Table I-5 CATEGORIZATION AND SELECTION OF PROJECTS FROM HYDROLOGICAL VIEWPOINT (1/3)

CODE	PROJECT AREA	DISTRICT	ITEM CONSIDERED FOR CATEGORIZATION								CATEGORIZATION				SPECIAL INTEREST	SELECTION
			Basin Number	General hydrological condition (1 - 10)	Water shortage (1 - 5)	Estimated runoff (ha meter/year)	Gross irrigation requirement (ha m/year)	Area (ha)	Catchment (km2)	Type of reservoir	Score for rainfall depth is less than 7	Water shortage (score is 3, 4, 5)	Water availability (sufficient or not)	Proposed area (30 ha - 400 ha)		
PERLIS																
PR 1	SIMPANG GETI	-	1	3	3	194	95	70	3	B	O	O	O	O	Water management combined with PR4	O
PR 2	PANGGAS-SMALL DAM PI	-	1	3	3	981	162	120	15	A	O	O	O	O		O
PR 4	TASEK MELATI	-	1	3	5	168	314	232	3	B	O	O	X	O	Water management combined with PR1	O
PR 5	PAYA KELUBI MANGO PR	-	1	3	5	6	14	10	0	B	O	O	X	X		
PR 6	HUTAN LEMBAH MANGO	-	1	3	5	19	35	26	0	B	O	O	X	X		
PR 7	~~TASEK MELATI-H~~	-	1	3	5	168	-	-	3	B	O	O	-	-	Dropped by State DID	
KEDAH																
KH 1	~~DURIAN PERAGIN~~	~~LANGKAWI~~	2	7	5		186	200		A	X	O	-	O	Dropped by State DID	
KH 2	~~AIR HANGAT~~	~~LANGKAWI~~	2	7	5		232	250		A	X	O	-	O	Dropped by State DID	
KH 3	AMPANGAN PDG SAGA	LANGKAWI	2	7	4	1189	452	486	12	A	X	O	O	X	Island	O
KH 4	KAWASAN PADI KEDAWA	LANGKAWI	2	7	5	991	186	200	10	B	X	O	O	O	Island, Government policy for paddy	O
KH 5	~~KEDAWANG~~	~~LANGKAWI~~	2	7	5		177	190		D	X	O	-	O	Combined with KH4	
KH 6	P LIBALI BERKELOMPOK	KUBANG PAS	3	7	4	134	65	64	1	A	X	O	O	O		O
KH 13	KG PDG GELANGGANG	PDG TERAP	3	6	4	1199	101	100	13	A	O	O	O	O		O
KH 14	SKIM JANING	PDG TERAP	3	6	4	2768	78	77	30	A	O	O	O	O		O
KH 15	LUBUK MERBAU	PDG TERAP	3	6	5	277	81	80	3	A	O	O	O	O		O
KH 16	SEKIM TANDOP BESAR	PDG TERAP	3	6	4	1845	51	50	20	B	O	O	O	O		O
KH 19	KURONG HITAM IRRIGAT	PDG TERAP	3	6	4	2879	34	34	31	A	O	O	O	O		O
KH 31	KUBUR PANJANG	PENDANG	3	6	5	6458	122	120	70	A	O	O	O	O		O
KH 32	KG KAYU TIGA	PENDANG	3	6	5	369	72	71	4	A	O	O	O	O		O
KH 34	~~KG SAWA KECIK~~	~~PENDANG~~	3	6	5		51	50		A	O	O	-	O	Dropped by State DID	
KH 35	BK PERAK	PENDANG	4	7	5	606	43	48	6	A,D	X	O	O	O		
KH 40	SG AIR JERNIH	KUALA MUDA	5	9	4	1120	93	120	10	A	X	O	O	O		
KH 41	SG BARU	KUALA MUDA	5	9	4	1120	93	120	10	A	X	O	O	O		
KH 43	BENDANG DALAM	KUALA MUDA	5	9	5	112	32	42	1	A,E	X	O	O	O		
PULAU PINANG																
PP 1	LUAR BAN PINANG TUNG	S PERAI UTAR	5	9	5	464240	8	10	4145	C	X	O	O	X		
PP 2		~~S PERAI UTAR~~	5	9	5		77	100		A	X	O	-	O	Dropped by State DID	
PP 3	TOK BEDU IRRIGATION A	S PERAI UTAR	5	9	5	2138	52	68	19	C	X	O	O	O	Good example of TYPE C	O
PP 4	~~KG TOK BEDU, AIR MELI~~	~~S PERAI UTAR~~	5	9	3		160	207		A	X	O	-	O	Dropped by State DID	
PP 5	PINANG TUNGGAL IRRIG	S PERAI UTAR	5	9	5	829	430	558	7	A	X	O	O	X		
PP 6	SG JARAK IRRIGATION A	S PERAI UTAR	5	9	5	2971	366	475	27	A	X	O	O	X		
PP 7	~~BK TOH ALLANG~~	~~S PERAI UTAR~~	5	9						D	X	-	-	-		
PP 8	~~SG BURUNG~~	~~BARAT DAYA~~	6	5	5		131	131		A	O	O	-	O	Island, Combined with PP9	
PP 9	SG BURUNG	BARAT DAYA	6	5	5	1289	202	202	14	B	O	O	O	O	Island	O
PP 10	~~MAK SULONG~~	~~S PERAI TENG~~	5	9						D	X	-	-	-	Dropped by State DID	
PP 11	SG KULIM IRRIGATION SC	S PERAI TENG	5	9		17136	1116	1447	153	D	X	-	O	X		
PP 12	SKIM PENGAIRAN SG KUL	S PERAI TENG	5	9		560	2	3	5	B	X	-	O	X		
PP 13	SKIM PENGAIRAN TASEK	S PERAI SELA	5	9			131	170		D	X	-	-	O		
PERAK																
PK 1	KG TASEK	HULU PERAK	4	7	5	949	36	40	9	A	X	O	O	O		
PK 2	PUSAT PERT TANAH TING	HULU PERAK	27	7	4	1592	-	-	15	A	X	O	-	-		
PK 3	INDUSTRI BUAH-BUAHAN	SELAMA	8	8	2	1808	Nil	57	10	D	X	X	O	O		
PK 4	BENDANG TEMELONG	HULU PERAK	7	7	5	1839	-	NA	21	A	X	O	-	-		
PK 5	P KELOMPOK BUAH-BUA	LARUT MATA	8	8	4	6039	Nil	30	33	B	X	O	O	O		
PK 6	P KELOMPOK BUAH-BUA	LARUT MATA	8	8	4	1537	Nil	292	9	A	X	O	O	O		
PK 7	SENOUK CHANGKAT NIN	LARUT MATA	8	8	5	5171	Nil	113	29	A	X	O	O	O		
PK 8	P KELOMPOK BUAH-BUA	LARUT MATA	8	8	3		Nil	-		B	X	O	-	-		
PK 9	BENDANG JENALIK	KUALA KANG	7	7	4	999	54	60	11	A	X	O	O	O		
PK 10	BENDANG KG LANEH	KUALA KANG	8	8	5	555	Nil	65	3	A	X	O	O	O		
PK 11	KANC TALIAIR BENDANG	KUALA KANG	8	8	5	470	Nil	52	3	A	X	O	O	O		
PK 12	KANC TALIAIR BENDANG	KUALA KANG	8	8	4	315	Nil	50	2	A	X	O	O	O		
PK 13	KANC TALIAIR PDG RENG	KUALA KANG	8	8	4		Nil	100		A	X	O	-	O		
PK 15	DENDANG A	MANJUNG	10	6	4	1240	70	59	16	A	O	O	O	O		O
PK 16	DENDANG B	MANJUNG	10	6	4	1240	136	114	16	A	O	O	O	O		O
PK 17	BRUAS & TAMBAHAN	MANJUNG	10	6	4	1240	332	278	16	A	O	O	O	O		O
PK 19	KG LALAT BATU 7	HILIR PERAK	9	8						B	X	-	-	-		
PK 20	SG BATANG PDG MATI	HILIR PERAK	9	8		1329	112	142	12	A	X	-	O	O		
PK 21	SG MANIK,IRRIG SCHEME	HILIR PERAK	9	8	3	76411	5193	6600	690	D	X	O	O	X		

Table I-5 CATEGORIZATION AND SELECTION OF PROJECTS FROM HYDROLOGICAL VIEWPOINT (2/3)

CODE	PROJECT AREA	DISTRICT	ITEM CONSIDERED FOR CATEGORIZATION								CATEGORIZATION				SPECIAL INTEREST	SELECTION
			Basin Number	General hydrological condition (1 - 10)	Water shortage (1 - 5)	Estimated runoff (ha meter /year)	Gross irrigation requirement (ha m/year)	Area (ha)	Catchment (km2)	Type of reservoir	Score for rainfall depth is less than 7	Water shortage (score is 3, 4, 5)	Water availability (sufficient or not)	Proposed area (30 ha - 400 ha)		
SELANGOR																
SG 1	TEBUK BERIHUN	SABAK BER	11	7	4		770	738		D	X	O		X		
SG 3	SG JANG	HULU SELA	12	6	3		208	200		A	O	O		O		
SG 4	BK TAMU	HULU SELA	12	6	3		208	200		A	O	O		O		
SG 5	KG KALONG TENGAH	HULU SELA	12	6	3		73	70		D	O	O		O		
SG 6	P SAYURAN SG YU	KUALA SEL	13	4	5		1340	1000		A	O	O		X		
SG 8	KUANG	GOMBAK	13	4	5	226286	3172	2368	3450	B	O	O	O	X		
SG 9	REKREASI SG CHONGKAI	HULU LANC	14	8		12400	140	164	118	A	X	-	O	O		
SG 10	KG KANTAN	HULU LANC	14	8	5		21	25		A	X	O		X		
SG 11	KG PASIR	HULU LANC	14	8	5		51	60		A	X	O		O		
SG 12	MINANG KABAU	HULU LANC	17	4	5		137	100		A	O	O		O		
SG 13	JLN ENAM KAKI 1	HULU LANC	17	4	4	5569	79	58	88	A	O	O	O	O		O
SG 14	SAPAN BT MINANGKABA	HULU LANC	17	4		3713	109	80	59	A	O	-	O	O		
SG 15	SG JAI BK KEPONG	HULU LANC	17	4	5	4429	198	145	70	A	O	O	O	O		O
SG 16	MARDI RESEARCH STATI	KELANG	15	6	5					B	O	O				
SG 18	TAMAN PERT MALAYSIA	PETALING	13	4						A	O	-				
SG 24	P KELOMPOK SAYURAN	KUALA LAN	15	6	5		42	40		B	O	O		O		
SG 25	P KELOMPOK KONTAN K	KUALA LAN	15	6	5		48	45		B	O	O		O		
NEGERI SEMBILAN																
NS 1	STESEN MARDI JELEBU	JELEBU	16	3	5	131	383	220	4	A	O	O	X	O	MARDI, demeonstration effect	O
NS 2	BUAH-BUAHAN LANJUT I	KUALA PIL/	17	4	3		18	13			O	O		X		
NS 3	SRI MENANTI	KUALA PIL/	17	4	4	1736	194	142	53	B	O	O	O	O		O
NS 4	PEMBANGUNAN SAWAH	GEMAS	18	4	3	13076	258	200	400	D	O	O	O	O		O
NS 5	REMBAU	REMBAU	17	4		418			13	A	O	-				
NS 6	P TERNAKAN UDANG GA	KUALA PIL/	17	4	5		274	200		A	O	O		O		
NS 7	KELOMPOK KG CHENGK/	REMBAU	17	4	4	7	202	148	0.2	B	O	O	X	O		
NS 8	KG BK TEMBOK & SG RA	PORT DICK	17	4						A	O	-				
MELAKA																
MA 1	TEBONG	ALOR GAJA	19	5	4		31	25		B	O	O	-	X	Dropped by State DID	
MA 2	ULU SG BULOH	ALOR GAJA	19	5	5	30379	12	10	403	A	O	O	O	X		
MA 3	SOLOK BT ALANG	ALOR GAJA	19	5	4		18	15		B	O	O	-	X	Dropped by State DID	
MA 4	FELCRA RAMUAN CINA	ALOR GAJA	19	5						B	O	-	-	-	Dropped by State DID	
MA 5	MERIAM PATAH	ALOR GAJA	19	5						B	O	-	-	-	Dropped by State DID	
MA 6	SOLOK PUNGGAI	ALOR GAJA	19	5	4		15	12		B	O	O	-	-	Dropped by State DID	
MA 9	PDG KELADI	ALOR GAJA	19	5						D	O	-	-	-	Dropped by State DID	
MA 11	SG UDANG	MELAKA TE	19	5	5	29902	61	50	397	D	O	O	O	O		O
MA 12	FELDA BK KATIL	MELAKA TE	19	5						B	O	-	-	-	Dropped by State DID	
MA 14	KANDANG	MELAKA TE	19	5	4		9	7		B	O	O	-	-		
MA 15	SOLOK BK META	MELAKA TE	19	5	5		9	7		B	O	O	-	-		
MA 16	FELCRA BK SEDANAN	JASIN	19	5	3	156	118	97	2	A	O	O	O	O	FELCRA	O
MA 17	GINGIN LAKE	JASIN	19	5	5		1221	1000		E	O	O	-	-	Dropped by State DID	
MA 18	KG PULAI/SERKAM	JASIN	19	5						B	O	-	-	-	Dropped by State DID	
JOHOR																
JR 3	SAWAH KEBUN BARU	MUAR	19	5	3	2787	217	178	37	B	O	O	O	O		O
JR 8	LDG KELOMPOK KG SRI T	KLUANG	21	7	5		110	120		B	X	O	-	O		
JR 9	LDG KELOMPOK BT SAM	BATU PAHA	20	4	5		164	114		B	O	O	-	O		
JR 10	LDG KELOMPOK KANGK/	BATU PAHA	25	6	4	160	58	50	2		O	O	O	O	DOA	O
JR 12	TUNJOK LAUT	KOTA TING	23	7		273	59	60	3	D	X	-	O	O		
JR 14	SG CHEMARAN	KOTA TING	23	7			10	10			X	-	-	X		
KELANTAN																
KN 1	JUBAKAR PANTAI	TUMPAT	26	5	5	388	48	50	4	B	O	O	O	O		O
KN 4	KG BELIAN	TUMPAT	26	5	4	1163	38	40	12	B	O	O	O	O		O
KN 5	LUBOK SELEHONG	TUMPAT	26	5	4	1163	48	50	12	B	O	O	O	O		
KN 8	BENDANG JELUTONG, KC	KOTA BHAI	26	5	5	8	72	75	0	B	O	O	X	O		
KN 9	BENDANG BT TINGGI, BK	KOTA BHAI	26	5	5	7	29	30	0	B	O	O	X	O		
KN 10	BENDANG SOKOR, BK CH	KOTA BHAI	26	5	5	3	48	50	0	B	O	O	X	O		O
KN 11	KUBANG TEBAKANG	PASIR MAS	26	5	4	872	96	100	9	C	O	O	O	O		
KN 12	BENDANG TASEK BERAN	PASIR MAS	26	5	5		96	100		C	O	O	-	O		
KN 13	TASIK PUTERA	PASIR MAS	26	5	4	775	19	20	8	E	O	O	O	X		O
KN 16	BENDANG PMTO SUNKAI	PASIR PUTE	26	5	5	291	31	32	3	D	O	O	O	O		
KN 24	RANC TALIAIR HILIR SAT	MACHANG	27	7	2	1624	392	465	15	D	X	X	O	X		
KN 26	RANC PENGAIRAN TERAS	TANAH MEI	27	7	3	3353	124	147	32	C	X	O	O	O		
KN 27	RANC PANGAIRAN GUAL	TANAH MEI	27	7	4	2229	71	84	21	A	X	O	O	O		
KN 35	RANC TALIAIR LEPAN AC	KUALA KR/	27	7	4	1804	30	36	17	A	X	O	O	O		

Table I-5 CATEGORIZATION AND SELECTION OF PROJECTS FROM HYDROLOGICAL VIEWPOINT (3/3)

CODE	PROJECT AREA	DISTRICT	ITEM CONSIDERED FOR CATEGORIZATION								CATEGORIZATION				SPECIAL INTEREST	SELECTION
			Basin Number	General hydrological condition (1 - 10)	Water shortage (1 - 5)	Estimated runoff (ha meter /year)	Gross irrigation requirement (ha m/year)	Area (ha)	Catchment (km2)	Type of reservoir	Score for rainfall depth is less than 7	Water shortage (score is 3, 4, 5)	Water availability (sufficient or not)	Proposed area (30 ha - 400 ha)		
TERENGGANU																
TR 1	TELABAK IRRIGATION SC	BESUT	27	7	4	590	98	116	6	A	X	O	O	O		
TR 3	SKIM TANAMAN PADI MA	KUALA TRC	28	5	5	139	435	420	2	E	O	O	X	X	Good example for TYPE E. Area to be reduced	O
TR 4	P KELOMPOK SAYURAN	KUALA TRC	28	5	4	181	8	8	2	B	O	O	O	X		
TR 7	SALIRAN TOK JIRING	KUALA TRC	28	5	5	76905	933	900	851	A	O	O	O	X		
TR 12	P KELOMPOK SAYURAN	KUALA TRC	28	5	4	181	21	20	2	B	O	O	O	X		
TR 14	P KELOMPOK SAYURAN	KUALA TRC	28	5	4		21	20		B	O	O	-	X		
TR 20	SKIM TANAM PADI DURI	MARANG	28	5	5	365	141	136	4	A	O	O	O	O		O
TR 24	P KELOMPOK SAYURAN	MARANG	28	5	4		10	10		B	O	O	-	X		
TR 28	P KELOMPOK SAYURAN	MARANG	28	5	4		6	6		B	O	O	-	X		
TR 34	LEMBAH MARANG II	MARANG	28	5	5	3615	622	600	40	A	O	O	O	X		
TR 38	P KELOMPOK SAYURAN	MARANG	29	5	4		10	10		B	O	O	-	X		
TR 42	P KELOMPOK SAYURAN	HULU TRG	28	5	4		17	16		B	O	O	-	X		
TR 44	P KELOMPOK SAYURAN	HULU TRG	28	5	4	181	41	40	2	B	O	O	O	O		O
TR 45	P KELOMPOK SAYURAN	HULU TRG	28	5	4	181	5	5	2	B	O	O	O	X		
TR 50	KOLAM ABANG	DUNGUN	29	5		18	-	-	0	E	O	-	-	-		
PAHANG																
PH 9	PAYA PAGAR SASAK	LIPIS	32	7	3	240	42	44	3	A	X	O	O	O		
PH 11	P.WAU,BETONG & GEMA	MARAN	35	4	4	696	86	59	7	A	O	O	O	O		O
PH 12	PAYA JELUTUNG	MARAN	35	4		197	73	50	2	A	O	-	O	O		
PH 13	PAYA NYAK BESAR	MARAN	35	4	3	987	309	212	10	A	O	O	O	O		O
PH 14	PAYA TING & BESAR KER	MARAN	35	4	3	432	102	70	5	A	O	O	O	O		O
PH 16	PAYA NYAK KECIL	MARAN	35	4	3	592	79	54	6	A	O	O	O	O		O
PH 17	PAYA PDG TENGGALA	MARAN	35	4	3	617	83	57	7	A	O	O	O	O		O
PH 19	PAYA SG LING	MARAN	35	4	3	237	262	180	3	A	O	O	X	O		
PH 20	PAYA LANTING	MARAN	35	4	3	3208	200	137	34	A	O	O	O	O	Inundation scheme	O
PH 23	PAYA PESAGI	MARAN	35	4	3		136	93		A	O	O	-	O	Inundation scheme, Fish pond	O
PH 24	PAYA KROT	MARAN	35	4	3	2468	92	63	26	A	O	O	O	O		O
PH 25	PAYA LDG	MARAN	35	4	3	494	232	159	5	A	O	O	O	O		O

