-0,077 1.32,217 649 Nuss Tenggara Timur 5,952 7,313 20,578 82 Timor Timur 5,952 7,313 20,578 82 Kalimantan Barat 219,765 116,787 154,212 490,764 1,608 Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,608 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan Selatan 7,058 35,035 77,128 255 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 64,856 64,490 66,025 195,371 845 Sulawesi Tenggara 200,822 174,374 172,000 547,196 2,729 Sulawesi Tenggara 200,822 174,374 172,000 547,196 2,729 Sulawesi Tenggara 34,674 31,884 46,541 113,003						
Nuss renggara 11mur 45.213 5952 7,313 20,578 92 Timor Timur 5,952 7,313 7,313 20,578 82 Bali/Nuss Tenggara 300,726 286,126 287,317 874,169 3,664 Kalimantan Barat 219,765 116,787 154,212 490,764 1,608 Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,608 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Tengah 20,0822 174,374 172,000 547,196 2,729 Sulawesi Tengara 20,0822 174,374 172,000 547,196 2,729 Sulawesi Tengah 20,0822 174,374		17T'/		0444		
Innor 1 mur 5,952 7,515 5,515 20,576 3,664 Ralimantan Barat 300,726 286,126 287,317 874,169 3,664 Kalimantan Tenggara 300,726 16,787 154,212 490,764 1,608 Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,608 Kalimantan Selatan 7,058 35,035 35,035 77,128 255 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 64,856 64,490 66,025 195,371 845 Sulawesi Tengah 87,066 67,931 67,631 87,196 2,729 Sulawesi Tenggara 34,674 31,818 46,541 113,033 348 Sulawesi Tenggara 336,613 352,248 1,078,279 4,886 Sulawesi Tenggara 34,674 31,818 46,541 113,033 348 Sulawesi 38,613 352,248 1,078,279 4,886					704/77	CK0'07
Bali/Nusa Tenggara 300,726 286,126 287,317 874,169 3,664 Kalimantan Barat 219,765 116,787 154,212 490,764 1,608 Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Timur 7,058 35,035 35,035 77,128 255 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 64,856 64,490 66,025 195,371 845 Sulawesi Utara 64,856 67,931 67,631 87,196 2,729 Sulawesi Tengah 87,066 67,931 67,631 172,000 5729 Sulawesi Tengara 34,674 31,818 46,541 113,033 348 Sulawesi Tenggara 34,674 31,818 46,541 113,033 348 Sulawesi 38,613 352,248 1,078,279 4,886 Mohuhn 7737 15,683 38,603 38,603 348 <td>071 170</td> <td>110</td> <td>///'CT</td> <td>Ta f</td> <td>CUC,11</td> <td></td>	071 170	110	///'CT	Ta f	CUC,11	
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Kalimantan Tengah 129,363 199,006 217,511 545,880 965 Kalimantan Selatan 226,225 154,673 162,030 542,928 1,684 Kalimantan 7,058 35,035 77,128 255 Kalimantan 582,411 505,501 568,788 1,656,700 4,512 Sulawesi Utara 64,856 64,490 66,025 195,371 845 Sulawesi Utara 67,931 67,632 195,371 845 Sulawesi Tengah 87,066 67,931 67,632 272,679 964 Sulawesi Tengah 200,822 174,374 172,000 547,196 2,729 Sulawesi Tengara 24,674 31,818 46,541 113,003 348 Sulawesi 387,418 338,613 352,248 1,078,279 4,886 Mahun 7737 15,683 15,683 38,603 348	71 1,897	4,676	7,317	10,027	12,301	9,528
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INDONESIA 3.715.709 3.279.796 3.207.280 10.202.785 41.577 47.315 58.090		146,982 11	11.190 14.426	18112

ealization, Actual Budgetary Consumption and Unit Cost of O&M for Swamp Development during 1989/90 to 1991/82	
Table 3.50 Re	

																																		:	
1 OTAL	11.128	10.280	8,428	9,851	9.757	9,529	10,631	11.250	9,785	•	•	ı	,	•	·		ı	•	'	•	•	9.626	10.214	9,563	11.233	9,862	•	,	13.000	13,000	13,000	1.	22,891	22,891	9.879
Progress	13,600	12,105	12,592	9,276	10,309	10,729	12,484	12,500	10,382	•	I	ı	ı	ł	•		•	1	١		1	11.863	12,090	12.576	12,496	12.173	•		13.000	13,000	13,000	1.	30.000	30,000	11.327
Progress	10,000	9,692	10:104	11,002	666'6	12,518	10,000	10,000	11.083	ı	ı	•	•	ı	J		•	'	•	1	1	966,6	9.994	10,000	1/6'6	966'6	'	,	,		,		24118	24,118	10.617
Progress	160'6	9,002	7,014	8,996	9,003	666'9	8,990		7,894	•	•	١	•	•	'n		,	ľ	'	• •	'	6.703	7.352	7.234	•	7,124	.,	•	,		••	,	9118	9,118	7.543
l otal	74	1,868	181	4,808	2.058	5,995	458	225	15,673	0	0	0	0	0	0	•	S	0	0	0	0	3,543	5.452	4.581	35	13,923	Ö	C	. 17	1	26	0	202	293	29.915
Progress	\$	718	8	1,992	732	2,172	196	125	6,015	0	0	0	0	0	0	•	þ	0	0	0	0	1.681	2.584	1.762	8	6,220	0	C	<u>, 6</u>	1 11	26	0	180	8	12,441
Progress I	25	677	36	1,959	665	1,898	157	100	5.517	0	0	0	0	0	0		c	0	0	0	0	1.046	1.948	1.328	2	4,476	0	c	0		0	0	8	8	10.075
Progress I	15	64	105	857	661	1,925	105	0	4,141	0	Ö	0	0	0	0		Ð	0	0	0	0	816	920	1,491	0	3,227	0	Ċ	0	0	0	0		ខ	7399
I otal	6,650	181 713	22, 187	488,068	210,935	629,107	43,080	20,000	1.601.740	0	0	0	0	0	0	¢	∍	0	0	0	0	368,068	533, 772	479.012	30,890	1,411.742	0	C	1.000	0001	2,000	0	12,800	12,800	3 028 282
Progress	2,500	59,315	3,653	214,745	71,008	202,447	15,700	10,000	579.368	0	0	0	0	0	0	¢	Ð	0	0	0	0	141,700	213,723	140.104	15,445	510,972	0	ç	1.000	1.000	2,000	0	6000	6,000	1 058 340 3
Progress	2.500	69,853	3,563	178.055	66,508	151,619	15,700	10.000	497,798	0	0	0	0	0	о	¢	>	0	0	C	0	104 639	194,910	132,800	15,445	447,794	0			0	0	0	3 400	3.400	948,992
Progress 1	1,650	52,545	14,971	95,268	73,419	275,041	11.680	0	524.574	0	0	0	0	0	0	¢	S	0	0	0	0	907 ICI	125139	206.108	Ó	452,976	Ģ	C	, c	0	0	0	3 400	3,400	980.950
Province	D.I.Ace'n	Sumatera Utara	Sumatera Barat	Riau	Jambi	Sumatera Selatan	Bengkulu	Lampung	Sumatera	D.K.I.Jakarta	Jawa Barat	Jawa Tengah	D.I.Jogyakarta	Jawa Timur	Jawa	;	Bali	Nusa Tenggara Barat	Nusa Tenggara Timur	Timor Timur	Bali/Nusa Tenggara	Kalimantan Rarat	Kalimantan Tencah	Kalimantan Selatan	Kalimantan Timur	Kalimantan	Sulawesi Utara	Sulanesi Tencah	Sulawesi Selatan	Sulawesi Tenggara	Sulawcsi	Maluku	Trian Tava	Maluku/Irian Jaya	INDONESIA
Code	11	12	13	4	15	16	17	18		31	32	33	34	35		i	21	23	23	2		G	8	3 (2	32		11	3	i ƙ	4		81	8	}	

Table 3.51 Realization, Actual Budgetary Consumption and Unit Cost of EOM during 1989/90 to 1991/92

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112624297181 5588 0225429728 588 0225429728 5685 02254 02542 02542 0254 0254 0254 0254	D.I. Aceh Sumatera Utara Sumatera Utara Sumatera Barat Riau Jambi Sumatera Selatan Bengkulu Lampung Sumatera D.K.I.Jakarta Jawa Barat	3,800 3,6515 26,985 0 61,748 61,748 78,830 207,878					Set Set	Progress				CTD CTP CLC	
	.).I. Aceh umatera Urara umatera Barat iau ambi ambi engkulu engkulu ampung umatera .K.I. Jakarta awa Barat	3,800 36,515 26,985 0 61,748 61,748 78,830 78,830 207,878		0							1105100	1105100	
	umatera Utara umatera Barat iau ambi engkulu engkulu ampung umatera X.I.Jakarta awa Barat	36,515 26,985 0 61,748 61,748 78,830 78,830 207,878	3,745	10,059	17,604	3	102	356	520	16.316	27.236	35.391	29.539
	umatera Barat Jau ambi engkulu engkulu ampung umatera X.I.Jakarta awa Barat	26,985 0 61.748 61.748 78,830 78,830 207.878	53.641	55,265	145,421	753	1,325	1.865	3,943	20,622	24.701	33.746	27.114
	iau ambi engkulu ampung umatera X.I.Jakarta awa Barat	0 61.748 61.748 78,830 207.878	39,557	40,057	106,599	603	1,040	I.224	2,867	22,346	26.291	30,556	26.895
	ambi umatera Selatan engkulu ampung umatera X.I.Jakarta awa Barat	0 61.748 0 78,830 207,878	0	0	0	0	0	0	0				1
	umatera Selatan engkulu ampung umatera X.I.Jakarta awa Barat	61,748 0 78,830 207,878	0	0	0	0	0	0	0	•	'ı	•	,
	engkulu ampung umatera).K.I.Jakarta awa Barat	0 78,830 207,878	85.511	88.239	235,498	147	2.324	2.724	6.521	23 855	27178	30 871	77 600
	ampung umatera S.K.I.Jakarta awa Barat	78,830 207,878	0	0	0	0	Ö	0	0			1	
	umatera .K.I.Jakarta awa Barat	207,878	104.930	113.691	297,451	9:44	2.612	3,435	1991	24 534	24 893	30.213	76 821
).K.I.Jakarta awa Barat		287,384	307.311	802,573	4,825	7,403	9,604	21,832	23.211	25.760	31,252	27,203
	awa Barat	0	0	0	0	0		0	Ö	•	ť	ı	•
	ſ	268,954	295 875	309.946	874 775	6 885	6 766	7 946	21 507	25,500	77 868	25627	24,690
	Jawa Tengah	158.102	212 638	200 236	21.1.2		6,06,5 6,06,5	0200	10.040	012 20	25,005	20,220	00110
	D I Inowakarta	2011/21	000112	000.20			1000					20000	501.74
	Lawa Timur	226 845	020 020	240.02		400	600 2	100 100	20.02	700,07	760'07	500015	766'07
			700070	0101010			1040	0000	106.07	1/+/27	2)8/2	566,67	124,07
, Su	EWEL	000,000	808,904	120,816	2,475,041	16,921	21,365	26,214	64,500	24,593	24,587	28,555	26,060
	Bali	0	0	0	C	C	C	с	C				•
	Nusa Tenggara Barat	20.693	22.193	22,193	65.079	463	205	712	1 767	275 00	26675	32 (82)	77150
2 83	Nusa Tenggara Timur	0	0	0	0	20	0	10	c	1		100/110	
-	Timor Timur	0	0	0	c	o c	Ċ	• C			ı		
щ	Bali/Nusa Tenggara	20.693	22,193	22.193	65 079	463	605	712	1 767	275 00	26 675	37 (82)	77150
	2					2			22.4		5	100,40	
	Kalimantan Barat	0	0	0	0	0	0	0	0	I	r		ı
	Kalimantan Tengah	0	0	0	0	Ó	0	0	0	,	,		•
	Kalimantan Selatan	15,300	24,400	23,700	63,400	394	677	720	1,791	25,752	27,746	30,380	28,249
2 7	Kalimantan Timur	0	0	0	0	0	0	0	0	•	•	•	1
м	Kalimantan	15,300	24,400	23.700	63,400	38	677	720	1,791	25.752	27,746	30,380	28,249
	Sulawesi Utara	C	0	c	C	ç	c	C	Ċ		I		
72 Si	Sulawesi Tengah	0		12.609	12,609		o c	490	007			30 575	20 575
	Sulawesi Selatan	48.073	64.934	77.147	190.154	1066	1 629	2.039	4774	271 00	25.027	067.90	200.00
74 Si	Sulawesi Tenggara	0	0	0	0	0	0	0	t C			201004	040,44
ŝ	Sulawesi	48,073	64,934	89,756	202,763	1,066	1,625	2,538	5,233	22,175	25,087	28.277	25,808
	Mahilai	c	c	¢	c	c	c	C	Ċ				
5 8 5 8) (2	· د	2		о ·) S	1	•	•	•
	inan Jaya	0	0	•	ō	0	0	0	0	•	•	1	•
Z	Maluku/Irian Jaya	0	•	0	0	0	0	0	0	E	ı	•	·
4	INDONESIA	979,994	1,267,875	1,360,987	3.608,856	23,669	31,666	39,788	95,123	24,152	24.976	29.235	26358
Source:	Source: Mid Term Review									-			

Table 3.52 Realization, Actual Budgetary Consumption and Unit Cost of EOM for Surface Irrigation during 1989/90 to 1991/92

Code	Province	1989/90 Progress	10 1990/91 1991/92 ss Progress Progres	1991/92 Progress	Total	1989/90 Progress	1990/91 Progress	1989/90 1990/91 1991/92 Total Progress Progress	Total	1989/90 Progress	90 1990/91 ess Progress	1991/92 Progress	Average
						ę	2		ł				
	D.I.Acch	3,800	3,745	60001	1/004	70	701	2	075	10,310	21.230	165.05	APC 67
12 SI	Sumatera Utara	32,815	44 491	44,525	121,831	658	1,071	1,539.	3,268	20,052	24,072	34.565	26,824
13 SI	Sumatera Barat	21,085	24,157	24,157	69,399	451	613	741	1,805	21,390	25,376	30.674	26,009
	Riau	0	0	Ö	0	0	0	0	0	'		•	
	Iambi	0	0	0	0	0	0	0	0	,	'	ł	
	Sumptara Calatan	15 738	16.601	001 21	48 968	112	410	£95	1 250	18178	74 697	37 868	75 507
	unintera octatan 		1 C			ì				2		2004	
	Bengkulu									' 00 v0			
18 L	Lampung	51.030	62,880	69,081	182,991	1.219	1,444	6/0/2	4,742	23,888,52	22.964	30.095	25,914
S	Sumatera	123,968	151.874	164,951	440,793	2,667	3,640	5,278	11,585	21,514	23,967	31,997	26,282
		C	ć	Ċ	¢	Ċ	. c	c	c				
	D.K.I.Jakarta	Ċ	0	0	5	5	> :	>	C	1	1	1.	•
	Jawa Barat	268,954	295.875	309,946	874,775	6.885	6,766	7,946	21.597	25,599	22.868	25.637	24 689
33 1	Jawa Tengah	158,102	277 638	299,336	735,076	3,908	6,962	610.6	19,949	24,718	25,076	30,330	27,139
	D I Inovakarta	24 149	25,399	25399	74,947	569		804	2.023	23.562	25.502	31,655	26 992
	Tawa Timir	736 845	270.050	285 346	790 743	555 5	v	8385	20 091	174 82	25.872	70 503	76.487
-,	Jawa (088,050	2022	720,516	140,014,2	176.01	COC'17	70,214	DA.	CKC 147	/90.47	CCC.97	non 97
		c	C	Ċ	с	C	с	c	Ċ			•	
						2							i T I
	Nusa Tenggara Barat	20,693	22,193	22,193	6/0,69	403	740	71/	1.76/	C/ 577	C/0'07	720725	751,122
R R	Nusa Tenggara Timur	c	0	0		5	5	5	o ·	•	•	,	
	Timor Timur	0	0	0	0		5	þ	0	•	•		
д	Bali/Nusa Tenggara	20,693	22,193	22.193	65,079	1 63	592	712	1.767	22,375	26,675	32.082	27,152
					•	. (C	•					
	Kalimantan Barat	o	0	o	0	Ð	5	Э	C	•	•	1	
	Kalimantan Tengah	0	•	0	0	0	0	0	0	•	•	1	
	Kalimantan Selatan	0	o	0	0	0	0	0	0	•	•	1	
	Kalimantan Timur	0	•	0	0	0	0	0	0	r	٠	,	
X	Kalimantan	0	0	0	0	0	0	0	0	ł		•	
							•						
	Sulawesi Utara	o	Ö	ວ	D.	0	5	D	C	•	•	•	
	Sulawesi Tengah	0	0	12,609	12,609	0	0	6 64	499 99	I	•	39. <i>5</i> 75	39,575
R S	Sulawesi Selatan	48.073	64,934	77,347	190,154	1.066	1,629	2.039	4,734	22,175	25.087	26.430	24,896
	Sulawesi Tenggara	0	Ö	0	0	0	0	0	0	I		ŀ	
S	Sulawesi	48,073	64,934	89,756	202,763	1,066	1.629	2,538	5,233	22,175	25.087	28,277	25,808
		c	¢	Ċ	c	C	Ċ	c	<				
	Matuku	þ	5	.	C	0	5	5	, S		•	1	
83 II	Irian Jaya	0	0	0	0	0	•	0	0	,	•	•	•
4	Maluku/Irian Jaya	0	0	0	0	0	0	•	0	•	•	•	·
5	NUDAFSIA	880.784	1 107 965	1 104 027	3 183 676	21117	900 10	34 742	83 (85	23 975	24 572	20 075	76 007
2100000		5											

Table 3.53 Realization, Actual Budgetary Consumption and Unit Cost of EOM for Swamp Development during 1989/90 to 1991/92

	LIOVILO	1 <i>9</i> 89/90 Progress	1990/91 Progress	1991/92 Progress	Total	1989/90 1990/91 1991/92 Tota Progress Progress Progress	1990/91 Progress	1991/92 Progress	Total	1989/90 Progress	1990/91 Progress	1991/92 Progress	Average
	DI Aceh		c		c	c		c	c	. '			
	Sumaters Utara	3 700	0216	10.740	23 590	° 8	420	326	675	25676	77 760	30354	78.614
5	Sumatera Barat	5.900	15.400	15.900	37.200	152	427	8 8	1.062	25.763	27.727	30.377	28,548
14	Riau	0	0	0	0	C	0	0	C	ł	•	. 1	
15	Jambi	0	0	0	Ö	0	Ö	0	0	ı	•	1	
16	Sumatera Selatan	46,510	68,910	71.110	186,530	1,196	1,914	2,161	5,271	25.715	27.775	30,390	28,258
1	Bengkulu	0	0	0	0	0	0	0	0				
18	Lampung	27,800	42,050	44,610	114,460	715	1.168	1.356	3,239	25,719	27.776	30.397	28.298
	Sumatera	83,910	135,510	142,360	361,780	2,158	3,763	4.326	10,247	25,718	27.769	30,388	28,324
*-4	D.K.I.Jakarta	Ö	0	0	0	0	0	0	Ó	I		t	
6	Jawa Barat	0	0	0	0		0	0	0	,	•	,	
33	Jawa Tengah	0	0	0	0	0	0	0	0	'	1	,	
4	D.I.Jogvakarta	0	0	Ó	0	0	0	0	0	,	ı	•	
ŝ	Jawa Timur	0	0	0	0	0	0	0	0		•	,	
	Jawa	0	0	0	0	0	0	0	0		•	,	
1	Bali	0	C	0	C	C	0	C	C			•	
52	Nusa Tenggara Barat	0	0	0	0	0	0	0	0	'	1	1	
'n	Nusa Tenggara Timur	0	0	0	0	¢	0	0	0	•	1	,	
4	Timor Timur	0	0	0	0	0	0	0	0	,	F	1	
	Bali/Nusa Tenggara	0	0	0	0	0	0	0	0	•	•	•	
61	Kalimantan Barat	0	0		0	0	0	0	0	I	•		
0	Kalimantan Tengah	0	0	0	0	0	0	0	0	,	•	•	
8	Kalimantan Selatan	15,300	24,400	23,700	63,400	394	677	720	1,791	25,752	27,746	30.380	28,249
4	Kalimantan Timur	0	0	0	0	0	0	0	0	r	L	•	
÷	Kalimantan	15,300	24,400	23.700	63.400	394	677	720	1,791	25,752	27,746	30,380	28,249
	Sulawesi Utara	0	0	. 0	0	J	0	0	0		•	•	
ы	Sulawesi Tengah	0	0	0	0	0	0	0	0	,	•	•	
þ	Sulawesi Selatan	0	0	0	0	0	0	0	0	ı	•	1	
4	Sulawesi Tenggara	0	0	0	0	0	0	0	0	,	'		
	Sulawesi	0	0	0	0	0	0	0	0	ŀ	ı	•	
H	Maluku	0	0	0	0	0	0	0	0	•	. 1	,	
83	Irian Jaya	0	0	0	0	0	0	0	0	1	ı	•	
	Maluku/Irían Jaya	0	0	0	0	0	0	0	ò	1	۱.	1	

