

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D	WATER PRESSURE TEST LUGEON VALUE	DEPTH
								%	ft			
December 8-11, 1955	0.5	39.575	Top soil deposits	10-15	Brown, silty sand, fine clean sand and GRAVEL of mixed composition, sand medium to coarse, subangular gravel well sorted, subangular subrounded, max size 7.5cm, 40-50% gravel.	SM	2.1	100	5	SPT - 10	0.5	
	1.7		River channel deposits		Tag of big boulders. Gray sandy & clayey SICT. Low plasticity, sticky, hard fragments of weathered sandstone up to 4cm Ø. sand is weathering product of the sandstone.	SW			5		1.7	
	2.7		Residual soil		Weathered claystone and SAND from completely weathered sandstone and little silty material and little clay in lower levels	SM			5		2.7	
	4.7		Weathered claystone		ROCK fragments, recovered in silty, banded SICT-claystone, completely weathered to sandy clay rock is gray, light sandstone f. sand grain size	CM			5		4.7	
	6.7		claystone		CLAYSTONE, fine laminations, very weak, splits // to bedding strongly to completely weathered claystone, fragments of clay with rock fragments, banded claystone	D			5		6.7	
	10.0					CM			5		10.0	
	11.0					D			5		11.0	
	12.0					CM			5		12.0	
	13.0					D			5		13.0	
	14.0					D			5		14.0	
	15.0					CM			5		15.0	

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY	R. Q. D	WATER PRESSURE TEST LUGEON VALUE	DEPTH
December 15-16, 1995	0.95		River deposits	000	Coarse GRAVEL and boulders of CLAY medium to high porosity. weathered rock fragments. SAND and CLAY, product of completely weathered rock, which zones consist of fine sand and gray zone consist of clay medium. Quarzitic boulders recovered at 1.14 and 6.5 m depth.	GW	4.1 m	100		Spot checked	
	3.45		Residual Soil		Alternation of CLAYSTONE and SANDSTONE, rock is banded or laminated, with bands = sandstone, dark gray = claystone, bands are 2.5 cm thick, laminations 2-3 cm, sandstone is very fine grained, core recovery possible, splits parallel to bedding	CH					
			Claystone / Sandstone								

DRILL LOG

HOLE NO. WB-3-94 SHEET NO. OF

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY	R. Q. D	WATER PRESSURE TEST LUGEON VALUE	DEPTH
								%			
December 1, 1994	1	50.681			Fine to very fine SAND, brown, dk. soft medium, very compact and silty, lams: porous, contains gravel, very loose	SP					1
	2										2
	3		River deposits		GRAVEL 3.5-6 cm Ø, subrounded to angular, mostly quartzite and white quartz, some fine to medium sand	SW	2.9				3
	4				coarser gravel, fragments of bigger boulders						4
	5				gravelly sand						5
	6				Dark brown CLAY, high plasticity	CH					6
	7				CLAYSTONE, weak, banded, splits; parallel to bedding	CL					7
	8				completely weathered rock: silty clay, brown, highly plastic, hard	D					8
	9				CLAYSTONE in fractured SANDY bands, 1-2 cm	CL					9
	10				Fragment of big quartz boulder weathered rock: hard clay with sand pockets	D					10
	11				Fragment of quartz boulder						11
	12				CLAYSTONE & SANDSTONE, banded, beds of 1mm-8mm	CL					12
	13				Quartzite fragments						13
	14				Weathered rock: clayey, silty soil with pebbles and sand pockets	D					14
	15				CLAYSTONE, weak	CL					15
	16				Weathered zone: hard brown CLAY	D					16
	17				SANDSTONE & CLAYSTONE, banded	CL					17
	18				completely weathered rock alternating with weak CLAYSTONE, soil: hard silty clay with white zones of fine sand	D					18
	19										19
	20										20
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	50										50

DRILL LOG

DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY	R. Q. D.	WATER PRESSURE TEST LUGEON VALUE	DEPTH
0.5	61.25	Top Soil		Fine SAND, peat roots, mottled silty SAND, brown, fine and low percentage of medium sand; subrounded quartz grains and angular white mica.	SB	1.2				0.5
4.5		River deposits		clayey SAND brown, medium flake, sandy clay sand, medium coarse	SC					4.5
16.25				from 10m, recovery of only fragments of quartz boulders pebbly CLAYSTONE, pebbles to 2.9 cm ϕ , 100% weak rock, block, plastic medium to high plastic igneous rocks	GW-9M					16.25
16.5				becomes sandy 14.8-15 fragment of quartzite, probably boulder from 16.5m silty claystone with intercalations of sandstone, weathered; sand beds 4cm, very fine						16.5
17				from 17.8m silt and sand stone, brown-gray, sand beds 1-2 cm	CL					17
20				from 20m to 25m predominantly black claystone with intercalations of white, fine sandstone and brown-gray siltstone; claystone weathers to light plastic clay						20
25		ALTERNATION of CLAYSTONE and SANDSTONE		from 25m to 30m sandstone predominates, white, very weak, fine, coated by clay; clay laminae included in the sandstone; some organic material						25

DRILL LOG

HOLE NO. WL-2-95 SHEET NO. 1 OF 1

HOLE NO. IV.1 LOG OF DRILLING HOLE (35/36)

DATE	DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY		R. Q. D.	WATER PRESSURE TEST LUGEON VALUE	DEPTH
								%	m			
January 19 - January 21, 1995	0.5	61.1	Top SOIL		Sandy silt, moist, plant roots SAND, brown, fine, clean, subrounded grains, including mica, loote	ML						
	2.5				green, sandy SILT brown, medium plastic CLAY, silty	SW-SM	2.4					
	3.45				Brown, gray clayey SAND very fine, silty, low plasticity, loose	CL						
	4.6				SAND, fine to medium, clean, some small pebbles	SW						
	5				Silty SAND, fine to medium grain subrounded grains, loose, mica	SM						
	5.85				GRAVEL in sand matrix, rock fragments and pebbles, gray, sand is fine to medium grained, pebbles: quartzite and dark igneous rock, diameter 5-6 cm - from 8-10 m sand is fine and silty - recovery of fragments of quartzite boulders at 7.95-8 m, 2.8-9 m and 10-10.5 m	GM						
						Highly to moderately weathered, very weak, laminated CLAYSTONE and SANDSTONE, the claystone is black, sandstone white, splits // to laminations, clay is predominant, highly plastic.	CL					

DRILL LOG

HOLE NO. WL-3-25 SHEET NO. / OF /

HOLE NO. IV.1 LOG OF DRILLING HOLE (36/36)

DEPTH	ELEVATION	ROCK TYPE OR FORMATION	COLUMN SECTION	DESCRIPTION	ROCK GRADE	GROUNDWATER LEVEL	CORE RECOVERY	R. Q. D	WATER PRESSURE TEST LUGEON VALUE	DEPTH	
1	60				SM	0.6m				0	
1.5				Silty SAND, brown, fine, subvitrified, passing into sandy clay low plasticity, medium consistency	SM					10	
2				Silty fine SAND, brown with pockets of clean SAND, organic material, rounded quartz grains, rock fragments, white mica and clay matrix at 3-3.6	SM					20	
3		River deposits		SAND and GRAVEL, gravel predominates from 5 to 9 m, gravel is angular to sub rounded, coarse (Ø between composition: fragments of quartzite boulders, siltstone, slate, igneous rocks, coal, matrix is silty fine sand	SM					30	
4										40	
5										50	
6										60	
7										70	
8										80	
9										90	
10										100	
11		Sandy claystone		Black laminated CLAY-STONE, white mm-thick laminae of sandstone, splits parallel to its lamination, very weak, clay levels 1st 2 mm thick, are predominant	CL						110
12										120	
13										130	
14										140	
15										150	

DATE 23/6/85, 1995

LOG OF TEST PIT

IV.2 LOG OF TSET PIT (1/39)