Table I-6 80 % RELIABLE MONTHLY RAINFALL

BN	Location	Station No.	Station Name	80 % Reliable Monthly Rainfall in mm													
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Ann
1	Perlis	6502003	Tasoh	8	9	29	43	110	80	86	106	157	170	92	33	922	1544
2	Lankawi	6398121	Sg.Penghulu	9	8	31	74	180	153	153	173	257	232	126	20	1416	2077
3	Kedah north	6105037	Gajah Mati	12	12	64	114	155	100	115	127	228	244	122	25	1318	2024
4	Kedah central	5807067	Sik	14	16	61	146	165	100	135	138	210	251	151	56	1443	2070
5	Kedah south, Perai	5305091	Kulim	43	40	109	180	159	87	119	123	195	271	201	73	1600	2440
6	Pulau Pinang	5402002	Pulau Pinang	12	16	35	102	194	80	126	131	261	230	129	20	1334	1916
7	Perak northeast	4811078	Elphill	45	67	87	132	142	73	88	71	150	179	144	85	1263	1856
8	Perak northwest	4807031	Taipin	195	186	296	348	188	98	113	125	205	310	324	195	2583	3761
9	Perak central east	4311001	Kampar	98	36	235	202	161	77	75	55	161	155	173	154	1582	2577
10	Perak central west	4307041	Sitiawan	80	82	89	114	98	45	49	69	103	75	158	146	1107	1976
11	Perak south	3711160	Ulu Bernam	85	61	114	127	118	52	45	73	126	153	183	146	1283	1912
12	Perak southeast	3717051	Bukit Frazer	106	54	88	100	135	69	47	46	89	202	186	166	1289	1937
13	Selangor west	3313043	Kuala Selangor	68	56	57	79	63	45	40	67	98	162	138	63	937	1577
14	Selangor central	3117070	Kuala Lumpur	62	131	133	233	151	85	80	97	139	140	164	90	1505	2216
15	Selangor southwest	2615131	Batu Untong	37	26	48	77	118	86	118	130	145	194	191	96	1268	1898
16	N.Sembiran north	2920012	Kuala Klawang	22	20	45	26	36	13	33	16	74	59	91	32	467	974
17	N.Sembiran west	2719001	Seremban	36	40	89	65	89	24	75	39	98	128	156	66	904	1269
18	N.Sembiran east	2724082	Jeram Padang	46	44	96	92	116	52	60	60	94	104	160	74	996	1557
19	Melaka	2222020	Melaka	24	21	77	108	87	96	107	116	137	142	162	68	1144	1773
20	Johor north	2330009	Melvile	23	27	50	98	80	47	47	68	72	90	144	66	811	1530
21	Johor northeast	2438185	Mersing	76	27	45	49	91	93	119	123	123	143	226	312	1427	2334
22	Johor central	2033152	Kluang	33	43	78	146	123	77	86	80	119	125	129	92	1130	1817
23	Johor southeast	1839196	Simpang Mawai	88	23	68	47	160	132	129	103	139	118	183	157	1346	2006
24	Johor south	1537114	Johor Bahru	78	87	119	156	142	106	95	102	114	156	171	157	1482	2152
25	Johor southwest	1829001	Batu Pahat	52	44	82	116	96	75	119	88	122	133	147	69	1143	1849
26	Kelantan north	6021061	Pasir Mas	44	14	21	17	51	83	129	137	173	175	248	292	1384	2166
27	Kelantan central	5521050	Kuala Krai	50	22	35	43	101	96	129	135	207	191	213	294	1516	2217
28	Terengganu north	5331048	Kuala Terengganu	47	23	27	20	47	65	69	98	96	179	329	291	1291	2284
29	Terengganu south	4734079	Dungun	67	29	35	26	60	75	78	98	99	159	248	334	1306	2166
30	Pahang north, Kelan	4620045	Merapoh	19	14	53	64	147	105	110	72	175	205	173	132	1267	2072
31	Pahang northeast	4324113	Kuala Tahan	27	16	36	99	153	86	105	82	163	183	133	75	1157	1836
32	Pahang Lipis	4120064	Kuala Lipis	77	58	71	105	139	91	81	85	155	157	197	158	1374	2094
33	Pahang north coast	3833004	Kuantan	106	42	47	46	114	82	88	119	155	160	210	313	1480	2342
34	Pahang central coast	3533102	Pekan	52	28	49	52	96	56	49	79	77	133	150	260	1081	2045
35	Pahang central	3424081	Temerloh	20	13	44	100	80	25	40	17	115	112	130	106	800	1356
36	Pahang south	2929001	Ldg. Sg. Mengah	49	19	30	77	114	45	58	48	74	75	145	114	847	1477
37	Pahang south coast	2834180	Chondong	106	25	43	39	67	49	82	90	106	122	242	304	1274	2309

Remarks : Probability analysis was done by Iwai Method using monthly rainfall records provided by DID.

Note :

163	Main rainy season
67	Other rainy season
36	Main dry season
55	Other dry season

BN : Basin number (Fig. 2.1)

Tot : Yearly total of 80 % reliable monthly rainfall

Ann : 80 % reliable annual rainfall

Table I-7 63 CANDIDATE SITES INCLUDING DID AND DOA RECOMMENDATION (1/3)

COD	NO	NAME OF PROJECT	1 NO_FARMH	2 ACR_PL	3 ACR_UPL	4 ACR_FTC	5 ACR_FARM	6 SOIL_TEX	7 POVERTY	8.Aa PC_A_AREA	8.Ab PC_B_AREA	8.Ia PC_A_GROSS	8.Ib PC_B_GROSS	9 IACR_PL	10 IACR_UPL	11 ILAND_OWN	12 TREND	13 PER_SUCC	14 LAND_OUT	15 EX_FO	15.a EX_ORGNO	15.b EX_ORGCAP
		PERLIS																				
PR	1	SIMPANG GETI	171	40	12			C,SAND,SILT	12	40		2646							V,P,R	YES	120	
PR	2	PANGGAS SMALL DAM PROJE	30	30	54	30		C,L,SAND	15	30	30	2646	2646				SAME		V,R	YES		
PR	6	HUTAN LEMBAH MANGO PRO	62			26.2		C,SAND,SILT									SAME	60	V,P,R,U	YES	38	
		KEDAH																				
KH	4	KAWASAN PADI KEDAWAN	150	200				C,SAND	20	200		3000					INC	40	V,R,FR	Y		
KH	6	P LIBALI BERKELOMPOK	56		58	36	1.5	C,L	28							22	SAME	40	R	Y	1	
KH	13	KG PDG GELANGGANG	90	100	50	20	20	C,L	35	100	100	1820	2100	20	20	15	INC	90	V,O(SUGER CANE)	Y	60	1200
KH	14	SKIM JANING	150	117	10	10	10	C,L	60	117	117	2458	1950	5	5	9	INC	40	V,P,R	Y	141	7050
KH	15	LUBUK MERBAU	150	80	15	15	10	C,L	40	80	20	2548	2184	3	5	15	INC	60	V,P,R,U	Y	80	
KH	16	SEKIM TANDOP BESAR	250	50	10	10	10	C,L	50	50	NIL	2548		5	5	12	INC	40	V,P,R,U	Y	50	
KH	19	KURONG HITAM IRRIGATION	170	105	15	30	15	C,L,SILT	85	105	105	2730	2457	2.5	6	12	INC	20	V,R,U,F	Y	45	6700
KH	32	KG KAYU TIGA	15	64				C,SAND		64	64	2448					SAME	80	R	Y	1	1900
KH	40	SG AIR JERNIH	200	120				C,SAND	20	200		2500					INC	40	V,P,R,U	Y	200	
KH	41	SG BARU	180	120				C,SAND	15	120	50	2400	2400				INC	40	V,P,U	Y	180	
KH	43	BENDANG DALAM	60	42				C		42	42	2000	2000				INC	60	V,O,R,U	Y	60	
		PULAU PINANG																				
PP	3	TOK BEDU IRRIGATION AREA	34	68				C	5	68	68	3900	3900				SAME	60	V,RUBBER	Y	25	
PP	5	PINANG TUNGGAL IRRIGATI	280	558				CLAY		558	558						INC	60	V,O	YES		
PP	6	SG JARAK IRRIGATION AREA	265	475						475	475						INC	60	V,O,C	YES		
PP	8	SG BURUNG	360	202	524	437		SAND		202	202	1832.07	1832.07	79		20	DEC	80	V,G,U	YES		
PP	13	SKIM PENGAIRAN TASEK SEL	200			170	170	CLAY,SAND									INC	100	V,O,C,R,U,F	YES		
		PERAK																				
PK	20	SG BATANG PDG MATI	58	142.51				C		142.51	142.51	2110	2110				S	60	V,OP,CC,PF,R,UC	Y	1	600000
PK	21	SG MANIK,IRRIG SCHEME	2962	6600	215.38	215.38		C	750	6149	6149	2110	2110				I	60	V,OP,R,UC,O	Y	3573	600000
		SELANGOR																				
SG	3	SG JANG	200			200		CLAY	20							20	INC	80	R,F	NO	100	
SG	4	BK TAMU	200		200	200		CLAY	20							10	INC	100	R,F	YES	200	
SG	5	KG KALONG TENGAH	100	100				CLAY,LOAM	20					70		70	INC	80	R,O(FRUIT)	NO	20	
SG	11	KG PASIR	8		12	20		SAND								12	SAME	80	V,G,R,U,F		50	
SG	14	SAPAN BT MINANGKABAU	318	180	20			CLAY		100	100	1800	1500	20	20		SAME	20	V,U,O(BELIMBING	NO	380	11824
		NEGERI SEMBILAN																				
NS	1	STESEN MARDI JELEBU	(220)																			
NS	7	KG BK TEMBOK & SG RAYA	147	260		15		C,S,P		140	60	800		90		30	S	20	V,OP,CC,R,UC	Y		
		MELAKA																				
MA	2	ULU SG BULOH	15	NIL	NIL	NIL	NIL	c	5					NIL			S	100	V,C,R,U,F,O(DURIA	N		
MA	11	SG UDANG	6	10	NIL	NIL		c	4					NIL	NIL	NIL	S	60	V	NO		
MA	15	SOLOK BK META	10	NIL	NIL	NIL	7	c	6								S	60	P	NO		
MA	16	FELCRA BK SEDANAN	119	-	312	97		c	25							312		108			80	V,OP,C,R,U,F
		JOHOR																				
JR	8	LDG KELOMPOK KG SRI TIMC	180	60	40	30	30	LOAM	NO							35	45	SAME	60	V	YES	68	350
JR	9	LDG KELOMPOK BT SAMBUL	112		113.6	40	40	CLAY	112							73.6	62	SAME	40	V,OP,R		1	100000
JR	10	LDG KELOMPOK KANGKAR P	25		56	32	32	CLAY	15							32	33	SAME	40	OP,R,F	YES	1	50555
		KELANTAN																				
KN	1	JUBAKAR PANTAI	35	160	20			CLAY,SILT,LO	35					20	40	20	INCREAS	40	VILLAGE,COCOA,C	YES	135	
KN	4	KG BELIAN	150	40	20	8		CLAY,SILT,LO	150					40	10		SAME	40	VILLAGE,GRASS	YES	100	
KN	5	LUBOK SELEHONG	150	40	20	8		CLAY,SILT,LO	150					40	10	20	SAME	40	VILLAGE,GRASS	NO	100	
KN	8	BENDANG JELUTONG, KOK L	65	75				CLAY,SAND	45	25		1300		3		3	INCREAS	20	VILLAGE,PADDY,F	NO		
KN	9	BENDANG BT TINGGI, BK CHI	40	30				CLAY,SAND	30	30	20	1500	1220				INCREAS	20	VILLAGE,PADDY,F	NO		
KN	10	BENDANG SOKOR, BK CHINA	60	50				CLAY,SAND	50	35		1500					INCREAS	20	VILLAGE,PADDY,F	NO		
KN	13	TASIK PUTERA	30	20	8			CLAY		20	20	4700	4700				INCREAS	20	VILLAGE	YES	30	1500
KN	16	BENDANG PERIGI	55	27		2904		CLAY,SAND	50	27	5	1000	900				INCREAS	20	VILLAGE,PADDY,F	NO		
KN	24	RANC TALIAIR HILIR SAT I	453	465	50				440	436	436			30	20	50	INCREAS	80	VILLAGE,RUBBER	NO		
KN	26	RANC PENGAIRAN TERASIL	120	147	5	2	3	CLAY	50	30	30	1800	1800	30	5	25	INCREAS	40	VILLAGE,RUBBER	YES	60	100
KN	27	RANC PENGAIRAN GUAL IPOI	150	84	15	2		CLAY	100	84	75	2500	2300				SAME	20	VILLAGE,RUBBER	YES	105	100
KN	35	RANC TALIAIR LEPAN AGOR	45	32	19184	658		LOAM	45	32		3700					SAME	20	VILLAGE,RUBBER	YES	160	
		TERENGGANU																				
TR	1	TELABAK IRRIGATION SCHEI	58	100	16	12	10	C	50	97	69.4	2500	2220	3			INC	40	V,O,C,G,R,U,F	YES	50	
TR	3	SKIM TANAMAN PADI MARAS	403	200	150	50	20	C	400	100		1200		100	30	50	SAME	40	V,R,U,F	YES	60	
TR	4	P KELOMPOK SAYURAN	20		8			S	3								SAME	60	C	YES		
TR	7	SALIRAN TOK JIRING	200	600	100	150	50	C	100	400		3884		200	50	200	INC	40	V,P,R,U	YES	100	
TR	12	P KELOMPOK SAYURAN	40		20			C									SAME	60	V,C,P,R,U	YES		
TR	14	P KELOMPOK SAYURAN	12					C	5								SAME	60	V,P,R,U	YES		
TR	20	SKIM TANAM PADI DURIAN F	30	40	76	10	10	C	30	20		1000		201	56	10	INC	40	V,R,U,F	YES	25	
TR	24	P KELOMPOK SAYURAN	10		4.8			C									SAME	60		YES		
TR	28	P KELOMPOK SAYURAN	13		6			C												YES		
TR	34	LEMBAH MARANG II	68	200	250	100	50	C	60	200		1000		210	200	20	INC	40	V,O,P,R,U	NO		
TR	38	P KELOMPOK SAYURAN	14		7.5			SAND	8								SAME		V,C			
TR	42	P KELOMPOK SAYURAN	40	16	16			C	38								SAME	60	R,F	YES		
TR	44	P KELOMPOK SAYURAN	22	40	2.4			C	22					37.6	0.2	28	INC	40	R	YES		
TR	45	P KELOMPOK SAYURAN	5	4.4	4.4			L	5								INC	20	R,F	YES		
		PAHANG																				
PH	19	PAYA SG LING	75	180				C						180		75	SAME	NONE	V,O,R	NO		
PH	20	PAYA LANTING	50	137				C						137		50	SAME	60	V, RU ,OP	NO		

Table I-7 63 CANDIDATE SITES INCLUDING DID AND DOA RECOMMENDATION (2/3)

COD	NO	15.c EX_ORGDEP	16 EX_MEST	16.a EX_MEST_NO	16.b EX_MEST_PROB	17 EX_GF	17.a EX_GFNO	17.b EX_GFPROB	18.c1 CROP1	18.p1 PMONTH1	18.c2 CROP2	18.p2 PMONTH2	18.c3 CROP3	19.p3 PMONTH3	19.f1 FRUIT1	19.h1 HMONTH1	19.f2 FRUIT2	19.h2 HMONTH2	19.f3 FRUIT3	19.h3 HMONTH3	21 ANFARMING	22 NOFINT	23 PROPPART
		PERLIS																			4000	8000	YES
PR	1	12000				YES	61	W,S	TABACCO	JAN-MAY											4000	4000	YES
PR	2					YES	25	W,L	TABACCO	JAN-MAY	VEGET	JUN-DEC	SUGER CANE	APR-JAN	MANGO	MAY-JUN							YES
PR	6		YES	38	W	YES			MANGO						MANGO	MAC-JUN							
		KEDAH																			3000	2000	Y
KH	4				W,L,TECH.																600	400	Y
KH	6		Y(SB)	56	W,M,MK	Y	56	M	POMELO	MEI					POMELO	MAC&AUG					2600	3000	U
KH	13		N			Y	28	W,S,MAN	SUGER CANE	FEB					DURIAN	JUN/JUL	RAMBUTAN	JUL/AGU	LANGSAT	AUG	2600	1400	Y
KH	14	10000	Y	66	W,MAR	Y	75	W,MAR							DURIAN	JUL	RAMBUTAN	AGU	LANGSAT	AUG	3600	1400	Y
KH	15	600	N			Y	65	W,S							DURIAN	AGU	RAMBUTAN	AGU	CEMPEDAK	JUL	3900	1500	Y
KH	16	500	N			Y	45	W,S,MAR							RAMBUTAN	AGU	DURIAN	JUL	CEMPEDAK	JUL	3000	1500	Y
KH	19	9500	N			Y	40	W,F							DURIAN	JUL	RAMBUTAN	AGU	LANGSAT	AUG	3600		Y
KH	32		Y	39	W	Y	39	W	PADDY	JUL-DEC	RUBBER	JAN-DEC	MELON&VEGE	JAN-JUN							2500	1200	Y
KH	40		Y	200	W,S	Y	85	W,S													2000	1800	Y
KH	41		N		W,S	Y	35	W,S													2880		Y
KH	43		N		W	Y	60	W															
		PULAU PINANG																			4200	1200	Y
PP	3		N			N																	U
PP	5		NO			NO															4500	3000	YES
PP	6														DURIAN	SEP							
PP	8		NO	10	W,L	YES	200	W,S,F,L,MAN	DURIAN												10000	3000	Y
PP	13					YE		F,L,MAR													10000	3000	Y
		PERAK																					
PK	20	300000	N			N															300	600	YES
PK	21	300000	N			N															300	500	YES
		SELANGOR																			4500	500	YES
SG	3		NO			YES	200	WATER	DURIAN	SEP	CEMPED	SEP	RAMBUTAN	SEP	DURIAN	JUNE	RAMBUTAN	JULY	CEMPEDAK	JUN	10000		YES
SG	4		NO			YES	200	WATER	DURIAN	SEP	CEMPED	SEP	RAMBUTAN	SEP	DURIAN	JUNE	RAMBUTAN	JULY	CEMPEDAK	JUN	1500	4800	YES
SG	5		NO			YES	50	WATER							STAR FRUIT	APR							
SG	11		NO			YES	8	WATER							STAR FRUIT								
SG	14		NO			NO			STAR FRUIT	1992													
		NEGERI SEMBILAN																			4800		U
NS	1														DURIAN	JULAI	RAMBUTAN	JULAI					
NS	7		N			Y	4	S,FT,L															
		MELAKA																			1000	NO	
MA	2		N			N																NO	6
MA	11		N			N			CHILI		VEGETABLE											NO	
MA	15		NO			Y	10	W	CHILI		VEGETABLE												
MA	16																						
		JOHOR													CAMPADAK	SEPTEMBER	DURIAN				2400	-7200	YES
JR	6		YES	68		YES	68											MAY		SEPT/OCT	4800		YES
JR	9	50000	YES	112	NO MAJOR PROBL	YES	112	WATER,MARK	DURIAN	1989	DUKONG	1989	START FRUT	1989	STAR FRUIT	JAN/MARCH					5000	9600	YES
JR	10	20222	NO			YES	33	WATER	DURIAN	1986	DUKONG	1990	DUKU LANGSA	1987	DURIAN		DUKONG		DUKU LANGSAT		2160	3000	NO
		KELANTAN																			2160	2400	NO
KN	1		NO	125	WATER,FARMING	NO			TOBACCO		VEGETABLE										1200	100	NO
KN	4		NO	100	WATER,FARMING	NO			TOBACCO												4500	4000	YES
KN	5		NO	100	WATER	NO		WATER,FARM	TOBACCO	JAN											4500	4000	YES
KN	8		NO			NO															5000	4000	YES
KN	9		NO			NO			TOBACCO	MAY-AUG											4800	4800	NO
KN	10		NO						TOBACCO	MAY-AUG											3000		YES
KN	13	1500	NO			NO			TOBACCO	FEB											1800	1800	YES
KN	16		NO			YES	14	WATER,FARMING,MANAGEMENT,MARKETING							MASSMELO	APR					2500	1500	YES
KN	24																				3000	1500	YES
KN	26	5	NO			NO									DURIAN	JUL-SEP	RAMBUTAN	JUL-SEP			3000		YES
KN	27	5	NO			NO									DURIAN	SEP,OCT	RAMBUTAN	SAME					
KN	35		NO			NO			RUBBER	SEP,OCT					DURIAN	SEP,OCT	RAMBUTAN						
		TERENGGANU																			4000	1200	YES
TR	1	23	NO			NO			WATER MELO	JUL-SEP					DURIAN	AUG	RAMBUTAN	AUG	DUKU	SEP-OCT	3600	1000	YES
TR	3					YES	50	W,L							DURIAN	AUG	CEMPEDAK	AUG			2400	600	YES
TR	4		NO			YES	20	W	VEGETABLE	OCT-DEC											3800	500	NO
TR	7		YES		W,L	YES	100	W,L															YES
TR	12		YES		W	YES	40	S															YES
TR	14				W	YES	12	W													300	100	U
TR	20		NO		W,L	YES	25	W,L							RAMBUTAN	AUG	DURIAN	AUG					YES
TR	24					YES	12	W															YES
TR	28					YES	13	W,MAN													300	100	U
TR	34		NO		W,L	NO									DURIAN	AUG	RAMBUTAN	AUG					YES
TR	38					YES	15	W													2400	600	YES
TR	42					YES	40	W,MAN,MAR	CHILI,LONG B	JUL	MAIGE	MAR-JUL									2400	600	YES
TR	44		YES		W	YES	22	W,MAN,MAR	CHILI	JUN	SAWI,CU	JUN									3600		NO
TR	45		NO			YES	5	L,MAN,MAR	CHILI		VEGETABLE												
		PAHANG																					YES
PH	19		NO		F,L,MAN	NO																3000	Y
PH	20		NO																				

Table I-7 63 CANDIDATE SITES INCLUDING DID AND DOA RECOMMENDATION (3/3)