	Average	560 560 575 860 861 861 723 817 817		1 1 1 1 1	518 514 372 1,665 516	932 932 1,349 1,188	807 807	455
2	,000/ha) 1991/92 Progress	1,918 1,082 4,082 556 4,009 4,009 752			267 385 302 1,279 347	932 932 1,188	565 565	574
Budgetary Consumption and Unit Cost of Upgrading of Swamp during 1989/90 to 1991/92	Unit Cost (Rp.1, X0 1990/91 ss Progress	#DIV/0! 1.152 1.152 1.152 1.500 1.500 950 861 861 567	1 1 1 1 1 1 1	i i i i i ₁	733 715 746 1,896 731		1,616 1,616	869
uring 1989/	Unit 1989/90 Progress	47 224 774 774 774 774 774 774 724 231 255 255			934 359 185 2,760 583		523 523	274
of Swamp d	lion Rp.) Total	2,522 4,262 9,683 5,288 5,288 27,839 27,839 11,952 71,952	000000	00000	7,511 9,786 4,482 2,498 24,277	0 466 1,079 1,545	0 6,455 6,455	104,229
Jpgrading (Consumption (Million 191 1991/92 To ress Progress	1,630 1,028 1,272 3,745 5,563 5,563 1,129 1,129 1,129 1,129 1,009	000000	00000	2,039 3,130 2,275 8,339 8,339	0 466 0 1,079 1,545	5,600 2,600 2,600 2,600	32,429
nit Cost of I	etary Consu 1990/91 Progress	752 2,194 2,194 2,882 2,659 2,659 2,155 2,155 20,474	000000	00000	3,393 5,506 2,075 1,327 12,301	00000	3,071 3,071	35,846
tion and U	Actual Budgetary C 1989/90 1990/ Progress Progre	140 2,1040 3,056 3,056 2,104 2,142 3,533 3,533	000000	00000	2,079 1,150 132 276 3,637	00000	0 784 784	35,954
y Consump	T otal	4,500 6,389 11,400 11,100 77,020 77,020 17,520 172,520	000000	00000	14,500 19,031 12,052 1,500 47,083	500 800 1,300	0 8,000 8,000	228,903
al Budgetar	1 (ha) 1991/92 Progress	850 950 5440 5,440 3,000 10,000 10,000 3,000 10,000 3,00000000	000000	00000	7,644 8,131 7,537 700 24,012	500 800 1,300	0 4,600 4,600	56,452
Realization, Actus	l Realization 1990/91 Progress	650 1,905 1,905 1,921 2,800 3,800 3,800 3,800 22,496	000000	00000	4,631 7,700 3,800 700 16,831	00000	0 1,900 1,900	41,227
	Physical 1989/90 Progress 1	3,000 3,534 9,400 3,900 6,000 55,600 710 123,484	000000	00000	2,225 3,200 715 6,240	00000	0 1,500 1,500	131,224
Table 3.54	Province	D.I.Aceh Sumatera Utara Sumatera Barat Riau Jambi Sumatera Selatan Bengkulu Lampung Sumatera	D.K.I.Jakarta Jawa Barat Jawa Tengah D.I.Jogyakarta Jawa Jawa	Bali Nusa Tenggara Barat Nusa Tenggara Timur Timor Timur Bali/Nusa Tenggara	Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Kalimantan Timur Kalimantan	Sulawesi Utara Sulawesi Tengah Sulawesi Selatan Sulawesi Tenggara Sulawesi	Maluku Irian Jaya Maluku/Irian Jaya	INDONESIA Source: Mid Term Review
	Code	100420808	888888 108888 2087 2087 2087 2087 2087 2087 2087	2887	2882	2264	82 83	Sourc

	Average	860 867 867 872 872 873 873) (i k i i i)		430 433 1,665 492	932 1,349 1,188	807 807	436
o 1991/92	1,000/ha) 1991/92 Progress	1,918 1,082 424 			335 302 331 331 1,279 398	932 1,349 1,188	565 565	712
g 1989/90 t	Unit Cost (Rp.1 0 1990/91 ss Progress]	1,1 <i>57</i> 1,1 <i>52</i> 1,1 <i>52</i> 1,1 <i>52</i> 2,78 567 567	1 4 1 4 3 3	1 1 1 1 1	415 496 182 182 1,896 541		1,616 1,616	694
Budgetary Consumption and Unit Cost of Upgrading of Non-Tidal Swamp during 1989/90 to 1991/92	Uni 1989/90 Progress	2244 3,060 32, 224 33,050 231 241			869 596 185 2,760 647		233 '	262
n-Tidal Sw	(Million Rp.) Total	2,522 3,276 3,276 3,276 2,526 13,556 13,556 29,989 29,989	000000	00000	3,035 3,345 9,498 9,498 9,938	0 466 1,079 1,545	0 6,455 6,455	47,925
ding of No	Consumption (Mi (91 1991/92 ess Progress	1,630 1,272 1,272 1,129 9,068 9,068	000000	00000	938 884 885 895 3,479	0 466 1,079 1,545	0 2,600 2,600	16,692
st of Upgra		752 2,194 0 0 695 2,155 5,796	000000	00000	1,467 1,467 164 1,327 4,942	00000	0 3,071 3,071	13,809
nd Unit Co	Actual Budgetary 1989/90 1990 Progress Progr	2,1040 1,1000 1,10000 1,100000000	000000	00000	630 477 132 132 1,515	00000	0.487 1880 0.487	17,424
umption a	Total	64,500 64,500 64,77 7,389 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,5000 64,50000 64,50000 64,5000000000000000000000000000000000000	000000	00000	7,060 7,731 3,915 1,500 20,206	500 500 800 1,300	8,000 0 8,000 0	109,945
setary Cons	zation (ha) 1 1991/92 ss Progress	8 1 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000000	00000	2,804 2,931 700 8,735 8,735	500 500 1,300	0 600 600 600	23,435
ctual Budg	al Realizatio 1990/91 Progress	1,905 8,800 8,800 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,850 8,500	000000	00000	3,531 4,000 900 9,131	00000	0 1,900 1,900	19,886
Realization, Actual]	Physical Reali 1989/90 1990/9 Progress Progree	3,000 9,534 9,534 0,5340 0,53400000000000000000000000000000000000	000000	00000	725 800 715 2,340	00000	0 1,500 1,500	66,624
Table 3.55 Rt	Province	D.I. Aceh Sumatera Utara Sumatera Barat Riau Jambi Sumatera Selatan Bengkulu Lampung Sumatera	D.K.I.Jakarta Jawa Barat Jawa Tengah D.I.Jogyakarta Jawa Timur Jawa	Bali Nusa Tenggara Barat Nusa Tenggara Timur Timor Timur Bali/Nusa Tenggara	Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Kalimantan Timur Kalimantan	Sulawesi Utara Sulawesi Tengah Sulawesi Selatan Sulawesi Tenggara Sulawesi	Maluku Irian Jaya Maluku/Irian Jaya	INDONESIA Source: Mid Term Review
	Code	10011018	37 4 3 3 3 1 37 4 3 3 3 1	22882	2222	2284	82	Sourc

	1				00414		3 8 1	տ
	Average	860 - 1 38760 - 1 877 - 387			570 570 421 84			47
1991/92	1,000/ha) 1991/92 Progress	613 - 75888 - 1			227 432 289 318			477
Realization, Actual Budgetary Consumption and Unit Cost of Upgrading of Tidal Swamp during 1989/90 to 1991/92	Unit Cost (Rp.1)) 1990/91 1 s Progress F	1,500 950 1,024 1,076	1 1 1 1 1	1 1 1 1 1	1,751 952 659 956			1,033
mp during	Uni 1989/90 Progress	784 1771 242 270		, , , , ,	286 286 280 280 280	1 1 1 1 1	1 1 1 1 .	287
Tidal Swa	(Million Rp Total	9,683 26,992 1,963 1,963 1,963 1,963 1,963	000000	00000	4,476 6,441 3,424 0 14,341	00000	000	56,304
grading of	Consumption (<u>N</u> 91 1991/92 ess Progress	0 3,745 5,569 5,563 10,877	000000	00000	1,101 2,246 1,513 4,860	00000	000	15,737
Cost of Up	retary Cons 1990/91 Progress	2,882 9,137 9,137 0,137 0,137 0,137 0,137	000000	00000	1,926 3,522 1,911 0 7,359	00000	000	22,037
and Unit	Actual Budgetary 1989/90 1990/ Progress Progr	0 3,056 1,060 12,292 15,408	000000	00000	1,449 673 0 2,122	00000	000	18,530
asumption	Total A	0 11,261 11,100 692,081	000000	00000	7,440 11,300 8,137 0 26,877	00000	000	118,958
getary Col	on (ha) 1991/92 Progress	5,440 5,440 2,300 10,000 17,740	000000	00000	4,840 5,200 5,237 0 15,277	00000	000	33,017
Actual Bud	alizatio //91 ress	0 1,921 8,920 8,920 13,641	000000	00000	1,100 3,700 2,900 0 7,700	00000	000	21,341
ealization,	Physical Re 1989/90 199(Progress Prog	3,900 6,000 50,800 60,700 60,700	000000	00000	1,500 2,400 3,900	00000	000	64,600
Table 3.56 R	Province	D.I.Aceh Sumatera Utara Sumatera Barat Riau Jambi Sumatera Selatan Bengkulu Lampung Sumatera	D.K.I.Jakarta Jawa Barat Jawa Tengah D.I.Jogyakarta Jawa Timur Jawa	Bali Nusa Tenggara Barat Nusa Tenggara Timur Timor Timur Bali/Nusa Tenggara	Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Kalimantan Timur Kalimantan	Sulawesi Utara Sulawesi Tengah Sulawesi Selatan Sulawesi Tenggara Sulawesi	Maluku Irian Jaya Maluku/Irian Jaya	INDONESIA Source: Mid Term Review
	Code	1218142378	35 33 333 35 33 3321	8888	19882	12 12 12 12 12 12 12 12 12 12 12 12 12 1	82	Sourc

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	h /ha) verage	\$\$;&;	\$ §	64 888 889	399 888 888	396 308 373 373 373	308 197 273 301 301	367 555 499 499	265 520 415 455 455	511 511	458
	nd Rupiah 991/92 Av	747	082 082	552	88 88	455 611	422 327 368 397	333 570 537 533 533 533 533 533 533 533 533 533	686 726 605 657 661	364 575 575 552	801 777 789	586
16/066	e (Thousan 990/91 195	473 419	88 8	797 787	27	451 461	285 390 390 390 390 390 390 390 390 390 390	300 220 225	508 530 50 50 50 50 50 50 50 50 50 50 50 50 50	380 469 474 464	423 423	441
and Development during 1989/90 to 1990/91	Unit Price 1989/90 15	444 704	368	132 382	187 443	191 319	363 292 378 378 357	300 313 112 112	219 354 337 280	51 324 368 368 368	411 364 128	327
during 1	Rupiah) Total	10,924 6,664	6,421	4,018 1018	3,026 8,758	9,079 53,193	0 1,760 1,760 4,574 14,044	185 2,579 3,664	3,667 6,152 6,247 18,204 18,204	2,179 11,750 4,026 7,378 25,334	1,387 602 1,990	116,429
opment	(Million R 991/92	5,167 3,674	2,911	1,8,1 4,28,1	3,339 3,340	4,515 27,254	0 762 762 565 3,572	50 302 598 2,219	1,710 3,585 4,022 1,123 10,439	1,548 3,887 1,541 3,020 9,995	432 834 834 834	54,313
nd Devel	d Amount [990/91	3,909	1,978		0 4,011	3,655 17,426	0 457 296 1,979 4,651	90 996 0 0	536 1,798 1,798 682 4,458	495 3,691 543 2,633 7,362	¥°¥	35,527
	Contracted . 1989/90 19	1.017	1,531	849	1,408 1,408	909 8,514	0 3,820 541 137 1,323 5,821	3780 313 3580 3580 3580 3580 3580 3580 3580 358	1,421 1,126 427 334 3,308	136 4,172 1,943 1,725 7,977	411 200 611	26,589
Amount of Contract for	T otal	19,358 13,266	13,291	8,278	7,439 15,423	22,781	0 5,716 1,680 11,625 37,241	600 1,529 7,854 2,191 12,174	9,979 10,893 11,308 4,282 36,462	8,213 22,618 9,707 15,102 55,640	2,825 1,068 3,892	254,488
d Amoun	Area (ha) (991/92	6,922 6.0 <i>5</i> 7	3,731	3,357	3,756 4,910	9,932 44,639	3,490 2,330 3,000 9,000	150 529 2,319 1,132 4,130	2,492 4,935 6,645 1,708 15,780	4,250 6,046 5,258 8,250 18,094	539 518 1,057	92,700
Area and	ontracted / 1990/91	8,270 4,709	5,403	2,696	0 7,334	8,099 37,780	4,218 1,530 1,042 5,125 11,915	300 0 4,535 0 4,835	1,004 2,775 3,396 1,673 8,848	1,301 7,865 1,159 5,555 1,5880	1,286 0 1,286	80,544
Physical	Ct 1989/90 1	4,166 2,500	4,157	2,224	3,683 3,179	4,750 26,660	10,512 1,856 458 3,500 16,326	150 1,000 1,059 3,209	6,483 3,183 1,267 901 11,834	2,662 8,707 6,000 4,297 21,666	1,000 550 4,759	81,244 X,Jun.199
Table 3.57	Province	D.I. Aceh Sumatera Utara	Sumatera Barat	Jambi	Sumatera Selatan Bengkulu	Lampung Sumatera	D.K.I. Jakarta Jawa Barat Jawa Tengah Yoguyakarta Jawa Timur Jawa	Bali N.T.B. N.T.T. Timor Timur Bali/Nusa Tenggara	Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Kalimantan Timur Kalimantan	Sulawesi Utara Sulawesi Tengah Sulawesi Selatan Sulawesi Tenggara Sulawesi Tenggara	Maluku Irian Jaya Maluku and Irian Jays	INDONESIA 81,244 1 and Land Development, DGFCA, Jun 1
	Code	-10			91			22822	2882	2284	82 82 82	1 and La

tent during 1989/90 to 1990/91 Table 3.57 Physical Area and Amount of Contract for Land Developm

Annex G

Small Scale Irrigation (Irigasi Desa)

ANNEX G

SMALL SCALE IRRIGATION (IRIGASI DESA)

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Text

1. General

In addition to the some million ha of PU irrigation schemes, there are about one million ha farmer-operated irrigation schemes, so called "Irigasi Desa". Ministry of Agriculture (MoA) has supported these irrigation schemes through credit, and physical development including planning, land reclamation, small canal construction and so on. Today, custodian of those "Irigasi Desa" has been changed to Ministry of Public Works (MoPW) from MoA. Accordingly MoPW intend to categorized those farmer-operated irrigation schemes into Irigasi Kecil (Small Scale Irrigation Scheme). Then naming of those schemes may change to "Small Scale Irrigation" from "Irigasi Desa" or "Village Irrigation". In this Annex, however former name of "Irigasi Desa" is used to avoid confusion from PU's small scale irrigation system.

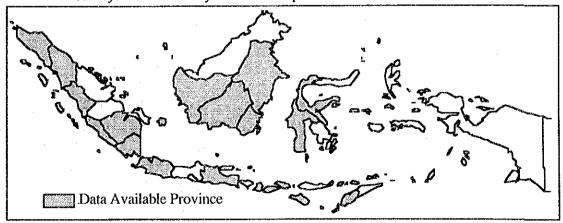
To clarify the exiting condition of Irigasi Desa, we FIDP Team scrutinized so far available data and information. The result of latest inventory survey carried out by DOI-I in last fiscal year is assumed to have most accurate information but not computerized information. The Team then started with computerizing work and made analysis work for revealing the existing condition of Irigasi Desa. This Annex show the result of analysis and its procedure.

2. Data

Inventory survey for the Irigasi Desa has been carried out by two agencies namely Ministry of Agriculture (MoA) and Ministry of Public Works (MoPW). Only MoPW's data covered whole Indonesia. Those data are available in following data source or office.

Data-1. Data from inventory survey carried out by MoPW-DOI-I in 1992 (18 Provinces)

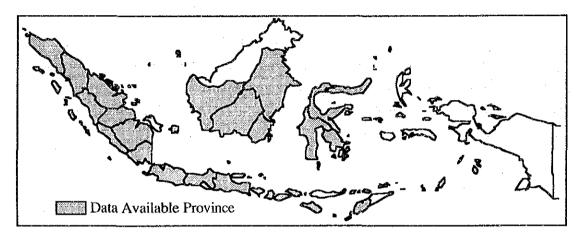
This is latest inventory data. Survey was carried out in last fiscal year of 1992/93 covering 18 provinces as shown below. Table 2.1 shows the result of survey. Full inventory data are compiled in Data Book.



Data-2

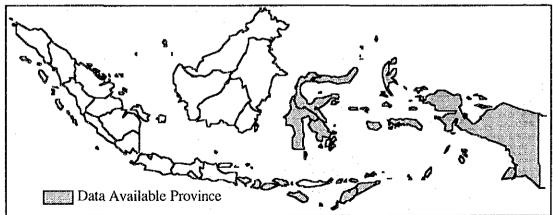
"Rekapitulasi Daerah Irigasi Desa dan SawahTadah Hujan", MoPW, DGWRD, DOI-I,September 1982 (23 province)

This is the first inventory survey on Small Scale Irrigation schemes carried out in September 1982 by Sub-Directorate of Operation and Maintenance, Directorate of Irrigation I, DGWRD in cooperation with the provincial offices. The survey which was checked in 1983 and printed out in April 1984. The inventory survey results was attached as Table 2.2 herein and show that the number of irrigation schemes was 25,300, and the designed area (Baku) and irrigated area (Functional Area) 1,885,700 ha and 1,036,600 ha respectively in 23 provinces as shown below.



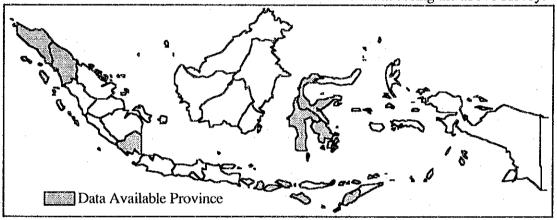
Data-3 Second Integrated Irrigation Sector Project (IISP - II), MoPW, ADB, September 1992. (10 provinces)

Recent studies on the Second Integrated Irrigation Sector Project (IISP - II) by ADB collected the data on village irrigation covering in the eastern region (10 provinces; Bali, Nusa Tenggara, Timor Timur, Sulawesi, Maluku and Irian Jaya as shown below) in 1992. The data were mainly collected from PRAS and summarized in Table 2.3.



Data-4 "Feasibility Study for Land Development Project Improvement of Land and Irrigation System at Farm Level", MoA, JICA, October 1992, (8 provinces)

The feasibility study for the land development project (improvement of land and irrigation systems at farm level) was carried out by JICA for the Directorate General of Food Crop Agriculture (DGFCA) during the period from March 1991 to October 1992. The study included the inventory survey of village irrigation in 3 provinces (Sumatera Utara, Sulawesi Sulatan and Nusa Tenggara Barat) and assisted the inventory survey done by the Provincial Agricultural Services (PRAS) in 5 province (Aceh, Lampung, Sulawesi Tengah, Sulawesi Tenggara and Nusa Tenggara Timur). The survey results are shown in Table 2.3 with the collected data for Jambi and Jawa Barat during the above survey.



3. Estimation of Irrigation Area

Irrigation area of Irigasi Desa was estimated based on the mainly DOI-I's data (Data-1 & Data-2) and other inventory data were used for those provinces which has no data in Data-1 and Data-2.

3.1 DOI-I's Inventory data

As can be seen in Table 2.1 (Data-1), 9 Provinces have no information and 4 Provinces not cover all Cabang Dinas.

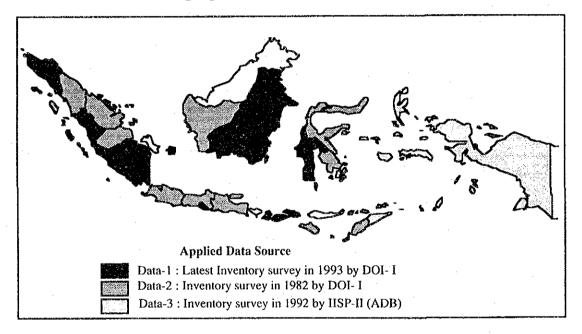
After checking all the data in detail, we found that NTT has complete data but doubtful. Then the result of Data-1 was applied to following 13 Provinces.

Aceh (11)	Yogyakarta(34)	Bali (51)	Kalimantan Barat (61)	Sulawesi Selatan (73)
Sumatera Barat(13)		NTB (52)	Kalimantan Tengah (62)	
Sumatera Selatan (16)	······································		Kalimantan Selatan (63)	
Bengkulu(17)	·······		Kalimantan Timur (64)	······································
Lampung(18)			,	

Irrigation area of all remaining Provinces except Timor Timur, Maluku and Irian Jaya was applied the Data-2 results. Applied Provinces are following 11 Provinces.

 Sumatera Utara (12)	Jakarta (31)	NTT (53)	Sulawesi Utara (71)
Riau (14)	Jawa Barat (32)		Sulawesi Tengah (72)
Jambi (15)	Jawa Tengah (33)		Sulawesi Tenggara (74)
	Jawa Timur (35)		

As for the remaining three Provinces ie. Timor Timur, Maluku and Irian Jaya, only Data-3 has the information. Data source to be applied to estimate the area of irrigation in each Province, then fixed as shown in following Figure.



3.2 Area of Irigasi Desa

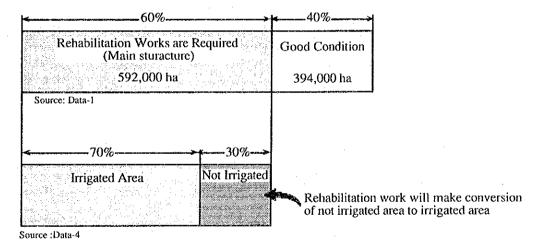
The area of present Irigasi Desa system in the whole Indonesia is estimated at about 986,000 ha based on the aforementioned three inventory data. Table 2.4 shows the estimated Irigasi Desa area of each Province and summarized below.