Code	Location	Latitude	Longitude
Borrow Sites for Concrete Aggregates			
AL-1-94	Sungaimanau	-	-
AL-2-94	P. Tempurung	-	-
AL-3-94	Sungaimanau	-	-
AL-4-94	P. Tengah	-	-
AL-5-94	Lubukambacang	-	-
Test Pits for Embankment Materials			
Bangkinang			
TB-1-94	Pulautarap	0° 19'28"	101° 56'36"
TB-2-94	Airmanis	0° 18'63"	101° 59'4"
TB-3-95	Pulaulawas	0° 21'46"	101° 27'2"
TB-4-94	Kubu	0° 21'22"	101° 5'00"
TB-5-94	Rumbia	0° 20'78"	101° 7'00"
TB-6-94	Pulauchorok	0° 21'40"	101° 10'65"
TB-7-95	Permbahan	-	-
TB-8-95	Padang terap	-	-
Taluk Kuantan			
TT-3-94	Kubu	0° 30'97"	101° 35'28"
TL-1-94	Sungaipinang	0° 36'20"	101° 24'7"
TL-2-94	Manau	0° 38'41"	101° 26'12"
TT-4-94	Setarajo	0° 33'20"	101° 31'70"
TT-5-94	Beringin	0° 31'00"	101° 34'50"
TT-6-94	Simandolak	0° 28'36"	101° 37'23"
TT-7-94	road T. Kuantan	0° 24'29"	101° 38'45"
TT-8-94	Kotapangean	0° 25'48"	101° 40'41"
TT-9-95	Kampungmeda	0° 25'78"	101° 42'21"
TT-10-95	Bedengsukuran	0° 29'41"	101° 50'28"
Airmolek			
TA-11-95	Sungaimalin	0° 29'47"	102° 2'02"
TA-12-95	Simpang Kelayang	0° 27'53"	102° 8'91"
TA-13-95	Batangborong	0° 25'35"	102° 11'54"
TA-14-95	Batugajah	0° 21'91"	102° 15'67"
TA-15-95	Japura	0° 21'74"	102° 20'95"
Rengat			
TR-16-95	Kotaraja	0° 21'94"	102° 31'57"
TR-17-95	Rengat	0° 22'55"	102° 32'08"
TR-18-95	Pematangreba	0° 23'91"	102° 26'7"
TR-19-95	Pematangreba	0° 23'61"	102° 26'00"
TR-20-95	Sungaiberingin	-	-



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IV.2
LOG OF TEST PIT
(2/39)

HOLE NO.	AL-1
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 18 th , 1994
LOCATION :	DATE FINISHED: DECEMBER 18 th , 1994
FEATURE : AGGREGATES	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : SUNGAI MANAU	LOGGED BY : EDDY DARMO
GROUND ELEVATION:	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.60 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 18 th , 1994	0.50 1.00			0.00 - 1.00 m Sandy GRAVEL, grey to light grey, subrounded to rounded, fine to pebble, with composition as follows: - cobble 5 % - pebble 60 % - gravel 20 % - fine and coarse grained sand 15 %	Samples: - 0.00 - 1.00 M (2)
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (3/39)

HOLE NO.	AL-2
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 22 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 22 th , 1994
FEATURE : AGGREGATES	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : TEMPURUNG ISLAND	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.85 m	SUPERVISOR : Dra. ILEANA CARMEN . P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 12, 1994	0.50			Sandy GRAVEL, grey to light brown, fine to cobble, subrounded to rounded, Ø max. 9 cm (GP). The composition of material : - cobble 3 % - pebble 50 % - gravel 30 % - sand 17 %	Samples : - 0.00 - 1.00 M (2)
	1.00			BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(4/39)

HOLE NO.	AL-3
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 24 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 24 th , 1994
FEATURE : AGGREGATES	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.75 m	SUPERVISOR : Dra. ILEANA CARMEN, P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	0.50 1.00			0.00 - 1.00 m Sandy GRAVEL, grey to light grey, rounded to subrounded, fine to cobble, Ø max. 8 cm (GP). - cobble 2% - pebble 45% - gravel 35% - sand 18%	Sample: - 0.00 - 1.00 M
				BOTTOM OF HOLE	

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IV.2
LOG OF TEST PIT
 (5/39)

HOLE NO.	AL-4
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 24 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 24 th , 1994
FEATURE : AGGREGATES	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : BUKIT KAUMAN	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.80 m	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 24 th , 1994	0.50 0.80 1.00	0.80		0.00 - 1.00 m Sandy GRAVEL grey to light grey, subrounded to rounded, fine to coarse, Ø max. 10 cm (GP) - cobble 16 % - pebble 40 % - gravel 30 % - sand 14 %	Sample : - 0.00 - 1.00 M
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(6/39)

HOLE NO.	AL-5
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 24 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 24 th , 1994
FEATURE : AGREGATES	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : KOTO KOMBU	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.65 m	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	0.50 0.65 1.00	▽	○	0.00 - 1.0 m Sandy GRAVEL, grey to light grey, subrounded to rounded, Ø max. 10 cm - cobble 16 % - pebble 45 % - gravel 25 % - sand 14 %	Sample : - 0.00 - 1.00 M
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (7/39)

HOLE NO.	TB-1-94
TOTAL DEPTH	2.00 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 20th, 1994
LOCATION : MERANGIN VILLAGE (BANGKINANG)	DATE FINISHED : JANUARY 20, 1994
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : 1.40 m	SUPERVISOR : Dra. ILEANA CARMEN.P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	0.30			TOP SOIL; Sandy SILT, Brown, Plant roots	Proctor at depth : - 0.45 - 1.25 m - 1.35 - 2.00 m
	1.00			Sandy SILT, reddish brown, moist in place, soft, very fine to fine grained, low to medium plasticity. ML.	
	2.00			SILT; grey, soft to medium stiff, moist in place, medium to high plasticity, found small amount of fine grained sand. MH Some part found of plant roots.	
				Bottom of Pit	

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IV.2
LOG OF TEST PIT
 (8/39)

HOLE NO.	TB-294
TOTAL DEPTH	2.00 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 20 , 1994
LOCATION :	DATE FINISHED : DECEMBER 20 , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : SALO VILLAGE	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN, P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	1.00		○	0.00 - 2.00 m: Grevelly SAND reddish brown, fine - coarse grained, medium dense, subangular - subrounded, moist in place, gravel consist of + 20 % with maximum Ø 20 cm, well graded, SW.	
	2.00		○	BOTTOM OF PIT	Proctor : (0.35 - 2.00 m) Upstair (N-W) (1.00 - 4.50 m)

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IV.2
LOG OF TEST PIT
 (9/39)

HOLE NO.	TB-2 UPS
TOTAL DEPTH	4.50 m

PROJECT : KAMPAR - INDRAGIRI RIVER	DATE STARTED : DECEMBER 20 , 1994
LOCATION :	DATE FINISHED : DECEMBER 20 , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION : SALO VILLAGE	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN.P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 20 , 1994	1.00			0.00 - 4.50 m : SAND reddish brown, fine - medium grained, loose - medium dense, poorly graded. SP.	
	2.00				
	3.00				
	4.00				
	4.50				
				BOTTOM OF PIT	Proctor : (1.00 — 4.50 m)

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IV.2
LOG OF TEST PIT
(10/39)

HOLE NO.	TB-3-95
TOTAL DEPTH	2.00 m

PROJECT : KAMPAR— INDRAGIRI RIVER	DATE STARTED : JANUARY 2 , 1995
LOCATION	DATE FINISHED : JANUARY 2 , 1995
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : BANGKINANG	LOGGED BY : YANDRA
GROUND ELEVATION:	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMENT. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 2 , 1995	0.30			0.00 - 0.20 m : Top Soil , SILT dark brown, moist in place, low plasticity with plant root remains.	
	1.00			0.20 - 1.35 m : SILT, reddish brown, moist in place, low - medium plasticity, firm. ML - MH.	
	1.35			1.35 - 2.00 m :SILT, brown - reddish brown, low plasticity, moist in place, firm - stiff. ML.	
	2.00				
				BOTTOM OF PIT	Proctor: (0.25 — 1.35 m) (1.35 — 2.00 m)

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IV.2
LOG OF TEST PIT
(11/39)

HOLE NO.	TB-4-94
TOTAL DEPTH	1.45 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 31, 1994
LOCATION :	DATE FINISHED : DECEMBER 31, 1994
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : AIR TIPIS VILLAGE	LOGGED BY : YANDRA
GROUND ELEVATION:	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : 1.20 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 31, 94	1.00 1.45	1.20		0.00 - 1.45 m : SILT, reddish brown, moist in place, low - medium plasticity, firm - stiff . ML - MH.	
				BOTTOM OF PIT	Proctor : (0.25 - 1.40 m)