COD	NO	24 PROPACR	25 PROPACR	26 PROPMAN	27 PROPINVEST	28 PSTDSIZE	29.Aa DP_A_AREA	29.Ab DP_B_AREA	29.Ya DP_A_YIELD	29.Yb DP_B_YIELD	PR_LANDU	FU_LANDU	AGENT	PURPOSE	OWNER	SOIL/LAND	RANKING
		PERLIS															
PR	1				8000	2000	40		5500		paddy	Pm,Tob	JPS		GOVN	C,SAND,SILT	C
PR	2			MINI	6000	1800	30	30	5000	5000	upland	Pm,Po,Tob,Veg	JPS			C,L,SAND	C
PR	6	38		MINI							tree crop	Fo	IADP		PRI	C,SAND,SILT	B
		KEDAH															
KH	4	150	200		5000	1000											DID recom
KH	6	40	36	GROUP	600	100					upland	Fo				C,L	B
KH	13	60	100	INDIVIDUAL	3600	1600	100	100	3500	4000	paddy	Pm,Po,Chi,Veg,Live				C,L	A
KH	14	66	77	MINI	6000	1200	66	66	5880	3920	paddy	Pm,Po,Chi,Veg,Sta,Mel	JPS		GOVN	C,L	C
KH	15	65	80	GROUP	8000	1200	90	40	5880	3920	paddy	Pm,Po,Chi,Veg,Mel				C,L	B
KH	16	45	50	GROUP	8000	1200	55	NIL	5880		paddy	Pm,Chi,Mel				C,L	C
KH	19	63	34	GROUP		1200	34	34	5600	4480	paddy	Pm,Po,Mel	JPS		GOVN	C,L,SILT	C
KH	32	39	64	MINI	4800						paddy					C,SAND	B
KH	40	200	120	GROUP	3500	2000	200	200	5500	5500	paddy	Pm,Po	JPS		GOVN	C,SAND	C
KH	41	180	120	GROUP	3500	2000	120	50	5500	5500	paddy	Pm,Po				C,SAND	C
KH	43	60	42	GROUP	3500	600	42	42	4000	4000	paddy	Pm,Po				C	B
		PULAU PINANG															
PP	3	34	68	MINI	6600	2200	68	68	5000	5000	paddy	Pm,Po	JPS			C	C
PP	5			INDIVIDUAL			558	558	7000	7000	paddy	Pm,Po	JPS			CLAY	C
PP	6			INDIVIDUAL			475	475	3900	3900	paddy	Pm,Po	JPS		ENTER		C
PP	8			MINI	6000	2000	202	202	3000	3000	upland	Pm,Po	JPS			SAND	C
PP	13										tree crop		JPS			CLAY,SAND	C
		PERAK															
PK	20	58	142	GF	12000	4000	142	142	4000	4000	paddy	Pm,Po	JKR/JPS		P	C	C
PK	21	2640	6600	GF	12000	4000	6600	6600	4000	4000	paddy	Pm,Po	JKR/JPS			C	C
		SELANGOR															
SG	3	100	200	GROUP	12000	2400					tree crop	Fo				CLAY	A
SG	4	200	200	GROUP	12000	2400					tree crop	Fo				CLAY	A
SG	5	50	70	PRIVATE	12000	4500					paddy					CLAY,LOAM	C
SG	11	8	60	GROUP	12000	10000					tree crop	Veg,Sta,Live				SAND	C
SG	14		80	INDIVIDUAL	4000	1000	200	200	50	50	paddy	Pm,Po			PRI	CLAY	C
		NEGERI SEMBILAN															
NS	1																DID recom
NS	7	50	148	GF	7200	8000	162	162	4000/season	4000/season	paddy	Pm,Po,Veg,Ban	JPS		P	C,S,P	C
		MELAKA															
MA	2		INDIVIDUAL	10000	1000											C	C
MA	11	10	INDIVIDUAL	7600	1000						paddy				PRI	C	C
MA	15	7	GROUP	6000	1000						tree crop		MADP		PRI	C	B
MA	16										upland		FELCRA		GOVN	C	DID recom
		JOHOR															
JR	8			GROUP	5000	2000					paddy	Chi,Veg,Fo	JPS		P	LOAM	C
JR	9	112	40	GROUP	9500	2500	73.6	20	3000	10000	upland	Pm,Po,Tob,Chi,Veg,Sta	JPS		P	CLAY	B
JR	10	33	32	GROUP	10000	2000	35	10	5000	7000	upland	Pm,Po,Tob	-		-	CLAY	B
		KELANTAN															
KN	1		60	GROUP FARMING							paddy					CLAY,SILT,LOAM	C
KN	4	20	40	GROUP FARMING	4000		40	40	4	4	paddy	Pm,Po,Tob,Chi,Fish				CLAY,SILT,LOAM	C
KN	5	150	40	INDIVIDUAL	2000	100					paddy					CLAY,SILT,LOAM	C
KN	8	65	75	INDIVIDUAL	8400	36	75	75	7000	6500	paddy	Pm,Po	JPS		PRIVATE	CLAY,SAND	C
KN	9	40	50	INDIVIDUAL	8400	36	50	30	7000	6500	paddy	Pm,Po,Tob	JPS		PRIVATE	CLAY,SAND	C
KN	10	60	50	INDIVIDUAL	8400	36	50	15	7000	6500	paddy	Pm,Po,Tob	JPS		PRIVATE	CLAY,SAND	C
KN	13			INDIVIDUAL	6000	1235	100	75	4700	4700	paddy	Pm,Po,Tob,Mel,Fish,Live	JPS		PRIVATE	CLAY	C
KN	16	14	2	GROUP FARMING	4000	8000	27	5	5000	2900	tree crop	Pm,Po,Chi,Veg,Ban,Mel,Pap	JPS		PRIVATE	CLAY,SAND	C
KN	24			GROUP FARMING									JPS				C
KN	26	120	147	GROUP FARMING	7200	2400	147	147	5500	5500	paddy	Pm,Po	JPS		PRIVATE	CLAY	C
KN	27	150	84	GROUP FARMING	7200	2400	84	84	5500	5500	paddy	Pm,Po	JPS		PRIVATE	CLAY	C
KN	35	45	32	GROUP FARMING	6000	700	32	32	4500	4500	tree crop	Pm,Po	JPS		GOVERMENT	LOAM	C
		TERENGGANU															
TR	1	58	116	GROUP	6000	3000	116	116	5000	4580	paddy	Pm,Po	JPS		PRIVATE	C	C
TR	3	400	420	GROUP	6000	20					paddy		JPS,WIL,TE		GOVERN_PRI	C	C
TR	4	15	8	GROUP	6000		200		3884			Pm,Veg	JP		GOVERNMENT	S	B
TR	7	200	900		5000	20	200		3884		paddy					C	B
TR	12	40	20	GROUP	6000	4000						Veg	JP		PRIVATE	C	B
TR	14	30	20	GROUP	6000	2000						Veg	JP		PRIVATE	C	B
TR	20	30	136	GROUP	6000	20	50		3884		upland	Pm	JPS		GOVERNMENT	C	C
TR	24	30	10	GROUP	6000	2000						Veg	JP		PRIVATE	C	B
TR	28	13	6	GROUP	6000	2000						Veg			PRIVATE	C	C
TR	34	60	600	INDIVIDUAL	6000	20			2535		upland					C	C
TR	38	20	10	GROUP	6000	2000					upland	Veg				SAND	C
TR	42	40	16	GROUP	6000	2000					paddy	Veg				C	A
TR	44	50	40	GROUP	6000	1000					paddy	Chi,Pin,Sta	JP		PRIVATE	C	B
TR	45			GROUP	6000	1000					paddy		JP		PRIVATE	L	C
		PAHANG															
PH	19	75	180	GROUP	6000	300					paddy	OP,Fish	JPS			C	C
PH	20	50	137	G.F.	5000												DID recom

Table I-8 SITE RECONNAISSANCE SURVEY IN JAN. & FEB. 1994

State	No	Site Name	
PR	PR4	Tasek Merati	1/29
	PR6	Hutan Lembah Mango	1/29
		Arau Reservoirs	
KN	KH2	Kubang Badak	1/29
	KH3	Padang Saga	1/29
	KH4,5	Kadawang	1/29
	KH24	Kg. Betong	1/30
	KH27	Kg. Seramat	1/30
	KH35	Bkt. Perak	1/30
		Kuban Yoi	1/30
PP	PP3	Tok Bedu	1/28
	PP9	Sg. Burong	1/26
PK	PK3	Industri Buah Buahan	2/4
	PK8	Kelompok Buah Buahan	2/4
SG	SG13	Jl. Enam Kaki	1/26
	SG14	Minang Kabau	1/26
	SG15	Bkt. Kepong	1/26
NS	NS1	MARDI	1/25
MA	MA15	Solok Bkt. Meta	1/31
	MA16	FELCRA	1/31
	MA14	Kandang	1/31
JR	JR3	Sawah Kebung Baru	2/1
	JR10	Ldg. Kelompok Bkt. Sambulan Yong Peng	2/1
KN	KN13	Tasek Putera	1/22
	KN25	Hilir Sat II	1/22
	KN16	Permatang Sunkai	1/22
TR	TR3	Tin Mine Pond	1/23
	TR12	Kanpong Banggol Katog	1/23
	TR34	Marang II	1/23
	TR44	Pasir Nereng	1/23
PH	PH9	Paya Pagar Sasak	2/7
	PH20	Paya Lanting	2/7
	PH23	Paya Pesagi	2/7

Table I-9 FORM OF SITE INFORMATION ON AGRICULTURE

		Output from Database		
		Site Information on Agriculture and Agro-economy		
No.	Code	Items of Information	Answers	Unit
1	A001	Name of Site		
2	A002	Code No. of Site		
3	A010	Total Farm Land		(ha)
4	A011	Total Paddy Cropped Area per year		(ha)
5	A012	Total Upland Cropped Area per year		(ha)
6	A013	Total Fruit Cropped Area		(ha)
7	A014	Total Tree Crop Area (Small-holding)		(ha)
8	A015	Total Fishery Area (Ponds and all the facilities)		(ha)
9	A016	Total Heads of Livestocks		(heads)
10	A020	Total Cropped Farm Land		(ha)
11	A021	Cropping Intensity		(%)
12	A022	Total Idle Farm Land		(ha)
13	A030	Farm Land per Farm-household		(ha)
14	A040	Type of Soil	ClayClay,LoamSiltLoamPeatSand	
15	A050	Total Numbers of Farm-household		(nos)
16	A051	Percentage of Farmers Successors		(%)
17	A052	Percentage of Poverty Farm-household		(%)
18	A060	Total Gross Production in Farming		(RM)
19	A061	Total Gross Production in Paddy		(RM)
20	A062	Total Gross Production in Upland Crops		(RM)
21	A063	Total Gross Production in Fruits		(RM)
22	A064	Total Gross Production in Tree Crops		(RM)
23	A065	Total Gross Production in Fishery		(RM)
24	A066	Total Gross Production in Livestock		(RM)
25	A070	Total Production Cost in Farming		(RM)
26	A071	Total Production Cost in Paddy		(RM)
27	A072	Total Production Cost in Upland Crops		(RM)
28	A073	Total Production Cost in Fruits		(RM)
29	A074	Total Production Cost in Tree Crops		(RM)
30	A075	Total Production Cost in Fishery		(RM)
31	A076	Total Production Cost in Livestock		(RM)
32	A080	Total Net Production in Farming		(RM)
33	A081	Total Net Production in Paddy		(RM)
34	A082	Total Net Production in Upland Crops		(RM)
35	A083	Total Net Production in Fruits		(RM)
36	A084	Total Net Production in Tree Crops		(RM)
37	A085	Total Net Production in Fishery		(RM)
38	A086	Total Net Production in Livestock		(RM)
39	A090	Total Net Farm income		(RM)
40	A091	Total Non Farm income		(RM)
41	A100	Proposed Acreage in Farm Development Plan		(ha)
42	A101	Proposed Participants in Farm Development Plan		(nos)
43	A102	Project Farm Land per Farm-household		(ha)
44	A110	Proposed Total Gross Production in Farming		(RM)
45	A111	Proposed Farm Gross Production / Farm-household		(RM)
46	A120	Proposed Total Production Cost in Farming		(RM)
47	A121	Proposed Production Cost / Farm-household		(RM)
48	A130	Proposed Total Net Production in Farming		(RM)
49	A131	Proposed Farm Net Production / Farm-household		(RM)
50	A140	Project Net Income by Farming / Farm-household		(RM)
51	A150	Project Benefit in Farming per year		(RM)
52	A151	Project Total Increase in Farm Income per year		(RM)

Table I-10 MAJOR ENVIRONMENTAL PROBLEMS AND THE REMEDIAL MEASURES FOLLOWED FOR THE LONG LISTED PROJECTS (1/2)

State	No. of Project Areas	Major Environmental Problems																		Remedial Measures Followed					
		Water Quality									Soil Erosion		Flooding	River Erosion	Water Short	Water Logg.	Drau-ght	No Prob.	No Data	Impr-oving	Bund-ing	Silt Trap	No Meas.	No Data
		DE	IE	FE	SA	BW	SE	MN	WE	GE	LG	LC													
Perlis	7		2	1					1									3					7	
Kedah	47									2	3		1				4	39					47	
Paula Pinang	13			5						1			2					6	1		1		6	6
Perak	21	1	1				2				2	7	1					6	3	7	1	1	9	3
Selangor	25			1				1	1				1		1			13	6				10	15
N. Sembilan	8									1	1							6					6	2
Melaka	18	1	2		1	1	2	1	1				1					8		1			17	
Johor	14																	9	5				9	5
Kelantan	35									2		1	3	3				31		1			34	
Trengganu	53										2							23	28				12	41
Pahang	25						5			1	1		8			10		5	3				20	5
Total	266	2	5	7	1	1	9	2	3	7	9	8	17	3	1	10	4	149	46	9	2	1	177	77

DE - Domestic Effluent, IE - Industrial Effluent, FE - Farm Effluent, SA - Salinity, BW - Brackish Water, SE - Sediments, MN - Minerals, WE - Weeds, GE - General

LG - Logging, LC - Land Clearing

Table I-10 MAJOR ENVIRONMENTAL PROBLEMS OF THE SHORT LISTED PROJECTS (2/2)

State	No. of Project Areas	Major Environmental Problems																	
		Water Quality									Soil Erosion		Flooding	River Erosion	Water Short	Water Logg.	Drau-ght	No Prob.	No Data
		DE	IE	FE	SA	BW	SE	MN	WE	GE	LG	LC							
Perlis	6		2						1									3	
Kedah	19									1			1				3	14	
Paula Pinang	13			5						1			2					6	
Perak	19		1				1				2	7	1					6	3
Selangor	17							1					1		1			11	3
N. Sembilan	8									1	1							6	
Melaka	5	1			1	1	1											1	
Johor	6																	6	
Kelantan	14									2			3	3				9	
Trengganu	15										1							12	2
Pahang	12						2			1			7			9		2	
Total	134	1	3	5	1	1	4	1	1	6	4	7	15	3	1	9	3	76	8

DE - Domestic Effluent, IE - Industrial Effluent, FE - Farm Effluent, SA - Salinity, BW - Brackish Water, SE - Sediments, MN - Minerals, WE - Weeds, GE - General Water Quality, LG - Logging, LC - Land Clearing

Table I-11 MAJOR ENVIRONMENTAL PROBLEMS OF THE SHORT LISTED PROJECTS

COD	NO	NAME OF PROJECT	DISTRICT	MAJOR ENVIRONMENTAL PROBLEM
PR	1	SIMPANG GETI	-	WATER QUALITY, IE
PR	2	PANGGAS SMALL DAM PROJECT	-	WATER QUALITY, IE
PR	4	TASEK MELATI	-	WATER QUALITY, WE
PR	5	PAYA KELUBI MANGO PROJECT	-	NO
PR	6	HUTAN LEMBAH MANGO PROJECT	-	NO
PR	7	TASEK MELATI-II	-	NO
KH	3	AMPANGAN PDG SAGA	LANGKAWI	WATER QUALITY
KH	4	KAWASAN PADI KEDAWANG	LANGKAWI	NO
KH	5	KEDAWANG	LANGKAWI	NO
KH	6	P LIBALI BERKELOMPOK	KUBANG PASU	NO
KH	13	KG PDG GELANGGANG	PDG TERAP	NO
KH	14	SKIM JANING	PDG TERAP	NO
KH	15	LUBUK MERBAU	PDG TERAP	NO
KH	16	SEKIM TANDOP BESAR	PDG TERAP	NO
KH	19	KURONG HITAM IRRIGATION SCHEME	PDG TERAP	NO
KH	31	KUBUR PANJANG	PENDANG	FLOODING
KH	32	KG KAYU TIGA	PENDANG	DRAUGHT
KH	34	KG SAWA KECIK	PENDANG	DRAUGHT
KH	35	BK PERAK	PENDANG	DRAUGHT
KH	40	SG AIR JERNIH	KUALA MUDA	NO
KH	41	SG BARU	KUALA MUDA	NO
KH	43	BENDANG DALAM	KUALA MUDA	NO
KH	48	KG BETONG - P DURIAN KELOMPOK	SIK	NO
KH	49	KG KUBANG YOI	SIK	NO
KH	50	KG SELAMAT - P SAYUR + BUAHAN	SIK	NO
PP	1	LUAR BAN PINANG TUNGGAL	S PERAI UTARA	FLOODING
PP	2		S PERAI UTARA	NO
PP	3	TOK BEDU IRRIGATION AREA	S PERAI UTARA	WATER QUALITY, FE
PP	4	KG TOK BEDU, AIR MELINTAS, PMTG BEF	S PERAI UTARA	WATER QUALITY, FE
PP	5	PINANG TUNGGAL IRRIGATION AREA (PI	S PERAI UTARA	NO
PP	6	SG JARAK IRRIGATION AREA	S PERAI UTARA	WATER QUALITY, FE
PP	7	BK TGH ALLANG	S PERAI UTARA	NO
PP	8	SG BURUNG	BARAT DAYA	WATER QUALITY, FE
PP	9	SG BURUNG	BARAT DAYA	WATER QUALITY, FLOODING
PP	10	MAK SULONG	S PERAI TENGAH	NO
PP	11	SG KULIM IRRIGATION SCHEME	S PERAI TENGAH	WATER QUALITY, FE
PP	12	SKIM PENGAIRAN SG KULIM	S PERAI TENGAH	NO
PP	13	SKIM PENGAIRAN TASEK SELATAN	S PERAI SELATAN	NO
PK	1	KG TASEK	HULU PERAK	SOIL EROSION,LC
PK	2	PUSAT PERT TANAH TINGGI BK BARING	HULU PERAK	SOIL EROSION,LC,LG
PK	3	INDUSTRI BUAH-BUAHAN	SELAMA	NO
PK	4	BENDANG TEMELONG	HULU PERAK	SOIL EROSION,LC
PK	5	P KELOMPOK BUAH-BUAHAN	LARUT MATANG	NO
PK	6	P KELOMPOK BUAH-BUAHAN/SAYURAN	LARUT MATANG	NO
PK	7	SENOUK CHANGKAT NING	LARUT MATANG	NO
PK	8	P KELOMPOK BUAH-BUAHAN AIR PUTIH	LARUT MATANG	WATER QUALITY,IE
PK	9	BENDANG JENALIK	KUALA KANGSAR	SOIL EROSION,LC,LG
PK	10	BENDANG KG LANEH	KUALA KANGSAR	SOIL EROSION,LC
PK	11	RANC TALIAIR BENDANG SENGGANG	KUALA KANGSAR	SOIL EROSION,LC
PK	12	RANC TALIAIR BENDANG LEMPOR	KUALA KANGSAR	SOIL EROSION,LC
PK	13	RANC TALIAIR PDG RENGAS	KUALA KANGSAR	WATER QUALITY, SE
PK	15	DENDANG A	MANJUNG	-
PK	16	DENDANG B	MANJUNG	-
PK	17	BRUAS & TAMBAHAN	MANJUNG	-
PK	19	KG LALAT BATU 7	HILIR PERAK	FLOODING
PK	20	SG BATANG PDG MATI	HILIR PERAK	NO
PK	21	SG MANIK,IRRIG SCHEME	HILIR PERAK	NO
SG	1	TEBUK BERIHUN	SABAK BERNAM	-
SG	3	SG JANG	HULU SELANGOR	NO
SG	4	BK TAMU	HULU SELANGOR	NO
SG	5	KG KALONG TENGAH	HULU SELANGOR	NO
SG	6	P SAYURAN SG YU	KUALA SELANGOR	NO
SG	8	KUANG	GOMBAK	NO
SG	9	REKREASI SG CHONGKAK	HULU LANGAT	NO
SG	10	KG KANTAN	HULU LANGAT	-
SG	11	KG PASIR	HULU LANGAT	WATER QUALITY, MN
SG	12	MINANG KABAU	HULU LANGAT	WATER SHORTAGE
SG	13	JLN ENAM KAKI 1	HULU LANGAT	-
SG	14	SAPAN BT MINANGKABAU	HULU LANGAT	NO
SG	15	SG JAI BK KEPONG	HULU LANGAT	FLOODING
SG	16	MARDI RESEARCH STATION	KELANG	NO
SG	18	TAMAN PERT MALAYSIA	PETALING	NO
SG	24	P KELOMPOK SAYURAN KG ENDAH	KUALA LANGAT	NO