Area of Irigasi	Desa
Region	Area (ha)
Sumatera	312,620
Jawa	329,306
Bali/Nusa Tenggara	139,057
Kalimantan	40,885
Sulawesi	157,794
Maluku/Irian Jaya	6,349
INDONESIA	986,011

3.3 Condition of Present Irigasi Desa System

Data-1 include condition of structures and canals as well as acreage of the system. According to this inventory information, about 495,000 ha or 60 % of system have damaged intake structure out of 858,000 ha of total area in this inventory. Applying this damaged ratio to the estimated Irigasi Desa area of about 986,000 ha, it may be said that about 592,000 ha of system may require rehabilitation works of intake structure. These area may have water shortage problem and some portion of area may not received any water from the canal. The proportion of not irrigated area to the required rehabilitation area is to be estimated at 30 % referring to the information of Data-4.

Above discussion can be illustrated as shown below.



3.4 Consideration

(1) Data Incompleteness

As shown in Table2.1, new inventory survey does not cover the whole Indonesia. This data incompleteness make difficulty to grasp the present condition of Irigasi Desa. Then supplemental inventory survey works are required to accomplish the "Inventory Survey for Village Irrigation Scheme". Following 14 Provinces are needed to do supplemental inventory survey.

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No.	Province Name (Code)
1	Sumatera Utara (12)
2	Riau (14)
3	Jambi (15)
4	Jakana (31)
5	Jawa Barat (32)
6	Jawa Tengah (33)
7	Jawa Timur (35)
8	NTT (53)
9	Timor Timur (54)
10	Sulawesi Utara (71)
11	Sulawesi Tengah (72)
12	Sulawesi Tenggara (74)
13	Maluku (81)
14	Irian Jaya (82)

(2) Data Accuracy

There are some inaccurate data such as;

- Total irrigated area is two or three times of the total irrigation area surveyed by CBS.
- Duplicated scheme name
- Duplicated with PU's irrigation scheme
- Too many same area's scheme within a Kabupaten.
- Definition of Area of Irrigation is not clear, i.e. survey results is actually
 - irrigated area or designed area.

Data needs checking works to clear above matters.

(3) Review Works

Our estimation is standing on so far available data, then all our estimation figure should be reviewed as soon as possible upon completion of supplemental inventory survey and data checking works.

4. Performance in Repelita V

At present, the rehabilitation of existing Irigasi Desa schemes has been mainly implemented through the budget of DGFCA, Ministry of Agriculture (APBN) and the budget of the provincial Government (APBD). Tables 4.1 and 4.2 show the progress of the rehabilitation program of Irigasi Desa schemes carried out by DGFCA in Repelita V and summarized as follows; These tables showed that DGFCA assisted the rehabilitation of Irigasi Desa of about 310 places and 24,000 ha using 900,000,000 Rupiah for 4 years during 1989/90 to 1992/93.

Province/Island		39/90 ctual		90/91 ctual		991/92 Actual		92/93 Ictual	Т	otal
	Nos.	Area ha	Nos.	. Area ha	No	s. Area ha	No	os. Area ha	Nos.	Area ha
Sumatera	3	310	12	1,115	13	1,693	56	2,956	84	6,074
Jawa	11	643	15	758	6	586	- 33	2,212	65	4,199
Bali/Nusa Tenggara	7	644	9	766	11	2,276	28	1,164	55	4,850
Kalimantan	2	140	8	417	10	743	32	2,905	52	4,205
Sulawesi	5	439	6	375	7	389	- 39	3,333	. 57	4,536
Maluku/Irian Jaya	0	0	0	0	0	0	0	0	0	0
INDONESIA	28	2,176	50	3,431	47	5,687	188	12,570	313	23,864

Numbers and Area of Rehabilitation of Village Irrigation in Repelita V

Source : Directorate of Land Rehabilitation and Development, DGFCA

Budget Used for Rehabilitation of Village Irrigation (APBN)

				Uni	t: Rp. million
Province/Island	1989/90 Actual	1990/91 Actual	1991/92 Actual	1992/93 Actual	Total
Sumatera	9.3	44.8	59.6	131.4	245.1
Jawa	33.7	47.9	22.8	112.5	216.9
Bali & Nusa Tenggara	16.1	35.3	46.1	73.0	170.5
Kalimantan	0.0	43.8	46.2	23.0	113.0
Sulawesi	18.6	22.7	41.1	69.0	151.4
Maluku & Irian Jaya	0.0	0.0	0.0	0.0	0.0
INDONESIA	77.7	194.5	215.7	408.9	896.8

Source : Directorate of Land Rehabilitation and Development, DGFCA

5. Necessity of Rehabilitation

There are about one million ha of irrigation systems at farmers' level in the country as estimated in Section 3 which are constructed and maintained by farmers themselves to irrigate their lands. It is recognized that these Irigasi Desa systems play a significant role in meeting country's food requirements and in supporting lives of the rural population.

However, many of such farmers' irrigation systems at farm level have been damaged and not functioning well nor maintained well. The irrigation schemes with an area less than 150 ha under DGWRD have been handed over to the farmers' groups after improving the systems by rehabilitation, efficient O&M, special maintenance, etc. It is pressing requirement to improve also irrigation systems at farm level in order to increase agricultural production, expand employment opportunity, raise farmers' income, and improve welfare of the rural population.

As mentioned in Section 3.3, about 60% or 600,000 ha of existing area have water shortage problem due to damage of irrigation facilities. These facilities needs urgent rehabilitation for increasing farmer's income and its high cost performance.

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Tables

No.	Province	Cabang Dinas/Kabupaten Irr. Region	Code No.	Name	Nos.of Scheme	Area (ha)
i	D.I. Aceh	Pengairan I	1106	Aceh Besar	11	1,25
	· · · ·	Pengairan II	1107	Pidie	19	16
		Pengairan III	1108	Sigli Aceh Utara	10 27	38
		Pengairan IV	1108	Aceh Timur	8	3,58 1,10
		Pengairan V	1105	Aceh Tengah	28	1,97
		Pengairan VI	1105	Aceh Barat	123	34,96
		Pengairan VII	1101	Aceh Selatan	33	2,20
			1106	Aceh Tenggara	-	
	Total		1109	Cabang Calang	259	45,62
2	Sumatera Utara		1201	Deli Serdang		
-	5400000		1202	Langkat	23	1,50
			1203	Tanah Karo	90	3,89
			1204	Dairi	67	3,45
			1205	Simalungun	67	5,50
			1206	Asahan	22	8,32
	1. A.		1207	Labuahan Ratu	20	3,42
			1208 1209	Tapanuli Utara Tapanuli Selatan	- 38	2 50
			1210	Tapanuli Tengah	28	3,584 3,632
			1211	Nias	43	2,65
	Total				398	35,97
3	Sumatera Barat		1301	Lubuk Sikaping	726	12,948
			1302	Bukit Tinggi	93	4,860
			1303	Payakumbuh	502	0.60
			1304 1305	Batu Sangkar Padang	593	8,59
			1305	Solok	217	10,72
			1307	Sijunjung	135	78
			1308	Painan	245	11,34
	Total	·		·	2,009	49,250
4	Riau		1401	Kodya Pekanbaru	N.A	N.A
			1402	Kampar	N.A	N.A
			1403 1404	Indragiri Hulu Bengkalis	N.A	N.A
			1404	Kepulauan Riau	N.A N.A	N.A N.A
		· · · · · · · · · · · · · · · · · · ·				
2	Jambi		1501 1502	Bungo Tebo Sarongun Bangko	N.A N.A	N.A N.A
			1502	Kerinci	N.A	N.A
				· · · · · ·		
6	Sumatera Selatan	Pengairan Mura I	1601	Musi Rawas	4	790
		Musi Rawas II Pengairan Dati II Lahat	1608 1604	Musi Rawas Lahat	34 316	7,393
		Lahat	1604	Lahat	46	33,74(3,419
		Dati II Bangka	1602	Bangka	27	4,230
		Pengairan	1608	Dati II Belitung	12	610
		Pengairan OKU I	1604	Ogan Komering	81	8,396
		Pengairan Dati II	1603	Muara Enim	28	3,640
	Total	the second s	1610	Kodya Palembang	548	62,218
	Bengkulu	Pengairan Bengkulu Selatan	1701	Bengkulu Selatan	105	8,393
7	DongAutu	Pengairan Arga Makmur	1702	Bengkulu Utara	47	4,312
7		Pengairan Curup	1703	Rejang Lebong	50	3,635
7					202	16,340
7	Total	.				
	Total Lampung	Cabang Palas	1802	Lampung Selatan	31	
		Cabang Palas Pengairan Lampung Utara	1805	Lampung Utara	72	5,974
		Cabang Palas Pengairan Lampung Utara Pengairan Pring Sewu	1805 1801	Lampung Utara Lampung Selatan	72 14	5,974 10,651
	Lampung	Cabang Palas Pengairan Lampung Utara	1805 1801 1803	Lampung Utara	72 14 23	5,974 10,651 10,650
		Cabang Palas Pengairan Lampung Utara Pengairan Pring Sewu	1805 1801 1803	Lampung Utara Lampung Selatan Lampung Utara	72 14	5,974 10,651 10,650
8	Lampung	Cabang Palas Pengairan Lampung Utara Pengairan Pring Sewu	1805 1801 1803 1804 3171	Lampung Utara Lampung Selatan Lampung Utara Cabang Bandar Jaya Jakarta Selatan	72 14 23 140 0	5,974 10,651 10,650 <u>38,156</u> 0
8	Lampung Total	Cabang Palas Pengairan Lampung Utara Pengairan Pring Sewu	1805 1801 1803 1804 3171 3172	Lampung Utara Lampung Selatan Lampung Utara Cabang Bandar Jaya Jakarta Selatan Jakarta Timur	72 14 23 140 0 0	5,974 10,651 10,650 <u>38,156</u> 0 0
8	Lampung Total	Cabang Palas Pengairan Lampung Utara Pengairan Pring Sewu	1805 1801 1803 1804 3171 3172 3173	Lampung Utara Lampung Selatan Lampung Utara Cabang Bandar Jaya Jakarta Selatan	72 14 23 140 0	10,881 5,974 10,651 10,650 38,156 0 0 0 0 0 0 0 0 0 0

Tabel 2.1 Inventory Data on Irigasi Desa by Province Based on the Inventory Survey by DOI-I in 1992

	Province	Cabang Dinas/Kabupaten Irr. Region	Code No.	. Name	Nos.of Scheme	Area (ha)
10	Jawa Barat	Pengairan Bandung (+Kodya)	3207	Bandung	1,148	34,8
	Juna Dalat	Pengairan Serang	3201	Serang	71	6,5
		Pengairan Tanggerang	3203	Tanggerang	35	4,5
		Pengairan Bogor	3204	Bogor	571	25,7
		Pengairan Sukabumi	3205	Sukabumi	961	44,4
		Pengairan Cianjur	3206	Cianjur	535	6,4
		Pengairan Garut	3208	Garut	1,091	38,2
		Pengairan Tasikmalaya	3209	Tasikmalaya	857	37,4
		Pengairan Ciamis	3210	Ciamis	917	28,3
		Pengairan Indramayu Barat	3213	Indramayu Barat	-	-
		Pengairan Indramayu Timur	3214	Indramayu Timur	- .	-
		Pengairan Rentang	3215	Rentang		- 10 4
		Pengairan Pandeglang	3216	Pandeglang	257	19,6
		Pengairan Lebak/Rangkas Bitung	3217	Lebak/Rangkas B.	305	24,2
		Pengairan Sumedang	3218	Sumedang	698	14,3
		Pengairan Majalengka	3219	Majalengka	-	
		Pengairan Cirebon	3220	Cirebon	6	5
		Pengairan Kuningan	3221	Kuningan	335	5,7
		Pengairan Induk Tarum Barat II	3251	Induk Tarum B.II	-	-
		Pengairan Cikarang	3252	Cikarang	•	-
		Pengairan Lemah Abang	3253	Lemah Abang	-	-
		Pengairan Induk Tarum Barat I	3254	Induk Tarum B.I	-	-
		Pengairan Cipaminkis	3255	Cipaminkis	-	-
		Pengairan Rengas Dengklok	3256	Rengas Dengklok	-	-
		Pengairan Telagasari	3257	Telagasari	-	-
		Pengairan Purwakarta	3258	Purwakarta	-	-
		Pengairan Induk Tarum Timur	3259	Induk Tarum T.	-	-
		Pengairan Jatisari	3260	Jatisari	+	-
		Pengairan Binong	3261	Binong	-	-
		Pengairan Patrol	3262	Patrol	•	-
		Pengairan Subang	3263	Subang	-	-
		Pengairan Pompa Curug	3264	Pompa Curug		-
	Total	Pengairan Jitu Walahar	3265	Jitu Walahar	7,787	291,2
11	Jawa Tananh		3333	Malahayu	N.A	N
11	Jawa Tengah		3334	Pemali Hulu	N.A	Ň
			3335	Pemali Hilir	N.A	Ň
			3336	Gung		٢
			3336 3337	Gung Comal	N.A	
			3337	Comal	N.A N.A	1
			3337 3338	C o m a l Sengkarang	N.A N.A N.A	1
			3337 3338 3339	C o m a l Sengkarang Kupang Sambong	N A N A N A N A	1 1 1
			3337 3338 3339 3340	C o m a l Sengkarang Kupang Sambong B o d r i	N.A N.A N.A N.A N.A	ז ז ז ז
			3337 3338 3339 3340 3341	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu	N.A N.A N.A N.A N.A N.A	1 1 1 1 1
			3337 3338 3339 3340 3341 3342	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir	N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu	N.A N.A N.A N.A N.A N.A N.A	יז ה ה י י י י י
	·		3337 3338 3339 3340 3341 3342 3343 3343	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i	N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3344 3345	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hillir Progo Hulu L u s i Serang Hulu	N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1
	·		3337 3338 3339 3340 3341 3342 3343 3344 3345 3346	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir	N.A N.A N.A N.A N.A N.A N.A N.A	1 1 7 7 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3347 3348	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3347 3348 3349	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs.Wonogiri	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3347 3348	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3347 3348 3347 3348 3349 3350 3351	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3345 3346 3347 3348 3349 3350	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3346 3347 3348 3349 3350 3351 3351	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs.Boyolali	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs.Wonogiri Bs.Klaten Bs.Karanganyar Bs.Boyolali Sragen	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353 3354	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs.Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs.Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3340 3341 3342 3343 3344 3345 3346 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355 3356	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs. Boyolali Sragen Bogowonto Luk Ulo	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3346 3347 3348 3349 3350 3351 3352 3353 3355 3356 3357	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs.Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Tengah	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355 3356 3357 3358 3359	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs.Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Hulu Serayu Hulir Citanduy Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
12	Yogyakarta		3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3346 3347 3348 3347 3348 3349 3350 3351 3352 3353 3354 3355 3356 3357 3358 3359	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs. Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Tengah Serayu Hilir Citanduy Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
12	Yogyakarta		3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355 3356 3357 3358 3359	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs. Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Hulu Serayu Hulu Serayu Hulu Serayu Hilir Citanduy Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	ר ח
12	Yogyakarta		3337 3338 3339 3340 3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355 3355 3356 3357 3358 3359 3401 3402 3403	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hulu L u si Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs. Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Hulu Serayu Hulu Serayu Hilir Citanduy Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
12	Yogyakarta		3337 3338 3339 3340 3341 3342 3343 3344 3344 3345 3346 3346 3347 3348 3349 3350 3351 3352 3353 3354 3355 3356 3357 3358 3359	C o m a l Sengkarang Kupang Sambong B o d r i Tuntang Hulu Tuntang Hilir Progo Hulu L u s i Serang Hulu Serang Hilir Muria Barat Muria Timur Bs. Wonogiri Bs. Klaten Bs. Karanganyar Bs. Boyolali Sragen Bogowonto Luk Ulo Serayu Hulu Serayu Hulu Serayu Hulu Serayu Hulu Serayu Hilir Citanduy Timur	N.A N.A N.A N.A N.A N.A N.A N.A N.A N.A	ר ת ת ת ת ת ת ת ת ת ת ת ת ת ת ת ת ת ת ת

Tabel 2.1 Inventory Data on Irigasi Desa by Province Based on the Inventory Survey by DOI-1 in 1992

No.	Province	Cabang Dinas/Kabupaten Irr. Region	Code No.	Name	Nos.of Scheme	Area (ha)
13 Jawa	Timur		3501	Brantas Malang	99	4,75
			3502	Brantas Kepanjen	-	-
			3503	Brantas Kasri	- 35	- 70
			3504 3505	Brantas Pasuruan Brantas Kediri	35 64	79 1,17
			3506	Brantas Nganjuk	3	7
			3507	Brantas Tulungagung	33	10
		and the second	3508	Brantas Trenggalek	68	1,30
			3509	Brantas Blitar	61	1.45
			3510	Brantas Jombang	62	2,48
			3511	Brantas Mojoagung	-	-
			3512 3513	Brantas Pare Brantas Mojokerto	- 80	- 1,01
			3513	Brantas Sidoarjo	- 00	- 1,01
			3515	Brantas Wonokromo		
			3516	Pek.Samp.Lumajang	65	2,83
			3517	Pek.Samp.Probolinggo	42	1,00
	:		3518	Pek.Samp.Krasaan	· -	-
	1		3519	Pek.Samp.Tanggul		- 64
			3520	Pek.Samp.Bondowoso	27	94
			3521 3522	Pek.Samp.Situbondo	18	19
			3522	Pek.Samp.Rawatantu Pek.Samp.Jember	37	- 45
			3524	Pek.Samp.Banyuwangi	59	88
			3525	Pek.Samp.Genteng	- 57	-
			3526	Pek.Samp.Benculuk		-
			3527	Madiun	45	64
			3527	Sampang	13	28
			3528	Barat		-
			3529	Ngawi	47	2,63
			3530	Ponorogo	20	69.
			3531 3532	Pacitan Bojonegoro	30 250	779 5,45
			3533	Tuban	69	2,93
			3534	Lamongan	133	6,96
			3535	Pamekasan	40	1,19
			3536	Bangkalan	. 27	1,76
			3537	Sumenep	55	934
i	Total				1,482	43,760
14 Bali			5101	Jembrana	31	1,88
			5102	Tabanan	119	5,63
			5103	Badung	0	
			5104	Gianyar	80	2,59
			5105	Klungkung	7	34.
			5106	Bangli	10	33
			5107	Karang Asem	31 140	3,84
	Total		5108	Buleleng	418	2,894 17,520
·····	Total	······	· · · · ·		410	
15 Nusa'	Tenggara Barat		5201	Kota Mataram	0	. I
			5202	Lombok Barat	90	2,90
			5203	Lombok Tengah	23	1,40
			5204	Lombok Timur	183	10,85
			5205	Sumbawa Barat	46	6,62
			5206 5207	Sumbawa Timur	206 74	26,17 11,27
			5207	Dompu Bima	189	9,65
	Total	· .	J200	Dania	811	68,90
		·			0.40	15.67
10 Nusa'	Tenggara Timur		5301 5302	Kupang Timor Tengah S	240 33	15,67 13,28
		Propinsi N.T.T Timor Tengah	5302	Dati II T.T.U	33 9	2,30
		Belu	5304	Belu .	13	2,80
		Alor	5305	Dati II Alor	22	9,79
		Seksi Flores Timur	5306	Flores Timur	19	1,71
		Sikka	5307	Dati II Sikka	56	2,84
		Ende	5308	Ende	89	7,74
			5309	Dati II Ngada	103	2,65
		Manggarai	5310	Manggarai	315	60,52
			5311	Sumba Timur	21	2,24
			5312	Sumba Barat	40	2,38
	Total				960	123,95

Tabel 2.1 Inventory Data on Irigasi Desa by Province Based on the Inventory Survey by DOI-1 in 1992

No.	Province	Cabang Dinas/Kabupaten lrr. Region	Code No.	Name	Nos.of Scheme	Area (ha)
17	Timor Timur		5401	Ambeno	N.A	N.A
			5402	Bobonaro	N.A	N.A
			5403	Dili	N.A	N.A
			5404	Manatuto	N.A	N.A
			5405	Baucau	N.A	N.A N.A
			5406	Viqueque	N.A N.A	N.A
			5409 5410	Ermira Covalima	N.A N.A	N.A N.A
	Kalimantan Barat	· · · · · · · · · · · · · · · · · · ·	6101	Pontianak	34	4,044
10	Ranneattan Dura		6102	Singkawang	-	-
				Sambas	27	1,688
			6103	Sanggau	7	460
			6104	Sintang	11	725
			6105	Ketapang	21	3,608
	Total		6106	Kapuas Hulu	13 113	583 11,108
	Kalimantan Tengah		6201	Kota Waringin Barat	2	832
	Transmin Tengan		6207	Murung Raya/Kapuas	2	650
			6208	Barito Utara	3	2,800
			6210	Barito Timur/Sel.	4	2,670
	Total	:				6,952
20	Kalimantan Selatan		6302	Banjar	10 13	1,975 2,600
			6303	Tapin University Sectors	13	1.72
			6304	Hulu Sei Selatan	o 4	47.
			6305 6306	Hulu Sei Tengah Hulu Sei Utara	5	600
			6307	Tabaleng	4	82
	·		6308	Tanah Laut	8	1.00
			6309	Kotabaru	5	1,700
	Total				57	10,900
						0.55
21	Kalimantan Timur	Kutai	6403	Kutai	21	2,550
		Samarinda	6401	Samarinda (Kodya)	5 23	230 5,665
		Pasir	6404	Pasir	23	5,00
		Berau	6405	Berau	3	1,850
		Bulungan	6406 6402	Bulungan Kodya Balikpapan	3	1,00,1
	Total	·			58	11,92
22	Sulawesi Utara		7101	Minahasa	N.A	N.A
			7102	Bolang Mangandon	N.A	N.A
			7103	Gorontalo	N.A	N,A
			7104	Tahua	N.A	N.A
			7105	Pengairan Dumoga	N.A	N.4
23	Sulawesi Tengah	Donggala	7201	Donggala	29	6,48
2.0	Suluries rengan	DouBBan	7202	Poso	-	_ `
			7203	Luwuk Banggai	-	~
			7204	Buol Toli-Toli	-	
		Donggala	7205	Parigi	12	1,27
	Total	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	41	7,762
24	Sulawesi Selatan	Pengairan Bendun Benteng	7301	Pinrang	19	4,57
		Kabupaten Enrekang	7302	Sidren	44	3,56
		Kabupaten Polewali Mamasa	7303	Mandar	45	18,57
		Pengairan Gowa- Takalar	7304	Gowa/Takalar	18 45	3,28 5,82
		Pengairan Maros	7305	Maro s Rona	45 41	5,82 9,90
		Pengairan Bone	7306 7307	B o n e Soppeng/Wajo	29	5,18
		Kabupaten Sopeng Kabupaten Wajo	1001	Sopeng Wajo	4	1,30
		Pengairan Bulukumba Selayar	7308	Bulukumba	73	12,20
		Pengairan Jeneponto-Bantaeng		Jeneponto/Bantaeng	111	19,04
		Pengairan Selatan-Tator	7310	Luwu/Tator	34	9,25
		Pengairan Pangkep-Baru	7311	Pangkep/Barru	2	45
		Pengairan Pangkep-Baru	,,,,,	Kab, Pangkep	3	42
		Pengairan Pangkep-Baru		Kab. Barru	27	3,63
			7217	Kab. Pangkep & Kep.	24	1,90
		Pengairan Sinjai	7312 7313	Bendung Benteng Sinjai	36	4,44
		Pengairan Lawu Utara	7314	Luwu Utara	53	8,87
		Pengairan Luwu Selatan/Tator		Kab. Tana Toraja	71 679	12,60 125,04