App. :

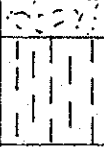


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IV.2
LOG OF TEST PIT
 (12/39)

HOLE NO.	TB-5-94
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 30, 1994
LOCATION :	DATE FINISHED : DECEMBER 30, 1994
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : KAMPAR RIVER AREA	LOGGED BY : YANDRA
GROUND ELEVATION : —	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN, P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 30, 94	1.00			<p>0.00 - 0.25 m Gravelly SAND, light grey, fine to coarse sand, subangular to subrounded sand, about 25 % of gravel, angular to subrounded gravel, max. size 6.5 cm (pebble).</p> <p>0.25 - 1.00 m SILT, reddish brown to brown, moist in place, firm to stiff, medium to high plasticity (MH).</p> <p>BOTTOM OF PIT</p>	<p>Proctor; (0.30 — 1.00 m)</p>

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IV.2
LOG OF TEST PIT
(13/39)

HOLE NO.	TB-6-94
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 31, 1994
LOCATION : P. RUMBAI	DATE FINISHED : DECEMBER 31, 1994
FEATURE : EMBANKMENT AREA	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : PULAU RAMBAI VILLAGE	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : 0.70 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 31, 1994	1.00	0.70	---	0.00 - 1.00 m SILT, light brown to brown, moist in place, non to low plasticity, soft to firm (ML).	
				BOTTOM OF PIT	Proctor ; (0.20 - 1.00 m)

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IV.2
LOG OF TEST PIT
(14/39)

HOLE NO.	TB-7-95 TK-7
TOTAL DEPTH	1.10 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN DW	DATE STARTED : JANUARY 4 , 1995
LOCATION :	DATE FINISHED : JANUARY 4 , 1995
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : Kp. PANJANG	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : 0.68 m	SUPERVISOR : Dra. ILEANA CARMEN.P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 4 , 1995	0.25		ML	0.00 - 0.25 m : Top Soil	
	1.10			0.25 - 1.10 m : Silty CLAY, yellowish grey, medium plasticity, firm - stiff, moist in place. ML - MH.	
				BOTTOM OF PIT	Proctor : (0.30 - 1.10) m

App. :



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IV.2
LOG OF TEST PIT
 (15/39)

HOLE NO.	TB-8-95 TK-8
TOTAL DEPTH	2.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN DW	DATE STARTED : JANUARY 3 , 1995
LOCATION :	DATE FINISHED : JANUARY 3 , 1995
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : TANJUNG VILLAGE	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : 1.90 m	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 3, 95	0.15			0.00 - 0.15 m : Topsoil, Sandy SILT, brown, low plasticity, soft. ML.	
	0.50			0.15 - 0.50 m : Sandy SILT, brown, moist in place, soft, low plasticity. ML.	
	1.00			0.50 - 2.00 m : SILT, light brown - brown, low - medium plasticity, moist in place, firm. ML. (Alluvial deposit)	
	2.00				
				BOTTOM OF PIT	Proctor: (0.20 - 0.50 m) (0.60 - 2.00 m)

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IV.2
LOG OF TEST PIT
(16/39)

HOLE NO.	TL-1
TOTAL DEPTH	2.00 m

PROJECT	KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED	: DECEMBER 12 th , 1994
LOCATION	: SUNGAI PINANG	DATE FINISHED	: DECEMBER 12 th , 1994
FEATURE	: EMBANKMENT	COORDINATOR	: Ir. SETIAWAN MSc
AREA DESIGNATION	:	LOGGED BY	: EDDY DARMO
GROUND ELEVATION	:	GEOLOGIST	: EDDY DARMO
DEPTH OF G.W.L.	: 2.00 m	SUPERVISOR	: Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DECEMBER 12, 1994	0.00 - 2.00	2.00		0.00 - 0.30 m Top soil, SILT, brown to reddish brown, moist, soft, containing plant's roots (ML). 0.30 - 1.00 m Silt, brown to reddish brown, moist, soft, low plasticity (ML). 1.00 - 2.00 m SILT, reddish brown, moist, soft (ML - MH). BOTTOM OF HOLE	Proctor: - 0.30 - 2.00 M

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IV.2
LOG OF TEST PIT
 (17/39)

HOLE NO.	TL-2
TOTAL DEPTH	3.70 m

PROJECT : KAMPAR—INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 13 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 13 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : BUKIT KAUMAN	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 13 th , 1994	0.00 - 1.00			0.00 - 0.40 m Top soil, SILT, brown, moist, soft, containing plant's roots.	Proctor : - 0.40 - 3.70 M
	1.00 - 3.70			0.40 - 3.70 m Silt, brown to reddish brown, moist, soft (ML).	
	3.70			BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (18/39)

HOLE NO.	TT-3
TOTAL DEPTH	3.30 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 22 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 23 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION : Kp. SAWAH	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 3.00 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 22 th , 1994	1.00			0.00 - 0.90 m : TopSoil; SAND, reddish brown,	Proctors: - 0.90 - 3.10 M - 3.10 - 3.30 M
DEC. 23 th , 1994	2.00			0.90 - 2.20 m : SAND, reddish brown, fine grained, poorly graded, loose, subangular - subrounded. SP.	
	3.00			2.20 - 3.10 m ; SAND, reddish brown - grey, fine grained, loose - medium dense, sub rounded, poorly graded. SP.	
				3.10 - 3.30 m : Sandy SILT, grey, moist to wet, soft, low plasticity. ML.	
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(19/39)

HOLE NO.	TT-4
TOTAL DEPTH	3.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 14th, 1994
LOCATION :	DATE FINISHED : DECEMBER 15, 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION:	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DECEMBER 14th, 1994	0.00 - 1.00		3-3	0.00 - 0.40 m : TopSoil, reddish brown, soft, containing plant root remain. ML.	Proctors : - 0.40 - 1.90 M - 1.90 - 3.00 M
	1.00 - 2.00		3-3	0.40 - 1.90 m : SILT, reddish brown, moist in place, soft - firm, high plasticity. MH.	
	2.00 - 2.50		3-3	1.90 - 2.50 m : Clayey SILT, dark brown - brown, moist in place, soft, medium plasticity. ML - MH.	
DEC. 15th	2.50 - 3.00		3-3	2.50 - 3.00 m : Gravelly SILT reddish brown - light grey, firm - stiff, low plasticity, with small amount of sand ± 5% ; gravel max. Ø 8 cm, subrounded - rounded. ML.	
	3.00			BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (20/39)

HOLE NO.	TT-5A
TOTAL DEPTH	1.50 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 13 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 13 th , 1994
FEATURE : EMBANG MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : BERINGIN VILLAGE	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 1.50 m	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	1.00			0.00 - 0.25 m : Top Soil. 0.25 - 1.50 m : SILT, grey - reddish grey, moist in place, soft - firm, low plasticity. ML. (derived from Completely - Highly	Proctor: - 0.25 - 1.50 M
	1.50			BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(21/39)

HOLE NO.	TT-5B
TOTAL DEPTH	6.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 13 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 13 th , 1994
FEATURE : EMBANG MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : BERINGIN	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DECEMBER 13 th , 1994	0.00			0.00 - 0.50 m : Top Soil.	Proctor: - 0.50 - 6.00 M Upstair
	1.00			0.50 - 6.00 m : Grevelly SILT, reddish brown - light grey, moist in place, soft - firm, low plasticity. ML. Gravel ± 20 % consist of Quarzite, strong rock, subrounded, with Ø 8 cm. (derived from Terrace deposit)	
	2.00				
	3.00				
	4.00				
	5.00				
6.00				BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
(22/39)

HOLE NO.	TT-6A
TOTAL DEPTH	1.50 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 17 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 17 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : TEBING TINGGI	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 1.26 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 12 th 1994	0.00 1.00 1.26 1.50			0.00 - 0.25 m Top soil, SILT, reddish brown, moist, soft, containing plant's roots (ML). 0.25 - 1.50 m SILT, reddish brown, moist, soft (MH).	Proctor: - 0.25 - 1.50 M
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (23/39)