Table I-11 MAJOR ENVIRONMENTAL PROBLEMS OF THE SHORT LISTED PROJECTS

COD	NO	NAME OF PROJECT	DISTRICT	MAJOR ENVIRONMENTAL PROBLEM
SG	25	P KELOMPOK KONTAN KG KUNDANG	KUALA LANGAT	NO
NS	1	STESEN MARDI JELEBU	JELEBU	NO
NS	2	BUAH-BUAHAN LANJUT MANIS	KUALA PILAH	NO
NS	3	SRI MENANTI	KUALA PILAH	SOIL EROSION, LG
NS	4	PEMBANGUNAN SAWAH KG. LONDAH	GEMAS	NO
NS	5	REMBAU	REMBAU	NO
NS	6	KELOMPOK KG CHENGKAU ULU	REMBAU	NO
NS	7	KG BK TEMBOK & SG RAYA	PORT DICKSON	WATER QUALITY
NS	8	P TERNAKAN UDANG GALAH	KUALA PILAH	NO
MA	2	ULU SG BULOH	ALOR GAJAH	NO
MA	11	SG UDANOG	MELAKA TENGAH	WATER QUALITY, DE
MA	14	KANODANOG	MELAKA TENGAH	WATER QUALITY, SA
MA	15	SOLOK BK META	MELAKA TENGAH	WATER QUALITY, BW
MA	16	FELCRA BK SEDANOANO	JASINO	WATER QUALITY, SE
JR	3	SAWAH KEBUN BARU	MUAR	NO
JR	8	LDG KELOMPOK KG SRI TIMOR	KLUANG	NO
JR	9	LDG KELOMPOK BT SAMBULAN, YONG PI	BATU PAHAT	NO
JR	10	LDG KELOMPOK KANGKAR MERLIMAU	BATU PAHAT	NO
JR	12	TUNJOK LAUT	KOTA TINGGI	NO
JR	14	SG CHEMARAN	KOTA TINGGI	NO
KN	1	JUBAKAR PANTAI	TUMPAT	NO
KN	4	KG BELIAN	TUMPAT	NO
KN	5	LUBOK SELEHONG	TUMPAT	NO
KN	8	BENDANG JELUTONG, KOK LANAS	KOTA BHARU	RIVER EROSION, FLOODING
KN	9	BENDANG BT TINGGI, BK CHINA	KOTA BHARU	RIVER EROSION, FLOODING
KN	10	BENDANG SOKOR, BK CHINA	KOTA BHARU	RIVER EROSION, FLOODING
KN	11	KUBANG TEBAKANG	PASIR MAS	WATER QUALITY
KN	12	BENDANG TASEK BERANGAN	PASIR MAS	NO
KN	13	TASIK PUTERA	PASIR MAS	WATER QUALITY
KN	16	BENDANG PMTG SUNKAI	PASIR PUTEH	NO
KN	24	RANC TALIAIR HILIR SAT 1	MACHANG	NO
KN	26	RANC PENGAIRAN TERASIL	TANAH MERAH	NO
KN	27	RANC PANGAIRAN GUAL IPOH	TANAH MERAH	NO
KN	35	RANC TALIAIR LEPAN AGOR	KUALA KRAI	NO
TR	1	TELABAK IRRIGATION SCHEME	BESUT	SOIL EROSION, LG
TR	3	SKIM TANAMAN PADI MARAS	KUALA TRG	NO
TR	4	P KELOMPOK SAYURAN	KUALA TRG	NO
TR	7	SALIRAN TOK JIRING	KUALA TRG	NO
TR	12	P KELOMPOK SAYURAN	KUALA TRG	NO
TR	14	P KELOMPOK SAYURAN	KUALA TRG	NO
TR	20	SKIM TANAM PADI DURIAN HAJI	MARANG	-
TR	24	P KELOMPOK SAYURAN	MARANG	NO
TR	28	P KELOMPOK SAYURAN	MARANG	NO
TR	34	LEMBAH MARANG II	MARANG	-
TR	38	P KELOMPOK SAYURAN	MARANG	NO
TR	42	P KELOMPOK SAYURAN	HULU TRG	NO
TR	44	P KELOMPOK SAYURAN	HULU TRG	NO
TR	45	P KELOMPOK SAYURAN	HULU TRG	NO
TR	50	KOLAM ABANG	DUNGUN	NO
PH	9	PAYA PAGAR SASAK	LIPIS	WATER QUALITY, SE
PH	11	P.WAU,BETONG & GEMAYAII	MARAN	NO
PH	12	PAYA JELUTUNG	MARAN	WATER LOGGING, FLOODING
PH	13	PAYA NYAK BESAR	MARAN	WATER LOGGING, FLOODING
PH	14	PAYA TING & BESAR KERTAU	MARAN	WATER LOGGING, FLOODING
PH	16	PAYA NYAK KECIL	MARAN	WATER LOGGING, FLOODING
PH	17	PAYA PDG TENGGALA	MARAN	WATER LOGGING, FLOODING
PH	19	PAYA SG LING	MARAN	WATERLOGGING
PH	20	PAYA LANTING	MARAN	WATER LOGGING, FLOODING,WQ
PH	23	PAYA PESAGI	MARAN	WATER LOGGING, FLOODING, SE
PH	24	PAYA KROT	MARAN	NO
PH	25	PAYA LDG	MARAN	WATERLOGGING

Note : Data with lines drawn accross indicates the short listed projects dropped by the states

DE - Domestic Effluent, IE - Industrial Effluent, FE - Farm Effluent, SA - Salinity, BW - Brackish Water, SE - Sediments, WE- Weeds, GE - General, LG - Logging, LC - Land Clearing

Table I-12 LIST OF DID MONITORING STATIONS FOR WATER QUALITY AND SUSPENDED SEDIMENT

State	Water Quality Station			Suspended Sediment Station		
	P.S	S.S	River Name/ Station Name	P.S	S.S	River Name/ Station Name
Perlis					4	*Sg. Jemeh at Titi Tampang* *Sg. Tasoh at Titi Baru* *Sg. Arau at Ldg. Tebu Felda* *Sg. Perlarit at Wang Mu*
Kedah	1		Sg. Muda at Jam. Syed Omar	1		Sg. Muda at Jam. Syed Omar
Pualau Pinang	0			0		
Perak	5	11	Sg. Kinta at Weir G. Tg. Tualang Sg. Perak at Jam. Iskandar Sg. Plus at Kg. Lintang Sg. Kurau at Pondok Tanjung Sg. Krian at Selama *Sg. Slim at Slim River* *Sg. Sungkai at Sungkai* *Sg. Bidor at Malayan Bidor Bhd.* *Sg. Btg. Padang at Tg. Keramat* *Sg. Cenderiang at Bt. 32 Jln. Tapah* *Sg. Kampar at Kg. Lanjut* *Sg. Raia at Keramat Pulai* *Sg. Pari at Jln. Silibin Ipoh* *Sg. Kurau at Bt. 14 Jln. Taiping* *Sg. Ijok at Titi Ijok* *Sg. Rui at Jam. Jln. Raya*	5	9	Sg. Kinta at Weir G. Tg. Tualang Sg. Perak at Jam. Iskandar Sg. Plus at Kg. Lintang Sg. Kurau at Pondok Tanjung Sg. Krian at Selama *Sg. Slim at Slim River* *Sg. Sungkai at Sungkai* *Sg. Bidor at Malayan Bidor Bhd.* *Sg. Btg. Padang at Tg. Keramat* *Sg. Cenderiang at Bt. 32 Jln. Tapah* *Sg. Raia at Keramat Pulai* *Sg. Pari at Jln. Silibin Ipoh* *Sg. Kurau at Bt. 14 Jln. Taiping* *Sg. Rui at Jam. Jln. Raya*
Selangor	3	3	Sg. Lui at Kg. Lui Sg. Selangor at Rantau Panjang Sg. Bernam at Jam. SKC *Sg. Langat at Kg. Sg. Rincing* *Sg. Selangor at Rasa* *Sg. Bernam at Tanjong Malim*	4	4	Sg. Langat at Dengkil Sg. Lui at Kg. Lui Sg. Selangor at Rantau Panjang Sg. Bernam at Jam. SKC *Sg. Langat at Kg. Sg. Rincing* *Sg. Semenyih at Kg. Sg. Rincing* *Sg. Selangor at Rasa* *Sg. Bernam at Tanjong Malim*
Wilayah Persekutan	5	0	Sg. Klang at Jam. Sulaiman Sg. Kombak at Jln. Tun Razak Sg. Batu at Sentul Sg. Klang at Lrg. Kwan Seng Sg. Anak Keroh at Taman Kepong	5	0	Sg. Klang at Jam. Sulaiman Sg. Kombak at Jln. Tun Razak Sg. Batu at Sentul Sg. Klang at Lrg. Kwan Seng Sg. Anak Keroh at Taman Kepong
Negeri Sembilan	2	1	Sg. Muar at Bt. 57 Jln. Gemas- Rompin Sg. Kepis at Jam. Kayu Lama *Sg. Linggi at Jam. Jln. Persekutan*	3	0	Sg. Linggi at Jam. Jln. Persekutan Sg. Muar at Bt. 57 Jln. Gemas- Rompin Sg. Kepis at Jam. Kayu Lama
Melaka	1	1	Sg. Melaka at Pantai Belimbing *Sg. Kesang at Chin Chin*	1	1	Sg. Melaka at Pantai Belimbing *Sg. Kesang at Chin Chin*
Johor	5	5	Sg. Parit Madirono at Weir Sg. Johor at Rantau Panjang Sg. Sembrong at Kuala Sg. Tamok Sg. Muar at Buloh Kasap Sg. Endau at Kuala Jemakah *Sg. Linggui at Ran. Tanah Jengli* *Sg. Sayong at Jam. Johor Tenggara* *Sg. Bekok at Bt. 77 Jln. Yong Peng/Labis* *Sg. Lenggor at Bt. 42, Kualang/Mersing* *Sg. Segamat at Segamat*	4	3	Sg. Parit Madirono at Weir Sg. Johor at Rantau Panjang Sg. Sembrong at Kuala Sg. Tamok Sg. Muar at Buloh Kasap *Sg. Linggui at Ran. Tanah Jengli* *Sg. Bekok at Bt. 77 Jln. Yong Peng/Labis* *Sg. Lenggor at Bt. 42, Kualang/Mersing*
Kelantan	4	4	Sg. Lebir at Kg. Tualang Sg. Kelantan at Jam. Guillemard Sg. Golok at Kg. Jenob Sg. Nenggiri at Jam. Bertam *Sg. Golok at Rantau Panjang* *Sg. Pergau at Batu Lembu* *Sg. Lanas at Air Lanas* *Sg. Galas at Dabong*	4	5	Sg. Galas at Dabong Sg. Kelantan at Jam. Guillemard Sg. Golok at Kg. Jenob Sg. Golok at Rantau Panjang *Sg. Nenggiri at Jam. Bertam* *Sg. Lebir at Kg. Tualang* *Sg. Pergau at Batu Lembu* *Sg. Sokor at Kg. Tegawan* *Sg. Lanas at Air Lanas*

Table I-12 LIST OF DID MONITORING STATIONS FOR WATER QUALITY AND SUSPENDED SEDIMENT

State	Water Quality Station			Suspended Sediment Station		
	P.S	*S.S*	River Name/ Station Name	P.S	*S.S*	River Name/ Station Name
Terengganu	4	*0*	Sg. Cherul at Ban Ho Sg. Kemaman at Rantau Panjang Sg. Dangun at Jam. Jeram Kenyir Sg. Chalok at Jam. Jalok	5	*0*	Sg. Cherul at Ban Ho Sg. Kemaman at Rantau Panjang Sg. Dangun at Jam. Jeram Kenyir Sg. Chalok at Jam. Jalok
Pahang	13	*3*	Sg. Rompin at Jam. Kuantan/Segamat Sg. Bera at Stn. Hutan Kemayan Sg. Triang at Jam. Keretapi Sg. Pahang at Temerloh Sg. Jengka at Jam. Kg. Awah Sg. Pahang at Lubok Paku Sg. Kuantan at Bukit Kenau Sg. Lipis at Benta Sg. Pahang at Sg. Yap Sg. Jelai at Jeram Bungor Sg. Tembeling at Kg. Merting Sg. Tekam at Lembangan Ujian A Sg. Tekam at Lembangan Ujian B Sg. Tekam at Lembangan Ujian C *Sg. Mentiga at Jam. Cini* *Sg. Lepar at Jam. Gelugur* *Sg. Tembeling at Kg. Merting*	11	*11*	Sg. Rompin at Jam. Kuantan/Segamat Sg. Bera at Stn. Hutan Kemayan Sg. Triang at Jam. Keretapi Sg. Pahang at Temerloh Sg. Pahang at Lubok Paku Sg. Kuantan at Bukit Kenau Sg. Lipis at Benta Sg. Pahang at Sg. Yap Sg. Jelai at Jeram Bungor Sg. Tembeling at Kg. Merting *Sg. Keratong at Jam.Bahau Keratong* *Sg. Serting at Jam. Padang Gudang* *Sg. Tenaglir at Jam. Jln Raya* *Sg. Keshar at Jam. Lama* *Sg. Benus at Hutan Lipur Lentang* *Sg. Mentiga at Jam. Cini* *Sg. Bentong at Jam. Kuala Marong* *Sg. Jengka at Jam. Kg. Awah* *Sg. Lepar at Jam. Gelugur* *Sg. Jelai at Kuala Medang* *Sg. Kechau at Kg. Dusun*
Total	43	*28*		43	*37*	

P.S - Principal Station *S.S - Secondary Station*

Table I-13 SUMMARY OF ENVIRONMENTAL IMPACTS BASED ON THE PRELIMINARY ASSESSMENT MATRIX

ENVIRONMENTAL COMPONENTS	NUMBER OF PROJECTS				
	No Impact	Significant and Solvable	Significant but Unknown	Significant and Unsolvable	Environmental Enhancement
I. PHYSICOCHEMICAL					
1. LAND					
(i) Change of Land use (Devastation or desertification)	100	4	4	0	6
(ii) Soil Erosion	108	5	1	0	0
(iii) Soil Salinization	110	2	2	0	0
(iv) Deterioration of soil fertility	106	5	3	0	0
(v) Others	114	0	0	0	0
2. SURFACE WATER					
(i) Water Balance	85	5	2	0	22
(ii) Flooding	84	13	3	1	13
(iii) Soil sedimentation	98	9	3	1	3
(iv) Water Quality	97	7	5	1	3
(v) Drainage Pattern	85	11	4	0	14
(vi) Change in Existing Use	101	7	2	1	3
(vii) Others	112	2	0	0	0
3. GROUNDWATER					
(i) Change in groundwater hydrology	96	12	2	0	4
(ii) Water Quality	109	1	4	0	0
(iii) Change in Existing Use	108	2	4	0	0
(iv) Others	114	0	0	0	0
4. ATMOSPHERE					
(i) Atmospheric pollution	109	2	2	0	1
(ii) Others	114	0	0	0	0
5. NOISE					
(i) Noise Pollution	114	0	0	0	0
(ii) Others	114	0	0	0	0
II. BIOLOGICAL					
6. SPECIES AND POPULATIONS					
(i) Terrestrial Vegetation	109	4	0	0	1
(ii) Terrestrial Wildlife	111	2	1	0	0
(iii) Other Terrestrial Fauna	110	4	0	0	0
(iv) Aquatic/Marine Flora	110	3	1	0	0
(v) Fish	105	4	1	0	4
(vi) Other Aquatic/Marine Fauna	113	1	0	0	0
7. HABITATS AND COMMUNITIES					
(i) Terrestrial Habitats	113	1	0	0	0
(ii) Terrestrial Communities	111	2	1	0	0
(iii) Aquatic, Estuarine, Marine Habitats	111	2	1	0	0
(iv) Aquatic, Estuarine, Marine Communities	111	2	1	0	0
(v) Others	114	0	0	0	0
III. HUMAN					
8. HEALTH AND SAFETY					
(i) Physical Safety	114	0	0	0	0
(ii) Psychological Well-Being	110	2	0	0	2
(iii) Outbreak of Diseases	110	3	1	0	0
(iv) Others	114	0	0	0	0
9. SOCIAL AND ECONOMIC					
(i) Employment	84	3	5	1	21
(ii) Housing	94	6	0	1	13
(iii) Change in Way of Life	84	4	5	0	21
(iv) Involuntary Settlement	105	5	1	0	3
(v) Population Increase	99	6	3	0	6
(vi) Others	114	0	0	0	0
10. AESTHETIC AND CULTURAL					
(i) Impacts on the Community	80	4	4	0	26
(ii) Conflicts amoung communities	107	7	0	0	0
(iii) Historic and Cultural Assets	114	0	0	0	0
(iv) Others	111	1	0	0	2

Table I-14 SUMMARY OF ENVIRONMENTAL IMPACTS FOR SMALL RESERVOIR DEVELOPMENT FOR THE STATES IN PENINSULAR MALAYSIA BASED ON THE PRELIMINARY ASSESSMENT MATRIX

NUMBER OF PROJECTS

ENVIRONMENTAL COMPONENTS	PERLIS					KEDAH					PAULA PINANG					PERAK				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
I. PHYSICOCHEMICAL																				
1. LAND																				
(i) Change of Land use (Devastation or desertification)	5					15		1		1	8					9	3			
(ii) Soil Erosion	5					15	1	1			8					11	1			
(iii) Soil Salinization	5					16	1				8					12				
(iv) Deterioration of soil fertility	5					17					8					9	3			
(v) Others	5					17					8					12				
2. SURFACE WATER																				
(i) Water Balance					5					17	8					11	1			
(ii) Flooding	3				2	15	2				7		1			10	1	1		
(iii) Soil sedimentation	4				1	15		2			5	2		1		9	3			
(iv) Water Quality	4				1	15		2			7			1		9	3			
(v) Drainage Pattern	3				2	17					7	1				11	1			
(vi) Change in Existing Use	4				1	16				1	8					8	4			
(vii) Others	5				0	17					8					12				
3. GROUNDWATER																				
(i) Change in groundwater hydrology	5					17					8					2	10			
(ii) Water Quality	5					17					8					12				
(iii) Change in Existing Use	5					17					8					11	1			
(iv) Others	5					17					8					12				
4. ATMOSPHERE																				
(i) Atmospheric pollution	4				1	17					8					11	1			
(ii) Others	5					17					8					12				
5. NOISE																				
(i) Noise Pollution	5					17					8					12				
(ii) Others	5					17					8					12				
II. BIOLOGICAL																				
6. SPECIES AND POPULATIONS																				
(i) Terrestrial Vegetation	4				1	17					8					10	2			
(ii) Terrestrial Wildlife	5					17					8					10	1	1		
(iii) Other Terrestrial Fauna	5					17					8					10	2			
(iv) Aquatic/Marine Flora	5					17					7		1			11	1			
(v) Fish	5					17					5		1		2	10	2			
(vi) Other Aquatic/Marine Fauna	5					17					8					11	1			
7. HABITATS AND COMMUNITIES																				
(i) Terrestrial Habitats	5					17					8					11	1			
(ii) Terrestrial Communities	5					17					8					10	2			
(iii) Aquatic, Estuarine, Marine Habitats	5					17					8					11	1			
(iv) Aquatic, Estuarine, Marine Communities	5					17					8					11	1			
(v) Others	5					17					8					12				
III. HUMAN																				
8. HEALTH AND SAFETY																				
(i) Physical Safety	5					17					8					12				
(ii) Psychological Well-Being	5					15				2	8					11	1			
(iii) Outbreak of Diseases	5					17					7		1			11	1			
(iv) Others	5					17					8					12				
9. SOCIAL AND ECONOMIC																				
(i) Employment	1				4	3				14	8					9			3	
(ii) Housing	4				1	8				9	8					11	1			
(iii) Change in Way of Life	2				3	2				15	8					9	1	2		
(iv) Involuntary Settlement	5					17					8					9	3			
(v) Population Increase	4				1	16				1	8					8	3	1		
(vi) Others	5					17					8					12				
10. AESTHETIC AND CULTURAL																				
(i) Impacts on the Community					5					17	6				2	9	2	1		
(ii) Conflicts amoung communities	5					17					8					11	1			
(iii) Historic and Cultural Assets	5					17					8					12				
(iv) Others	5					17					6				2	12				

ENVIRONMENTAL COMPONENTS	SELANGOR					N. SEMBILAN					MELAKA					JOHOR				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
I. PHYSICOCHEMICAL																				
1. LAND																				
(i) Change of Land use (Devastation or desertification)	17					5					4					6				
(ii) Soil Erosion	15	2				4	1				4					6				
(iii) Soil Salinization	16	1				5					4					6				
(iv) Deterioration of soil fertility	16	1				4	1				4					5		1		
(v) Others	17					5					4					6				
2. SURFACE WATER																				
(i) Water Balance	14	3				4	1				4					6				
(ii) Flooding	14	2	1				5				4					6				
(iii) Soil sedimentation	14	2	1			4	1				4					5	1			
(iv) Water Quality	14	3				4		1			4					6				
(v) Drainage Pattern	14	1	2			1	4				4					6				
(vi) Change in Existing Use	14	2		1		5					4					5	1			
(vii) Others	15	2				5					4					6				
3. GROUNDWATER																				
(i) Change in groundwater hydrology	15	2				1				4	4					6				
(ii) Water Quality	15		2			5					4					6				
(iii) Change in Existing Use	15		2			5					4					6				
(iv) Others	17					5					4					6				
4. ATMOSPHERE																				
(i) Atmospheric pollution	16	1				5					4					6				
(ii) Others	17					5					4					6				
5. NOISE																				
(i) Noise Pollution	17					5					4					6				
(ii) Others	17					5					4					6				
II. BIOLOGICAL																				
6. SPECIES AND POPULATIONS																				
(i) Terrestrial Vegetation	16	1				5					4					6				
(ii) Terrestrial Wildlife	16	1				5					4					6				
(iii) Other Terrestrial Fauna	15	2				5					4					6				
(iv) Aquatic/Marine Flora	15	2				5					4					6				
(v) Fish	15	2				5					4					6				
(vi) Other Aquatic/Marine Fauna	17					5					4					5				
7. HABITATS AND COMMUNITIES																				
(i) Terrestrial Habitats	17					5					4					6				
(ii) Terrestrial Communities	17					5					4					6				
(iii) Aquatic, Estuarine, Marine Habitats	17					4	1				4					6				
(iv) Aquatic, Estuarine, Marine Communities	17					4	1				4					6				
(v) Others	17					5					4					6				
III. HUMAN																				
8. HEALTH AND SAFETY																				
(i) Physical Safety	17					5					4					6				
(ii) Psychological Well-Being	17					5					4					6				
(iii) Outbreak of Diseases	17					5					4					6				
(iv) Others	17					5					4					6				
9. SOCIAL AND ECONOMIC																				
(i) Employment	15	1		1		4	1				4					6				
(ii) Housing	15	1		1		1	4				4					6				
(iii) Change in Way of Life	15	2				5					4					6				
(iv) Involuntary Settlement	16	1				5					4					6				
(v) Population Increase	15	2				5					4					6				
(vi) Others	17					5					4					6				
10. AESTHETIC AND CULTURAL																				
(i) Impacts on the Community	15	2				5					4					6				
(ii) Conflicts amoung communities	15	2				1	4				4					6				
(iii) Historic and Cultural Assets	17					5					4					6				
(iv) Others	16	1				5					4					6				