Tabel 2.1 Inventory Data on Irigasi Desa by Province Based on the Inventory Survey by DOI-1 in 1992

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No.	Province	Cabang Dinas/Kabupaten Irr. Region	Code No.	Name	Nos.of Scheme	Area (ha)
25	Sulawesi Tenggara		7401	Kendari	N.A	N.A
			7402	Unaaha	N.A	N.A
			7403	Kolaka	N.A	N.A
26	Maluku		8101	Maluku Utara	N.A	N.A
			8102	Maluku Tengah	N.A	N.A
			8103	Halmahera Tengah	N.A	N.A
27	Irian Jaya		8201	Jayapura	N.A	N.A
			8202	Monokwari	N.A	N.A
			8203	Paniai (Nabire)	N.A	N.A
			8204	Sorong	N.A	N.A
			8205	Merauke	N.A	N.A
	Ground Total			<u> </u>	17,053	981,447

Tabel 2.1 Inventory Data on Irigasi Desa by Province Based on the Inventory Survey by DOI-I in 1992

Table 2.2 Results of Inventory Survey on Irigasi Desa in 1982 by DGWRD

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $							•						Į			
D.J. Acch Kabupaten Keemutan Desi Areadina Areadina Weir Free Indac Others Total Vol Total Vol State Actionation Total PU State	ę		J.		j,	Number of	Design	Functional							Outside of	Tolai
D1. Actin D2 State State <t< th=""><th>,</th><th></th><th>Kabupaten I</th><th>Kecamatan</th><th>Desa</th><th>Scheme</th><th>Arca(ha)</th><th>Area(ha)</th><th></th><th>ree Intake</th><th></th><th>Total</th><th></th><th>Irrí. Schemes Irri. Schemes</th><th>rri. Schemes</th><th></th></t<>	,		Kabupaten I	Kecamatan	Desa	Scheme	Arca(ha)	Area(ha)		ree Intake		Total		Irrí. Schemes Irri. Schemes	rri. Schemes	
Summers Una 10 100	· =	D.1 Acob	, c	133	5 388	852	96 649	43.266	505 209	108	243	860	43,002		88,203	-
Summers have 1 100 147 2.941 75.30 544 14.925 2.31 2.492 2.31 2.491 56 3.351 3.511 3.641 4.695 2.31 2.491 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 56 3.351 2.391 2.36 3.351 2.391 2.36 3.351 2.391 2.362 3.352 2.381 2.391 2.36 3.351 2.391 2.36 3.351 2.391 2.36 3.351 3.351 3.351 3.351 3.351 3.351 3.351 3.351 3.353	2 1	Currenter Phone	2 2	50	282.5	1 1 3 2	193 435	79.580	677	370	403	1,450	24,078		118,400	
Riau 7 72 84 99 2331 2401 57 733 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 6673 7333 7333 6673 7333 7333 7333 7333 7333 7333 7333 7333 7333 7333 7333 7333 7333 7334 7334 7333 7334	4 2	Sumators Utata		ŝ	1467	2007	107.641	70.580	948	1.315	1.351	3,614	14,925		52,724	91.460
Math 6 77 1,13 335 66.719 1857 167 98 56.123 2.184 Bergkult 4 7 731 19.162 7.833 66.719 1857 167 98 65.139 7.83 Bergkult 4 7 731 19.162 7.834 62.307 35.55.64 3.934 2.576 3.199 7.83 Bergkult 5 7 7 731 19.162 7.824 66.357 3.154 2.766 3.219 9.726 3.01 7.38 3.01 3.01 3.01 3.05 3.01 3.05 3.01 3.05 3.01 3.05 3.01 3.06 5.75 3.01 3.03 5.05 3.01 3.03 5.05 3.01 <th< td=""><td>2 2</td><td>OULINATION DOLON</td><td>ŗr</td><td><u>8</u> 5</td><td>804</td><td>1</td><td>75.813</td><td>107 0</td><td>55</td><td>ŝ</td><td>39</td><td>8</td><td>4,674</td><td></td><td>30,764</td><td></td></th<>	2 2	OULINATION DOLON	ŗr	<u>8</u> 5	804	1	75.813	107 0	55	ŝ	39	8	4,674		30,764	
Samatera Selaran 5 52 2001 1,775 10,1278 62,959 1,185 90 123 728 10,065 143 Bengkulu 4 76 1,477 71 131 19,162 7,84 62,554 3,394 2,576 3,219 9,729 10,065 144 Sumatera 77 731 19,162 7,824 66,2207 325,564 3,934 2,576 3,219 9,729 10,065 144 Java Tengah 5 30 234 522 10,236 2,5123 10,364 2,5128 10,365 2,518 1,449 13 Java Tengah 5 30 233 1,138 4,136 2,313 3,134 13,96 2,516 3,214 13,96 5,528 10,065 14,367 Java Timur 34 5 34,350 34,350 34,350 35,33 35,347 36,439 36,535 36,538 36,538 36,548 36,548 36,548	<u>+ 4</u>	Kiau fembi	- 14	1 5	1159	222	012.53	18 957	167	98	<u>8</u>	1,231	2,184		40,850	
Summers Solarin 1,2 72,2,100 1,17 7,117 7,117 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116 1,116	<u>2</u> `;	Jamoi	9	5.6			010 011	62.050	1 192	08	126	1,389	7.858		322,828	
Bengkult 4 7.4 1.201 7.13 9.13 9.05 9.73 9.10 6.105 1.044 2.34 2.34 3.03 2.34 3.03 2.34 3.03 2.34 3.03 2.34 3.03 2.34 3.34 3.34 1.36 4.344 3.34 3.34 3.35 3.34 3.35 3.34 3.35 3.34 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35 3.344 3.35	9	Sumatera Selatan	£1	76	7,001	2121	017,011	404'70		200	3 0	22			0 406	
Lampurg 4 76 1.437 964 6.5342 $31,542$ $31,93$ 237 $32,91$ 904 $31,91$ Sumarea 77 731 19,162 7,824 $692,207$ $325,564$ $3,934$ 237 $32,91$ 904 $31,91$ $91,62$ $1,044$ 33 Jawa Timur 37 396 7320 507 $27,168$ $25,554$ $31,934$ $28,97$ $48,44,95$ $48,44,95$ Jawa Timur 38 577 438 50 $34,350$ $31,4553$ 1344 $11,996$ 826 $41,069$ $55,956$ $58,936$ $58,934$ Jawa Timur $11,4$ $1,603$ $22,356$ $11,623$ $38,45,720$ $31,4537$ 7008 $28,736$ $48,720$ Jawa Timur $11,4$ $1,603$ $22,356$ $13,4537$ 7008 $28,736$ $48,4720$ Jawa Timur $11,3$ $66,439$ $43,850$ 7308 $28,736$ $18,937$	7	Bengkulu	4	24	1,204	121	28,130	16,189	U U	3	2	17				
Sumateria 77 731 19,162 7,824 692.207 325,564 3,934 2,576 3,29 10,005 14 D:K.I.Jakara 5 30 234 225 13,034 251,809 4833 1,364 1465 1465 1465 1465 16643 1465 1465 1465 15643 1484 1366 1364 1364 1465 1475 16643 1475 16643 1475 16643 14163 11216 1793 16643 11175 16643	18	Lampung	4	76	1.487	964	63,542	31,542	379	494	5	ŧ.	4,044		CD/,CC	
D.K. Lislaerra 5 30 234 29 4.868 1.607 84 25 27 136 1.004 Jawa Bara 37 743 5.522 10.238 310,364 251,809 4833 1.368 7.485 5.449 5.522 Jawa Fleat 37 743 8312 818 41,950 35.7 1364 513 8449 503 5.524 5.535 5.545 5.545 15.545 15.5347 5.533 5.545 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.5347 5.545 5.5347 5.55347 5.5347 5.5347 5.5347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55347 5.55345 5.51545 5.55347		Sumatera	11	131	19,162	7,824	692.207	325,564	3,934	2.576	3,219	9,729	101,065		717.028	
D.K.I.Jakara 2 20 2.24 10.36 2.100 0.01			`	6			0.70 1		, ro	24	5	136	1 004		1.504	3.131
Java Baat 29 427 5/32 10.268 21,805 4.833 1.264 1.460 5/528 5/528 5/59 4.833 1.264 1.460 5/528 5/596	3	D.K.I.Jakarta	ŝ	30	724	67	4,808	1.00/1	\$	1 ;	14 .		044.04		171 946	200 136
Java Tengah 37 496 7.80 507 27.168 25.325 1.884 1.396 8.84 1.06 5.9596 Java Timur 35 577 8.312 818 41,950 34,852 207 677 818 46,720 Java Timur 36 577 8.312 818 41,950 34,852 207 67 544 818 46,720 Java Timur 114 1,603 22.356 11,652 384,350 314,593 7,008 2872 2.665 12.345 183,347 NTT 17 56 449 773 66,439 4856 53.35 11,63 1,219 NTT 13 56 446 335 218,350 131,017 1963 67,45 57,45 7572 NTT 13 56 449 53,213 133,569 364 134 1163 12,19 Timor Timur 13 66 33,250 131,617 1963	22	Jawa Barat	29	427	5,522	10,298	310,364	251,809	4,833	1,384	1,202	C04, /			1010111	
D.1.Jogyaára 5 73 438 0 0 0 0 0 0 0 0 2.218 4570 Jawa 1114 1,603 22.356 11,652 34,550 34,550 34,550 34,550 34,550 34,550 34,550 34,550 34,550 34,551 158,371 Jawa 1114 1,603 22.356 11,652 34,530 34,550 34,552 755 14 80 6,735 NTT 13 9 1,662 1,126 109,859 426,453 438,45 356,41 166 5745 NTT 13 65 449 2,032 39,529 733 206 7,972 873 NTT 13 65 449 2,733 13,1017 1963 6,793 42,653 645 7,972 Bai/Nusa 7 7 1 1067 124 31,617 1963 2,944 7,972 Kalimanta 8<	33	Jawa Tengah	37	496 86	7,850	507	27,168	26,325	1,884	1,396	826	4.100	20,920		CK0,101	
Jawa Timur 38 577 8.312 8.18 4.1,950 34,852 207 67 544 8.18 46,720 Jawa Timur 38 577 8.312 81,350 314,559 7,008 2,872 2665 12,455 158,347 Bail 7 56 494 773 66,439 48,864 585 75 141 801 6,745 NTF 7 56 494 773 66,439 48,864 585 755 141 801 6,745 NTF 7 56 494 773 66,439 48,864 585 756 151,901 151,901 NTT 11 13 65 44,85 316,901 333,556 356 356 356 25,964 7972 Bail/Nuastren Faegan 8 100 18,401 333,559 356 359 320 67 7972 Kalimantan Faegan 6 82 11 100	4	D.I.Joevakana	ŝ	73	438	0	0	¢	0	0	0	o	5,218		666'01	
Java 114 1,603 22,356 11,522 38,4,550 314,593 7,008 2,872 2,665 12,545 158,347 4 NTB 7 56 494 773 66,439 48,864 533 75 141 801 6,745 NTB 7 56 494 773 66,439 48,864 583 75 141 801 6,745 NTF 113 66 42032 39,529 733 200 67 1,000 8,745 NTF 113 66 439 48,864 583 75 141 801 6,745 TrinorTimur 13 66 439 2,835 131,017 1963 629 362 2964 7972 2975 Kalimantan Fengah 6 82 11,451 496 116 277 899 2.944 Kalimantan Fengah 6 833 237,893 111,451 496 116 277 <td>š</td> <td>Jawa Timur</td> <td>38</td> <td>577</td> <td>8.312</td> <td>818</td> <td>41,950</td> <td>34,852</td> <td>207</td> <td>67</td> <td></td> <td>818</td> <td>46,720</td> <td></td> <td>170,528</td> <td></td>	š	Jawa Timur	38	577	8.312	818	41,950	34,852	207	67		818	46,720		170,528	
Ball 9 51 643 9.523 733 200 67 1000 8 NTB 17 56 494 773 6.433 4.854 551 141 801 6.745 NTB 17 56 494 773 6.433 4.854 564 154 1.105 109.855 4.262 564 545 564 154 1.125 109.855 4.262 564 154 1.105 1.215 109.855 1.215 109.855 1.215 100 6.745 5.76 5.76 7.97 8 1.215 </td <td>2</td> <td>Taura</td> <td>114</td> <td>1 603</td> <td>22,356</td> <td>11.652</td> <td>384.350</td> <td>314,593</td> <td>7.008</td> <td>2.872</td> <td></td> <td>12,545</td> <td>158,347</td> <td></td> <td>516,572</td> <td>717.211</td>	2	Taura	114	1 603	22,356	11.652	384.350	314,593	7.008	2.872		12,545	158,347		516,572	717.211
Bail 9 51 643 1,000 42,032 39,529 733 200 67,45 NTB 7 5 449 1,173 66,439 48,864 585 364 154 1,163 1,219 NTT 13 56 449 1,73 66,439 48,864 585 364 154 1,163 1,219 Timor Timur 13 65 449 270 3,248 2,835 365 364 154 1,163 1,219 Railmantar 13 65 449 270 3,248 2,895 213,561 33,569 36 37 393 2,156 Kalimantar Tengah 6 82 1,006 124 31,563 11,461 496 116 27 89 2,166 10 8,700 6,83 2,944 6 8,9 2,166 11,461 496 116 27 89 2,166 11,165 11,19 11,165 11,19										000		200	0	-	515	263
NTB75649477366,43948,86458575141801 0.745 NTT13981.6621,126109,85942,6246455655647,972NTT13654492703,2482,895218,330131,0171,9636393622,9647,972Bait/Nusa Tenggara422703,2482,899218,330131,0171,9656356373932,156Kalimantan Tengah6821,096196,392133,56936320373932,156Kalimantan Tengah6821,096196,392133,56936373932,156Kalimantan Tengah6821,09612431,593111,4514961162778992,944Kalimantan7711,06712431,593111,6013059373932,156Kalimantan7831,256339,736157,6075685173521,4375,100Kalimantan7831,2631,73812,252140151218500668Sulawesi Utan7831,160712431,59310,156156473736,136Sulawesi Tengah561,114842182,38075,08448530196868Sulawesi Tengara55<	51	Bali	6	51	6 3	1,000	42,052	670.65	133	202		201				
NTT 13 98 1,662 1,126 109,859 42,624 645 364 154 1,163 1,219 Timor Timur 13 65 449 2,899 218,330 131,017 1963 639 362 2,964 7,972 Kalimantan Tenggara 42 2770 3,248 2,899 218,330 131,017 1963 53 22,964 7,972 Kalimantan Tengah 6 82 1,096 19 6,3229 986 6 12 1 19 0 Kalimantan Tengah 6 82 1,096 19 6,3229 986 6 12 1 19 0 0 Kalimantan Tengah 7 71 1,067 124 31,593 11,601 30 37 393 2,143 5,100 Kalimantan 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 </td <td>22</td> <td>RIN</td> <td>4</td> <td>56</td> <td>494</td> <td>773</td> <td>66,439</td> <td>48.864</td> <td>585</td> <td>ŝ</td> <td></td> <td>ž</td> <td>0.47</td> <td></td> <td>140,02</td> <td></td>	22	RIN	4	56	494	773	66,439	48.864	585	ŝ		ž	0.47		140,02	
Timor Timur1365449 <td>53</td> <td>TIN</td> <td>13</td> <td><u>98</u></td> <td>1,662</td> <td>1,126</td> <td>109.859</td> <td>42,624</td> <td>645</td> <td>364</td> <td>154</td> <td>1,163</td> <td>1,219</td> <td></td> <td>163,01</td> <td></td>	53	TIN	13	<u>98</u>	1,662	1,126	109.859	42,624	645	364	154	1,163	1,219		163,01	
Bail/Nusa Tenggara 42 270 3.248 2,899 218.330 131,017 1,963 639 362 2,964 7,972 Kalimantan Barat 8 108 4.685 319 63291 33.569 36 37 393 2.156 Kalimantan Barat 8 108 4.685 31.99 63.291 33.569 36 37 393 2.156 Kalimantan Tengah 1 100 1840 833 237,833 111,451 496 116 277 889 2.944 Kalimantan Timur 7 71 1,067 124 31.593 11,451 496 116 277 889 2.944 Kalimantan Timur 7 83 1,255 339,736 157,607 568 517 352 1,437 5,100 Kalimantan 32 868 1,256 157,607 568 517 352 1,437 5,100 Kalimantan 5 6 17,809	54	Timor Timur	13	65	449				•	·	•	•	•		1	
Kalimantan Barat81084.685319 63.921 33.569 36 320 37 393 2.156 Kalimantan Tengah682 1.096 19 6.329 986 6 12 1 19 0 Kalimantan Tengah682 1.096 1.9 6.329 986 6 12 11 100 Kalimantan Tengah683 21.7893 111.451 496 116 277 889 2.944 Kalimantan Selatan11 1000 1.840 833 237.893 111.451 496 116 277 889 2.944 Kalimantan 22 361 8.688 1.205 339.7366 157.607 568 517 352 1.437 5.100 Kalimantan 32 361.7832 339.7366 157.607 568 517 352 1.437 5.100 Kalimantan 7 83 1.162 483 26.138 12.252 1440 151 218 509 668 Sulawesi Utara 7 83 1.162 483 26.138 12.252 1440 151 218 509 5635 Sulawesi Utara 23 169 1.114 842 182.2380 75.084 485 301 966 510 Sulawesi Tenggata 6 45 510 24.792 10.361 56 47 37 140 25.100 Sulawesi Tenggata 6		Rali Nues Tenocars		270	3.248	2.899	218,330	131.017	1,963	639		2,964	7,972		35,004	64,906
Kalimantan Barat81084.68531963.92133.56936320373932.156Kalimantan Tengah6821.096196.3299866121190Kalimantan Tengah6821.096196.3299866121190Kalimantan Tengah7711.06712431.593111.4514961162778892.944Kalimantan323618.6881.295339.736157.6075685173521.4375.100Kalimantan323618.6881.295339.736157.6075685173521.4375.100Sulawesi Utara7831.16248326.13812.2521400151218509668Sulawesi Tengah5621134842182.38075.0844853019688233.607Sulawesi Tengah5641114842182.38075.0844853019688233.607Sulawesi Tengah5641114842182.35075.08448533.60733.607Sulawesi Tengah5641114842182.35075.08448533.60733.607Sulawesi Tengah565177023.71107.3328085413521.70135.120Sulawesi Tengah55		And Such a new Liting		i												
Kalimantan Tengah6821.096196.3299866121190Kalimantan Tengah11001.840833237.893111.4514961162778892.944Kalimantan Selatan7711.0671.2431.593111.4514961162778892.944Kalimantan Selatan323618.6881.295339.736157.6075685173575.100Kalimantan323618.6881.295339.736157.6075685173521.4375.100Sulawesi Utara7831.16248326.13812.252140151218509668Sulawesi Tengah561.114842182.38075.08448530196833Sulawesi Tengah561.114842182.38075.08448530196835Sulawesi Tengah561.114842182.38075.08448530196835Sulawesi Tengah561.114842182.38075.08448530196868Sulawesi Tengah561.114842182.38075.084485301967170Sulawesi Tengah551.114842182.38075.0844853019675.084Sulawesi Tengah556170<	61	Kalimantan Barat	8	108	4,685	319	63,921	33.569	36	320	37	393	2,156		190.764	14
Kalimantan Selatan111001.840833237.893111.4514961162778892.944Kalimantan Selatan7711.06712431.593111.6013069371360Kalimantan Timur323618.6881.295339.736157.6075685173892.944Kalimantan323618.6881.295339.736157.6075685173521.4375.100Sulawesi Utara7831.16248326.13812.252140151218509668Sulawesi Tengah5691.114842182.38010.361564737140210Sulawesi Tengah51691.114842182.38010.351564737510Sulawesi Tengah5651.114842182.38010.351564737510Sulawesi Tengah5651.11484217024.79210.135127421170653Sulawesi Tengah55561.71484224.79210.7338085413521.70135.120Sulawesi Tengah555675.0844853019677035.120Sulawesi Tengah555617035.23107.3328085413521.70135.120Sulawesi<	3	Kalimantan Tenerah		82	1,096	19	6.329	986	9	12		61	0		46,533	
Kalimantan Timur 7 71 1,067 124 31,593 11,601 30 69 37 136 0 Kalimantan 32 361 8,688 1,295 339,736 157,607 568 517 352 1,437 5,100 Sulawesi Utara 7 83 1,162 483 26,138 12,252 140 151 218 509 668 Sulawesi Tengah 5 62 159 133 12,522 140 151 218 509 668 Sulawesi Tengah 5 669 1,114 842 18,2380 75,084 485 301 968 210 Sulawesi Tengah 5 669 1,114 842 18,2380 75,084 485 301 966 540 568 Sulawesi Tengana 23 169 1,114 842 18,232.01 75,084 485 301 967 700 550 566 541 352 1700 5535 567 568 541 352 1,701 35,120 854	ŝ	Kalimantan Selatan		100	1.840	833	237,893	111.451	496	· 116	•••	889	2,944		269,551	291,168
Kalimantan 32 361 8.688 1,295 339,736 157,607 568 517 352 1,437 5,100 Sulawesi Utara 7 83 1,162 483 26,138 12,252 140 151 218 509 668 Sulawesi Utara 7 83 1,162 483 26,138 12,252 140 151 218 509 668 Sulawesi Tengah 5 62 159 139 17,809 10,361 56 47 37 140 210 Sulawesi Selatan 23 169 1,114 842 182,2380 75,084 485 301 96 882 33,607 Sulawesi Tenggara 6 45 697 1770 24,792 10,7352 808 541 352 1,701 35,120 Sulawesi 41 359 3,132 1,634 251,119 107,332 808 541 352 1,701 35,120	3	Kalimantan Timur		11	1.067	124	31.593	109.11	30	69		136	0		65,152	•
Sulawesi Utara 7 83 1,162 483 26,138 12,252 140 151 218 509 668 Sulawesi Tengah 5 62 159 139 17,809 10,361 56 47 37 140 210 Sulawesi Tengah 5 62 159 139 17,809 10,361 56 47 37 140 210 Sulawesi Tengah 5 69 1,114 842 182,380 75,084 485 301 96 868 Sulawesi Tenggara 6 45 697 170 24,792 10,1355 127 42 1 170 6535 Sulawesi Tenggara 6 45 697 170 24,792 10,7832 808 541 352 1,701 35,120 Sulawesi 5 56 1,634 251,119 107,832 808 541 352 1,701 35,120 Maluku 5 56 18,64 0 0 0 0 0 0 0 0 <	5	Kalimantan	32	361	8,688	1,295	339,736	157,607	568	517		1.437	5,100		572,000	
Sulawesi Uara 7 7 7 140 210 Sulawesi Tengah 5 6 17 37 140 210 Sulawesi Tengah 5 6 17 37 140 210 Sulawesi Tengah 5 6 170 24,792 10,1361 56 47 37 140 210 Sulawesi Tengah 5 45 697 170 24,792 10,1351 3567 33,607 Sulawesi Tenggara 6 45 697 170 24,792 10,1351 37 170 6535 Sulawesi Tenggara 6 45 697 170 24,792 10,1351 37 1701 35,120 Maluku 5 56 1,845 0 <td< td=""><td>i</td><td></td><td>£</td><td>6</td><td>1 167</td><td>102</td><td>76 120</td><td>17 757</td><td>140</td><td>151</td><td>218</td><td>509</td><td>668</td><td></td><td>12.851</td><td>20.541</td></td<>	i		£	6	1 167	102	76 120	17 757	140	151	218	509	668		12.851	20.541
Sulawesi Tengah 5 62 159 17,809 10,401 50 41 51 140 210 Sulawesi Tengah 23 169 1,114 842 182,380 75,084 485 301 96 882 33,607 Sulawesi Selatan 23 169 1,114 842 182,380 75,084 485 301 96 882 33,607 Sulawesi Selatan 23 169 1,70 24,792 10,1355 127 42 1 70 635 Sulawesi 41 359 3,132 1,634 251,119 107,832 808 541 352 1,701 35,120 Maluku 5 56 1,845 0 0 0 0 0 0 0 0 0 10 1170 35,120 Maluku/Tian Jaya 15 171 2,664 0 0 0 0 0 0 0 0 0 0 0 0 0 10 11 2,664 0 0 0	-	Sulawesi Ulara	•• •	9	1,102	Ç.	001107		2							6 050
Sulawesi Selatan 23 169 1.114 842 182.380 75.084 485 341 90 882 35.00/ Sulawesi Tenggara 6 45 697 170 24.792 10,135 127 42 1 170 635 Sulawesi Tenggara 6 45 697 170 24.792 10,135 127 42 1 170 635 Sulawesi 41 359 3.132 1,634 251,119 107.832 808 541 357 1701 35,120 Maluku 5 56 1.845 0	5	Sulawesi Tengah	'n	62	55	651	1/.80%	10, 01	ĥ	tt	2	}			c	è
Sulawesi Tenggara 6 45 697 170 24.792 10,135 127 42 1 170 635 Sulawesi 41 359 3.132 1,634 251,119 107.832 808 541 352 1,701 35,120 Maluku 5 56 1.845 0 0 0 0 0 0 0 17 35,120 Maluku 5 56 1.845 0 0 0 0 0 0 0 0 17 35,120 Maluku/Trian Jaya 10 115 819 -	R	Sulawesi Selatan	23	169	1,114	842	182,380	75,084	485	301		792	100.00		4	n.
Sulawesi 41 359 3.132 1,634 251,119 107,832 808 541 352 1,701 35,120 Maluku 5 56 1,845 0 0 0 0 0 0 Irian Jaya 10 115 819 - - - - 0 0 0 Maluku/Irian Jaya 15 171 2,664 0 0 0 0 0 0 0	74	Sulawesi Tenegara	é	45	697	170	24,792	10,135	127	42		170	635		5,426	
Maluku 5 56 1,845 0 <th< td=""><td></td><td>Sulawesi</td><td>4</td><td>359</td><td>3.132</td><td>1,634</td><td>251,119</td><td>107.832</td><td>808</td><td>541</td><td></td><td>1,701</td><td>35,120</td><td></td><td>242,474</td><td>355,078</td></th<>		Sulawesi	4	359	3.132	1,634	251,119	107.832	808	541		1,701	35,120		242,474	355,078
Maluku 5 56 1.845 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			• .					C	c	¢	c	c		· •	21 735	71 725
Irian Jaya 10 115 819	81	Maluku	^	ጽ	1,845	Ð	0	Þ	S	>	>	2	J		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	
15 171 2,664 0 0 0 0 0 0 0	8	Irian Jaya	10	115	819	•	•	•	•	'	•	ι.	•	••	•	
		Maluku/Irian Jaya	15	171	2,664	0	0	0	0	0	0	0	0	0	21,735	21,735
<u>1111111111111111111111111111111111111</u>		INCOMPOSIN	102	2 405	050 050	75 3U	1 885 747	1 036 613	14 281	7.145		28.376	307.604	1 320.376	2,104,813	2,732,793