HOLE NO.	TT-6B
TOTAL DEPTH	6.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 17 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 17 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : TEBING TINGGI	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN . P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DECEMBER 17 th , 1994	1.00		—	0.00 - 6.00 m : Grevelly SIL reddish brown - light grey, moist in place, soft - firm, low plasticity, ML. Gravel consist of \pm 40 % with maximum \varnothing 10 cm, well graded, subangular - subroundes.	Proctor: - 0.00 - 6.00 M Upstair
	2.00		—		
	3.00		—		
	4.00		—		
	5.00		—		
	5.50		—		
	6.00				
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
 (24/39)

HOLE NO.	TT - 7A
TOTAL DEPTH	6.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 16 th , 1994
LOCATION : PANGEAN	DATE FINISHED : DECEMBER 16 th , 1994
FEATURE : EMBANKMENT	COORDINATOR : IR. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILENA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	1.00		○	0.00 - 6.00 m Silty GRAVEL, light grey to reddish brown, subrounded to rounded, Ø max. of gravel 9 cm, ± 60 - 65 %. Derived from Terrace Deposit.	Proctor: - 0.00 - 6.00 M Upstair
	2.00		○		
	3.00		○		
	4.00		○		
	5.00		○		
	6.00		○		
				BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
 (25/39)

HOLE NO.	TT-7B
TOTAL DEPTH	3.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 16 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 16 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : PANGEAN	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN . P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DECEMBER 16 th , 1994	1.00			0.00 - 0.50 m : Silty GRAVEL light grey - reddish brown, subrounded - rounded, loose, moist in place, Ø max. 7 cm, well graded, SW.	Proctors: - 0.50 - 1.50 M - 0.150 - 3.00 M
	2.00			0.50 - 1.50 m : SILT, reddish brown, moist in place, soft, high plasticity. MH.	
	3.00			1.50 - 3.00 m : Sandy SILT, reddish brown, moist in place, medium plasticity, soft, ML - MH	
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(26/39)

HOLE NO.	TT-8
TOTAL DEPTH	3.00 m

PROJECT : KAMPAR — INDRAGIRI RIVER BASIN	DATE STARTED : DECEMBER 16 th , 1994
LOCATION :	DATE FINISHED : DECEMBER 16 th , 1994
FEATURE : EMBANK MENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION : PANGEAN	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 1.00 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
DEC. 16 th , 1994	0.00 - 1.50	-0.4		0.00 - 0.20 m : Top Soil. 0.20 - 1.50 m : Clayey SILT, brown - reddish brown, moist - wet in place, soft, high plasticity. MH.	Proctor: -0.20 - 1.50 M
				BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
(27/39)

HOLE NO.	TT-9-95
TOTAL DEPTH	2.00 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 18, 1995
LOCATION : KAMPUNG MEDAN (INDRAGIRI-HULU)	DATE FINISHED : JANUARY 18, 1995
FEATURE : EMBANGMENT MATERIAL)	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN. P.

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 18, 1995	0.50	NONE		0.00 - 0.52 m SILT, yellowish brown, low to medium plasticity, moist in place, containing small amount of fine to coarse sand & subangular to subrounded gravel, max. size : 5.5 cm, soft (ML)	Proctors : - 0.10-0.45 m - 0.55-2.00 m
	1.00			0.52 - 2.00 m Sandy SILT mixed with gravel-cobble, whitish red, low to medium plastic silt, fine to coarse sand, subangular to rounded gravel - cobble, about 35% gravel-cobble, max. size 12.5 cm, moist in place, medium dense and well compacted (ML - GW).	
	1.50				
	2.00				
				BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
 (28/39)

HOLE NO.	TT-10-95
TOTAL DEPTH	1.25 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 18, 1995
LOCATION : CERENTI VILLAGE	DATE FINISHED : JANUARY 18, 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSC
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION:	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : -0.90 m	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN 18 '95	0.50			0.00 - 1.25 m Sandy SILT, Silty SAND, yellowish brown to whitish red, fine to medium sand, low to medium plastic silt, moist in place, soft to firm, containing small amount of subangular gravel, max. size 2.5 cm (ML - SP).	Proctor : - 0.05-1.25 m
	1.25				
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(29/39)

HOLE NO.	TA-11-95
TOTAL DEPTH	2.20 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 19 , 1995
LOCATION : BINIO VILLAGE	DATE FINISHED : JANUARY 19 , 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : -1.77 m	SUPERVISOR : Dra. ILEANA CARMEN , P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 19 , 1995	0.50	-1.77		0.00 - 0.82 m Clayey SILT- Silty clay, greyish red, moist in place, low to medium plasticity, firm, dry strength (CL - ML).	Proctors : - 0.10-0.75 m - 0.85-1.15 m
	0.82			0.82 - 1.20 m SILT old yellow (yellowish), non to low plasticity, containing small amount of fine sand, moist in place, firm to medium stiff (ML).	
	2.20			1.20 - 2.20 m Clayey SILT, whitish red, intercalated with old yellow silt, moist in place, soft to firm, low plasticity, containing small amount of fine sand (ML).	
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(30/39)

HOLE NO.	TA-12-95
TOTAL DEPTH	2.20 m

PROJECT ; KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 20 th , 1995
LOCATION : SP. KELAYANG	DATE FINISHED : JANUARY 20 th , 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : -1.85 m	SUPERVISOR : Ir. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 20, 1995	1.00	-1.85		0.00 - 0.25 m Gravelly SAND, yellowish brown, fine to coarse sand, subangular to subrounded sand, about 15 % angular to subrounded gravel, well compacted, max. size 5 cm (SW).	Proctors : - 0.25-2.20 m
	2.20			0.25 - 2.20 m Gravelly SAND, whitish red, fine to coarse grained sand, angular to subrounded sand, about 35 % angular to subrounded gravel, max. size 6 cm, well compacted, medium dense, containing small amount of non plastic silt (SW).	
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(31/39)

HOLE NO.	TA-13-95
TOTAL DEPTH	3.10 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 20 th , 1995
LOCATION : S. LALA (INDRAGIRI HULU)	DATE FINISHED : JANUARY 21 th , 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN. P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 20, 1995	0.20			0.00 - 0.20 m Top soil, SILT, dark brown, non plastic silt, containing plant's roots.	Proctors : - 0.25-1.35 m - 1.40-3.10 m
	0.00				
	1.00			0.20 - 1.40 m SILT, light brown to brown, moist in place, firm to medium stiff, non to low plasticity, some parts contain small amount of subangular gravel, max. size 3 cm (ML).	
	1.40			1.40 - 3.10 m Gravelly SAND, light brown, fine to coarse grain, subangular to subrounded sand, about 10 % of subangular to subrounded gravel, max. size 3.8 cm, medium dense, well compacted, containing a little of non plastic silt (SW).	
	2.00				
	2.50				
	3.10				
				BOTTOM OF PIT	

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IV.2
LOG OF TEST PIT
(32/39)

HOLE NO.	TA-14
TOTAL DEPTH	2.10 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 24 th 1995
LOCATION : BATU GAJAH	DATE FINISHED : JANUARY 24 th 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. :	SUPERVISOR : Dra ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 24 th , 1995	1.00			0.00 - 0.30 m TOP SOIL, SILT, brown, moist, containing plant's roots (ML).	Proctor : - 0.30-2.10 m
	2.00			0.30 - 2.10 m Gravelly SILT, brown to reddish brown, moist, soft, max. ϕ of SILTSTONE 8 cm.	
				End of Baserock	

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IV.2
LOG OF TEST PIT
(33/39)

HOLE NO.	TA - 15
TOTAL DEPTH	0.30 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 20 th , 1995
LOCATION : JAPURA	DATE FINISHED: JANUARY 25 th , 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION:	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
	0.10			0.00 - 0.10 m TOP SOIL, Gravelly SILT, brown, moist, containing plant's roots.	Proctor: - 0.10-0.30 m
	0.30			0.10 - 0.30 m Gravelly SILTSTONE, grey, fine to gravel, stiff to very stiff, rounded to subrounded. TERRACE DEPOSITE.	
				End of Baserock (SILTSTONE)	

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IV.2
LOG OF TEST PIT
 (34/39)