ENVIRONMENTAL COMPONENTS	KELANTAN					TRENGGANU					PAHANG					PENINSULAR MALAYSIA				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
I. PHYSICOCHEMICAL																				
1. LAND																				
(i) Change of Land use (Devastation or desertification)	6	1	3		3	15					10				2	100	4	4	0	6
(ii) Soil Erosion	13					15					12					108	5	1	0	0
(iii) Soil Salinization	11		2			15					12					110	2	2	0	0
(iv) Deterioration of soil fertility	11		2			15					12					106	5	3	0	0
(v) Others	13					15					12					114	0	0	0	0
2. SURFACE WATER																				
(i) Water Balance	11		2			15					12					85	5	2	0	22
(ii) Flooding	8	1		1	3	12	2			1	5				7	84	13	3	1	13
(iii) Soil sedimentation	13					15					10				2	98	9	3	1	3
(iv) Water Quality	10	1	2			15					9				3	97	7	5	1	4
(v) Drainage Pattern	7	1	2		3	12	3				3				9	85	11	4	0	14
(vi) Change in Existing Use	11		2			14				1	12					101	7	2	1	3
(vii) Others	13					15					12					112	2	0	0	0
3. GROUNDWATER																				
(i) Change in groundwater hydrology	11		2			15					12					96	12	2	0	4
(ii) Water Quality	11		2			14	1				12					109	1	4	0	0
(iii) Change in Existing Use	10	1	2			15					12					108	2	4	0	0
(iv) Others	13					15					12					114	0	0	0	0
4. ATMOSPHERE																				
(i) Atmospheric pollution	11		2			15					12					109	2	2	0	1
(ii) Others	13					15					12					114	0	0	0	0
5. NOISE																				
(i) Noise Pollution	13					15					12					114	0	0	0	0
(ii) Others	13					15					12					114	0	0	0	0
II. BIOLOGICAL																				
6. SPECIES AND POPULATIONS																				
(i) Terrestrial Vegetation	12	1				15					12					109	4	0	0	1
(ii) Terrestrial Wildlife	13					15					12					111	2	1	0	0
(iii) Other Terrestrial Fauna	13					15					12					110	4	0	0	0
(iv) Aquatic/Marine Flora	13					15					12					110	3	1	0	0
(v) Fish	13					15					10				2	105	4	1	0	4
(vi) Other Aquatic/Marine Fauna	13					15					12					113	1	0	0	0
7. HABITATS AND COMMUNITIES																				
(i) Terrestrial Habitats	13					15					12					113	1	0	0	0
(ii) Terrestrial Communities	12		1			15					12					111	2	1	0	0
(iii) Aquatic, Estuarine, Marine Habitats	12		1			15					12					111	2	1	0	0
(iv) Aquatic, Estuarine, Marine Communities	12		1			15					12					111	2	1	0	0
(v) Others	13					15					12					114	0	0	0	0
III. HUMAN																				
8. HEALTH AND SAFETY																				
(i) Physical Safety	13					15					12					114	0	0	0	0
(ii) Psychological Well-Being	12	1				15					12					110	2	0	0	2
(iii) Outbreak of Diseases	13					15					10	2				110	3	1	0	0
(iv) Others	13					15					12					114	0	0	0	0
9. SOCIAL AND ECONOMIC																				
(i) Employment	7	1	2		3	15					12					84	3	5	1	21
(ii) Housing	10				3	15					12					94	6	0	1	13
(iii) Change in Way of Life	6	1	3		3	15					12					84	4	5	0	21
(iv) Involuntary Settlement	8	1	1		3	15					12					105	5	1	0	3
(v) Population Increase	7	1	2		3	14				1	12					99	6	3	0	6
(vi) Others	13					15					12					114	0	0	0	0
10. AESTHETIC AND CULTURAL																				
(i) Impacts on the Community	10		3			15					10				2	80	4	4	0	26
(ii) Conflicts amoung communities	13					15					12					107	7	0	0	0
(iii) Historic and Cultural Assets	13					15					12					114	0	0	0	0
(iv) Others	13					15					12					111	1	0	0	2

0 - No Impact, 1 - Potentially significant adverse environmental impact for which a design solution has been identified
2 - Adverse environmental impact that is potentially significant but insufficient information has been obtained to make a reliable prediction (Significant Unknown Impact)
3 - Residual and significant adverse environmental impact (Significant Known but Unsolvable Impact), 4 - Significant environmental enhancement (Useful for environmental development)

Table I-15 CLARIFICATION OF PRESCRIBED ACTIVITIES IN THE PROJECT SITES VISITED (1/2)

CODE	NO	NAME OF THE PROJECT	PRESENT AND PROPOSED ACTIVITY IN THE PROJECT AREA	RELEVANT PRESCRIBED ACTIVITY ACCORDING TO EQA, 1974	Remarks / Necessity of EIA
PR	1	SIMPANG GETI	Already existing scheme. A better water management would increase paddy cultivation area by 40 ha.	Irrigation schemes covering an area of 5000 ha or more	EIA may not be necessary since the project is an already existing scheme and the irr. area is less.
PR	4	TASEK MELATI	Already existing scheme. Irrigated area is 50 ha.	Irrigation schemes covering an area of 5000 ha	Already existing scheme - EIA not necessary
PR	6	HUTAN LEMBAH MANGO PROJECT	Presently 22.6 ha is cultivated. New proposal is not clear.	------	------
KH	2	AIR HANGAT	Presently 250 ha is cultivated. Planning for fruit culture. Proposed for small reservoir to be constructed on streams	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed area for small reservoir is not clear yet. However Kedah Cement factory needs more water from the same water resources.
KH	3	AMPANGAN PDG SAGA	Presently 486 ha of paddy cultivation is done. DCA already started the excavation.	------	It is an on-going project. Hence EIA may not be necessary.
KH	4	KAWASAN PADI KEDAWANG	Presently rainfed paddy of 200 ha area. Government intends to maintain the area for tourism purpose. Few number of small reservoirs is proposed.	Construction of impounding reservoirs covering an area of 200 ha or more	The area of the propsed reservoirs is not clear. However it is expected to be less than 200 ha.
KH	5	KEDAWANG	Part of the above area proposed by DOA. Small reservoir is proposed to be constructed in the depression.	Construction of impounding reservoirs covering an area of 200 ha or more	The area of the propsed reservoirs is not clear. However it is expected to be less than 200 ha.
KH	24	P KG BETONG	Presently 13.5 ha of Durian farm is cultivated. There are 2000 ha of Durian projects in SIK District.	Development of agricultural estates of 500 ha or more involving changes in agricultural use.	No EIA is necessary for developing small farm. If small reservoir development will be carried out it will cover only a part of 2000 ha and the agrl. use remains same. EIA may not be necessary.
KH	35	BK PERAK	Presently fruit farming of 8 ha is done by students. A small reservoir is proposed on the stream.	Construction of impounding reservoirs covering an area of 200 ha or more	The area is too small; EIA not necessary.
KH	???	KP KUBANG YOI	Presently vegetables are grown on 3 ha area. In future plans to expand for 8 ha for fruit culture.	------	The area is too small; EIA not necessary.
PP	3	TOK BEDU IRRIGATION AREA	Part of granary area of 68 ha is planned to be cultivated with paddy, vegetables and fruits	Construction of impounding reservoirs covering an area of 200 ha or more	The area of planned reservoir is not clear yet.
PP	9	SG BURUNG	An area of 500 ha is planned to be cultivated with paddy, vegetables, fisheries and tourism.	Development of agricultural estates of 500 ha or more involving changes in agricultural use.	Already existing scheme . Besides the area to be developed will be less than 500 ha.
PK	3	INDUSTRI BUAH-BUAHAN	Farmers Organization Association is planning to cultivate Durian by clearing 57 ha of forest area.	Conversion of hill forest land to other land use covering an area of 57 ha or more.	EIA is necessary since the development area is more than 50 ha.
PK	8	P KELOMPOK BUAH-BUAHAN AIR PUTIH	Fruit cultivation is going on in 200 ha area. The area has drainage problem.	Construction of impounding reservoirs covering an area of 200 ha or more	EIA is not necessary.
SG	13	JLN ENAM KAKI 1	Paddy mini-estate of 73 ha and star fruit of 4 ha by Felcra. Proposed to increase the storage capacity at the upstream.	Construction of impounding reservoirs covering an area of 200 ha or more	Not much increase in storage capacity is expected. EIA shall not be necessary.
SG	14	SAPAN BT MINANGKABAU	Presently double cropping of paddy cultivation was performed on 177 ha. A reservoir is proposed at upstream	Construction of impounding reservoirs covering an area of 200 ha or more	Necessity of project is not clear.
SG	15	SG JAI BK KEPONG	Presently paddy mini estate of 58 ha area.	------	Proposal for the small reservoir is not clear.

Table I-15 CLARIFICATION OF PRESCRIBED ACTIVITIES IN THE PROJECT SITES VISITED (2/2)

CODE	NO	NAME OF THE PROJECT	PRESENT AND PROPOSED ACTIVITY IN THE PROJECT AREA	RELEVANT PRESCRIBED ACTIVITY ACCORDING TO EQA. 1974	Remarks / Necessity of EIA
NS	1	STESEN MARDI JELEBU	Experimental and commercial research farm managed by MARDI is damaged by severe draught. A small reservoir is proposed.	Construction of impounding reservoirs covering an area of 200 ha or more	Size of the proposed reservoir is expected to be less than 200 ha.
MA	14	KANDANG	Experimental project for crop diversification to convert 28ha of paddy to fruit cultivation. A small pond exists.	Development of agricultural estates of 500 ha or more involving changes in agricultural use.	The area is very small. EIA is not necessary.
MA	15	SOLOK BK META	Vegetables are grown on 4 ha farm converted from paddy field	Development of agricultural estates of 500 ha or more involving changes in agricultural use.	The area is very small. EIA is not necessary.
MA	16	FELCRA BK SEDANAN	A FELCRA project covering 335 ha. A small reservoir already exisits. Improvement is necessary.	Construction of impounding reservoirs covering an area of 200 ha or more	The scheme already exists. EIA may not be necessary.
JR	3	SAWAH KEBUN BARU	A multicrop farming management project on a 40 ha area. No water resource development is planned.	------	The scheme already exists. EIA may not be necessary.
JR	10	LDG KELOMPOK KANGKAR MERLIMAU	Presently hilly area of 33 ha is planted with Durian, Dukong Star fruit etc. A pond exisits and another pond is proposed.	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed pond is expected to be less than 200 ha. Therefore EIA may not be necessary.
KN	13	TASIK PUTERA	Presently single crop of paddy exists. 20 ha of vegetables. Proposed to construct a reservoir in abolished river.	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed pond is expected to be less than 200 ha. Therefore EIA may not be necessary.
KN	16	BENDANG PMTG SUNGKAI	Presently irrigated upland crop on 10 ha and is planned to be expanded to 32 ha.	Development of agricultural estates of 500 ha or more involving changes in agricultural use.	The proposed development area is small. Hence EIA is not necessary.
KN	24	RANC TALIAIR HILIR SAT 1	A non-granary area of 431 ha and only 1/3 is cultivated. In future paddy is planned to be cultivated. A lowlying idle land is to be exvated to increase storage capacity.	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed excavation area is not clear.
TR	3	SKIM TANAMAN PADI MARAS	Presently rainfed paddy area of 100 ha. In future, vegetable is planned in off-season. Two tin mining ponds of 3 ha area shall be used.	Construction of impounding reservoirs covering an area of 200 ha or more	The pond area is small. Hence EIA shall not be necessary.
TR	12	BANGUL KATONG	Presently paddy in the main season and vegetables in the off-season in 16 ha area. Proposed to expand 20 ha for fruits. A small reservoir is proposed on nearby stream.	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed pond area is not clear. However it is expected to be less than 200 ha.
TR	34	LEMBAH MARANG II	Presently single crop of paddy on 200 ha. In future vegtable in proposed. Proposed to enlarage main canal.	Construction of impounding reservoirs covering an area of 200 ha or more	Water resource for small reservoir development is not enough.
TR	44	P KELOMPOK SAYURAN	Vegetable cultivation is practiced on 3 ha. In future, it is planned to be expanded to 40 ha by a small reservoir to be constructed on the stream.	Construction of impounding reservoirs covering an area of 200 ha or more	The proposed pond area is not clear. However it is expected to be less than 200 ha.
PH	9	PAYA PAGAR SASAK	Presently non-granary area of 79 ha. Irrigation system exists.	------	No new proposal in this project.
PH	20	PAYA LANTING	Presently abondoned inundation scheme of 187 ha. In future part of the area to be converted to fish pond, vegetables etc.	Conversion of mangrove swamps for agricultual use covering 50 ha or more.	Although the area is an inundation area it is not mangrove swamps. EIA shall not be necessary.
PH	23	PAYA PESAGI	Presently abondoned inundation scheme of 93 ha. In future part of the area to be converted to fish pond etc.	Conversion of mangrove swamps for agricultual use covering 50 ha or more.	Although the area is an inundation area it is not mangrove swamps. EIA shall not be necessary.

Table I-16 INFORMATION ON SELECTED PROJECTS (1/4)

Item	PR1,4	KH4,5	PP3	NS1	MA16
A. GENERAL					
a. Name of project area	PR1, Simpang Geti PR4, Tasek Melati	KH4, Kesawang (DID) KH5, Kedawang (DOA)	Tok Bedu Irrigation scheme	MARDI Station	Bkt. Sedanang
b. District	-	Langkawi	Sungei Perai Utara	Jerebu	Jasin
c. Mukim	Oran, Paya	Kedawang	6	Lakai	Selandar
d. Kanpung	Oran, Pdg. Lai	Kedawang, Bk.Lembu	Tok Bedu	-	Bk. Sedanan
e. Project area (ha)	302	412	68	600	409
f. Reservoir type	Existing ponds	A,B	C	A	A
g. Status	Existing	New	New	New	New
h. Owner	DID	DID, DOA	DID	MARDI	FELCRA
i. Theme	System O & M Water management	Improved sustainability Agro-tourism	Strategic resource management.	Fruits, demonstration	Multi-crop Agro-tourism
j. Crop	multi-crop	paddy, traditional farming	multi-crop, paddy	fruits	multi-crop
k. Remarks					
B. METEO-HYDROLOGY					
Present Condition					
a. Basin number	1	2	5	16	19
b. Mean annual rainfall of the Basin (mm)	1770	2387	2731	1325	1989
c. Yearly total of 80% rainfall of the Basin (mm)	922	1416	1600	467	1144
d. Hydrological score [1 (worst) - 10(best)]	3	7	9	3	5
e. Water shortage [1 (least) - 5 (most)]	3.5	5	5	5	3
f. Rainy season	Apr - May, Sep - Oct	Apr - May, Sep - Oct	Apr - May, Sep - Oct	Oct - Nov	Apr, Oct - Nov
g. Dry season	Dec - Feb	Dec - Feb	Dec - Feb	Jan - Feb, Jun - Aug	Jan - Feb, May
h. Wettest month	Oct	Sep	Oct	Nov	Nov
i. Driest month	Jan	Feb	Feb	Jun	Feb
Planning					
a. Catchment area (km2)	3 km2, 3 km2	10	19	4 (estimated)	2 (estimated)
b. Estimated runoff (ha m)	194	991	2138	131	229
c. 1 in 5 year rainstorm per day (mm)	111	138	138	79	137
d. 1 in 50 year - do -	167	195	213	96	240
C. IRRIGATION AND DRAINAGE					
Present condition					
1 Existing irrigation facilities	YES	YES	YES	YES	YES
2 Existing irrigation area (ha)	PR-1: 40 PR-4: 232	KH-4: 412 KH-5: 190	68	220	97
3 Water resources	River	River	River	River	Well
4 Existing dam or pond	YES	NO	NO	YES	YES
5 Dam height	-	-			
6 Effective storage of dam or pond (m3)	PR-1: 48,000 PR-4: 70,000	-	NA	12,000	146,200
7 Off-taking system	PR-1: Pumping up PR-4: Free intake	Free intak	Pumping up	Pumping up	Pumping up
8 Adjucent projects concerned	Timah Tasoh dam project	-	-	-	-
9 Overlapping area with the adjucent project(ha	PR-1: 10 PR-4: 20	-	-	-	-
10 Flood occurrence year	PR-1: 1990 PR-4: 1991	NA	1,990	NA	NA
11 Flood season	PR-1: Nov. PR-4: Oct. to Nov.	NA	Oct to Nov.	NA	NA
12 Inundation period (day)	PR-1: 10 PR-4: 2	NA	2	NA	NA
13 Reason of flood	Insufficient river levee height	-	choking of river section	NA	NA
14 Water shortage occurrence year	PR-1:1990-1993 PR-4: 1990-1993	1991-1992	NA	NA	NA
15 Water shortage season	PR-1: Nov.to April PR-4: Jan. to Mar.	Oct. to Nov.	NA	NA	NA
16 Reason of water shortage	Water management,drought	Drought	NA	NA	NA
17 Damaged crop due to water shortage	PR-1: Tabacco PR-4: -	Paddy	NA	NA	NA
18 Damaged area (ha)	PR-1: 10 PR-4: -	200	NA	NA	NA
19 O & M budget (RM/ann)	PR-1: 2,000 PR-4: 15,000	2,500	100,000	4,560	-
20 Work system of O & M	Force account	Force account	Subletting	Subletting	Subletting
Planning					
1 Rehabilitation of existing irr. facilities	YES	YES	YES	NO	YES
2 Increase of irrigation area (ha)	-	-	50	NA	more than 8
3 Total irrigation area (ha)	272	200	118	220	more than 105
4 Designed new dam height (m)	-	-	-	NA	NA
5 Existing dam height (m)	-	-	-	-	-
6 Heightening of dam (m)	-	-	-	-	-
7 Excavation depth (m)	0.0	1.5	NA	-	-
8 Height of existing weir (m)	-	-	-	-	-
9 Heightening of weir (m)	-	-	-	-	-
10 Submerged land (ha)	0	26	NA	NA	NA
11 Total storage capacity (m3)	142,500	250,000	6,000	NA	NA
12 Brackish water intrusion	NO	NO	NO	-	-
13 Numbers of streams to flow in (nos)	-	NA	NA	-	-

Table I-16 INFORMATION ON SELECTED PROJECTS (2/4)