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Code	Province	Number of Scheme		rea (ha) Functional Field	Number of Scheme	Designed Area(ha)	(ha)
<u> </u>		Scheme	Design Alea	T unctional T loid	Scheme	Alca(iia)	Giay
11	D.I.Aceh	598		32,213			
12	Sumatera Utara	845	121,775	57,234			
13	Sumatera Barat						
14	Riau						
15	Jambi	398		28,754			
16	Sumatera Selatan			•			
7	Bengkulu						
8	Lampung	130	l .	14,066			
	Sumatera	1,971		-			
31	D.K.I.Jakarta						
32	Jawa Barat	2,855		165,942			
33	Jawa Tengah	_,		,			
34	D.I.Jogyakarta						
35	Jawa Timur						
	Jawa	2,855	0	165,942			
51	Bali				468	20,647	19,874
52	Nusa Tenggara Barat	328	35,499	29,800	196	22,966	
53	Nusa Tenggara Timur	305		28,302	479	43,631	
54	Timor Timur			20,002	n.a	20,000	
	Bali/Nusa Tenggara	633	35,499	58,102	1,143	107,244	
51	Kalimantan Barat						
52	Kalimantan Tengah						
53	Kalimantan Selatan						
54	Kalimantan Timur						
	Kalimantan						
71	Sulawesi Utara		н. 1		240	19,086	11,500
72	Sulawesi Tengah	134		8,218	110	12,458	
73	Sulawesi Selatan	962			959	155,912	
74	Sulawesi Tenggara	163		18,082	250	36,359	
	Sulawesi	1,259		-	1,559	223,815	
31	Maluku	0	. 0	0	-		6,000
32	Irian Jaya	-	-	-	16		349
	Maluku/Irian Jaya	0	0	0	16		6,349
	INDONESIA	6,718	306,534	449,911	2,718	331,059	156,935

Table 2.3 Collected Data on Irigasi Desa by JICA, HSP-II and PRAS

Code	Province	Number of	Irrigated	Data
		Scheme	Area (ha)	Source
11	D.I.Aceh	259	45,622	Data-
12	Sumatera Utara	1,132	79,580	Data-2
13	Sumatera Barat	2,009	49,256	Data-
14	Riau	99	2,491	Data-2
15	Jambi	333	18,957	Data-2
16	Sumatera Selatan	548	62,218	Data-
17	Bengkulu	202	16,340	Data-
18	Lampung	140	38,156	Data-
31	D.K.I.Jakarta	29	1,607	Data-
32	Jawa Barat	10,298	251,809	Data-2
33	Jawa Tengah	507	26,325	Data-
34 35 51 52 53	D.I.Jogyakarta	1,080	14,713	Data-
	Jawa Timur	818	34,852	Data-
	Bali	418	17,526	Data-
	Nusa Tenggara Barat	811	68,907	
	Nusa Tenggara Timur	1,126	42,624	
54	Timor Timur	-	10,000	Data-
61	Kalimantan Barat	113	11,108	
62	Kalimantan Tengah	11	6,952	Data-
63	Kalimantan Selatan	57	10,900	
64	Kalimantan Timur	58	11,925	
71	Sulawesi Utara	483	12,252	Data-
72	Sulawesi Tengah	139	10,361	Data-
73	Sulawesi Selatan	679	125,046	
74	Sulawesi Tenggara	170	10,135	Data-
81	Maluku	-	6,000	Data-
82	Irian Jaya	16	349	Data-
	Sumatera	4,722	312,620	
	Jawa	12,732	329,306	
	Bali/Nusa Tenggara	2,355	139,057	
	Kalimantan	2,355	40,885	
	Sulawesi	1,471	157,794	
	Maluku/Irian Jaya	1,471	6,349	
	INDONESIA	21,535	986,011	

Table 2.4 Estimated Area of Irigasi Desa by Province

Data-1Inventory Survey by DOI-I,DGWRD 1992Data-2Inventory Survey by DOI-I,DGWRD 1982Data-3Inventory Survey data by ADB in 1992

Numbers and Areas for Rehabilitation of Irigasi Desa	-
Table 4.1	

:						60				(C 4) C 0 - V		
2		1000,000	1000101	1001/00		1000/04	11	1000,000	1000101	AICA (IIA)	10001000	10001
No	FTOVINCE	Actual	Actual	1991/92 Actual	Actual	Program	1 0121	1989/90 Actual	1990/91 Actual	Actual	i 992/95 Actual	Program
11	D.I.Aceh	₹ —1	ν. Υ				. 16	6	325	180	300	n.a.
12	Sumatera Utara	0	0]		26	0	0	301	985	п.а.
13	Surnatera Barat	0	-	÷			6	0	70	150	412	п.а.
14	Riau	0	0				Υ.	0	0	0	230	п.а.
15	Jambi	0	0	0	9	0	9	0	0	0	302	п.а.
16	Sumatera Selatan	0	ŝ				10	0	370	607	139	п.а.
17	Bengkulu	Ö	0	Υ	Ð		6	0	0	155	313	n.a.
18	Lampung	7	ŝ	L	Ð		12	220	350	300	275	п.а.
	Sumatera	ŝ	12	13	ч л	6	93	310	1,115	1,693	2,956	
5	D K I Iakarta	C		C		c	C	C	C	Ċ	Ċ	¢
÷۲	Tawa Rarat	». ц	5 V	- o	> o		> <u>-</u>	355	270	150	ALA ALA	
3 8	Jawa Zancoh Jawa Tancoh	ጉ ሮ	26	- -	00		- 6	156		125	247	
3 5	DI locuetone	о с	с	- (10	001	241			11.4.
	Iawa Timur	7 6	<u>, , , , , , , , , , , , , , , , , , , </u>	U ~		t C	101	100	04] 64	31	C17	1 1
3	Torrest Miller	י ב	t 1	- `	28		010	201			1/0	11-4-
	Jawa	11	<u>.</u>	Ð	33	10		243 2	8c/	080	7177	
51	Bali	3	ŝ	4	v		20	80	119	126	230	п.а.
52.	Nusa Tenggara Barat	ŝ	9	4	10	ŝ	30	564	647	140	522	п.а.
53	Nusa Tenggara Timur	0	0	ŝ	12		16	0	0	2,010	412	п.а.
54 24	Timor Timur	0	0	0		0	0	0	0	0	0	п.а.
	Bali/Nusa Tenggara	7	6	11	28	11	66	644	766	2,276	1,164	
61	Kalimantan Barat	0	v	Ŷ	01	4	12	140	120	461	787	đ
62	Kalimantan Tengah									C	412	a 1
63	Kalimantan Selatan	0	5 erî						° (61	, 001	945	
8	Kalimantan Timur	0	0			0	II	0		182	761	n a
	Kalimantan	5	00	10	32	YO	58	140	417	743	2,905	
71	Sulawesi Utara	6	7	4	50	4	32	210	130	167	930	n.a.
72	Sulawesi Tengah	0	0		ν η			0	0	172	350	п.а.
73	Sulawesi Selatan	ę	4	-	4		15	229	245	50	335	1.2.
74	Sulawesi Tenggara	0	0	0		5		0	0	0	1.718	п.а.
	Sulawesi	ŝ	9					439	375	389	3,333	
81	Maluku	0	0	0		4	4		0	0	0	п.а.
82	Irian Jaya	0	0			-	-	0	0	0	0	2 1
	Maluku/Irian Jaya	0	0	0	0	5	Ŷ	0	0	0	0	
	INDONESIA	28	50	47	188	63	376	2.176	3 431	5 687	12 570	
Sour	Source : Directorate of Land Reh	Rehabilitati	On and D	abilitation and Development DGFCA	NGFCA							11.41

					,	Unit: Rp1,000	
No.	Province	1989/90	1990/91	1991/92	1992/93	1993/94	Total
NO.	Plovince	Actual	Actual	Actual	Actual	Program	
11	D.I.Aceh	3,100	18,875	14,100	9,200	20,740	66,015
12	Sumatera Utara	5,100	10,075	12,500	41,850	37,850	92,200
13	Sumatera Barat	0	3,775	9,400	15,000	0	28,17
13	Riau	0	<i>5,115</i> 0	0,409	12,000	11,899	23,89
14	Jambi	0	0	ů 0	n.a.	0	,
15	Sumatera Selatan	0	10,800	5,390	15,475	ŏ	31,66
		0	10,000	12,860	15,000	- Õ	27,86
17	Bengkulu	=	11,325	5,300	22,900	0	45,72
18	Lampung Sumatera	6,200 9,300	44,775	59,550	131,425	70,489	315,53
	Sumatora	7,500			,		
31	D.K.I.Jakarta	0	0	. 0	0	0	(
32	Jawa Barat	9,300	7,770	4,120	30,500	0	51,69
33	Jawa Tengah	9,300	14,670	5,200	28,500	48,180	105,85
34	D.I.Yogyakarta	5,800	10,400	9,450	18,500	29,090	73,24
35	Jawa Timur	9,300	15,100	4,000	35,000	0	63,40
	Jawa	33,700	47,940	22,770	112,500	77,270	294,18
51	Bali	620	5,100	12,450	18,000	41,800	77,97
52	Dall Nusa Tenggara Barat	15,500	22,650	19,500	25,000	37,050	119,70
-	Nusa Tenggara Barat Nusa Tenggara Timur	0	7,550	14,100	30,000	7,575	59,22
53 54		0	1,550	0	0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
.)4	Bali & Nusa Tenggara	16,120	35,300	46,050	73,000	86,425	256,89
						a a a aa	101 60
61	Kalimantan Barat	0	22,650	26,730	23,000	29,200	101,58
62	V	0	0	0	n.a.	9,870	9,87
63	Kalimantan Selatan	0	21,150	5,400	n.a.	7,020	33,57
64	Kalimantan Timur	0	0	14,100	n.a.	0	14,10
	Kalimantan	0	43,800	46,230	23,000	46,090	159,12
71	Sulawesi Utara	9,300	7,550	18,800	56,500	30,280	122,43
72	Sulawesi Tengah	<u>,</u> ,500	0	16,380	12,500	0	28,88
73	Sulawesi Selatan	9,300	15,100	5,950	n.a.	32,970	63,32
74		0,500	0	0	n.a.	40,700	40,70
14	Sulawesi Tenggara	18,600	22,650	41,130	69,000	103,950	255,33
			-	-		00.000	10.00
81	Maluku	0	0	0	. 0	28,250	28,25
82	2	0	0	0	0		8,06
	Maluku & Irian Jaya	0	. 0	0	0	36,310	36,31
	INDONESIA	77,720	194,465	215,730	408,925	420,534	1,317,37

Table 4.2 Budget Used for Rehabilitation of Irigasi Desa (APBN)

Source : Directorate of Land Rehabilitation and Development, DGFCA

Annex H

Environmental Consideration

ANNEX H

ENVIRONMENTAL CONSIDERATION

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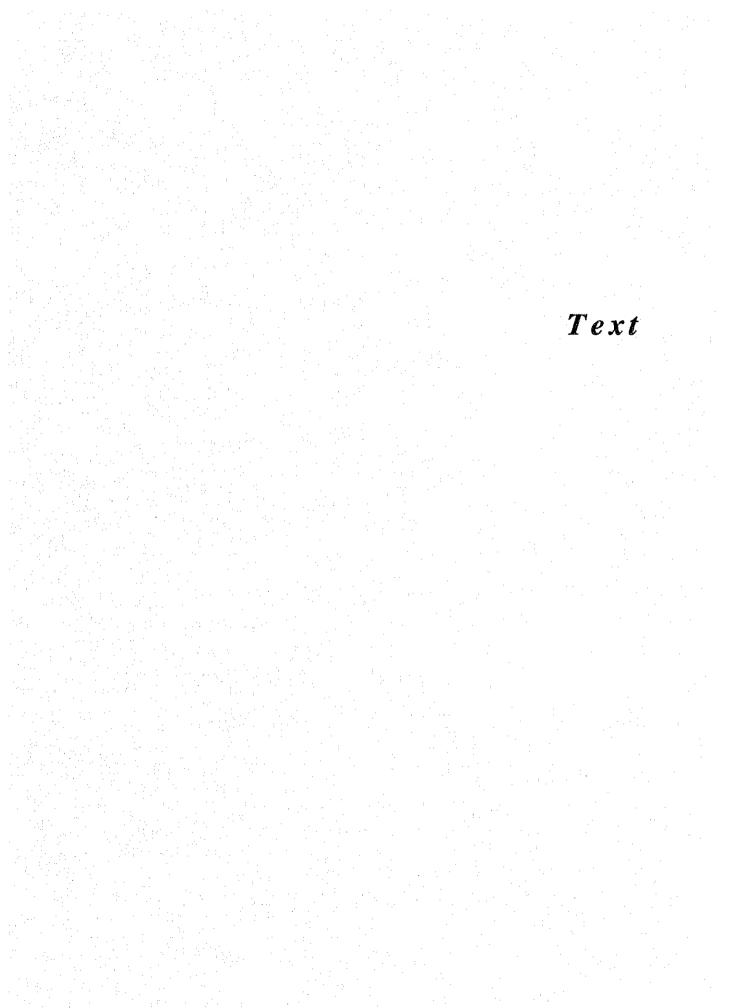
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1. Introduction

Environmental problems are caused in general attributable to the increasing demand of human activity for higher living standards as well as population growth. Increase demands for food, water and energy shoulder the nature much burden, which finally bring about various environmental problems such as the deterioration of water quality, decrease of soil fertility, soil erosion, air pollution, acidic rain, etc., all of which adversely affect the ordinary life of people.

It is the early 1970's that public concern for the environment became the subject of international conferences. The United Nations organized a first "World Environment Conference" in 1972, which founded the United Nations Environmental Program. In 1978, the International Union for the Conservation of Nature, the IUCN, launched the "World Conservation Strategy (WCS)", which concerned about the natural wealth in the third world, and introduced the concept of sustainable development.

This concept was popularized by the "World Commission on Environment and Development (WCED), which later published the report "Our Common Future" (1987). This report addresses the relationship between environment and long-term development. Sound management of the natural resources is considered a prerequisite to economic development, whereas economic development is necessary for sound environmental management.

The concept of sustainable development acknowledges the importance of economic growth, but it also recognizes that the natural resources are finite and that a wasteful use of them today jeopardizes income and welfare in the future. Indonesia accepted the World Conservation Strategy; in its National Conservation Strategy.

As a result, due attention is given to the maintenance of the environmental equilibrium in the development planning of Indonesia.

In this paper, environmental consideration on water resources including irrigation is discussed first, then the general procedure of environmental impact assessment is explained second, and finally Indonesian system on environmental impact assessment is discussed especially for surface irrigation project.

This paper mainly owes to the following references:

Delft Hydraulics et al. Environmental Aspects of WR Planning, Technical Note No.7, Planning of Integrated Water Resources Development, Bina Program Pengairan (BPP), Jakarta, March 1992. Environmental Impact Management Agency (BAPEDAL) et al. A Guide to Environmental Assessment in Indonesia, 1992

World Bank. Environmental Assessment Sourcebook, Volume II, Sectoral Guideline, World Bank Technical Paper Number 140, Washington D.C., 1991.