HOLE NO.	TR-16 -'95
TOTAL DEPTH	1.20 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 22 , 1995
LOCATION : KAMPUNG DAGANG - RENGAT	DATE FINISHED : JANUARY 22 , 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc.
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : - 0.90 m	SUPERVISOR : Dra. ILEANA CARMEN .P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 22 '95	0.90 1.20			<p>0.00 - 0.90 m SAND, brown, fine to coarse grained sand, angular to rounded sand, loose (deposite area) (SW).</p> <p>0.90 - 1.20 m Sand, dark grey, fine to medium grained sand, loose at dry, containing small amount of non to low plastic silt, moist in place (ML).</p> <p>BOTTOM OF PIT</p>	<p>Proctors: - 0.10 - 0.85 M - 0.95 - 1.20 M</p>

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IV.2
LOG OF TEST PIT
(35/39)

HOLE NO.	TR-17
TOTAL DEPTH	1.00 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 30 th , 1995
LOCATION : : KAMPUNG BESAR KOTA	DATE FINISHED : JANUARY 30 th , 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : 0.68 m	SUPERVISOR : Dra ILENA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 30 th , 1995	0.50	0.68	3 2 3 2 2 2	0.00 - 1.00 m TOP SOIL, SILT, dark grey, wet in place, containing plant's roots, low plasticity (ML).	Proctor: - 0.00 - 1.00 M
	1.00			BOTTOM OF HOLE	

App. :



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IV.2
LOG OF TEST PIT
(36/39)

HOLE NO.	TR - 18
TOTAL DEPTH	1.50

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 23 th , 1995
LOCATION : PEMATANG REBAH	DATE FINISHED: JANUARY 23 th , 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION:	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JANUARY 23 th 1995	0.50			0.00 - 0.20 m Gravelly SILT, light grey to reddish brown, moist, soft, max. gravel of quartzite 5 cm, rounded to subrounded.	Proctor: - 0.20 - 1.50 M
	1.00			0.20 - 1.50 m SILT, grey, moist, soft.	
	1.50			BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
(37/39)

HOLE NO.	TR-18 Upstairs
TOTAL DEPTH	5.00 m

PROJECT : KAMPAR - INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 23 th , 1995
LOCATION : PEMATANG REBAH	DATE FINISHED : JANUARY 23 th , 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : NONE	SUPERVISOR : Dra. ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 23 th 1995	0.00 - 1.00		○ ○ ○	0.00 - 5.00 m Gravelly SILT, light grey to reddish brown, moist, soft, max. gravel of quartzite 5 cm, rounded to subrounded.	Proctor: - 0.00 - 5.00 M Upstair
	1.00 - 5.00		○ ○ ○	TERRACE DEPOSITE. 0.00 - 0.10 m TOP SOIL, gravelly SILT, brown, moist, containing plant's roots. 0.10 - 0.30 m Gravelly SILTSTONE, grey, fine to gravel, stiff to very stiff, rounded to subrounded. End of Baserock (SILTSTONE)	

App. :



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IV.2
LOG OF TEST PIT
 (38/39)

HOLE NO.	TR-19-95
TOTAL DEPTH	1.30 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 22 , 1995
LOCATION : PEMATANG	DATE FINISHED : JANUARY 22 , 1995
FEATURE : EMBANKMENT MATERIAL	COORDINATOR : Ir. SETIAWAN MSc
AREA DESIGNATION :	LOGGED BY : YANDRA
GROUND ELEVATION :	GEOLOGIST : YANDRA
DEPTH OF G.W.L. : NONE	SUPERVISOR : DR. ILEANA CARMEN .P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 22, '95	0.20			0.00 - 0.20 m Top soil, reddish, containing plant's roots.	Proctor: - 0.25 - 1.30 M
	1.00			0.20 - 1.25 m SILT, reddish grey, non to low plasticity, moist in place, firm to medium stiff (ML).	
	1.30			1.25 - 1.30 m Highly weathered siltstone, reddish grey - grey, medium stiff to stiff, non plasticity, some parts are changed into silt (ML).	
				BOTTOM OF PIT	

App. :



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IV.2
LOG OF TEST PIT
(39/39)

HOLE NO.	TR - 20
TOTAL DEPTH	0.75 m

PROJECT : KAMPAR-INDRAGIRI RIVER BASIN	DATE STARTED : JANUARY 31 th , 1995
LOCATION : SEI BERINGIN	DATE FINISHED : JANUARY 31, 1995
FEATURE : EMBANKMENT	COORDINATOR : Ir. SETIAWAN MS
AREA DESIGNATION :	LOGGED BY : EDDY DARMO
GROUND ELEVATION :	GEOLOGIST : EDDY DARMO
DEPTH OF G.W.L. : - 0.47 m	SUPERVISOR : Dra ILEANA CARMEN P

DATE	DEPTH (m)	G.W.L.	SYMBOL	SOIL DESCRIPTION	REMARKS
JAN. 31 th , 95	0.50		— — — — —	0.00 - 0.20 m TOP SOIL, SILT, brown to reddish brown, moist, soft (ML).	Proctor: - 0.20 - 0.75 M
	0.75		— — — — —	0.20 - 0.75 m SILT, brown, moist to wet in place, soft (ML).	
				BOTTOM OF HOLE	

App. :

V ENVIRONMENTAL ANALYSIS

V ENVIRONMENTAL ANALYSIS

**Table V.1 WATER QUALITY OF KAMPAR RIVER AT MUARA MAHAT
AND BANGKINANG NEAR RANTAUBERANGIN WEIR.**

Parameter	Unit	
Temperature	oC	26.8 - 27.2
Colour	col.unit	79
Turbidity	NTU	63 - 32
Total Dissolved Solid (TDS)	mg/l	40 - 190
Total Suspended Solid (TSS)	mg/l	around38
Electrical conductivity	mS/cm	9 - 26
pH	-	6.2 - 6.7
Dissolved Oxygen (DO)	ppm	3.9(average)
Chemical Oxygen Demand (COD)	ppm	39.84 - 42.10
Biological Oxygen Demand (BOD)	ppm	around2.8
Oil & grease content	ppm	undetected
Iron (Fe)	ppm	0.05 - 0.24
Calcium (Ca)	ppm	3.30 - 7.22
Magnesium (Mg)	ppm	1.00 - 4.39
Mangan (Mn)	ppm	0.13 - 1.03
Cadmium (Cd)	ppm	undetected
Zink (Zn)	ppm	undetected
Copper (Cu)	ppm	undetected
Lead (Pb)	ppm	undetected
Chromium (Cr)	ppm	undetected
Cl -	ppm	6.21 - 31.62
NO ₃ -	ppm	0.02 - 0.22
NO ₂ -	ppm	0.0 - 0.1
NH ₄ +	ppm	0.02 - 0.34
SO ₄ 2-	ppm	10 - 57

(Data from Laboratory of Public Works of Riau)

**Table V.2 WATER QUALITY OF RIVERS SINGIGI,
TESO AND JAKE NEAR KAMPAR KIRI NO.1 DAM AND
KAMPAR KIRI NO.2 DAM.**

Parameter	Unit	
Temperature	oC	26.8 - 27.2
Colour	col.unit	
Turbidity	NTU	2
Total Dissolved Solid (TDS)	mg/l	20
Total Suspended Solid (TSS)	mg/l	15
Electrical conductivity	mS/cm	around 9
pH	-	6.3 - 6.7
Dissolved Oxygen (DO)	ppm	3.8 - 3.9
Chemical Oxygen Demand (COD)	ppm	39.84
Biological Oxygen Demand (BOD)	ppm	10.0 - 15.0
Oil & grease content	ppm	undetected
Iron (Fe)	ppm	0.1
Calcium (Ca)	ppm	0.83
Magnesium (Mg)	ppm	0.95
Mangan	ppm	0.22
Chromium (Cr)	ppm	undetected
Cl -	ppm	24.14
NO ₃ -	ppm	0.21
NO ₂ -	ppm	undetected
NH ₄ +	ppm	0.01
SO ₄ 2-	ppm	13.2
PO ₄ -	ppm	27.64

(Data from Laboratory of Public Works of Rain)

Table V.3 ANNUAL RAINFALL IN BOTH
RIVER BASINS (1981 - 1992)

(unit: mm)

YEAR	KAMPAR	INDRAGIRI
1981	2,381	2,220
1982	2,687	2,278
1983	2,218	2,236
1984	2,939	2,644
1985	2,655	2,184
1986	2,640	2,501
1987	2,620	2,005
1988	2,590	2,210
1989	2,402	2,552
1990	2,235	2,275
1991	2,236	2,507
1992	2,138	2,848
AVE.	2,478	2,348
MAX.	2,939	2,644
MIN.	2,138	2,005

Table V.4 ANNUAL AVERAGE DISCHARGE
BY BASIN (1981 - 1992)

(unit : m³/year)

YEAR	KAMPAR	INDRAGIRI
1981	1,111	661
1982	1,225	647
1983	967	609
1984	1,378	759
1985	1,260	603
1986	1,247	731
1987	1,211	524
1988	1,211	579
1989	1,062	699
1990	971	624
1991	968	733
1992	882	700
AVE.	1,124	656
MAX.	1,378	759
MIN.	882	524

Table V.5 CONDITIONS OF CLIMATE IN STUDY AREAS.