Item	PR1,4	KH4,5	PP3	NS1	MA16
D. AGRICULTURE					
Present Condition					
a. Farmland total (ha)	52 (paddy 40, upland 12)	-	68 (paddy)	200 (fruits)	409 (fruits 97, upland 312)
b. Farm family total (nos)	171	-	34	-	119
c. Farmland / Family (ha)	0.3	-	2	-	3.4
d. Soil type	clay, sand, silt	-	-	-	clay
e. Idle land total (ha)	-	-	-	-	312
f. Poverty family (%)	7	-	-	-	21
g. Farmer successor (%)	-	-	60	-	80
h. Family income / year (RM)	12,000	-	-	-	-
i. Farm income / year (RM)	4,000	-	-	-	-
j. Off-farm income / year (RM)	8,000	-	-	-	-
k. Present land use	paddy, upland	-	paddy	-	fruits
l. Crop intensity (%)					
Development Plan					
a. Proposed development crops					
b. Proposed target income (RM)					
c. Proposed farm facilities					
E. ENVIRONMENT					
Major environmental problems	Water quality, Weeds Industrial effluent	No	Water quality Flooding	No	Water quality Sedimentation
Physicochemical					
1. Land					
a. Change of Land use (Devastation or desertification)	0	2	0	0	0
b. Soil Erosion	0	1	0	1	0
c. Soil Salinization	0	1	0	0	0
d. Deterioration of soil fertility	0	0	0	1	0
e. Others	0	0	0	0	0
2. Surface water					
a. Water Balance	4 (PR1,4)	4	0	1	0
b. Flooding	4 (PR1,4)	1	0	1	0
c. Soil sedimentation	4 (PR4)	2	0	1	0
d. Water Quality	4 (PR4)	2	0	2	0
e. Drainage Pattern	4 (PR1,4)	0	0	0	0
f. Change in Existing Use	4 (PR4)	0	0	0	0
g. Others	0	0	0	0	0
3. Ground water					
a. Change in groundwater hydrology	0	0	0	0	0
b. Water Quality	0	0	0	0	0
c. Change in Existing Use	0	0	0	0	0
d. Others	0	0	0	0	0
4. Atomosphere					
a. Atmospheric pollution	4 (PR4)	0	0	0	0
b. Others	0	0	0	0	0
5. Noise					
a. Noise Pollution	0	0	0	0	0
b. Others	0	0	0	0	0
Biological					
6. Species and populations					
a. Terrestrial Vegetation	0	0	0	0	0
b. Terrestrial Wildlife	0	0	0	0	0
c. Other Terrestrial Fauna	0	0	0	0	0
d. Aquatic/Marine Flora	0	0	0	0	0
e. Fish	0	0	0	0	0
f. Other Aquatic/Marine Fauna	0	0	0	0	0
7. Habitats and communities					
a. Terrestrial Habitats	0	0	0	0	0
b. Terrestrial Communities	0	0	0	0	0
c. Aquatic, Estuarine, Marine Habitats	0	0	0	1	0
d. Aquatic, Estuarine, Marine Communities	0	0	0	1	0
e. Others	0	0	0	0	0
Human					
8. Health and safety					
a. Physical Safety	0	0	0	0	0
b. Psychological Well-Being	0	0	0	0	0
c. Outbreak of Diseases	0	0	0	0	0
d. Others	0	0	0	0	0
9. Social and economic					
a. Employment	4 (PR1)	4	0	1	0
b. Housing	0	4	0	0	0
c. Change in Way of Life	4 (PR1)	4	0	0	0
d. Involuntary Settlement	0	0	0	0	0
e. Population Increase	0	0	0	0	0
f. Others	0	0	0	0	0
10. Aethetic and cultural					
a. Impacts on the Community	4 (PR1, PR4)	4	0	0	0
b. Conflicts amoung communities	0	0	0	0	0
c. Historic and Cultural Assets	0	0	0	0	0
d. Others	0	0	0	0	0

0 - No Impact, 1 - Potentially significant adverse environmental impact for which a design solution has been identified

2 - Adverse environmental impact that is potentiall significant but insufficient information has been obtained to make a reliable prediction

3 - Residual and significant adverse environmental impact (Significant Known but Unsolvable Impact) ,

Table I-16 INFORMATION ON SELECTED PROJECTS (3/4)

Item	JR10	KN16	TR3	TR44	PH20
A. GENERAL					
a. Name of project area	Kelompok Kangkar Batu Pahat	Permatang Sunkai	Skim Tanaman Padi Maras	Pasir Nering	Paya Lanting
b. District	Batu Pahat	Pasir Putch	Kuala Terengganu	Hulu Terengganu	Maran
c. Mukim	Sri Medan	Bk. Jawa	Bk. Rakit	Jenagor	Chenor
d. Kanpung	Kangkar Merlimau	Permatang Sunkai	Darat Bk. Rakit	Pasir Nering	Lanting
e. Project area (ha)	82	32	420	42	137
f. Reservoir type	B	A	E	A	A
g. Status	New	New	New, Improvement	New	New
h. Owner	DOA	DID	Presently No (State land)	DOA	DID
i. Theme	Fruits	Multi-purpose reservoir	Strategic development for future. mining pond	Group farming Poverty eradication	Revitalization, Strategic devlptt. Inundation scheme
j. Crop	fruits	vegetables, fruits, domestic	vegetables, paddy	fruits	vegetables, fishery
k. Remarks					
B. METEO-HYDROLOGY					
Present Condition					
a. Basin number	25	26	28	28	35
b. Mean annual rainfall of the Basin (mm)	2154	2699	2528	2528	1634
c. Yearly total of 80% rainfall of the Basin (mm	1143	1384	1291	1291	800
d. Hydrological score [1 (worst) - 10(best)]	6	5	5	5	4
e. Water shortage [1 (least) - 5 (most)]	4	5	5	4	3
f. Rainy season	Apr - May, Oct - Nov	Nov - Dec	Nov - Dec	Nov - Dec	Apr - May, Oct - Nov
g. Dry season	Jan - Feb, Jun	Feb - Apr	Feb - Apr	Feb - Apr	Jan - Feb, Jun
h. Wettest month	Nov	Dec	Nov	Nov	Nov
i. Driest month	Feb	Feb	Feb	Feb	Feb
Planning					
a. Catchment area (km2)	2	3	1.54	2	34
b. Estimated runoff (ha m)	229	415	198	258	4583
c. 1 in 5 year rainstorm per day (mm)	151	245	384	384	121
d. 1 in 50 year - do -	227	455	774	774	168
C. IRRIGATION AND DRAINAGE					
Present condition					
1 Existing irrigation facilities	NO	YES	YES	YES	NO
2 Existing irrigation area (ha)	5	32	1,955	2	187
3 Water resources	Spring water	River & G. water	River & G. water	River	NO
4 Existing dam or pond	NO	NO	YES	NO	NO
5 Dam height	-	-	NA	-	-
6 Effective storage of dam or pond (m3)	-	-	NA	-	-
7 Off-taking system	-	Pumping up	Free intake	Pumping up	NO
8 Adjucent projects concerned	-	-	-	-	-
9 Overlapping area with the adjucent project(ha	-	-	-	-	-
10 Flood occurrence year	NO	NA	-	NA	1991 &1993
11 Flood season	NO	NA	-	NA	Nov. to Jan.
12 Inundation period (day)	NO	NA	-	NA	90
13 Reason of flood	-	NA	-	NA	Choking of river section
14 Water shortage occurrence year	NO	NA	-	NA	NA
15 Water shortage season	NO	Mar. to Apr.	-	NA	NA
16 Reason of water shortage	-	Drought	-	NA	NA
17 Damaged crop due to water shortage	NO	Paddy	-	NA	NA
18 Damaged area (ha)	NO	10	-	NA	NA
19 O & M budget (RM/ann)	0	2,500	-	NA	180
20 Work system of O & M	-	NA	-	NA	NA
Planning					
1 Rehabilitation of existing irr. facilities	YES	YES	YES	YES	NA
2 Increase of irrigation area (ha)	50	32	NA	NA	NA
3 Total irrigation area (ha)	55	64	NA	NA	NA
4 Designed new dam height (m)	-	-	-	NA	NA
5 Existing dam height (m)	-	-	-	-	-
6 Heightening of dam (m)	-	-	-	-	-
7 Excavation depth (m)	3.0	-	-	-	-
8 Height of existing weir (m)	-	1.35	-	-	-
9 Heghtening of weir (m)	-	0.6	-	-	-
10 Submerged land (ha)	NO	32	-	NA	NA
11 Total storage capacity (m3)	9,000	10,000	140,000	NA	NA
12 Brackish water intrusion	NO	-	-	-	-
13 Numbers of streams to flow in (nos)	-	-	4	-	-

Table I-16 INFORMATION ON SELECTED PROJECTS (4/4)

Item	JR10	KN16	TR3	TR44	PH20
D. AGRICULTURE					
Present Condition					
a. Farmland total (ha)	82 (fruits 32, upland 50)	30 (paddy 27, fruits 3)	420 (paddy 200, fruits 50, upland 150, plantation 20)	42 (paddy 40, upland 2.4)	137 (paddy)
b. Farm family total (nos)	25	55	400	22	50
c. Farmland / Family (ha)	3.3	0.55 (paddy 0.5)	1.05	2.8	2.7
d. Soil type	clay	clay, sand	clay	clay	clay
e. Idle land total (ha)	32	-	30	0.2	-
f. Poverty family (%)	60	90	100	100	-
g. Farmer successor (%)	40	20	40	40	none
h. Family income / year (RM)	14,600	3,000	4,600	3,000	-
i. Farm income / year (RM)	5,000	3,000	3,600	2,400	-
j. Off-farm income / year (RM)	9,600	-	1,000	600	-
k. Present land use	upland, fruits	paddy, fruits	paddy, upland	paddy, upland	paddy
l. Crop intensity (%)					
Development Plan					
a. Proposed development crops					
b. Proposed target income (RM)					
c. Proposed farm facilities					
E. ENVIRONMENT					
Major environmental problems	No	No	No	No	Water logging, Flooding Water quality
Physicochemical					
1. Land					
a. Change of Land use (Devastation or desertification)	0	1	0	0	4
b. Soil Erosion	0	0	0	0	0
c. Soil Salinization	0	0	0	0	0
d. Deterioration of soil fertility	0	0	0	0	0
e. Others	0	0	0	0	0
2. Surface water					
a. Water Balance	0	0	0	0	0
b. Flooding	0	1	1	0	4
c. Soil sedimentation	0	0	0	0	0
d. Water Quality	0	0	0	0	4
e. Drainage Pattern	0	1	1	0	4
f. Change in Existing Use	0	0	0	0	0
g. Others	0	0	0	0	0
3. Ground water					
a. Change in groundwater hydrology	0	0	0	0	0
b. Water Quality	0	0	0	0	0
c. Change in Existing Use	0	1	0	0	0
d. Others	0	0	0	0	0
4. Atomosphere					
a. Atmospheric pollution	0	0	0	0	0
b. Others	0	0	0	0	0
5. Noise					
a. Noise Pollution	0	0	0	0	0
b. Others	0	0	0	0	0
Biological					
6. Species and populations					
a. Terrestrial Vegetation	0	0	0	0	0
b. Terrestrial Wildlife	0	0	0	0	0
c. Other Terrestrial Fauna	0	0	0	0	0
d. Aquatic/Marine Flora	0	0	0	0	0
e. Fish	0	0	0	0	4
f. Other Aquatic/Marine Fauna	0	0	0	0	0
7. Habitats and communities					
a. Terrestrial Habitats	0	0	0	0	0
b. Terrestrial Communities	0	0	0	0	0
c. Aquatic, Estuarine, Marine Habitats	0	0	0	0	0
d. Aquatic, Estuarine, Marine Communities	0	0	0	0	0
e. Others	0	0	0	0	0
Human					
8. Health and safety					
a. Physical Safety	0	0	0	0	0
b. Psychological Well-Being	0	0	0	0	0
c. Outbreak of Diseases	0	0	0	0	4
d. Others	0	0	0	0	0
9. Social and economic					
a. Employment	0	0	0	0	4
b. Housing	0	0	0	0	0
c. Change in Way of Life	0	0	0	0	0
d. Involuntary Settlement	0	0	0	0	0
e. Population Increase	0	0	0	0	0
f. Others	0	0	0	0	0
10. Aethetic and cultural					
a. Impacts on the Community	0	0	0	0	4
b. Conflicts amoung communities	0	0	0	0	0
c. Historic and Cultural Assets	0	0	0	0	0
d. Others	0	0	0	0	0

0 - No Impact, 1 - Potentially significant adverse vironmental impact for which a design solution has been identified

2 - Adverse environmental impact that is potentiall significant but insufficient information has been obtained to make a reliable prediction

3 - Residual and significant adverse environmentalimpact (Significant Known but Unsolvable Impact) .

Table I-17 FEATURES OF PILOT PROJECTS PROPOSED BY STATE COORDINATORS (1)

Code No.	Name of Project	District	Mukim	Kampung	River System	Existing or potential	Area Category
PR 1	SIMPANG GETI		ORAN	ORAN	SG JERNEH	E	N
PR 4	TASEK MELATI		PAYA	PDG LATI	ALOR TASEK MELATI	E	N
PR 6	HUTAN LEMBAH MANGO PROJECT		MATA AYER	HUTAN LEMBAH	SG. GIAL	E	U
KH 2	AIR HANGAT	LANGKAWI	AIR HANGAT	KUMBANG BADAK	SG KUBANG BADAK	P	R,U
KH 3	AMPANGAN PDG SAGA	LANGKAWI	ULU MELAKA	PDG SAGA	SG SAGA / PETANG	E	N
KH 4	KAWASAN PADI KEDAWANG	LANGKAWI	KEDAWANG	KEDAWANG	SG CENANG	P	R
KH 5	KEDAWANG	LANGKAWI	KEDAWANG	BK LEMBU	SG CENANG	P	R
KH 35	BK PERAK	PENDANG	PDG PELIANG	BK PERAK	SG BK PERAK	P	U
	KG. KUBANG YOI	SIK					
	Sik Durian Project	SIK					
PP 3	TOK BEDU IRRIGATION AREA	S PERAI UTARA		TOK BEDU	SG KREH	E	N
PP 9	SG BURUNG	BARAT DAYA	M.E & H	KG SG BURONG	SG BURONG	E	G
PK 3	INDUSTRI BUAH-BUAHAN	SELAMA	IJOK	KG MESJID, IJOK	SG CHOP	P	U
PK 8	P KELOMPOK BUAH-BUAHAN AIR PUTIH	LARUT MATANG	TAIPING	KG PAK DOLLAH	SG MALAI	R	U
SG 13	JLN ENAM KAKI 1	HULU LANGAT	BERANANG	JLN 6 KAKI	SG GOMP	R	N
SG 14	SAPAN BT MINANGKABAU	HULU LANGAT	BERANANG	SESAPAN BT MINANGKABAU	SG BERANANG/SG PURUN	R	N
SG 15	SG JAI BK KEPONG	HULU LANGAT	BERANANG	SG JAI	SG SOMPO	R	N
NS 1	STESEN MARDI JELEBU	JELEBU	LAKAI		SG TRIANG	R	U
MA 14	KANDANG	MELAKA TENGAH	KANDANG	KANDANG	SG DUYONG	R	R
MA 15	SOLOK BK META	MELAKA TENGAH	ALAI/KANDANG	SLK. BK META	SG PUNGGUR	R	R
MA 16	FELCRA BK SEDANAN	JASIN	SELANDAR	BK SEDANAN	SG. AYER MENTANGOR	R	U
JR 3	SAWAH KEBUN BARU	MUAR	TANGKAK	SAGIL		E	N
JR 10	LDG KELOMPOK KANGKAR MERLIMAU	BATU PAHAT	SRI MEDAN	KANGKAR MERLIMAU		P	U
KN 13	TASIK PUTERA	PASIR MAS	PASIR MAS	KUBANG PANJANG	ALOR PUSU BESAR	E	N,R,U
KN 16	BENDANG PMTG SUNGKAI	PASIR PUTEH	BK JAWA	PMTG SUNGKAI	SG LINJA	P	U
KN 24	RANC TALIAIR HILIR SAT 1	MACHANG	ULU SAT	KEMUNING	SG SAT	E	N
TR 3	SKIM TANAMAN PADI MARAS	KUALA TRG	BT RAKIT	DARAT BT RAKIT	PANCOR MARAS	R	R
TR 12	P KELOMPOK SAYURAN	KUALA TRG	SERADA	BENGGOL KATONG		E	N
TR 34	LEMBAH MARANG II	MARANG	JERONG	JERONG SURAU	ALOR PAK BONG	E	R
TR 44	P KELOMPOK SAYURAN	HULU TRG	JENAGOR	PASIR NERING		E	N
PH 9	PAYA PAGAR SASAK	LIPIS	KEOHAN	PETOLA	SG BEDONG	E	N
PH 20	PAYA LANTING	MARAN	CHENOR	LANTING	SG LANTING	R	R
PH 23	PAYA PESAGI	MARAN	CHENOR	KG PESAGI	SG PESAGI	R	R

Source : Questionnaire I

E : Existing
R : To be rehabilitated
P : Potential

G: Granary Area
N: Non Granary Area
R: Rainfed Area
U: Upland Area
P: Plantation Area

Table I-17 FEATURES OF PILOT PROJECTS PROPOSED BY STATE COORDINATORS (2)

Code No.	Water Shortage at Present						Water Shortage for Future					
	Irrigation	Domestic	Industry	Fisheries	Agro-Tourism	Others	Irrigation	Domestic	Industry	Fisheries	Agro-Tourism	Others
PR 1	3						3					
PR 4	5						5					
PR 6	5						5					
KH 2	5						5					
KH 3	3	1			3		4	3			4	
KH 4	5				5		5				5	
KH 5	5						5					
KH 35	5	4					5	4				
PP 3	3						5					
PP 9	4			3	4		5			5	5	
PK 3	3						4					
PK 8	1	2	3	2	3		3	3	3	3	4	
SG 13	2						4					
SG 14												
SG 15	2						5					
NS 1	4						2					
MA 14	4				4		4				4	
MA 15	3						5					
MA 16	3			3	3		3			3	3	
JR 3	2						2					
JR 10	5						5					
KN 13	2						4					
KN 16	3	1			3		5	3			4	
KN 24	1						2					
TR 3	4						5					
TR 12	1						4					
TR 34	4						5					
TR 44	1						4					
PH 9	1						3					
PH 20	3			3			3			3		
PH 23	3			3			3			3		

5 : most severe
1 : least severe

Table I-17 FEATURES OF PILOT PROJECTS PROPOSED BY STATE COORDINATORS (3)

Code No.	Type of Reservoir	Purpose of Reservoir	Irrigation: Number of Farmers	Irrigation: Benefitted Area (ha)	Domestic Water: No. of Families	Fisheries: Area of Pond (ha)	Industries: Kind of Industries	Industries: No. of Factories	Others: Item	Others: Numbers	Land Ownership
PR 1	B	IP,IO(TBC)	30	9							G
PR 4	B	IP,IV,IO(TBC),A	160	50							G
PR 6	B	IF	62	23							P
KH 2	A	IP,IV,IF	300	250							G,P
KH 3	A	IP,IF,D,A	500	486	6000						G
KH 4	B	IP,A	350	412							P
KH 5	D	IP,IV,IF	170	190							G,P
KH 35	A,D	IV,IF,D	50	200	50		Medium	1			G
PP 3	C	IP,IV,IF	34	68							G
PP 9	B	IP,IV,F,A	100	525		2					G
PK 3	D	IF	2105	57							P
PK 8	B	IV,IF,D,IN,F,A	50	200	15	10	Medium	4			P
SG 13	A	IP	60	75							G
SG 14	A	A									G
SG 15	A	IP	40	50							G
NS 1	C,D	IF		607							O(MARDI)
MA 14	B	IV,IF,A	30	25							P
MA 15	B	IV,IF	30	25							P
MA 16	A	IF,IO,F,A,IV	120	290		0.1					G
JR 3	B	IV,IF									G
JR 10	B	IF	33	30							P
KN 13	E	IP,IV	30	20							G
KN 16	D	IP,IV,IF,IO,D,A	55	32	10						G
KN 24	D	IP	515	431							P
TR 3	E	IP,IV	60	100							P
TR 12	B	IV	40	20							P
TR 34	A	IP,IV	40	200							G
TR 44	B	IV	22	40							P
PH 9	A	IP	40	44							G
PH 20	A	IV,IO(O.P),F	50	137		50					P
PH 23	A	IV,F	30	73		20					P

A : Dam on Small River
B : Pond in Lowland, Swamp and Idle Land
C : Abolished River
D : Upstream of Present Intake
E : Tin Mine Pond or Lake

IP : Irrigation for Paddy
IV : Irrigation for Vegetables
IF : Irrigation for Fruits
IO : Irrigation for Others

D : Domestic Water Supply
IN : Industrial Water Supply
F : Fisheries
A : Agro-Tourism
O : Others

G : Government Owned
P : Private Qwner

Table I-17 FEATURES OF PILOT PROJECTS PROPOSED BY STATE COORDINATORS (4)

Code No.	Environmental Problems		Remedial Measures		Priority of Project from State Viewpoint
PR 1	WATER QUALITY,IE		NO		5
PR 4	WATER QUALITY,WE		NO		5
PR 6	NO		NO		5
KH 2	NO		NO		5
KH 3	NO		NO		5
KH 4	NO		NO		5
KH 5	NO		NO		5
KH 35	DRAUGHT		NO		5
PP 3	WATER QUALITY,FE			a	4
PP 9		c		c	5
PK 3	NO		NO		5
PK 8	WATER QUALITY,IE	a	NO		5
SG 13		c		c	4
SG 14		c		c	5
SG 15		c		c	4
NS 1	NO		NO		5
MA 14	WATER QUALITY, SA		NO		4
MA 15	WATER QUALITY, BW		NO		5
MA 16	WATER QUALITY, SE		IMPROVING		5
JR 3	NO		NO		c
JR 10	NO		NO		5
KN 13	NO		NO		5
KN 16	NO		NO		5
KN 24	NO		NO		4
TR 3		c		c	4
TR 12		c		c	5
TR 34		c		c	4
TR 44		c		c	5
PH 9	WATER QUALITY, SE		NO		3
PH 20	WATERLOGGING	a	NO	a	4
PH 23	WATER QUALITY, SE	a	NO	a	4

5 : highest priority
1 : lowest priority

Table I-18 JICA STUDY TEAM'S FINDINGS IN SITE INSPECTION AND EVALUATION OF PROJECT (1)