Ministry of Public Works. Technical Guidelines for Analysis of Environmental Impacts of Surface Water Irrigation Projects, Jakarta, 1990

2. Functions of Water Resources System

Management of environment on water resources aims to prevent the water resources system (WRS) from deteriorating so that it could be not able to perform its function adequately. Since Water resources sector include irrigation sub-sector in Indonesia, functions of water resources in relation to environment will be discussed here.

Most important functions of a WRS is overviewed in the following table:

	ons of the water resources sy	
Functions	Description	Functions
Provision of local	Local communities use water	- local drinking water
products	and water based products that	- traditional fishing
(intangible)	are not marketed	- subsistence irrigation
Provision of	Use by public or private	- urban drinking water
commercial products	enterprises of water and water	- industrial water supply
(tangible)	based products that are	- irrigation
	marketed or otherwise given a	- hydro power generation
	monetary value.	- commercial fishing
Environmental functions (tangible)	Regulation functions, non- consumptive use.	 self-purification capacity regulation of the hydrological cycle reduction of salt intrusion recreation and tourism transportation
		•
Option values	Functions or values that may	- gene pool
(intangible)	become important in the future	
Existence values	Values assigned to entities of	- nature conservation
(intangible)	the system, not derived from	
- · ·	other functions or values.	CHUD DL . The Latent Nie 7

 Table 2.1
 Functions of the water resources system

Source: Delft Hydraulics et al. Environmental Aspects of WR Planning, Technical Note No.7, Planning of Integrated Water Resources Development, Bina Program Pengairan (BPP), Jakarta, March 1992.

Actual functions and potential or latent functions, and between functions that are tangible (that can be given a value, monetary or otherwise) and those that are intangible, should be distinguished. In many projects, provision of local products such as local drinking water, traditional fishing, subsistence irrigation are not evaluated as monetary values.

Environmental problems related to water resources development are in general classified into four broad categories as shown in the next Table.

Type of problem	Example
Environmental degradation	 habitat destruction isolation disturbance inundation/desiccation hydrological changes
Exhaustion of natural resources	 erosion/soil degradation over-exploitation of renewable resources exhaustion of non-renewable resources
Pollution	 dispersion of toxic substances eutrophication acid deposition climate change solid waste disposal
Safety risks	 vector-borne diseases calamities, disasters intoxication

Table 2.2 General classification of environmental problems

Source: Delft Hydraulics et al. *Environmental Aspects of WR Planning*, Technical Note No.7, Planning of Integrated Water Resources Development, Bina Program Pengairan (BPP), Jakarta, March 1992.

Water resources development may on the one hand be influenced by, or, on the other hand cause problems belonging to one or more of these categories.

When considering measures to solve environmental problems related to water resources development, not only technical and financial aspects, but also sociological and psychological discussion have to be taken into account. How benefits and burdens of a project are distributed over time and space and between groups of people or different economic sectors is also of importance.

Many environmental problems have a time lag between the generation of the problem and the time of its actual impact, in other words there is a shift-off of the burdens to further generations. The siltation of reservoirs is a good example.

Another type of shift-off is hydro-power projects that cause problems in the downstream area due to changes in the sediment and water regime. In this case, the environmental impacts become manifest in areas outside the project area. Shift-off mechanisms also occur when the economic sectors in society that benefit from a project are not the same as those that experience the negative impacts of the development, or when individuals get benefits obtained at the cost of collective burdens.

Those who are going to propose projects should consider such shift-off mechanisms as above explicitly. Impacts of project will not affect within one generation only, nor within the proposed project areas only, nor within objective sectors only, and nor within expected beneficiaries only. In this sense, planners should have wide views and cultivated common sense to consider such environmental impacts. An overview of the various shift-off mechanisms is given in the following table.

Table 2.3	Shift-off mechanism	underlying environmental problems
Benefits	Burdens	Examples
now	later	future generation
here	there	downstream effects of reservoirs
one sector	other sectors	urban, industrial vs. rural, fisheries

Table 2.3	Shift-off	mechanism	underlying	environmental	problems

collective

individual

Source: Delft Hydraulics et al. Environmental Aspects of WR Planning, Technical Note No.7, Planning of Integrated Water Resources Development, Bina Program Pengairan (BPP), Jakarta, March 1992.

"Tragedy of the commons"

Incorporation of environmental aspects into the planning process should start with an inventory of all functions of the water resources and an identification of all interested parties that make use of these functions (table below). For reasons of environmental soundness and sustainability, i.e. the ability of the system to perform its functions for society now and in the future, this inventory of actual and potential functions should have high priority. Water resources planning should aim at avoiding the loss of functions as much as possible and at enhancement of the multi-functionality of the system. This requires a identification of possible conflicts between functions.

Function	Users	Demands on system
Local products:	n a den anten en la frankrik for an den en lande frankrik forten en forten en forten en den frankrik en en den	
- water supply	villagers	high water quality, groundwater recharge
- traditional fishing	artisan fishermen	medium water quality, flood frequency
- subsistence agriculture	farmers	flood frequency
Commercial products:		
 urban water supply industrial water supply irrigation hydro-power commercial fishery 	municipalities private enterprises irrigation boards electricity companies private fishing companies, individual fishermen	high water quality, continuity high/medium water quality, continuity seasonally distributed water flow continuity medium water quality, natural water regime
Environmental functions:		
- self-purification capacity	most water users	sufficient minimum flows
- regulation of hydrological cycle	most water users	minimal extreme events (floods and droughts)
- prevention of salt intrusion	farmers, water companies	minimum low flows
- recreation and tourism	urban people and tourists	a rich and diversified eco-system, high water quality
- transportation	private companies	minimum water depth
Option value/existence value Source: Delft Hydraulics	-	a rich and diversified ecosystem, high water quality ects of WR Planning, Technical Note No.7,

Table 2.4 Checklist for the functions of and demands on the water resources

Source: Delft Hydraulics et al. Environmental Aspects of WR Planning, Technical Note No.7, Planning of Integrated Water Resources Development, Bina Program Pengairan (BPP), Jakarta, March 1992.

3. Environmental Consideration on Irrigation and Drainage

Irrigation and drainage projects manage water supplies for the purpose of agricultural production. There is a wide variety of irrigation types depending upon the source of water (surface or groundwater), means of water storage, conveyance and distribution system, and methods of delivery (field application).

Large scale utilization of surface water (predominantly rivers) for irrigation has long been practiced, in some countries for thousands of years, and still accounts for the major public sector investments in irrigation due to its importance on increasing and stabilizing food production.

The dominant delivery method is surface irrigation (flood or furrow irrigation) in which water is distributed over the irrigated area by gravity in overland flow. Almost all irrigation system in Indonesia are also classified in this category. The other systems are sprinkler and drip (trickle) irrigation. Although they are relatively new technologies requiring higher initial investment and more intensive management than surface irrigation, sprinkler and drip irrigation show great potential for maximizing the efficiency of water use and reducing irrigation-related environmental problems.

Irrigation projects can include the following facilities and infrastructure: (a) dams, watershed and reservoirs; (b) diversion and intake facilities; (c) wells, pumping stations, canals, ditches and pipelines for the conveyance of water (including drainage); and (d) distribution systems for sprinkler and drip irrigation.

3.1 Potential Environmental Impacts

The potential negative environmental impacts of most large irrigation projects include: waterlogging and salinization of soils, increased incidence of water-borne and water-related diseases, resettlement or changes in the lifestyle of local populations, and increase of agricultural pests and diseases resulting from the elimination of dry season die-back and the creation of a more humid microclimate. The expansion and intensification of agriculture made possible by irrigation has the potential for causing increased erosion; pollution of surface and groundwater from agricultural biocides; deterioration of water quality; and increased nutrient levels in the irrigation and drainage water resulting in algal blooms, proliferation of aquatic weeds and eutrophication in irrigation canals and downstream waterways. Increased quantities of agricultural chemicals are usually required in irrigated lands to keep production levels up; fertilizer must be used to compensate for high growth rate and loss of nutrients through leaching, and pesticides to control the greater numbers of crop pests and diseases.

As for waterlogging and salinity hazard, it will be serious problem particularly in arid or semiarid zones with fine soils (e.g., vertisols) in a wide floodplain such as the downstream area of Indus river and Nile river basin. Due to the humid climate with high rainfall, Indonesia will not be suffered from waterlogging or salinity problem. Even in eastern islands where have long dry season, waterlogging or salinity problem will not be expected due to porous soil structures.

Large irrigation projects which impound or divert river waters have the potential to cause major environmental disturbances resulting from changes in the hydrology and limnology of river basins. Reducing the river flow changes floodplain land use and ecology, disrupts riverine and estuarine fisheries, and causes salt water intrusion up the river and into the groundwater of adjacent lands. Diversion and loss of water through irrigation reduces the water supply for downstream users, including municipalities, industries and agriculturists. Without certain legal regulation such as water right, this kind of problem may not be solved in the course of the development in a river basin in principle.

A reduction in a river's base flow also decreases the dilution of municipal and industrial wastes added downstream, posing pollution and health hazards. The deterioration of water quality below an irrigation project can render the water unfit for other users, harm aquatic species, and, because of high nutrient content, result in aquatic weed growth that clogs waterways and has health, navigation and ecological consequences. Regulation on water quality is prerequisite, which calls for the necessity of water treatment and continuous monitoring.

The potential direct negative environmental impacts of the use of groundwater supplies for irrigation arise from overtapping groundwater supplies (withdrawing water in excess of the rate of recharge). This results in the lowering of the water table, land subsidence, decreased water quality, and saltwater intrusion (in coastal areas). Assessment of groundwater potential and recharge amount in planning stage is a crucial determinant for the success of the project. Monitoring and evaluation is another important work at post-project stage.

A number of external environmental factors influence irrigation projects. Upstream land use will affect the quality of water entering the irrigation area, particularly the sediment content (e.g., from agriculturally-induced erosion) and chemical composition (e.g., from agricultural and industrial pollutants). Use of river waters with a large sediment load may result in canal clogging. Over time, cleaning the canals and depositing the sediment on cropland, or simply irrigating with water of high sediment content can raise the land level to such a height that irrigation is impaired. Careful study on land use in the upstream of the project site will be necessary so as to reflect the future environmental change into project design.

The obvious benefits conferred by irrigation are those resulting from increased production of food. In addition, concentration and intensification of production on a smaller area can protect forests or wildlands from being converted to agriculture. Increased vegetative cover for a greater portion of the year helps reduce soil erosion, as does land preparation (e.g., land levelling and contouring). Some health benefits result from improved hygiene and a decrease in the incidence of certain diseases. Irrigation projects can also moderate flooding downstream.

3.2 Special Issues

(1) Social Issues

Social disruption is inevitable in large irrigation projects covering vast areas. Local people dislocated by the irrigation project face the classic resettlement problems: a decrease in the standard of living, increased health problems, social conflicts, and deterioration of natural resources in the resettlement area. The people remaining in the area will likely have to change their land use practice and agricultural patterns. The local people often find that they have less access to water, land and vegetation resources as a results of the project. Conflicting demands on the water resources and inequalities in distribution can easily occur both in the project are and downstream. All these factors -- changing agricultural practices, increasing population density, and altering the distribution of wealth -- can have a profound influence on traditional social patterns.

An increase, sometimes extraordinary, of water-borne or water-related diseases commonly is associated with the introduction of irrigation. The diseases most often linked with irrigation are schistosomiasis, malaria and onchocerciasis, whose vectors proliferate in the irrigation waters. Other irrigation-related health risks include those associated with increased use of agrochemicals, deterioration of water quality, and increased population pressure in the area.

(2) Irrigation Efficiency and Improvement of Existing Systems

Inefficient use of water (i.e., overwatering) wastes water which could go to other users and avoid ecological impacts downstream. This problem would be occurred where competition of water demand among areas or sectors are in critical condition (e.g., Jawa island). In such areas maximizing the efficiency of water use should be or primary concern of all irrigation project.

3.3 Characteristics of Irrigation in Indonesia

When talking about irrigation in Indonesia, one has usually imagined the irrigation to paddy field. The irrigation development in Indonesia is thus for paddy field. Unlike the upland crops, lowland paddy grows under a inundated condition in a levelled flat field. Under the inundated condition, water in paddy field usually move downwards, leaching nutrients out of soil. In this sense, salinity problem will unlikely to occur in Indonesia.

Being flat and levelled with levees, paddy field will not cause soil erosion, on the contrary paddy field tends to prevent soil erosion from strong rainfall. Besides paddy field can retard runoff by storing rainwater in a field. A part of stored water will be leached out of soil layer to augment groundwater.

Thus, irrigation for lowland paddy is rather different from that for upland crops. Other problems such as water related diseases, effect to downstream area, social problems, etc. will, however, be common issues to be examined.

4. Methods of Environmental Impact Assessment

4.1 Purpose of Environmental Impact Assessment (EIA)

The purpose of EIA is to present the likely environmental impacts of a proposed project, plan or policy so that a rational decision can be made upon its implementation. EIA also contributes to the reduction or mitigation of adverse impacts by proposing a number of project alternatives. Project alternatives may include alternative sites, alternative processes or alternative implementation schedules. The earlier it is carried out in the planning process, the more EIA may optimize the project design, from both economic and environmental points of view. For this reason, EIA is sometimes referred to as Early Identification of <u>A</u>lternatives. When applied in this way, EIA may also contribute to the sustainability of the resource use and environmental soundness of the executed projects.

The results of the assessment have to be presented in a proper and understandable way in a document called the Environmental Impact Statement (EIS). This document gives an overview of the beneficial and adverse impacts of the proposed project and the presented project alternatives.

4.2 Participants in the EIA process

(1) The proponent

The proponent is the person or group of persons who wishes to establish or carry out a proposed development activity, which is considered to have impacts on the environment. The proponent, sometimes called the initiator, may be a private person, a company, or a government agency.

(2) The decision maker

The decision maker is the person or agency whose decision on the proposed activity is requested by the proponent.

(3) Interest groups

In some countries, interest groups have been established who represent the general public. These groups, who are in most case likely affected people by the proposed activity and who have keen interest in the environment as a whole.

(4) Consultants

Consultants often play an important role in the preparation of the EIS. They may be employed by either the proponent or the decision maker.

4.3 General procedure of an EIA

The EIA process can be subdivided into three main stages:

- the pre-study phase;
- the actual impact assessment, which result in the EIS; and
- the post-study period, in which the information is used to come to a decision and in which the impacts of the project are monitored.

The impact assessment starts with the collection and analysis of basic data on the project and on the environment (including both socio-economic and natural aspects) as far as it is likely to be affected. The collection and analysis of the environmental data provides a description of the so-called base line conditions. In defining the baseline conditions also the environmental effects of autonomous developments (trends), may be taken into account.

Potential impacts are identified, based on the information on baseline conditions and sources of impact. This identification involves and estimate of the order of magnitude of the impacts. Usually not all potential impacts are studied in detail. For the selection of the impacts to be studied in detail, criteria are used such as:

- the magnitude of the change;
- the extent of the affected area; and
- the significance with respect to the effects.

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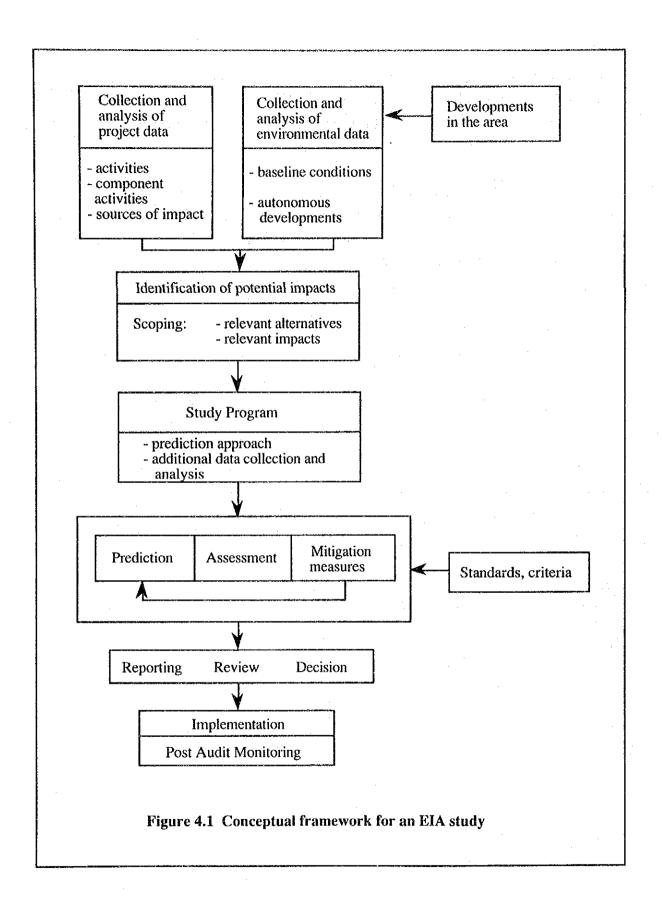
The process of selecting relevant alternatives and identification of the important impacts is commonly known as scoping. The scope of the EIA, which also includes agreement on the contents and requirements of the EIS, is usually determined in a number of meetings between the proponent and the decision making authority.

The actual study period concentrates on the preparation of the Environmental Impact Statement. In this phase an assessment is made of the selected alternatives and impacts. Furthermore measures to mitigate undesired, adverse impacts are proposed. In drafting the EIS, the following considerations have to be taken into account:

- the information must be clearly presented;
- the information has to be presented for the different phases of the activity (construction, operation); both direct and indirect and cumulative impacts have to be included;
- the information has to be structured in such a way that the significant impacts of each alternative are highlighted; and
- the EIS must have a summary, which is understandable for non-experts.

In some countries the pre-study phase is called the Initial Environmental Examination (IEE). The outcome of the IEE is sometimes used to determine whether or not the impacts of the proposed project are such that a full scale EIA has to be performed.

In the post-study, the EIS is reviewed, the actual decision is made and the impacts are monitored. The general outline of an environmental impact assessment is illustrated in the following figure, in which the conceptual framework of EIA studies is shown.



4.4 Field and Level of Application of EIA

(1) Field of application

For which projects or plans an EIA is obligatory differs from one country to another. There are three different approaches to the question of how to regulate the field of application of EIA. The first is an ad-hoc approach, in which a separate decision is made for each case, that is not based on a formal screening procedure. In the second approach the field of application of EIA is roughly determined, e.g. by giving certain project size thresholds, by a global screening of the environmental impacts or by applying environmental sensitivity criteria. Sometimes the screening is carried out as a formalized Initial Environmental Examination (IEE). On the basis of the results of this IEE it is decided whether or not a full scale EIA has to be carried out. In the third approach a positive or negative list is used. Such a list describes all the cases in which an EIA is, or is not, obligatory.

(2) Level of application

An EIA can be applied at various levels: at the level of individual projects, as well as at the level of strategies (plan and programs). The advantage of a policy level EIA is that it can be conducted early in the planning phase, before concrete proposals for projects are made. In this way the total scope of alternatives is larger. Also EIA's at the planning level may demonstrate the cumulative impact of a number of small projects which together from a development strategy, but are too small on a project basis for separate EIA's.

4.5 Management aspects of EIA

The main objective of an EIA is to give the environmental aspects of a proposed activity a proper place in the decision making process. This requires first of all collection of information on environmental effects of the proposed activity and secondly the use of this information by the decision maker. Many EIA's in the past have not reached their objective, because the authors failed to present the information which was required so as to be actually used by the decision maker . Experience has shown that crucial factors for success of an EIA are timing, focus on the main issues, and clear presentation of the results.

As regards the timing of an EIA, the assessment should take place as early as possible in the planning stage, parallel to other (e.g. technical design) studies. Too much detail in the EIA and EIS should be avoided. As major developments bring about other developments, which may have impacts as well, it is not always clear at which level further consequential impacts should be ignored. A good scoping procedure may solve this problem. The EIS should contain a

clear, balanced and understandable account of the impacts resulting from a proposed activity. Improperly analyzed or unclearly presented information, that is too extensive or unstructured, is of no use at all to the decision maker.

5. EIA in Indonesia

5.1 History

In response to the Stockholm Environmental Conference held in 1972, BAPPENAS established a Bureau for National Resources and the Environment, which might be the first commitment of the Indonesian Government to the principles of sustainable development and environmental protection. Professor Emil Salim was appointed to head a new State Ministry concerned with environmental affairs in 1976, which later was renamed as the State Ministry for Population and Environment (KLH). The Environmental Management Act in 1982 (Law Number 4/82) provided a legal basis for all subsequent policies. A number of Environmental Study Centers (PSLs) had been established in all national and provincial universities and in a number of private universities. The national Environmental Impact Management Agency, BAPEDAL, was established in July 1990. By the end of the decade the number of Indonesian Environmental NGOs had grown to more than 300. Another key development was the issuing of national regulations for environmental impact assessment in 1986.

5.2 EIA

Article 16 of the Environmental Management Act of 1982, Law 4/82, provides the legal basis for environmental assessment in Indonesia. As most Indonesian laws bearing upon the management of development, however, Law 4/82 does not provide operational guidelines for systematic implementation. Such guidelines awaited issuing of the Environmental Assessment Regulation (PP29 of 1986) and a series of Ministerial decrees beginning in 1987. PP29/86, known also by the mnemonic AMDAL for Analisa Mengenai Dampak Lingkungan, provides explicit guidance for the overall process.

AMDAL is an integrated review process to coordinate the planning and review of proposed development activities, particularly their ecological, socio-economic and cultural components, as a complement to the technical and economic feasibility.

Overall coordination of the AMDAL process is now under the responsibility of BAPEDAL. Authority for process implementation currently lies the Central and Provincial levels of government:

- 1. at the central level with 14 sectoral government departments and non-departmental government institutions, and
- 2. at the regional level with 27 provincial governments of Indonesia.