			Kampar		Indragiri			
			(1) 1970-93	(2) 1981-90	(3)	(4)	(5)	(6)
Rainfall	Avr.	mm/year	2,474	2,709	2,576	2,399	2,189	2,177
	Max.	mm/year	3,695	4,635				
	Min.	mm/year	1,892	2,200				
Rainfall days	Probable	day/year		191	171			
	Max.	day/year		216				
	Min.	day/year		168				
Temperature	Avr.	oC			27	(Avr. in 4 stations)		
	Max.	oC		37	34			
	Min.	oC		19	22			
Pressure		mbar	1,006-1,013		1,012	(Avr. in 4 stations)		
Humidity	Avr.	%		77-85	77-85	(Avr. in 4 stations)		
Windspeed	Avr.	knot	6 - 9		7	(Avr. in 4 stations)		
	Max.	knot	(Avr. of 2 stations)		12			
	Min.	knot			5			

Station: (1) Pasar Kampar, (2) Simpang Tiga Air Port, (3) Sentajo
(4) Sijunjung, (5) Lirik, (6) Japura

Table V.6 DISTRIBUTION OF NATURAL FOREST RESERVE (HSA-W) IN STUDY AREA.

No.		DAMS and WEIRS	HSA-W location	Area (ha)
1	Kampar	Kampar Kiri No.2 Dam	6. Bukit Rimbang	136
2		Rantau Berangin Weir and Canal	5. Bukit Bungkok	11,336
3	Indragiri	Upper Sinamar Dam	1. Harau valley	315
			2. Mountain Sago	3,283
			3. Air Putih	23,467
		4. Sub-regency Lintaubuo	172	
4		Sukam Dam	7. Sub-regency Sijunjung	944
			8. Sub-regency Tjg. Gadang	42,943
Total				220,038

Table V.7 DISTRIBUTION OF PROTECTION FOREST (HL) IN STUDY AREA.

No.		DAMS and WEIRS	Location of Protected Forest	Area (ha)
1	Indragiri	Upper Sinamar Dam	1. HL.Kecamatan Harau	11,184
			2. HL.Kecamatan Luhak	26,104
			3. HL.Kecamatan Lintaubuo	1,672
			4. HL.Kec.Tanjung Gadang	22,512
2		Sukam Weir	5. HL.Kec.Sijunjung	31,896
3		Lower Kuantan	6. HL.Lubuk Jambi	225
4		Lubuk Jambi Weir and Canal	7. HL.Sintajo	416.2
Total				333,832.2

Table V.8 DISTRIBUTION OF LIMITED PRODUCTION FOREST (HPT) IN STUDY AREA.

No.		DAMS and WEIRS	Location of HPT	Area (Ha)
1	Kampar	Kampar Kiri No.1	HPT.Seranggi/Sengkilo	140
2		Rantau Berangin Weir and Canal	HPT.Muara Mahat	7,289
3	Indragiri	Upper Sinamar Dam	Sub-Regency Arau	41,867
			Sub-regency Luhak	15,576
4		Lubuk Jambi Weir and Canal	HPT. Sungai Peranap Kec. Tanjung Gadang	34,885
Total				239,607

Table V.9 BOTANICAL INVENTORY IN THE STUDY AREA OF KAMPAR RIVER BASIN.

No.	Local name	Scientific name	Family	Project site			Status		
				BKRB	DKK1	DKK2	NE	D	L
1	Arang-arang	<i>Dyospyros penticulosa</i>	Eben	v	v	v	v		
2	Asam Kandis	<i>Cllophyllum sp</i>	Gutac	v	v		v		
3	Balam	<i>Palagium coavatium</i>	Sapotac	v		v	v		
4	Bintangur	<i>Collaphyllum pulcherimum</i>	Gattif	v		v	v		
5	Baga	<i>Pouteria malaccensis</i>	Sapot	v	v		v		
6	Cengkudau	<i>Gyronniera sp</i>	Celum	v	v				
7	Durian	<i>Durio oxleyanis</i>	Bomb	v	v		v		
8	Dara-dara	<i>Cantieya rubigianosa</i>	Leacice	v		v	v		
9	Geranggan	<i>Cratoxylon arborescens</i>	Suftif	v	v	v	v		
10	Kuras	<i>Dryobalopnos oblongifolia</i> Dipt	Dipt	v	v	v			
11	Kulim	<i>Scorodocarpus borneensis</i>	Olac	v	v	v	v	v	
12	Keruing	<i>Dipterocarpus appendiculattus</i> Dipt	Dipt	v	v	v	v		
13	Kempas	<i>Koompassia malaccensis</i>	Fab	v	v	v	v		
14	Kedondong	<i>Dacryodes angoluta</i>	Burs	v		v			
15	Kelat	<i>Eugenia sp</i>	Myrt	v		v			
16	Karet	<i>Hevea brassilliensies</i>	Euphorb		v				
17	Labuai	<i>Dyera costulata</i>	Apec		v				
18	Lalan	<i>Santivia oblongifolia</i>	Eben	v	v				
19	Medang	<i>Litsea firma</i>	Laur	v	v	v	v		
20	Meranti Bunga	<i>Shorea dasyphylla</i>	Dipt	v	v	v	v		
21	Meranti Merah	<i>Shorea accuminata</i>	Dipt	v		v	v		
22	Meranti Putih	<i>Shorea lepidota</i>	Dipt		v	v	v	v	
23	Mersawa	<i>Anisoptera curtisil</i>	Dipt	v	v	v	v		
24	Paga	<i>Ploiarium sp</i>	Theac	v	v				
25	Pasak Bumi	<i>Euriconia jongifolia</i>	Hyrt	v	v		v		v
26	Petatau	<i>Strombasia javanica</i>	Olac	v	v	v			
27	Rengas	<i>Glutha rengas</i>	Anacard		v	v	v		
28	3 Resak	<i>Vatica sumatrana</i>	Dipt	v		v	v		
29	Sonduak	<i>Ganua moheyana</i>	Sapot	v	v				
30	Tampui	<i>Elatreiospernum tapos</i>	Euphorb		v	v			
31	Tembusu	<i>Fragraea fragrans</i>	Logac	v		v	v	v	
32	Terentang	<i>Campenosperma macrophylla</i>	Anac		v	v			
33	Kantong Semar	<i>Nepenthes ampularia</i>	Nepen		v			v	v

Candidate project site:

BKRB = Rantau Berangin Weir

DKK1 = Kampar Kiri No.1 Dam

DKK2 = Kampar Kiri No.2 Dam

Status:

NE = Economic value

D = Protected

L = Endangered

Table V.10 INVENTORY OF TERRESTRIAL FAUNA IN THE STUDY AREA OF KAMPAR RIVER BASIN.