State	Code No.	Project Name	Purpose	Facilities	Remarks	Priority
Perlis	PR 1	Simpang Geti	Presently 8 ponds irrigate 70 ha of padi lands. A better water management of ponds would increase 40 ha of paddy area.	No new facility is proposed. Question is how to irrigate efficiently scattered tabaco fields.	Water management at system as well as on farm seem to be problem.	1
	PR 4	Tasek Melati	The pond was constructed for irrigation and agro tourism purpose.	The pond has no inflow river. A link canal with major reservoir needed.	Water management of river system seems problem.	2
	PR 6	Hutan Lembah Mango Pjt.	Presently 30 ha of mango cultivated.	Hose irrigation practiced.	Proposed work not clearly defined.	
Langkawi	KH 2	Kubun Badak	Paddy of 250 ha cultivated, in future paddy plus fruits culture.	Small reservoir(s) to be constructed on stream(s).	Kedah Cement uses the same stream.	2
	KH 3	Padang Saga	Presently paddy cultivation of 486 ha and urban water supply going on.	At upstream of existing weir, proposed to excavate and construct bunds for impounding water.	DCA start the excavation work this year.	3
	KH 4	Kawasan Padi	Presently rainfed paddy field of 200 ha, Government intends to maintain the area for tourism purpose.	Proposed to build a few number of small reservoirs on streams.	Irrigation with a pond system.	1
	KH 5	Kedawang	Part of the above area, proposed by DOA.	A small reservoir to be constructed in depression.	Project should be combined with KH No.4.	
Kedah	KH 35	BK Perak	Presently fruits farm of 8 ha planted to star fruit and pomelo. Student running farm, but they lost interest.	Pumping facility was installed by DID. A small reservoir proposed on the stream.	No enthusiasm of beneficiary party.	
		Kg. Kubang Yoi	Presently vegetables grown on 3 ha of land. In future area expanded to 8 ha for fruits culture.	A pump and sprinkler irrigation system existing. Proposed to build a small pond on the stream.	Sik district is one of the poorest districts in Malaysia.	2
		Kg. Betong	Presently 13.5 ha of durian farm cultivated.	A pump and drip irrigation system existing taking water from Sg. Muda.	There are 2000 ha of durian projects in Sik district. Small reservoir study be done for some of these areas.	1

Table I-18 JICA STUDY TEAM'S FINDINGS IN SITE INSPECTION AND EVALUATION OF PROJECT (2)

State	Code No.	Project Name	Purpose	Facilities	Remarks	Priority
P. Pinang	PP 3	Tok Bedu Irrigation	Part of granary area of 68 ha, in future paddy, plus vegetables and fruits planned.	In future abolished river course is utilized for storing water.	Water quality has some problem.	1
	PP 9	Sg. Burung	Non granary area of 525 ha, in future paddy plus vegetables, fisheries and tourism.	Abolished meandering river course is utilized upstream existing weir.	Storage capacity seems rather small.	2
Perak	PK 3	Industri Buah -Buahan	Pkk with 2600 farmers constructing a durian farm of57 ha clearing forest	Three tanks and irrigation system to be constructed.	Steep slope may cause land slide. Environmental problem.	
	PK 8	Kelompok Buah Buahan	Fruit project of 600 ha going on, of which 42 ha was planted to rambutan. Soils contain acid peat.	Drains, farm road, electricity exist. No irrigation is planned.	Physical condition not good.	
Selangor	SG 13	Jalan Enam Kaki	Presently paddy mini estate of 73 ha and star fruit of 4 ha by Felcra.	Weir and canals existing, proposed to increase storage capacity upstream the weir.	Not much increase in storage expected.	
	SG 14	Sesapan BT Minangkabau	Presently double cropping of paddy cultivation performed on 177 ha.	Weir and canals existing. Proposed to build a reservoir somewhere upstream.	Necessity of project not clear.	
	SG 15	Bukit Kepong	Presently paddy mini estate of 58 ha.	Weir and canals existing.	Project is not clear.	
N. Sembilan	NS 1	Stesen Mardi Jelebu	Experiment and commercial research farm of 200 ha managed by MARDI presently damaged by sever drought.	Too small ponds and pump irrigation system exist, bigger reservoirs should be constructed.	The driest region in the country.	1
Melaka	MA 14	Kandang	A experimental project for crop diversification from paddy. 28 ha of area is planted to orange and banana.	A small pond and drip irrigation system existing. Flood being drained by pump during rainy season.	IADP, DOA, DUP project Soils and hydrological regime seem suitable only for paddy cultivation.	2
	MA 15	Solok Bk. Meta	Presently 11 farmers grow vegetables on 4 ha of field converted from paddy field.	Pond and sprinkler system existing. A rain shelter used. Pond supplies sufficient water fed by ground water.	A sample of ground water supply that can be expected in some of paddy areas.	

Table I-18 JICA STUDY TEAM'S FINDINGS IN SITE INSPECTION AND EVALUATION OF PROJECT (3)

State	Code No.	Project Name	Purpose	Facilities	Remarks	Priority
	MA 16	Felcra Bk. Sedanan	A Felcra project covering 335 ha for 108 settlers each having 2.4 ha of share holding. Rubber, cipda and durian planted.	A small reservoir existing and another proposed. Fisheries and agro tourism proposed.	Settlers are sea fishermen.	1
Johor	JR 3	Sawah Kebun Baru	A multi-crop farming management practiced successfully including paddy, rubber, oil palm, sugar cane, fruit, etc.	A weir and irrigation system functioning well. No water resources development planned.	An examplary village. Many new houses, cars seen. All chinese farmers.	
	JR 10	Ldg Kelompok Kangar	Presently a hilly area of 33 ha planted to durian, dukong, dukransa by 32 farmers since 1986.	A pond fed by spring water and pipe line existing. Another pond proposed.	Water stress of fruit trees during dry period emphasized by farmers.	1
Kelantan	KN 13	Tasik Putera	Presently single crop of paddy in future plus 20 ha of vegetables	Pump existing. Proposed to construct a reservoir in abolished river course	Water resources not enough. PPK exists.	2
	KN 16	Bendang Permatang Sungkai	Presently irrigated upland crop culture (water melon) in 10 ha by 14 farmers, in future expanded to 32 ha.	A well, pump and irrigation system are under construction, proposed a small reservoire on nearby stream.	Interviewed with farmer	1
	KN 24	Ranc Taliair Hilir Sat I	Non granary area of 431 ha, only 1/3 is cultivated in off season. In future paddy area is to be expanded.	A lowlying idle land upstream existing weir is to be excavated to increase storage capacity.	Increased paddy area is too small. Land is private owned. Other measure be sought.	
Trengganu	TR 3	Skim Tanaman Padi Maras	Presently rainfed paddy of100 ha, in future vegetable culture in off season.	Two tin mine ponds of 3 ha be utilized installed with control gates.	Land is private owned. Storage is small.	3
	TR 12	Bengul Katong	Presently paddy in main season and vegetables in off season in 16 ha, future plus vegetable and fruits expanded to 20 ha.	A tube well and irrigation system exist. Proposed to construct a small reservoir on nearby stream.	DOA project Farmers enthusiastic.	2
	TR 34	Lembah Marng II	Presently single crop of paddy of 200 ha in future plus vegetables in off season.	A weir and main canal exist. Proposed to enlarge the main canal for storage.	Water resources not enough.	

Table I-18 JICA STUDY TEAM'S FINDINGS IN SITE INSPECTION AND EVALUATION OF PROJECT (4)

State	Code No.	Project Name	Purpose	Facilities	Remarks	Priority
	TR 44	Pasir Nering	Presently vegetable culture is practiced on 3 ha fields by 20 farmers, in future expanded to 40 ha and 40 farmers.	Pump and drip system exist, in future a small reservoir to be constructed on the stream.	DOA project Poverty area. Farmers enthusiastic.	1
Pahang	PH 9	Paya Pagar Sasak	Non granary area of 79 ha, only 10-15 % cultivated. Many left village, others earn livelihood at Felcra farm.	Irrigation system existing. Electricity, water supply, too.	At interview nothing requested from farmers.	
	PH 20	Paya Lanting	Abandoned inundation scheme of 187 ha. In future part of area to be converted to fish pond and other planted to maize,etc.	Being swampy area, drainage needed.	Can be a sample area of land use of inundation scheme.	1
	PH 23	Paya Pesagi	Abandoned inundation scheme of 93 ha. Vegetables grown in fringe area. Fish pond proposed.	Drainage facilities needed.	Same as above.	2

Table I-19 CANDIDATE PILOT PROJECTS SELECTED BY JICA STUDY TEAM (1)

State & Project No.	Name of Project	District	Purpose	Area (ha)	Type of Reservoir	Owner of Project	Remarks	Recommendation
Perlis								
PR 1	Simpang Geti		Better water management	70		DID	Water Management	1
PR 4	Tasek Melati		Paddy, Vegetables, Tabaco Irrigation and Agro Tourism	50		DID	Water management	2
PR 6	Hutan Lembah Mango		Mango Irrigation	30		DOA		
Kedah								
KH 2	Kubun Badak	Langkawi	Paddy, Vegetables, Fruits Irrigation	250	A	DOA		2
KH 3	Padang Saga	Langkawi	Paddy Irrigation and Domestic Water Supply	486	B	DID		
KH 4	Kawasan Padi	Langkawi	Paddy, Agro Tourism	412	B	DID		1
KH 5	Kedawang	Langkawi	Paddy, Vegetables, Agro Tourism	190	B	DOA	Same area as KH4	
KH 35	BK Perak	Pendang	Fruits	8	A	DID	Students running farm.	
	Kg. Kubang Yoi	Sik	Vegetables, Fruits	8		DOA		
	Sik Durian	Sik	Durian	2000	B	DOA		3
Pulau Pinang								
PP 3	Tok Bedu	S Perai Utara	Paddy, Vegetables, Fruits	68	C	DID	Granary Area	1
PP 9	Sg. Burung	barat Daya	Paddy, Vegetables, Fisheries, Agro Torism	210	C	DID		2
Perak								
PK 3	Industri Buah Buahan	Selama	Durian	57	B	FOA		
PK 8	Kelompok Buah Buahan	Larut Matang	Fruits, vegetable	200		DOA	Acid Peat Soils	
Selangor								
SG 13	Jalan Enam Kaki	Hulh Langat	Paddy Mini Estate	73		DID		
SG 14	Sesapan BT Minangkabau	Hulu Langat	Paddy	177		DID		
SG 15	Bukit Kepong	Hulu Langat	Paddy Mini Estate	50		DID		
Negeri Sembilan								
NS 1	Stesen Mardi Jelebu	Jelebu	Fruits Culture Research Centre	200	A	MARDI		1
Melaka								
MA 14	Kandang	Melaka Tengah	Vegetables, Fruits	25		DOA		
MA 15	Solok BK. Meta	Melaka Tengah	Vegetables, Fruits	25		DOA		
MA 16	Felcra BK. Sedanan	Jasin	Fruits, Rubber, Durian, Fisheries and Agro Tourism	335	A	Felcra		1
Johor								
JR 3	Sawah Kebun Baru	Muar	Paddy, Vegetables, Fruits, Sugar, Oil palm, Rubber	92		DID		
JR 10	Ldg. Kelompok Kangar	Batu Pahat	Fruits	33	B	FOA		1
Kelantan								
KN 13	Tasik Putera	Pasir Mas	Paddy, Vegetables	20	C	DID		2
KN 16	Bendang Pmtg. Sungkai	Pasir Puteh	Paddy, Vegetables, Fruits, Domestic Water, Agro Tourism	32	A	DOA		1
KN 24	Ranc Taliair Hilir Sat I	Machang	Paddy	431	D	DID		3
Trengganu								
TR 3	Tanaman Padi Maras	Kuala TRG	Paddy, Vegetables	100	E	DID		3
TR 12	Bengul Katong	Kuala TRG	Paddy, vegetables, Fruits	20	A	DOA		2
TR 34	Lembah Marang II	Marang	Paddy, Vegetables	200	B	DID		
TR 44	Pasir Nering	Hulu TRG	Vegetables	40	A	DOA		1

Table I-19 CANDIDATE PILOT PROJECTS SELECTED BY JICA STUDY TEAM (2)

State & Project No.	Name of Project	District	Purpose	Area (ha)	Type of Reservoir	Owner of Project	Remarks	Recommen-dation
Pahang								
PH 9	Paya Pagar Sasak	Lipis	Paddy	44		DID		
PH 20	Paya Lanting	Maran	Vegetables, Fisheries	137	B	DID	Inundation Scheme	1
PH 23	Paya Pesagi	Maran	Vegetables, Fisheries	73	B	DID	Inundation Scheme	2

Table I-20 PILOT PROJECTS DECIDED BY DID

Priority Ranking	State	Project No.	Name	District	Area (ha)	Reservoir Type	Status	Owner	Theme
1	Perlis	PR1	Spg Geti	Perlis	70		Existing	DID	Systems O &M
		PR4	Tasek Melati	Perlis	50		Existing	DID	Systems O&M
2	Kedah	KH4	Kedawang	Langkawi	412	B	New	DID	Improved Sustainability & Agro Tourism
		KH5	Kedawang	Langkawi	190	B	New	DID/DOA	
3	N. Sembilan	NS1	MARDI	Jelebu	200	A	New	MARDI	Large scale commercial orchard
4	Pahang	PH20	Paya Lanting	Maran	137	B	New	DID	Inundation scheme revitalization/crop div. Strategic development for future water resource
5a	Trengganu	TR3	Skim Maras	K. Tgganu	100	E	Improve		Strategic development for future water resource (mining pond)
5b	Trengganu	TR44	Pasir Nering	H. Tgganu	40	A	New	DOA	Group farming Poverty eradication
6	Kelantan	KN16	Bdg. Ptmg Sungkai	Pasir Puteh	32	A	New	DOA	Multi-purpose reservoir
7	Johor	JR10	Kelompok Kangkar	Batu Pahat	33	B	Improve	DOA	System improvement
8	Melaka	MA16	Bld. Sedanan	Jasin	335	A	Exist/Impr.	FELCRA	Non DID owner operator Model system
9	P.Pinang	PP3	Skim Tok Bedu	SP Utara	68	C	New	DID	Strategic resource management

APPENDIX I

IDENTIFICATION CRITERIA FOR SMALL RESERVOIR

Identification Criteria for Small Reservoirs in Peninsular Malaysia

This Criteria are applied to the identification of existing and potential reservoirs in Peninsular Malaysia, which identification constitutes part of "the Feasibility Study on Small Reservoir Development in Peninsular Malaysia" conducted by JICA.

1. Objectives of the Study

A. To identify and evaluate existing and potential small reservoir development in Peninsular Malaysia;

B. To select pilot small reservoir irrigation project and undertake feasibility studies; and

C. To establish guidelines for the planning, design, and O&M of small reservoirs for irrigation.

2. Study Area

The Study shall cover agricultural areas in Peninsular Malaysia.

3. Background of the Study

1) The secondary and tertiary sectors of the Malaysian economy have been developing rapidly in recent years. However, the agricultural sector still maintains its importance with 1/5 of GDP and 1/3 of the total labour force. Moreover, in order to promote a balanced development of the country, the agriculture sector will play a vital role.

   In the 6th Malaysia Plan 1991-1995, enhancement of productivity and profitability is pronounced as a goal of the agricultural sector. Modernization and efficiency in farm management by small holders through introduction of crop diversification are particularly emphasized. At the same time, promotion of efficient utilization of resources and in-situ development are also focused. The in-situ development aims at more efficient utilization of existing farm land rather than reclaiming new land.

2) The Feasibility Study on Rationalization and Crop Diversification in Non-Granary Irrigated Areas in Malaysia conducted by JICA in 1989 reported that 45 % of the total 924 schemes identified was suffering from water shortage.
   In fact, the shortage of water and labour force has been the major reasons for generating idle paddy fields, which reached 160,000 ha or 27 % of the total paddy area in 1981. Since then, the Government has tried to reduce the idle land by encouraging farmers to convert the idle paddy fields to other crop lands and to introduce the group farming system. Consequently, 60,000 ha of idle land was revived by 1990. The water shortage problem, however, remains unsolved yet.

   Most irrigation schemes in Peninsular Malaysia take water from rivers by means of headworks and intake weirs. But, many rivers have shortage in flow during the off monsoon seasons. Moreover, abstraction of water from rivers is growing since demands for drinking and industrial water, in local cities, increase. Thus, more water resources and more economical development of them have become necessary year by year.

3) The Government of Malaysia plans to develop small reservoirs in rural areas in Peninsular Malaysia taking their advantages of low initial investment cost, quick yielding benefits, and cheap and easy O/M. The Government intends the small

reservoirs are used not only for agricultural purpose but also for domestic, industrial, agro-tourism and other purposes.

4. Basic Concepts for Small Reservoir Planning

1) Purposes of Small Reservoirs

Priority is given to the agricultural purpose. But, the fisheries, domestic, industrial, agro-tourism and other purposes which may serve any development of rural area shall be identified as well.

2) Future Agriculture

The National Agricultural Policy (1992-2010) pronounces that the overriding objective of the NAP is the maximization of income through the optimal utilization of resources in the sector and that the realization of the growth and developmental objectives, in particular, the transformation of the agricultural sector will be achieved through the following strategies: a) optimizing resource use; b) accelerated agro-based industries development; c) enhancement of R&D efforts and technological diffusion; d) greater role of the private sector; e) reformed marketing strategy; f) expanded food production: g) human resource development; h) development of viable and self-reliant farmer's/fishermen's institutions; and i) restructuring including greater bumiputera participation.
The NAP indicates the production and self-sufficiency levels of selected food commodities as shown in Table-1. It is evident that high growth rates are anticipated for vegetables, eggs, fish, meat, fruits, and milk, while minus or marginal growth rate is expected for rice. The Government's paddy production plan to meet self-sufficiency level of 65 % by 2010 is shown in Table-2, in which areas in the future of main granaries (8 schemes with a total area of 212,497 ha) and the second granaries (74 schemes with a total area of 28,441 ha) will continue to be the same level as in 1990 and the crop intensities and unit yields are expected to grow.

In the above context, the role of small reservoirs for agricultural purpose may become clear. One is to serve for irrigation of diversified crops such as vegetables and fruits, and the other is to serve for paddy irrigation in the designated main and secondary granary areas.

3) Objective Areas

The water resources development with small reservoirs is a kind of rural infrastructure arrangement work and it shall serve the rural development by increasing agricultural production, stabilizing farm management, supplying domestic and industrial water, and providing recreation to rural population.

In this regard, the objective area of small reservoirs has to cover all agricultural areas in Peninsular Malaysia irrespective of small holding farmers' areas and plantations. And the small holding farmers' areas cover the granary irrigated paddy, non-granary irrigated paddy, rainfed paddy, upland and tree crop areas.

4) In Situ Development

In compliance with the Government's "in situ development" policy, the objective areas of small reservoirs shall be restricted to existing farm lands.
No reclamation of new land is considered in the small reservoir development plan.

5) Low Investment Cost, Quick Yielding Benefits and Simple O/M

Advantages of the small reservoir are the expected small capital investment, quick yielding benefits and simple O/M. Projects against these principles are given low priorities.
The Government takes a prudent attitude in constructing a high dam due to the high investment cost and social and environmental issues. Hence, the small reservoir shall aim at cheap and safe structure as much as possible.

6) Environmental Protection

In planning the small reservoir, the Environmental Quality Act and other regulations shall be followed.

5. Type of Small Reservoir

Type A : Low dam built on a small river having a dam height of less than 15 m, a storage capacity of less than 1 million m3 (100 ha-m) and a catchment area of less than 50 km2;

Type B : Pond built by excavation, or dyking, or installation of regulating structures, in swamp, or low-lying land, or abandoned paddy field;

Type C : Pond formed utilizing an oxbow along an abolished river course:

Type D : Reservoir created by widening river width, excavating riverbed or heightening of river banks at upstream of an existing weir ; and

Type E : Reservoir utilizing a tin mine pond or a natural lake.

6. Schedule of Study

The Feasibility Study on Small Reservoir Development in Peninsular Malaysia is carried out from August 1993 to February 1995. Major study items and work schedule are as follows;

1) Preparation of Selection Criteria and Questionnaire
-done by JICA Study Team by October 14, 1993;

2) Field Survey for Identification of Small Reservoirs (First and Second Stages)
-done by State DID and Malaysian Consultant by February 15, 1994:

3) Establishment of Data Base
-done by Malaysian Consultant by February 15, 1994

4) Categorization and Priority Ranking
-done by JICA Study Team by March 15, 1994

5) Selection of 5 Pilot Schemes

- done by DID and JICA Study Team by March 15, 1994

6) Feasibility Study on 5 Pilot Schemes

- done by JICA Study Team from May 1994 to February 1995

7) Preparation of Guideline for Small Reservoir Development

- done by JICA Study Team by February 1995

7. Field Survey for Identification of Small Reservoirs

1) Responsible Agency

The field survey for identification of small reservoirs is responsibility of State DID. JICA employs a qualified Malaysian consultant firm who will assist State DID in conducting the identification work providing 5 engineers including one senior engineer from October 1993 to February 1994.
Expenses for the field survey will be borne by DID including costs for the simple topo survey, and transportation of local consultants in the field.

2) Two Stage Survey

The field survey is implemented in two stages; the first stage is to prepare a long list of small reservoirs and the second stage is to conduct semi-detailed survey on selected projects from the long list. Different questionnaires (Questionnaire I and II) will be prepared by JICA Study Team for the field survey of both stages.