The goal of AMDAL is to facilitate and expedite economically sound, environmentally and socially acceptable development ventures. It involves the following essential steps:

- 1. Identify the potential environmental impacts of a proposed project
- 2. Predict the extent of impacts if the project is implemented
- 3. Evaluate the impacts, including:
 - a. identifying which can be mitigated or managed and how that management will be done, for example, through changes in project design or location, and
 - b. identifying and assessing the significance of those impacts which cannot be mitigated (residual impacts).

It is not necessarily that all projects are to enter the AMDAL process. The determination of potential environmental impacts will be based on the proposed project type, complexity and location.

The AMDAL process is comprised of the following documents:

PIL (Penyajian Informasi Lingkungan, or Preliminary Environmental Information) KA (Kerangka Acuan, or Terms-of- Reference)

ANDAL (Analisis Dampak Lingkungan, or Environmental Impact Analysis)

RKL (Rencana Pengeloaan Lingkungan, or Environmental Management Plan)

RPL (Rencana Pemantauan Lingkungan, or Environmental Monitoring Plan)

AMDAL should be initiated as early as possible in the planning stages of a project.

The first point of contact for a project proponent is the responsible government authority at the national or provincial level, either:

- a. A sectoral agency,
- b. A non-departmental government institution, or
- c. The Investment Board.

The proponent is to contact the responsible agency. In case the project is private and requires foreign investment or needs assistance from the Indonesian Government, the proponent must get permit from the Investment Board (Badan Koordinasi Penanaman Modal, BKPM). The BKPM may then pass the proponent to the appropriate agency of the Central or Regional Government. Other private projects may proceed directly to the responsible government authority at the national or provincial level.

Table 5.1 General Relationship between AMDAL and Project Planning

AMDAL stage	Project Cycle Phase
Initial screening of project	Planning and program development
PIL	Pre-feasibility design
ANDAL and conceptual outline of the RKL/RPL	Feasibility design
Project Approval-in-principle	Feasibility design
Detailed RKL/RPL	Detailed design and permit
Implementation of RKL/RPL;	Pre-construction; Construction;
Modification if necessary	Operation; Post-project Evaluation

Initial project screening and scoping are conducted to determine whether the project type is exempt from the AMDAL Process and, if not, where in the Process it should enter. (The scoping of impacts is a critical component of the AMDAL Process, and should take place in an inter-disciplinary forum involving the proponent, consultant and all relevant government departments and public interests). Government projects and non-BKPM private projects are screened by the responsible government authority. BKPM private projects are screened by an intersectoral team coordinated by BAPEDAL.

One of four screening and scoping decisions will be made:

- a. Project is exempt from the AMDAL Process,
- b. Project is unacceptable as proposed,
- c. The proponent will be asked to prepare a PIL document when the potential impacts of a project are unknown
- d. The proponent will be asked to prepare KA for an ANDAL report when important impacts associated with the project are thought.

If the project is determined unacceptable as proposed, the proponent may revise and resubmit it, or abandon the proposal. If an AMDAL document is to be prepared, it will be reviewed by either a Central or Regional AMDAL Commission, or its designate. An AMDAL Commission may at any time make the decision to reject an AMDAL document due to inadequacies.

Table 5.2 Koles	of AMDAL Commissions	
	Central Commissions	Regional Commissions
	(Komisi Pusat)	(Komisi Daerah)
Established by:	Each sectoral Minister or Head of non-departmental government agency	Governor.
Chaired by:	Typically the Secretary General of the agency	Typically Provincial Development Planning Bureau (BAPPEDA)
Permanent members:	Ministry of Home Affairs; BAPEDAL; University or other experts; agency representatives.	Provincial office of the State Ministry of Population and Environmental Study (BKLH); Environmental Study Center in the Province (PSL)
Temporary members:	May include members of the local co organizations, other governmental a and the Investment Board.	ommunity, non-governmental

 Table 5.2
 Roles of AMDAL Commissions

If a PIL is prepared first, a decision will be made within 30 days of its submission to:

- a. Proceed to KA for an ANDAL, because the PIL has shown that there are potentially important impacts. Preparation of the KA is the responsibility of the proponent. Approval and sign-off are the joint responsibility of the proponent and government,
- b. Proceed to the RKL/RPL, because impacts are not significant and can be mitigated and managed.

After the KA are approved, the proponent will submit an ANDAL report to the responsible AMDAL Commission. It is desirable that ANDAL contain at least conceptual RKL and RPL documents. The Commission has 90 days in which to decide to:

- a. Reject the project because the associated impacts are unacceptable, in which case the proponent may revise or abandon the proposal,
- b. Allow the project to proceed to RKL and RPL. The decision approving the ANDAL expires if the proposed activity is not implemented within 5 years of it.

Once PIL or ANDAL report is approved, the proponent will be asked to submit the proposed RKL and RPL¹. These documents should be based on feasibility-level project design.

¹ It is desirable that the PIL and ANDAL documents contain at least conceptual RKL and RPL documents, such that the reviewer can be aware of which of the identified impacts can be mitigated and managed. At least one agency, the Department of Public Works, requires this.

After the RKL and/or RPL are submitted, the responsible AMDAL Commission has 30 days in which to make a decision on the document(s). They may be approved with or without conditions.

Final decisions on projects reviewed at the national level are made by the sectoral Minister, on recommendation of the Central AMDAL Commission. Decisions on projects reviewed at the provincial level are made by the Governor, on recommendation of the Regional AMDAL Commission.

Detailed engineering design and associated permits follow the AMDAL decision-in-principle, and incorporate the conceptual environmental management and monitoring conditions laid out in the feasibility design. Components of the environment that can not be licensed, such as important ecological values, must be adequately addressed in the RKL and RPL.

6. Technical Guidelines for AMDAL on Irrigation Projects

In accordance with the Act No.4/82, followed by PP29/86, Minister of Public Works issued the decree No.46/PRT/1990 concerning Technical Guidelines for the Management of AMDAL of Public Works Projects. Based on the Decree No.46/PRT/1990, a series of Technical Guidelines for the Management of Analysis of Environmental Impacts of Public Works Projects have been issued.

The guidelines have been prepared aiming to provide more detailed guidelines for preparation of AMDAL documents in order to ensure more accurate analysis of the impacts brought about by the project activities. Besides, the Technical Guidelines are expected to serve as reference for the project initiators in the preparation of AMDAL documents. So far 11 volumes of guidelines have been issued, including

Ground Water Irrigation Projects	(779/KPTS/1990)
Surface Water Irrigation Projects	(779/KPTS/1990)
Swamp Water Irrigation Projects	(779/KPTS/1990)
Road and Bridge Projects	(779/KPTS/1990)
Waste Management Projects	(779/KPTS/1990)
Waste Water Management Projects	(779/KPTS/1990)
Municipal Drainage Projects	(779/KPTS/1990)
Water Supply Projects	(779/KPTS/1990)
Human Settlement Projects	(184/KPTS/1991)
	Surface Water Irrigation Projects Swamp Water Irrigation Projects Road and Bridge Projects Waste Management Projects Waste Water Management Projects Municipal Drainage Projects Water Supply Projects

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10) Flood Control and River Regulation Projects (184/KPTS/1991)

11) Reservoir Projects (412/KPTS/1992)

Of the above 11 guidelines, items 1) to 3), and 11) will be related to irrigation projects. Those four guidelines classify the projects according to the project scale whether they need EIA. They are tabulated as below:

Categories II		
(PIL/ANDAL)	Categories III (PIL/No AMDAL)	Categories IV (No AMDAL)
Interval of wells <500 m	Interval of wells 500-1,000 m	Operation and Maintenance of Irrigation Network
Pump Capacity >30 liter/sec or near residence and seashore	Pump Capacity <30 liter/sec	
	Interval of wells <500 m Pump Capacity >30 liter/sec or near residence and seashore	Interval of wells <500 mInterval of wells 500-1,000 mPump Capacity >30 liter/sec or near residence andPump Capacity <30 liter/sec

Table 6.2 Classif	ication of Surface Wa	ter Irrigation Project	et by Scale
Categories I	Categories II	Categories III	Categories IV
(ANDAL)	(PIL/ANDAL)	(PIL/No AMDAL)	(No ĂMDAL)
Large Scale Irrigation	Medium Scale Irrigation	Small Scale Irrigation	Operation and
Development	Development	Development	Maintenance of
>5,000 ha	2,000-5,000ha	<2,000 ha	Irrigation Network
<u> </u>	Upgrading and	Upgrading and	-
	Rehabilitation	Rehabilitation	н. Н
	>5,000 ha	<5,000 ha	
Source: Petuniuk Te	knis Analisis Mengenai	Dampak Lingkungan	Provek Irigasi Air

Source: Petunjuk Teknis Analisis Mengenai Dampak Lingkungan Proyek Irigasi Air Permukaan 1990 Departamen Pekerjaan Umum.

Table 6.	5 Classi	neation of Swamp Irr	igation Project by Sc	ale
Cate	gories I	Categories II	Categories III	Categories IV
(AN	IDAL)	(PIL/ANDAL)	(PIL/No AMDAL)	(No AMDAL)
Tidal I	rrigation	Tidal Irrigation	Tidal Irrigation	Operation and
Devel	lopment	Development	Development	Maintenance of
>10,	000 ha	5,000-10,000ha	<5,000 ha	Irrigation Network
Swamp	Irrigation	Swamp Irrigation	Swamp Irrigation	4°*
Devel	lopment	Development	Development	
>5,0)00 ha	2,000-5,000 ha	<2,000 ha	
		Upgrading Tidal	Upgrading Tidal	
		Irrigation Development	Irrigation Development	
		10,000-60,000 ha	<10,000 ha	
	· ••	Upgrading Swamp	Upgrading Swamp	-
		Irrigation Development	Irrigation Development	
		5,000-30,000ha	<5,000 ha	
Source:		eknis Analisis Mengenai Irtamen Pekerjaan Umum.	Dampak Lingkungan Pro	yek Irigasi Rawa,

Table 6.3 Classification	of	Swamp	Irrigation	Pro	ject by	Scale
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 Table 6.4
 Classification of Reservoir Project by Scale

Categories I	Categories II	Categories III	Categories IV
(ANDAL)	(PIL/ANDAL)	(PIL/No AMDAL)	(No AMDAL)
Large Scale Irrigation	Medium/Small Scale	Planning, Education,	the same as
Development	Irrigation Development	and Training about	Categories III
>5,000 ha	<5,000 ha	Dam Project	
or			
Project of			
Significant Impact			

Source: Petunjuk Teknis Analisis Mengenai Dampak Lingkungan Proyek Bendungan, 1990 Departamen Pekerjaan Umum.

Each guideline describes the requirement and depth of environmental impact analysis according to the project stage. Since the work activities in many cases differ from one project to another, only general (not specific) description on environmental impacts is given as a matrix in the guideline. An example is shown on Table 6.5, for surface water irrigation project.

As seen in the table, impact on local people is main concern at any project stage. Land acquisition and relocation issues are the most serious impact to be considered explicitly. Compensation cost and circumstances of relocated area often dissatisfy affected people, which cause friction with the government. Participatory approach should be taken at the beginning of the project cycle (planning stage) to avoid such conflict as much as possible so that consent regarding project implementation can be obtained from all or at least majority of affected people. Information extension will also be an important approach to the people. At the construction stage, unavoidable disturbance such as air pollution (by dust), vibration by transportation device or machinery, etc. is expected with mobilization and construction works. To minimize such annoyance, hearing from the affected people should be required in order to promote well-managed construction implementation.

River water will be turbid during the construction of weir and its appurtenant structure, which may affect people in the downstream area. To what extent the impact will reach is not known, but information regarding duration of the construction works should be notified to those likely affected people prior to the commencement of the work.

Even after the completion of the project, impact of the structures and change in lifestyle on local people will be followed. Once any problem or issue is found, certain measures should be taken. However, in this stage, impacts may be unclear since they will be caused not only by single factor but by other factors. Examples are sedimentation in canals which may related to the change in landuse in the upstream area, and the use of chemicals in the rice field which may affect water quality in the downstream area as well as farmers' health. Joint or coordinated monitoring with other related agencies such as the Ministry of Agriculture should be made.

Stace	Activities likely to	Environment to be	Impact assessment	Alternatives of impact mitigation	mpact mitigation
0	cause impacts	affected by the impacts	and evaluations	Management	Monitoring
Crace	Activities likely to	Environment to be	Impact assessment	Alternatives of in	Alternatives of impact mitigation
Jiago	cause impacts	affected by the impacts	and evaluations	Management	Monitoring
I. Pre-construction	1. Deciding the dam location and canal traces	a. Community's socio- economic conditions	Social unrest	Information about the project to the community and concerned agencies	 Issues within the society Reaction from other agencies
		 b. Natural resources and cultural heritages 	Substantial damages	 Avoid areas sensitive to deterioration Adjust to the spatial plan/regional potentials 	 Social unrest Reaction from other agencies
	2. Land acquisition	a. Ownerships of land, crops and buildings	 Dissatisfied with the compensation. Disappointment in the project Stagnations to the project 	- Information extension and approach to the community - Reasonable compensation	Community's attitude and perceptions
		 b. Community's source of living 	- Change to/loss of source of living	 Initiate change of occupation Community's attitude and Priority for employment perceptions for local community 	Community's attitude and perceptions
	3. Relocation of residence	a. Residence relocated	- Disappointments in the new location and occupation in the new location	- Information extension and approach to the community	Community's attitude and perceptions
		b. Residents of the new location	- Social jeatousy and frictions	 Suitable location for settlement New location having about the same socio-economy and cultudal conditions 	Attitudes and perceptions of the people to be relocated
II. Construction					·
A. Construction Preparation	1. Mobilization of material and heavy equipment	 Mobilization of material and a. Environment/neighbohood/ heavy equipment buildings and public buildings 	- Increase of air pollution (dust) and noise	 Adjustment of transportation means Control of vehicle speed Regular showering 	- Community's complaints

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Activities likely to	Environment to be	Impact assessment	Alternatives of impact mitigation	npact mitigation
cause impacts	affected by the impacts	and evaluations	Management	Monitoring
	b. Public infrastructure/roads	- Damage to public infrastructure/roads	 Upgrading/repair of public infrastructure/roads used Suitable transportation 	
2. Mobilization of manpower	Community's socio-economic conditions	 Social unrest and jealousy Interaction with local customs 	Job priorities to local community	- Social unrest
3. Land opening and clearing	a. Environment/neighbohood/ dwellings and public buildings	- Increase of air pollution (dust) and noise	- Proper implementation	- Community's complaints
	b. Biotic Resources	 Loss of covering vegetation and change of land functions 	 Planting of trees in the substitute location/empty land around the project 	Balance of biotic resources
	c. Water resources	- Increase of water pollution due to erosion of the land	- Drainage management	River water quality
	d. Public utilities, telephone, gas, electric lines, etc.	- Effects to public utilities	- Relocation and repair of the damages	Proper functioning of public utilities
4. Construction of access road	a. Environment/neighbohood/ dwellings and public buildings	- Increase of air pollution (dust) and noise	 Management of the implementation Regular showering 	- Community's complaints
 Erection/operation of base camp, workshop, warehouse, etc. 	a. Neighborhood/housing and public buildings	- Increase air polllution (by dust), and noise	 Arrange the implementation Use of noise barriers and dust filters 	- Community's complaints
	b. Water resources	 water inundation pollution to water resources and water bodies 	- Good drainage - Provide a waste pool	- Quality of the water resources
	c. Biotic resources	- effects on flora and fauna	 Good drainage system Waste pool Dust filters and noise barriers 	Floral and fauna conditions

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Stage	Activities likely to	Environment to be	Impact assessment	Alternatives of impact mitigation	pact mitigation
	cause impacts	affected by the impacts	and evaluations	Management	Monitoring
	 6. Quarry management (by project) 6.1 Material quarrying (on land) a. Neighborhood/housing and public buildings 	a. Neighborhood/housing and public buildings	- Increase air polllution (by dust), noise and vibration	 Arrange the implementation Arrange work hours 	- Community's complaints
		b. Field resources	- Erosion/landslide	 Implementation by phases Reclamation of alternative phases Water resources 	 Erosion level Land stability Relocation
		c. Water resources	- Effects on the quality & quantity of water - Shallowing/sedimentation in upstream	- Good drainage - Settling basin	- Sedimentation level - Water quality
	6.2 Material quarrying (in the river)	a. Water resources	 River water quality River way erosion Stability of water structure 	 Proper location Proper amount of quarrying 	 River water quality Structure stability
		b. Users in the upstream	- Effects on user in the upstream		- Complaints from water users in the upstream
 B. Construction 1. at dam location 	1. Draining (partly/whole) the site	- Water resources	- Decrease in the riverflow capacity	- Implementation at low debit	- Higher river level in the upstream
	 Earth work (dredging) in riverbody 	- Water resources	 Increased pollution to the river water Effects to water users in the upstream 	 Proper construction arrangements Information to water users in the upstream 	 Water quality Unrest of water users in the upstream
	 Construction of dam and facilities 	- Neighborhood/housing and public buildings	- Noise & vibration from foundation pile erection	- Proper construction system	- Community's complaints

Stage	Activities likely to	Environment to be	Impact assessment	Alternatives of impact mitigation	ipact mitigation
	cause impacts	affected by the impacts	and evaluations	Management	Monitoring
	4. Earth and building material transportation	 Neighborhood/housing and public buildings 	 Increase air pollution (by dust) and noise 	- Control of vehicle speed	- Community's complaints
	, ,	- Public infrastructure/roads	- damages to public	- Repair/upgrading of the	- Infrastructure condition
			1111128/LOCUTE/TOADS	Intrastructure used - Suitable transportation	·
2. at the spillway & drainage	1. Digging and dredging of canals	- Public infrastructure/roads	 damages to public infrastructure troads 	- Proper implementation	- Infrastructure condition
			- Traffic congestion	- Repair to the damages	
		- Water resources (canal rehabilitation)	- increased pollution to water	 Arrangement of work hours Information to water users in the upstream 	- Community's complaints - Water quality
			- Effects to agricultural activities	 Cropping patterns Implementation Repair to damages 	 Infrastructure conditions Community's complaints Water quality
				- Information to water users in the upstream	
			- Effects to water users in the upstream	- Cropping patterns	
		- Field resources	- Changes of field aesthetics	 Proper dumpsite location & dump system Afforestation 	 Field aesthetics Field use
III Operation and Maintenance	0 ·			- Repair to damages	
1. at the dam site	 Drowning in the upstream part 	- Community's socio-economic conditions	- Change of community's living pattern	 Information and approach to community 	
		- Biotic resources	- Change of aquatic habitat in the upstream and downstream	- Provision of adequate facilities	- Biotic balance
			рал		
		- Field resources	- Land stability	- Enforcement of labil areas	- Landslides

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Ctores	Activities likely to	Environment to be	Imnact assessment	Alternatives of impact mitigation	pact mitigation
0.480	cause impacts	affected by the impacts	and evaluations	Management	Monitoring
	2. Dam operations	- Water resources	- Conflicts in water use	 Priority of water use Arrange cropping pattern 	- Community's unrest
		- River morphology	 Change of riverway and riverbody Effects to river infrastructure 	 Reef enforcement Enforcement of infrastructure 	 River body stability Infrastructure functions
2. at the spiilway	 Operations of irrigation canals/structure 	- Community's socio-economic conditions	- Effects to riverside community's mobility	- Crossing bridge at proper location	- Community's complaints
	2. Maintenance of irrigation canals/structure	- Water resources	 Increased turbidity of irrigation water Effects to activities in rice fields 	 Proper implementation Cropping pattern arrangement 	- Agricultural activities - Water quality
3. Canals	- Maintenance of canals	- water resources	 Increased turbidity of irrigation water Effects to activities in the upstream 	- Proper arrangements	- Water quality
4. In the rice fields	- Application of pesticides	- Farmers	- Effects on health of farmers	 Use of masks Good implementation Information 	- Farmers' health conditions
		- water resources	 increased pollution to spilled water Weeds along the structure 	 Information Use proper pesticides/chemicals 	 discharged water quality pland diseases
		- Biotic resources	- Effects to habitat	- Information	
5. Along the river basin	- Improper management of river basin	- Water resources	 Increased levels of erosion/sediments/wastes Shorter lifetime of dam 	 Information Reforestation, terraces, checkdams 	- Sedimentation/pollution levels
		- Field resources	- Deteriorated upstream	- Proper agriculture system in the upstream	

Annex I

Database and its Management

ANNEX I

DATABASE AND ITS MANAGEMENT

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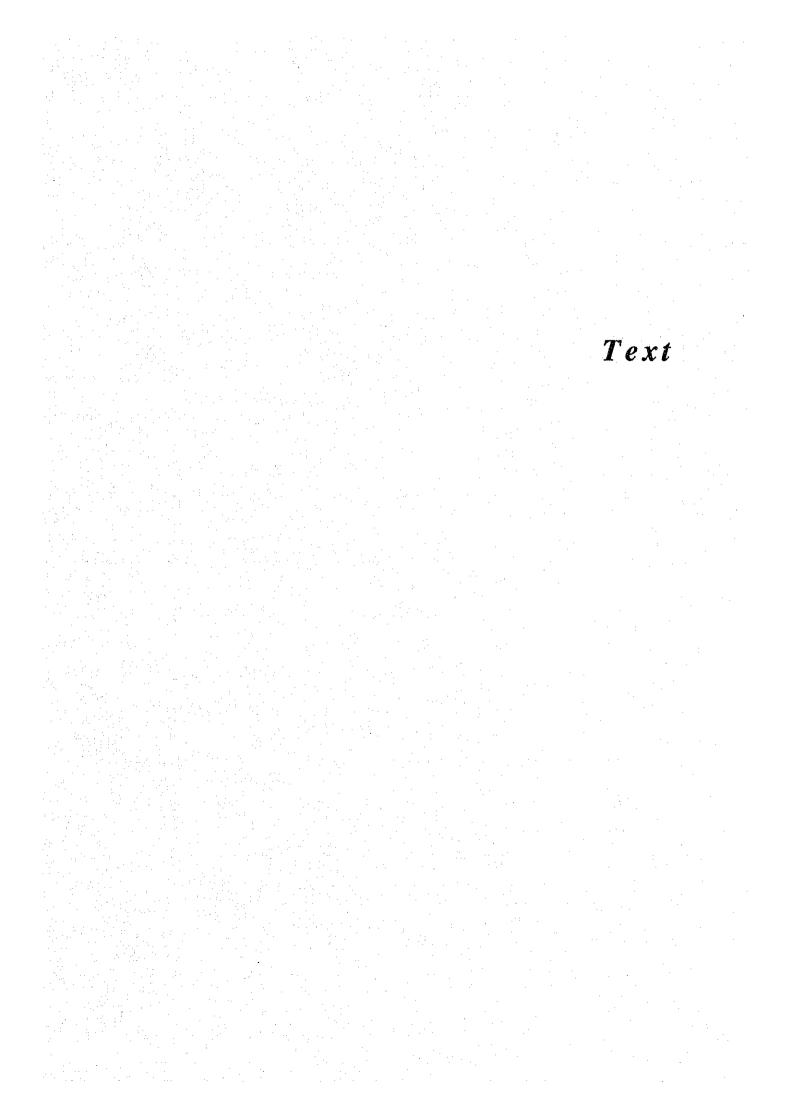
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1. Introduction

A Computer database is very powerful tool to store collected information in proper manner and to get information whenever it may required. In connection with the study, the database was prepared basing upon data obtained throughout the inventory survey and fully utilized to analyze present status of irrigation schemes and formulation of future development planning.