No.	Local name	Scientific name	Project site			Status
			BKRB	DKK1	DKK2	D
I. Mammals						
1	Babi hutan	<i>Sus scrofa</i>	v	v	v	
2	Beruang Madu	<i>Helarctos malayanus</i>		v	v	v
3	Beruk	<i>Macaca nemestrina</i>	v	v	v	
4	Harimau	<i>Panthera tigris sumateraensis</i>	v	v	v	v
5	Kijang	<i>Muntiacus muncak</i>	v	v	?	
6	Landak	<i>Hystrix brachyura</i>		v		v
7	Berang-berang	<i>Lutra sumatrana</i>		v		
8	Lutung Hitam	<i>Presbytis cristata</i>		v		
9	Gajah	<i>Elephas maximus</i>			v	v
10	Monyet ekor panjang	<i>Macaca fascicularis</i>	v	v	v	
11	Rusa	<i>Cervus unicolor</i>	v	v	v	v
12	Napu	<i>Tragulus napu</i>		v		v
13	Musang	<i>Paradoxorus hermaporoditus</i>	v	v	v	v
14	Siamang	<i>Symphalonus syndactylus</i>	v	v	v	
15	Tapir	<i>Tapirus indicus</i>	v	v	v	v
16	Ungko	<i>Hylobates agilis</i>	v	v		v
17	Trenggiling	<i>Manis javanica</i>		v		v
II. Birds						
1	Bubut Merah	<i>Centropus bengalensis</i>	v	v		
2	Beo	<i>Gracula regiwsa</i>		v	v	v
3	Burung Madu Kuning	<i>Nectarini jugularis</i>		v		v
4	Cacakurawa	<i>Pynonotus zeylancicus</i>	v	v		
5	Ayam hutan	<i>Galus-galus</i>		v	v	v
6	Elang Bondol	<i>Heliastur indicus</i>		v		v
7	Elang Hitam	<i>Spizaetur bartelsi</i>	v	v	v	
8	Kucica Hitam	<i>Copsyclus malabaricus</i>		v		
9	Pucuk Ular	<i>Anhinga melanong ester</i>		v		v
10	Madu Gunung	<i>Aethopyga eximialis</i>		v		v
11	Punai	<i>Treron sp.</i>	v	v		
12	Raja Udang Sungai	<i>Alcedo atheis</i>		v		v
13	Tekukur	<i>Stepopelia chenesis</i>		v		
14	Walet Gunung	<i>Aerodranus brevirostris</i>		v		v
III. Reptile						
1	Biawak	<i>Varanus salvator</i>	v	v	v	
2	Kura-kura	<i>Oritra bonensis</i>		v	v	v
3	Buaya Sinyolong	<i>Tonnistora Schlegelli</i>			v	v
4	Ular Sanca Hijau	<i>Chondrophython viridis</i>	v	v	v	v
5	Ular Sendok	<i>Naja tripudians</i>	v		v	
6	Buaya Katak	<i>Crocodylus sp</i>			v	
7	Bingkaruang	<i>Marbaya sp</i>	v	v	v	
IV. Amphibia						
1	Katak coklat	<i>Rama lumnocharis</i>	v	v	v	
2	Katak hijau	<i>Rama sp</i>		v		
3	Katak hijau besar	<i>Rama macrodon</i>		v		v

[Note]

BKRB = Bendung Kanal Rantau Berangin

DKK1 = Dam Kampar Kiri No.1

DKK2 = Dam Kampar Kiri No.2

[Status]

NE = Economical value

D = Protected

Table V.11 (1/3) INVENTORY OF FISH SPECIES IN KAMPAR AND INDRAGIRI RIVERS.

No.	Local name	Scientific name	Kmapar		Indragiri			
			BKN	KK	SN	SK	AMB	PP
	ORDER OSTARIOPHYSI							
1	Sepongakah	<i>Ambassis wolffi</i>	xx	xx		xx		
2	Geso	<i>Arius sp.</i>	xx	xx			x	xx
3	Baung Selo/Meno	<i>Bagrichthys hypselopterus</i>	xx	xx			xx	xx
4	Baung Layar	<i>Bagroides macrochantus</i>	xx	xx			xx	xx
5	Baung Tikus (Baung Moncik)	<i>Bagroides macropterus</i>	xx	xx			xx	xx
6	Baung Pisang	<i>Bagroides melapterus</i>	xx	xx			xx	xx
7	Pitulu (Mentulu)	<i>Barbichthys leavis</i>	xx	xx		xx	xx	xx
8	Ciling-ciling	<i>Botia hymenophisa</i>	xx	xx			xx	xx
9	Rajo Guntul	<i>Bot. macrochantus</i>	xx	xx			xx	xx
10	Pantau Kulibi	<i>Botia Strigata</i>	xx	xx			xx	xx
11	Lebah besar	<i>Brachygabius xanthozona</i>	xx	xx				
12	Kelompok (Sepimping)	<i>Chela oxygastroides</i>	xx	xx		xx	xx	x
13	Keli (Koli)/Lele	<i>Clarias batrachus</i>	xx	xx	xx	xx	xx	xx
14	Lambat (Limbekbaguek)	<i>Cla. teijsmanni</i>	xx	xx		xx	xx	xx
15	Lambat (Limbek Akar)	<i>Clarias sp.</i>	xx	xx		xx	xx	xx
16	Silimang Kopu	<i>Crossochilus gnathopogon</i>	xx	xx		xx	xx	x
17	Selais	<i>Cryptopterus monomena</i>	xx	xx		xx	xx	xx
18	Loi	<i>Cry. lais</i>	xx	xx		xx	xx	xx
19	Loi Godang Kepala/	<i>Cry. cryptopterus</i>	xx	xx			xx	xx
20	Loi Modang	<i>Cryptopterus sp.</i>	xx	xx		xx	xx	xx
21	Mas	<i>Cyprinus carpio</i>			xx	xx		
22	Umbut-Umbut	<i>Dangilla cuveri</i>	xx	xx			xx	xx
23	Mali	<i>Dangilla sp.</i>	xx	xx			xx	xx
24	Miding (Kujam)	<i>Dangilla sumatrena</i>	xx	xx			xx	xx
25	Selujur (Selimangbatang)	<i>Ephalzeorinchus kallopterus</i>	xx	xx		xx	xx	xx
26	Selimang Batu	<i>Ephalzeorinchus sp.</i>	xx	xx		xx	xx	xx
27	Barau	<i>Hampala bimaculata</i>	xx	xx		xx	xx	xx
28	Sikumu	<i>Hemisilurus chaveri</i>	xx	x				
29	Selais (Loi Bomban)	<i>Hem. schrinama</i>	xx	xx		xx	xx	xx
30	Iduang Budang	<i>Hem. moolonbergi</i>	xx	xx			xx	xx
31	Baluik Tulang	<i>Hem. hetrohinchus</i>	xx	xx			xx	xx
32	Mation/Limpok	<i>Kryptopterus bicirrhis</i>	xx	xx				
33	Lelan	<i>Labeo pleurotaenia</i>	xx	xx		xx	xx	xx
34	Lemak/Jelawat	<i>Leptobarbus hoeven</i>	xx	xx	xx	xx	xx	xx
35	Garing	<i>Leptobarbus sp.</i>	xx	xx	xx	xx	xx	xx
36	Parang-parang (Parang)	<i>Macririchthya macrochirus</i>	xx	xx				xx
37	Baung	<i>Macrones wycky</i>	xx	xx		xx	xx	xx
38	Baung Tungik/Inggir-inggir	<i>Mac. nigriceps</i>	xx	xx		xx	xx	xx
39	Baung Kuning	<i>Mac. planiceps</i>	xx	xx			xx	xx
40	Baung Hitam	<i>Macrones sp.</i>	xx	xx			xx	xx
41		<i>Microglanis sp.</i>	xx	xx				
42	Tali-tali	<i>Nemachillus fasciatus</i>	xx	xx		xx	xx	xx
43	Mujair	<i>Oreochromis musambica</i>			xx	xx		
44	Tawes	<i>Osteochillus hasseltii</i>			xx			
45	Kalabau	<i>Osteochillus kalabau</i>	xx	x		xx	xx	xx
46	Nilem	<i>Osteochillus schlegelii</i>	x	x	xx	xx		
47	Lukek	<i>Osteochillus sp.</i>	xx	xx		xx	xx	xx
48		<i>Osteochilus vittatus</i>	xx	xx				
49	Pawas (Paweh)	<i>Ost. haseltii</i>	xx	xx		xx	xx	xx
50	Siburuk Perut	<i>Ost. spirullus</i>	xx	xx		xx	xx	xx
51	Patin/Jambal	<i>Pangasius pangasius</i>	-	-			x	x
52	Juara (Juaro)	<i>Pangasius polyoronadon</i>	x	xx			x	x
53	Riu-riu	<i>Pseudotropius branchiopeptus</i>	x	xx			x	x

Table V.11 (2/3) INVENTORY OF FISH SPECIES IN KAMPAR AND INDRAGIRI RIVERS.