3) First Stage Field Survey

The questionnaire I for the first stage survey contains only about 13 general questions regarding the necessity of water for particular purpose(s), possible reservoir type, extent of benefits, etc. No field survey is necessary at this stage. All information is collected from relevant agencies including DOA, RISDA, FELDA, FELCRA, LPP/PPK, DOWS, and private sectors. State DID will organize meetings with these agencies to explain the questionnaire I and request reply. The first stage survey will be started on 15 October 1993 immediately after the workshop and completed after three weeks by 5 November 1993. JICA Study Team will decide the schemes which proceed to the second stage survey.

4) Second Stage Field Survey

The second stage survey will be started around 10 November 1993 and completed by 15 February 1994. Questionnaire II for the second stage survey will consist of about 20 pages. The outcomes of the second stage survey are filled up Questionnaires II and project sheets which depict the location, layout, and major structures of the project in sketch.
The second stage survey requires field visits to confirm technical and economic features of small reservoirs. Simple topo survey will be required for certain dams, if construction costs and reservoir capacity cannot be estimated otherwise.

8. Questionnaire

Questionnaire I and II are attached herewith. In principle, one questionnaire must be used for one project.
Method of the field survey and how to fill up the questionnaire are explained below.

8-1 Questionnaire I

1) First of all, please write the answerers' name, designation and date of entry.

2) The field survey is conducted for each State unit. A project number is affixed to each project. Project is named after the name of area in principle.

   A number of tin mining ponds exist near Ipoh. They are regarded as one group of ponds when they are handled under the present condition and as individual pond when certain ponds are vested with particular potential purpose(s).

3) Location of project is described to the Kampung level and plotted on 1 inch 1 mile map.

4) Name of river (water source) is identified to the tributary level.

5) Project is classified into the existing project or project to be rehabilitated or potential project.

6) Project is classified into five categories of land use: the granary irrigated paddy area, non-granary irrigated paddy area, rainfed paddy area, upland area (small holder) and plantation (large scale).

7) Water shortage and its degree for each project at present and in future is examined with regard to irrigation, domestic, industrial, fisheries, agro-tourism, and other uses.

8) Type of small reservoir is selected from the 5 types.

9) Purpose(s) of small reservoir is decided.

10) Anticipated beneficiary parties and extent of benefits are estimated.

11) Land ownership of reservoir site is clarified.

12) Major environmental problems are identified, if any.

13) Priority of projects is decided from the State point of view.

8-2 Questionnaire II

The Questionnaire II consists of six divisions: A. General, B. Meteorology and Hydrology, C. Irrigation and Drainage, D. Geology, E. Agriculture and Agro-economy, and F. Environment. A.General is the same as the Questionnaire I.

B. Meteorology and Hydrology

1) Necessary Information

   Regarding hydrological conditions, information which indicates i) basic characteristics of the water resources (catchment area, topography, precipitation, river discharge, vegetation of the catchment, etc.) and ii) present situation on water use (water shortage, purpose of water use, etc.) will be collected and analyzed for

selecting potential sites. Most of these data and similar information are included in the database which was prepared by the "Feasibility Study on Rationalization and Crop Diversification in Non-granary Irrigated Areas" In advance of conducting data collection with questionnaires on small reservoir development, the former database was requested to be revised and updated to explain the present condition at the 1st Workshop for the Study held on September 16th, 1993. These data and information will be fully utilized. Other necessary information such as present rate of irrigated area, reason of water shortage, existence of water resources development in the neighbourhood, sediment load, etc. will be collected using attached questionnaires.

2) How to Fill up the Questionnaires

The following is an instruction for answering the meteo-hydrological questions. Please follow this explanation note in interviewing, answering and checking the Q&A.

a) Meteorology

Q1. Refer to "Annual Summary of Meteorological Observations (MMS) ". If you have a nearby station which is not listed there, please write its name and location.
Q2. ditto
Q3. Please inquire the station of the duration of observation.
Q4. If you have only two seasons, please delete one from the questionnaire. Please write the calendar month.
Q5. "wettest month" means the month with the most rainfall.
Q6. "driest month" means the month with the least rainfall.

b) Hydrology

Q1. Refer to "Hydrological Data, Rainfall and Evaporation Records 1986 - 1990 (DID) ". If you have a nearby station which is not listed there, please write its name and location.
Q2. ditto
Q3. ditto
Q4. Refer to "Hydrological Data, Streamflow and River Suspended Sediment Records 1986 - 1990 (DID) ". If you have a nearby station which is not listed there, please write its name and location.
Q5. MAR represents "mean annual rainfall". Refer to "Hydrological Data, Rainfall and Evaporation Records 1986 - 1990 (DID) ". You can find the mean rainfall over the observation period. Write the data of the nearest station.
Q6. Please calculate seasonal rainfall from the monthly data listed in the above mentioned publications.
Q7. Please calculate seasonal rainfall from the monthly data listed in the above mentioned publications.
Q8. The answer should be written not only by the answerers' own judgment but also by the rainfall records.
Q9. Recent years = 10 years
Q10. ditto
Q11. If the scheme is included in the non-granary irrigated area, refer to the database of the Crop Diversification Study

Q12.
Q13. Tentatively, please understand that the granary or mini-granary areas are the projects which have planned irrigation areas of over 2,000 ha.
Q14. This should be answered by the answerers' judgment.
Q15. ditto
Q16. ditto

3) Selection of Schemes from Hydrological Aspects

Regarding the small reservoirs as the water resources, some standards will be prepared tentatively before starting data collection. These standards will be prepared for five types of small reservoirs consisting of dimensions of reservoirs, location, water supply system, etc. The questionnaire on the small reservoir will be prepared taking consideration these criteria, including existence of potential sites, proposed purpose, dimensions and efficiency of reservoirs, distance to the benefited area, characteristics of related rivers and so forth. These data and information will be compiled in a database as a basis of selection of potential sites.

C. Irrigation and Drainage

1) The survey will be carried out on the following main items to select the technically sound schemes and to analyze the possibility of its selection for the implementation; Besides, the data from the questionnaire will be used to estimate the construction cost of each scheme and the total project cost.

- Present condition of existing irrigation and drainage facilities
- Current condition of water management and O&M works in and around existing scheme areas
- General plan on small reservoir and its facilities based on the result of field survey and other data concerned with the scheme
- Estimate of work quantity of construction
- Bidding prices of the civil work contract in the respective States for the recent 3-years(1991-1993).

2) Operational plan of the survey and the subjects of the respective operation are proposed as follows:

(i) First Workshop with the State DID coordinators

- The questionnaire on the strategy of water resources development and bidding prices of the civil works for the recent 3-years are distributed to the coordinators of the respective States.
- The questionnaires are scheduled to be submitted before the commencement of the Second Workshop.

(ii) Second Workshop with the State DID Coordinators

- The questionnaires are scheduled to be delivered to the coordinators of the respective State DID.
- In the line with the questionnaires mentioned above, explanation will be made on the screening criteria of the plan and design of the proposed dam, reservoir and its facilities.

(iii) Questionnaires and field survey

- Field survey through the questionnaires by using the screening criteria of the plan and design (State DID & Local Consultant)
- Checking and plotting the location of the schemes in the topographic maps with a scale of 1 / 50,000 or 1 / 25,000 (State DID & Local Consultant)
- Coordinate meeting with the State Government Agencies concerned with the schemes in order to collect the data (State DID & Local Consultant)
- Preliminary field investigation and survey such as topographic survey on the proposed dam and reservoir sites and investigation of quarry and borrow pit sites (State DID & Local Consultant)
- Preliminary plan and design of dams and related facilities (Local Consultant)
- Preliminary construction cost estimate of the scheme (Local Consultant)

(iv) Checking and examination of the results of the questionnaires (State DID & Local Consultant)

(v) Final collection of the questionnaires and establishment of database (Local Consultant)

3) The following design criteria will be applied to determine an optimum standard of plan and design of the schemes and for the evaluation and examination of technically sound schemes; The detailed criteria are shown in the Appendix.

- Irrigation water requirements of respective crops in accordance with regional meteorological and hydrological conditions
- Primary criteria of design for dam and reservoir
- Primary criteria for determination of the optimized reservoir storage capacity

4) Scope of Works and Work Volume

Field survey on the topography of the proposed dam and reservoir sites and quarry and borrow pit sites will be carried out during the hearing survey of the questionnaire. The scope of works of the survey are as follows;

(i) Topographical survey in the dam and reservoir sites

Simple topographic maps in the proposed dam sites with basic dimensions of dam such as axis, length, height, and width will be prepared.

(ii) Quantity and quality survey on quarry and borrow pit sites

Field investigation of the site (confirmation of location, land ownership and simple work quantity survey)

D. Geology

1) Basic Geological Concept in the Project

Taking the topographic and geologic conditions of the Project area, and the proposed "small scale" and "diversified development methods" of the constructions or facilities in this project into account, the topographical and geological study in this project will be limited to the problems relating to the unconsolidated or semi-consolidated Quaternary deposits or weathered rocks. Furthermore, for the geological selection criteria for potential sites for small reservoir development, the following information are important;

i) The kind of the Quaternary deposits.
ii) Weathered conditions of the rocks.
iii) Existence of the damages like landslide, slope failure, etc. on or around the existing constructions, facilities, cut slope, natural slope, etc.

Therefore, the questionnaire targeting to obtain the information mentioned above has been prepared for the inventory survey.

2) Guidelines for Inventory Survey

This guidelines is applied to the plan of earth fill dams lower than 10m in the inventory survey carried out by the local consultants.

i). Cut Slope

The cut slope gradients are proposed as follows.

Natural ground	Gradient
Rocks	1:0.8
Sand or Sandy soil	1:1.5
Clay or Clayey soil	1:1.2

The slope protection works like sodding is required for the cut slope higher than 5m except for hard and soft rocks.

ii) Embankment

a) .Embankment Materials

The embankment materials for dams are required possessing sufficient water tightness and strength. Therefore, the materials like gravel, gravely soil, sand, sandy soil, etc. are not applicable for homogeneous type dams. Peat is not applicable, not only for the embankment materials, but also for the other facilities like a farm road.

b).Embankment Slope

The embankment slope gradients for dams and the other facilities are proposed as follows, respectively.

<u>For dams</u>

Slope	Gradient
Upstream	1:2.5
Downstream	1:2.5

<u>For the other facilities</u>

Materials	Height	Gradient
All materials	Up to 5m	1:1.8
All materials	More than 5m	1:2.0

The slope protection works for dam body is required, that is rip-rap protection for upstream slopes and sodding for downstream, respectively.
The embankment slope protection works for the other facilities are proposed sodding for the slopes higher than 5m.

3) Dam Foundation

Dam foundation shall possess required water tightness and strength, and be sufficiently safe against sliding failure and seepage failure. Therefore, following items are required taking into consideration.

i) The area underlain by thick peat or soft clay layer is not applicable for dam sites.

ii) Dam foundation excavation is carried out to the depth of 1.0m to remove humic and/or loose surface soil.

iii) If the dam foundation consists of pervious materials like gravel, gravely soil, loose sand or sandy soil, impervious blanket with the thickness of 1.0m and the length of five times of the dam height shall be considered to prevent leakage from the reservoir.

E. Agriculture and Agro-Economy

1) Questionnaires are designed to include three components ; i) General information about the village ii) Present agriculture condition and iii) Farmers' intention on development plan. These questionnaires are intended to obtain the relevant information on the scale of village economy, comparison of farming development with/without plan, and rough estimation of the benefit in agriculture.

2) The answers for the questionnaires will be inquired from the representatives of the farmers' organizations or village heads. The interviewer who will be in charge for filling up the forms of these questionnaires should have enough understanding on the farming practices in the villages since some detailed information need to be obtained through these questionnaires.

3) The survey villages, where there are possibility for development on existing reservoirs and potential reservoirs , will be selected by the state DID office, prior to the survey.
The survey area will be classified into four areas; Granary area, Non-granary area, Rainfed area and Upland area. The tree crops by small farm holding is also included in the survey..

4) The supporting data for these questionnaires will be obtained from the expert staff in the state government such as agriculture officers/workers in charge of the survey area. The data on the crop area and other land use will be checked in the district/state offices.

5) Definition of the Questionnaire items

E.1.5 Tree crops : Oil palm, Rubber, Cacao, and Coconut tree (Includes the area cultivated by small farm holding only and do not include the plantation area by big companies or farmers).

E.1.7 Poverty line (Under RM 4,800/yr) by definition of the Government

E.2.1 c,d,e, and f : Names of upland crops, except for Tobacco and Chili, have to be written in parentheses.

E.2.1 Cost of production : Excluded family labor costs.
(E.3.7 also in the same way)

E.2.9 "Mini-estate" means the estate managed by farmers' organization

E.2.10 "Group farming" means the area managed by farmers group by having a contract with other farmers.

E.2.11 "Planting month" should be written for the most prevalent month.

E.2.12 In case of year round cropping, "Harvest month" should be written as "every month".

E.2.13 Per ha cost shows for only one crop.

E.2.15 "Non-farm income" includes farming wages from other farmers and the plantation.

F. Environmental Study

In Malaysia, the Department of Environment (DOE) under the Ministry of Science, Technology and Environment is responsible for formulating and implementing the environmental policies of the Government of Malaysia. 'A Handbook of Environmental Impact Assessment Guidelines' prepared by DOE provides the environmental guidelines for the project initiator to follow before implementing a project. The questionnaires were prepared as per the EIA guidelines. The three parts of the questionnaires are as follows :

1) The survey items regarding the present environmental problems of the area and its vicinity and their remedial measures are included in Questionnaire (Part -1). Besides the environmental problems arising from any particular type of small reservoir (Type A to Type E) and their remedial measures are also included in Part - 1.

2) Environmental Impact Assessment (EIA) is necessary for the project with the prescribed activities mentioned in the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987. The Questionnaire (Part-2) containing the prescribed activities related to the Study will be used to verify the prescribed activities.

3) A preliminary assessment matrix (Questionnaire - Part 3) was prepared according to the Guidelines to analyze the environmental aspects of the existing and potential small reservoir sites of the Study Area. This data will be included in the database and will be used for preparing the Guideline for the development of small reservoirs in Peninsular Malaysia.

Definition of the Environmental Components

Each project activity may have a significant potential impact on the environment. The impact of the project activities on the various environmental components will be analyzed using the Preliminary Assessment Matrix (Questionnaire - Part - 3).

I. Physicochemical :

It includes those environmental components present to a greater extent at or near the earth's surface. The characteristics are land, water, atmosphere and noise. The major elements include water quality, flooding, soil erosion and sedimentation, change of land use etc.

II. Biological :

Biological environment includes non-human animal and plant life.

1) Species and Populations :

(i) Terrestrial vegetation : It should be considered in its broadest sense to include agriculture crops, pasture and native species.

(ii) Terrestrial Wildlife : It includes all the native wild animals.

(iii) Other Terrestrial Fauna : It includes domestic and farm animals , insects and snails.

(iv) Aquatic/Marine Flora : It includes mangrove forests, seaweeds and fresh water species.

(v) Fish : It includes freshwater and marine fish, prawns, crabs etc.

(vi) Other Aquatic/Marine Fauna : Other species that are not of direct economic importance.

2) Habitats and Communities :

It includes the areas and communities which are sensitive to ecological system.

(i) Terrestrial Habitats and Communities: Includes swamps, wetlands, grazing areas etc. and the communities in these areas.

(ii) Aquatic, Estuarine, Marine Habitats and Communities : It includes the areas near the shoreline and the communities in these areas..

III. Human :

It includes the environmental components which has a significant effect on human life such as health and safety, social and economic conditions and aesthetic and cultural values.

9. Assistance of Malaysian Consultant

Although the field survey is executed under the full responsibility of State DID, JICA employs a Malaysian consultant firm to supplement insufficient man power of State DID and assist the field survey from mid October 1993 to February 15, 1994.

10. Establishment of Data Base

Information collected in the field survey is input to computer to establish a data base. Since the data base is used later for categorization and priority ranking of schemes, a soft ware has to be designed for smooth outputting of necessary items. Lotus 123 is used for this work. Data input and system design are responsibility of the Malaysians consultant.

11. Categorization

Categorization will be made based on the following indices.

- Topography
- Meteorology and Hydrology
- Type of Small Reservoir
- Feature of Facilities
- Storage Capacity of Small Reservoir
- Purpose
- Investment Cost
- Average Farm Size
- Average Farm Income
- Planned Agricultural Area
- Cropping Pattern
- Profitability of Scheme

12. Priority Ranking

In the priority ranking, a numerical system of rating will be adopted. Certain rate is given to each of the following items and the priority rank is determined according to the sum of rates for all items. The profitability of scheme is the biggest item for evaluating the priority ranking. But high rates will be given to the correction of local economic imbalance, poverty elimination, and raise of income, too. (the rate will be determined in January 1994)

- Scale of Small reservoir
- Purpose
- Environment
- Investment Cost
- Profitability
- Cropping Intensity
- Opinion of Beneficiary Party
- Average Farm Size
- Average Farm Income

13. Selection of Five Pilot Schemes

Five pilot schemes will be selected by DID among 11 schemes which are top ranked schemes of 11 States.

Table-1

PRODUCTION AND SELF-SUFFICIENCY LEVELS
OF SELECTED COMMODITIES, 1990-2010
(tonnes)

FOOD ITEMS	1990		1995		2000		2010		GROWTH RATE OF OUTPUT (%)				
	SSL %	OUTPUT	SSL %	OUTPUT	SSL %	OUTPUT	SSL %	OUTPUT	1991-1995	1996-2000	1991-2000	2001-2010	1991-2010
Rice	73	1,138,000	62	1,120,000	65	1,102,000	65	1,200,000	(0.32)	(0.32)	(0.32)	0.86	0.27
Vegetables	73	566,469	105	1,066,420	115	1,382,697	125	2,739,179	13.49	5.33	9.33	7.08	8.20
Eggs ('000 nos.)	109	4,829,000	115	6,834,674	120	8,518,327	125	17,083,841	7.19	4.50	5.84	7.21	6.52
Fish	139	1,003,702	150	1,357,568	160	1,685,730	170	2,940,869	6.23	4.43	5.32	5.72	5.52
Meat :													
Beef	30	15,000	28	21,375	30	27,750	14	27,750	7.34	5.36	6.35	0.00	3.12
Mutton	10	550	30	2,250	43	3,950	21	3,950	32.54	11.91	21.79	0.00	10.36
Poultry	115	464,182	124	700,000	139	950,000	139	2,000,000	8.56	6.30	7.42	7.73	7.58
Pork	117	168,285	76	126,214	45	84,143	2	5,000	(5.59)	(7.79)	(6.70)	(24.60)	(16.12)
Fruits	99	716,366	105	992,019	115	1,286,230	120	2,446,151	6.73	5.33	6.03	6.64	6.33
Milk ('000 litres)	4.3	26,024	5	40,763	5	48,349	10	183,533	9.39	3.47	6.39	14.27	10.26

Source : MOA's calculations (1991)

PADDY PRODUCTION TO MEET SSL OF 65% BY 2010

	1990	2000	2010	GROWTH RATE (%) 1991–2000	2001–2010	1991–2010
Population (million)	18.010	22.608	28.381	2.30	2.30	2.30
Per Capita Consumption (kg/yr/person)	87	75	65	(1.47)	(1.42)	(1.45)
Consumption of Rice (million tonnes)	1.567	1.696	1.845	0.79	0.85	0.82
Prod. of Padi (mil. t)	1.751	1.695	1.846	(0.32)	0.86	0.27
Prod. of Rice (mil. t)	1.138 *	1.102	1.200	(0.32)	0.86	0.27
Resultant SSL (%)	72.63	64.99	65.05	(1.10)	0.01	(0.55)
MAIN GRANARIES (8 schemes)						
Area (ha)	212,497	212,497	212,497	0.00	0.00	0.00
CI (%)	166	180	180	0.81	0.00	0.41
Cropped Area (ha)	352,745	382,495	382,495	0.81	0.00	0.41
Yield (tonnes/ha)	3.34	4.20	4.85	2.32	1.45	1.88
Production of Padi	1,060,352	1,445,830	1,669,589	3.15	1.45	2.30
Production of Rice	689,228	939,789	1,085,233	3.15	1.45	2.30
% Share of total national production	60.6	85.3	90.4	3.48	0.59	2.02
SECONDARY GRANARIES (74 schemes)						
Area (ha)	28,441	28,441	28,441	0.00	0.00	0.00
CI (%)	120	150	170	2.26	1.26	1.76
Cropped Area (ha)	34,129	42,662	48,350	2.26	1.26	1.76
Yield (tonnes/ha)	3.34	3.80	4.06	1.30	0.66	0.98
Production of Padi	102,592	145,902	176,574	3.58	1.93	2.75
Production of Rice	66,685	94,837	114,773	3.58	1.93	2.75
% Share of total national production	5.86	8.61	9.56	3.92	1.06	2.48
TOTAL GRANARIES						
Area (ha)	240,938	240,938	240,938	0.00	0.00	0.00
Cropped Area (ha)	386,874	425,156	430,844	0.95	0.13	0.54
Production (padi)	1,162,944	1,591,732	1,846,163	3.19	1.49	2.34
Production (rice)	755,914	1,034,626	1,200,006	3.19	1.49	2.34
Prod. capacity to meet national rice prod. target	66%	94%	100%	3.52	0.63	2.07

* Estimated for 1990 . Resultant overall SSL is 72.6%. Note that figures for 1990 and for year 2000 include production of rice from non-granary areas.
Based on 10% allowance of padi yield for post-harvest losses and padi to rice conversion rate of 65%.

Source : MOA's calculations (1991)

CONCEPT OF SMALL RESERVOIR