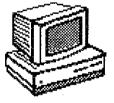
Directorate of Water Resources Planning (BPP), Directorate General of Water Resources Development, which have understood necessity of integrated database management for irrigation system, intended to update the stored data periodically for future management. Then BPP requested the team to hand over the database system for planning and programming. In response to the request by BPP, the team hands over the system containing computer program for data storage and retrieval, collected data.

This annex, first, explains what the computer database can do, making a telephone directory a sample. Secondly, in Chapter 3, the computer database in the study is outlined. Consequently, operation manual of computer database and system reference are presented in detail in Chapter 4 and Chapter 5, respectively.

A person in a management level will get what the system can do, by going through chapter 3. A person who operate the system and who is responsible for data maintenance, can move to Appendix - 1, that describes how to operate the system. On the other hand, Appendix - 2 will be very useful for a person who have knowledge of database system and will maintain the system.

2. What Database Can Do?

Database is computer jargon for a familiar and essential item in our everyday lives. A database is a collection of information organized and presented to serve a specific purpose.



One of the more familiar database examples is the telephone directory.

This common printed database contains the names, addresses, and telephone numbers of individuals, businesses, and government agencies. The addresses and telephone numbers have little value by themselves. They are useful only when they are related to a name.

The number of databases in common use is astonishing. Some common databases are a dictionary, a cookbook, a mail-order catalog, an encyclopedia, a library's card catalog, your

checkbook, and so on. Other familiar databases are stock market reports in newspaper, an accounts receivable ledger, and a personnel file.

Why are these examples databases? Why isn't the newspaper or a nonfiction book considered a database? After all, these also contain information. The reason is specific. In case of the examples given above, information is presented in a manner that makes it easy for you to locate some particular piece of information.

In the telephone directory, the telephone numbers and addresses are related to the name. The names are presented in alphabetical order so you can find them easily. Find the name and you can find both the address and the telephone number. The name is the Key to using the phone book. A dictionary works similarly : There is a word and a definition. The words are listed alphabetically so that they can be found, and the definition is related to the word. The key to the dictionary is the word.

The common element in all of the examples is organized information presented in a way that makes it easy to find by use of a key. In other words, any information that can be presented as tables (rows and columns) can be a database. Some examples of column headings in tables that could be considered databases are shown in following figure:

Examples	Column I	Headings		
PHONE BOOK:	NAME	ADDRESS	PHONE N	IUMBER
DICTIONARY:	WORD	DEFINITION		
CATALOG:	ITEM	DESCRIPTION	SIZE	PRT NO. COST
STOCK REPORT:	STOCK	SHARES	HIGH	LOW

What's a database?

By now, you should have a general concept of a database and you might be asking, "okay, but what's a computer database file? What can I do with it that I can't do without it?" The computer database file can't do anything you couldn't do yourself from a printed database. However, many things are just more practical to do with a computer than without a computer.

We have all found a scrap of paper with a phone number on it - no name, just a number. If we want to discover the name that belong to the number, the telephone book isn't much help. If, However, the telephone directory is a computer database file, we can ask the computer to check the phone number and the name will promptly appear. Suppose you want the phone number of someone named Smith who lives on Santa Monica Boulevard in Los Angeles. You can ask the computer's Los Angeles phone book file for the names, addresses, and phone numbers of all the Smiths on Santa Monica Boulevard. It may not give you a single name and numbers, but it will surely narrow down the search.

The computer is no panacea. It can't do anything you can't. but, it can help you do the things you want to do quickly and easily. It is a tool to help you accomplish things that are simply not practical without it.

Using a personal phone book as an example, a simple database might resemble the one shown in next figure. Of course, a real database file can contain many more items of information. In fact, this database is much better kept in a small notebook than in a computer. You can carry it around with you, make notes in it; and it's a lot cheaper. To get value from a computer you need to have a lot of information - in general, so much information that you can't use it efficiently without the computer.

Conceptually, a computer database file is just like one that you could create from paper and pencil. Because both a paper database and a computer database file exist to be used, an appropriate question is: What do you actually do with your phone book?"

Name	Address	Phone Number	
Byers, Robert A Sr	9999 Glencrest, Standale	555-9242	
Byers, Robert A Jr	48 N. Catalina, Pasedena	555-9540	
Cassidy, Butch	4800 Rimrock Ct. Sunland	555-1121	
Goose, Sil E.	21809 Cottage Ln., Montecito	555-8667	
Prague, Burton	67343 301 Trail N., Boca Del	555-4665	
Prague, Cary	60 Crosskey, Windsor	555-6887	
Zeus, Thor T.	25 Lightning Lane, Greece	555-6878	

A Simple Database

You write in new acquaintances, perhaps change the addresses or telephone numbers of people who move or get phone. Maybe you cross some people out (or erase them, if you've had enough foresight to keep your record in pencil). When you want to use the information stored there, you may be trying to make a call, data - reflects a process of change and, at any given time, will supply you with the information you are looking for. The same is true of a computer databases file. You can easily add, remove, or change the information in a computer database file. Likewise, you can easily view information from your database file.

In your everyday activities, you are always adding and subtracting from information at hand, changing it, selecting what you what to see, and ignoring what you don't want to see. This activity is basic to the thinking process. But, you are going to put all this information that you are so accustomed to having strewn about - where you can see it and touch it - into a computer database file.

Now, there will be something holding this information, something between you and data. Once you begin to use the computer you need to become comfortable with the idea that the data is inside the "blinking box." Even though you can no longer "touch" the information, it is there when you need it. After you become comfortable with this knowledge, you will be amazed at how many ways a computer database file can fulfill your information needs.

Using your computer will become as easy as using your phone book. It will take some thought, some planning, and some "how-to" knowledge. You needs to know how to create, how to use, and how to change your store of information. In the learning process, you won't have to reinvent the wheel. You are only learning a new function - a new set of mechanics for a new machine - designed to support your efforts to perceive and process information already familiar to you.

3. Database System in FIDP

This chapter. outlines the computer system used in the study and presents what is input and output of the system.

3.1 General

Data that consist the system are based on the inventory survey conducted from July to August, 1992 in all Provinces in Indonesia. The objectives of the survey are (1) to collect data on all the irrigation schemes for the study and (2) to clarify the status of irrigation development, especially real development potential and/or necessity of upgrading or special maintenance works for existing schemes and on the study stage and depth for the new development schemes. As for result of analysis in the survey, refer Annex - E, "Inventory Survey."

Inventory survey was carried out for three categories ; (i) surface irrigation scheme, (ii) swamp irrigation scheme and (iii) groundwater irrigation scheme.

3.2 Questionnaire

Questionnaires for inventory survey were prepared and finalized after trial inventory survey in Jawa Barat. The following three (3) kinds of questionnaires were prepared according to the type of development;



- Surface irrigation development,
- Swamp development, and
- Groundwater development.

Data items collected by the inventory survey are as follows;

Location of scheme Classification of Scheme History Present status of scheme, especially area Future status after implementing construction / rehabilitation Works Feature of irrigation facilities Construction / rehabilitation cost, if any Environmental Aspects

Questionnaire is attached to Appendix 2 in this Annex.

3.3 Selection of Scheme

Selection of inventoried scheme was made in following manner;

Surface irrigation development scheme

Existing scheme :

schemes indicated in "Rekapitulasi Inventarisasi Daerah Irigasi Pemerintah, 1991". However, scheme which planned area is less than 150 ha were excluded from the inventory survey since PU intends to transfer all small scale scheme up to 150 ha to farmers' group.

all schemes indicated in the list of on-going scheme and proposed scheme obtained at Provincial Office.

schemes indicated in "Inventarisasi Luas Pemamfaatan Lahan Rawa Pasang Surut (PRS) dan Rawa non Pasang Surut (PNPS)" (Inventory of Land Potential on Tidal Swamp and Non-Tidal Swamp). Schemes that function

Swamp development scheme

On-going and Proposed scheme :

Existing scheme :

On-going and Proposed scheme :

all schemes indicated in the list of on-going scheme and proposed scheme obtained at Provincial Office.

as only fishery were excluded.

Groundwater development scheme

Only data and information of On-going scheme and Proposed scheme will be collected based on scheme list available at Provincial Office.

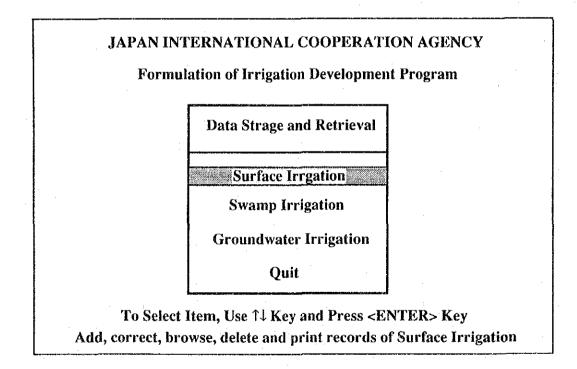
Procedure of Selection of the inventoried scheme is given in Figure 3.1.

3.4 Description of the System

This section is main part of the chapter and gives you what the system can do.

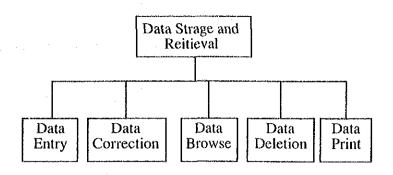
The database system consists of three sub-system; (i) Data storage and retrieval (ii) Print report, and (iii) System maintenance.

User-friendly interface is considered in this system so that even user, who has no knowledge of computer database system, can operate it easily. Most operation can be made by selecting menu as shown below;



3.4.1 Data Storage and Retrieval Sub-system

Sub-system of data storage and retrieval is further divided into five (5) menus, that are shown below;



Data Strage and Retrieval Menu

<u>Data entry sub-menu</u> is used when you want to register data of new irrigation scheme. When following instruction appears on the display, you can proceed data entry. First of all, you are prompted to enter an identification code (I.D.Number) of irrigation scheme. In this system, code no. of inventory of irrigation system made by Directorate Irigasi I is adopted. Note that this I.D.Number is important to identify schemes and no change is allowed And then, enter scheme name and relevant data. After confirmation if the entered data is correct, data is added to the master file.

Once data is registered, you can <u>correct</u> the data whenever you may require. Further, you can <u>delete</u>, <u>browse</u>, <u>print</u> entered record, if necessary. In any case, select particular menu and enter I.D.Number to search. The computer searches the record in which same code as specified one is contained. Data to meet the condition is retrieved from the master file and appears on the display. Otherwise, message of "I.D.Number xxxxxxx is not found" should appear on the display and ask you to re-enter the code number. After retrieving data, you may proceed such session as data correction, data deletion, data reference, and data printout. In case of data correction and data deletion, computer asks whether the corrected data is to be re-registered into the master file. If you don't want to change contents of record, quit without update the data. Note that contents of remains unchanged in both data reference and data printout sessions.

3.4.2 Report Sub-system

Once the records are stored into database system, you can utilize the data freely and print out data by any format you want. In the system, following kinds of output formats are provided for each category of irrigation;

(1)	Surface irrigation scheme	12
(2)	Swamp irrigation scheme	7
(3)	Groundwater irrigation scheme	2

1 - 7

These print out can be obtained just only selecting Province and the Format No. Sample of Printout format is presented in Table 3.1.

3.4.3 System Maintenance Sub-system



This system maintenance sub-system is used to keep data and the system in proper condition. Frequent backup of stored data is essential for preventing some accident because crash of computers and infection by a computer virus could result in damage of stored data. Therefore, program to make data backup from a hard disk drive of computer set to floppy disk drive is attached to the system. Furthermore, in reverse, function to restore data from floppy disk drive to hard disk drive is also installed.

3.5 Maintenance of The Computer Database

As stated in the preceding section, stored data in the system is based upon the inventory survey conducted in whole Indonesia in July, and August, 1992. Since receiving raw data the JICA Study Team have been making much effort to verify and correct data with other data source and developed computer program, but there may be, nevertheless, some discrepancy and error in the data. Meanwhile, status of irrigation schemes may vary year by year especially in irrigated area, record of construction / rehabilitation, and so on. Therefore, periodical data updating is vital to keep the computer database valuable.

The JICA Team strongly recommends BPP to check and update entered data at least once a year. BPP will request to Province to check and correct information of existing scheme and add information of new irrigation scheme to be implemented. The Team believes the first step to formulate future development plan is to collect fresh data from Province constantly and keep them in proper manner. It should be understood that value of a computer database depend on quality of information, such as (i) correctness, (ii) frequency of update data, and (iii) quickness to add latest data. Thus, it is recommended for BPP to establish organization to keep the data information system efficiently.

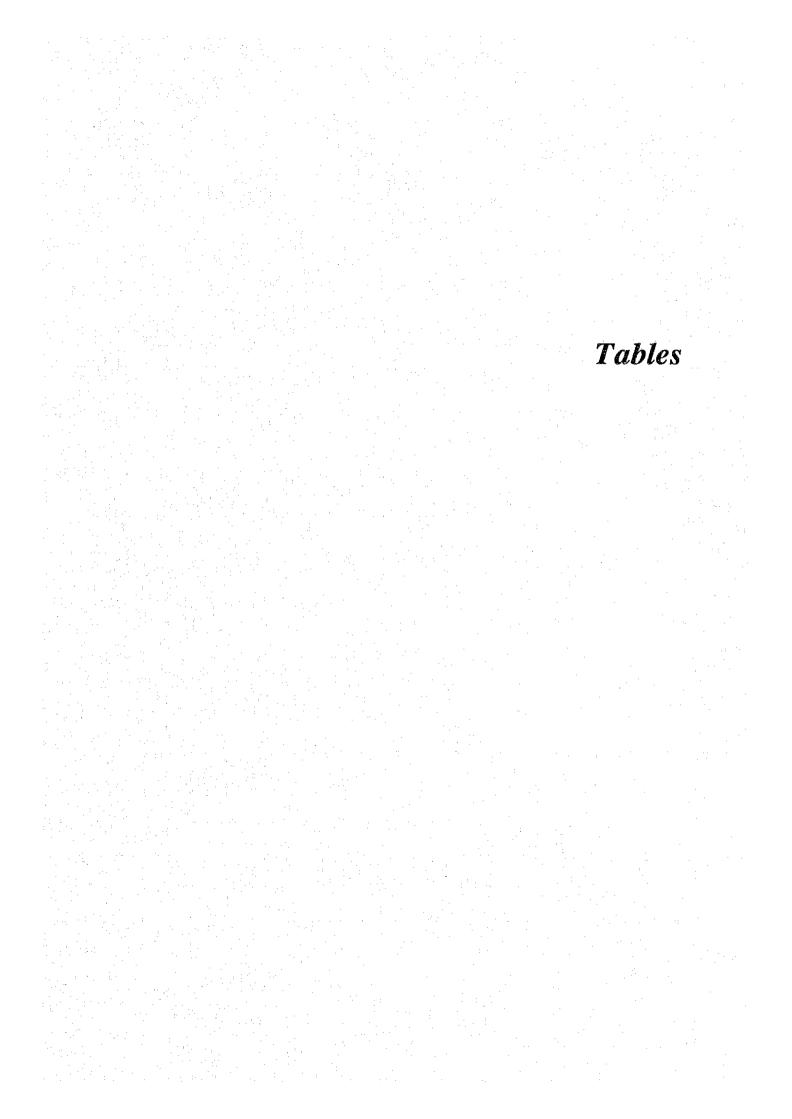


Table 3.1 Sample of Computer Printout

August 10,1993

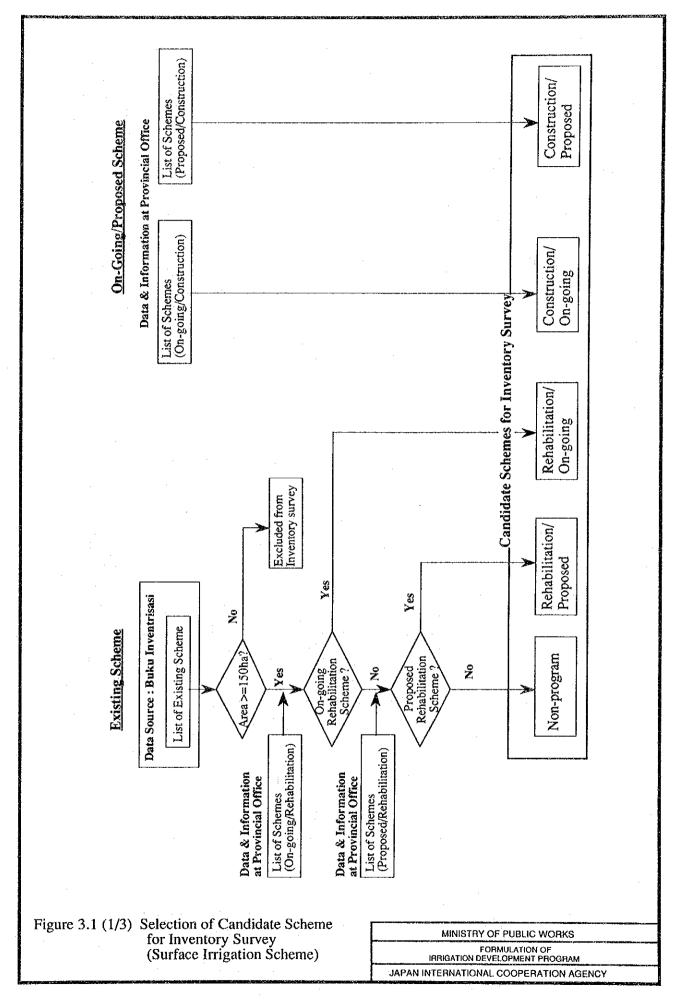
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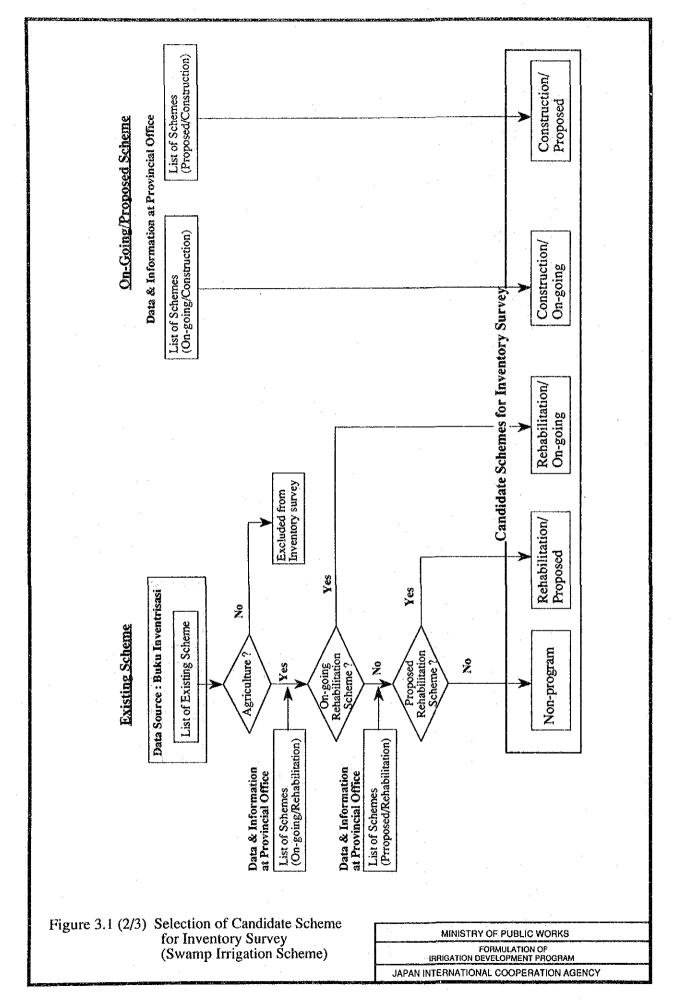
IT - 1

Figures

I iguies



IF - 1



IF - 2

On-Going/Proposed Scheme

	Data & Information at	Provincial Office
	List of Schemes (On-going/Construction)	List of Schemes (Proposed/Construction)
	Construction/ On-going	Construction/ Proposed
	Candidate Schemes f	or Inventory Survey
Figure 3.1 (3/3)	Selection of Candidate Scheme for Inventory Survey (Groundwater Development)	MINISTRY OF PUBLIC WORKS FORMULATION OF IRRIGATION DEVELOPMENT PROGRAM JAPAN INTERNATIONAL COOPERATION AGENCY

Data & Information at Provincial Office