No.	Local name	Scientific name	Kmpar		Indragiri			
			BKN	KK	SN	SK	AMB	PP
54	Tabengalan	<i>Puntius broimeides</i>	xx	xx		xx	xx	xx
55	Subahan (Siaban)	<i>Pun. bulu</i>	xx	xx		xx	xx	xx
56	Singarek/Seluang	<i>Pun. fasciatus</i>	xx	x		xx	xx	xx
57	Olang	<i>Pun. hexazona</i>	xx	xx		xx		xx
58	Lampam	<i>Pun. schwanwfeldi</i>	xx	xx		xx	xx	xx
59	Olang	<i>Pun. tetrazona</i>	xx	xx		xx		xx
60	KapieK	<i>Puntius belinka</i>	xx	xx	xx	xx	xx	xx
61	Sipaku	<i>Puntius sp.</i>	xx	xx				xx
62	Pantau	<i>Rasbora agryrotaenia</i>	xx	xx		xx	xx	xx
63	Pantau	<i>Ras. caudimacullata</i>	xx	xx		xx	xx	xx
64	Pantau	<i>Ras. dusonensis</i>	xx	xx		xx	xx	xx
65	Pantau	<i>Ras. einthoveni</i>	xx	xx		xx	xx	xx
66	Pantau	<i>Ras. elegans</i>	xx	xx		xx	xx	xx
67	Neon	<i>Ras. heteromorpha</i>	xx	xx		xx	xx	
68	Pantau	<i>Ras. leptosoma</i>	xx	xx		xx	xx	xx
69	Pantau	<i>Ras. macullata</i>	xx	xx		xx	xx	xx
70	Pantau	<i>Ras. pauciforata</i>	xx	xx		xx	xx	xx
71	Pantau	<i>Ras. piyersi</i>	xx	xx		xx	xx	xx
72	Pantau	<i>Ras. taeniata</i>	xx	xx		xx	xx	xx
73	Pantau	<i>Ras. tornieri</i>	xx	xx		xx	xx	xx
74	Pantau	<i>Ras. trilineata</i>	xx	xx		xx	xx	xx
75	Pantau	<i>Ras. urophthalma</i>	xx	xx		xx	xx	xx
76	Bilih	<i>Rasbora sp.</i>			xx	xx		
77	Pantau Titik Mata	<i>Rasbora sp.</i>	xx	xx		xx	xx	xx
78	Selimang (Lais)	<i>Siloroides indragiriensis</i>	xx	xx		xx	xx	xx
79	Lais (Loi Modang)	<i>Sil. hypothalmus</i>	xx	xx			xx	xx
80		<i>Spaerichthys osphromensides</i>	xx	xx				
81	Silopu	<i>Synancesia sp.</i>	xx	xx			xx	x
82	Sikam	<i>Theognathus hispidus</i>	xx	xx		xx	xx	xx
83	Motan	<i>Thinnichthys vaillanti</i>	xx	xx		xx	xx	xx
84	Asau (Motan)	<i>Thin. thymoides</i>	xx	xx		xx	xx	xx
85	Tapah	<i>Wallago leeri</i>	xx	xx		xx	xx	x
86	Sasau				xx	xx		
87	Kuriak				xx	xx		
88	Kulari				xx	xx		
89	Asang				xx	xx		
90	Mupai				xx	xx		
ORDER: SYNENTOGNATHI								
1	Julung-julung	<i>Dermogenys sp.</i>	x	x		xx	xx	xx
2	Tangkur	<i>Syngnathus sp.</i>	x	x				
ORDER: PERCOMORPHI								
1		<i>Chandra buruensis</i>	xx	xx			xx	xx
2	Harimau Siam	<i>Datnioides microlepis</i>	xx	xx				
3	Tambun	<i>Nandus nebulosus</i>	xx	xx		xx		
4	Sumpit	<i>Toxotes jaculatus</i>	xx	xx		xx		xx
5	Timah (Tima)	<i>Trchiurus haunela</i>	xx	xx		xx		
ORDER: MALACOPTERYGHI								
1	Belida (Belido)	<i>Notopterus chitala</i>	xx	xx			xx	xx
2	Lida-lida	<i>N. bornensis</i>	xx	xx			xx	xx
3	Kayangan (Kaloso)	<i>Sclerophages fermodus</i>	x	x			x	x
ORDER: BATOIDEI								
1	Pari		x	x			x	x
ORDER: SYNBRANCHOIDEA								
1	Belut	<i>Fluta alba</i>	xx	xx	xx	xx	xx	xx

Table V.11 (3/3) INVENTORY OF FISH SPECIES IN KAMPAR AND INDRAGIRI RIVERS.

No.	Local name	Scientific name	Kmapar		Indragiri			
			BKN	KK	SN	SK	AMB	PP
ORDER: LABYRINTHYSI								
1	Katung	<i>Anabas sp.</i>	xx	xx		xx	xx	xx
2	Puyu/ Betok	<i>Anabus testudineus</i>	xx	xx	xx	xx	xx	xx
3	Laga	<i>Betta anabantoides</i>	xx	xx				
4		<i>Betta brederi</i>	xx	xx				
5	Tempalo	<i>Betta taeniata</i>	xx	xx			xx	xx
6		<i>Ctenopoma sp.</i>	xx	xx				
7	Kissing gourami	<i>Helostoma rudolfi</i>	xx	xx			xx	xx
8	Tambakan (Singkek)	<i>Helostoma temmincki</i>	xx	xx		xx	xx	xx
9	Haruan	<i>Ophiocephalus bistriatus</i>	xx	xx		xx	xx	xx
10	Lompong	<i>O. lucius</i>	xx	xx			xx	xx
11	Jolai	<i>O. maruliodes</i>	xx	xx		xx	xx	xx
12	Bocek	<i>O. micropeltes</i>	xx	xx			xx	xx
13	Botuik	<i>O. pleurophthalmus</i>	xx	xx			xx	xx
14	Gabus	<i>O. striatus</i>			xx			
15	Toman	<i>Ophiocephalus melanosoma</i>	xx	xx			xx	xx
16	Gurami (Kalui)	<i>Osphronemus goramy</i>	xx	xx	xx	xx	xx	xx
17	Silancah	<i>Polyacanthus hasselti</i>	xx	xx			xx	xx
18	Sepat Hias/Mutiara	<i>Trichogaster leerii</i>	xx	xx			xx	xx
19	Sepat siam	<i>Trichogaster pectoralis</i>	xx	xx		xx	xx	xx
20	Sepat	<i>Trichogaster sp.</i>			xx			
21	Sepat	<i>Trichogaster trichopterus</i>	xx	xx			xx	xx
22	Jua		xx	xx			xx	xx
ORDER: PLECTOGNATHI								
1	Buntal	<i>Tetraodon leiurus</i>	xx	xx		xx	xx	xx
ORDER: OPISTHOMI								
1	Tilan	<i>Mastacembelus erythrotaenia</i>	xx	xx	xx	xx	xx	xx

BKN=Kecamatan Bangkinang
 KK = Kecamatan Kampar Kiri
 SN = Sinamar basin

SK = Sukam basin
 AMB = Lubuk Ambacang = Kuantan dam
 PP = Kec. Pasir Penyu = middle of Indragiri river

Legend:
 x x = many
 x = few
 - = nothing

Table V.12 AQUATIC PLANTS FOUND IN KAMPAR AND INDRAGIRI RIVERS.

No.	Local Name	Scientific Name
1	Bakung air	<i>Hanguana malayana</i>
2	Enceng gondok	<i>Eichornia crassiper</i>
3	Enceng leutik	<i>Monochoria vaginalis</i>
4	Kiambang	<i>Salvinia natans</i>
5	Papayungan	<i>Cyperus flabelliformis</i>
6	Rumput katak	<i>Limnobium spongia</i>
7	Gulma itik	<i>Lemna perpusilla</i>
8	Jeruju	<i>Acanthus ilicifolius</i>
9	Kakarewoan	<i>Azolla pinnata</i>
10	Lukut cai	<i>Hydrilla verticillata</i>
11	Mendong	<i>Fimbristylis globulosa</i>
12	Rumputt ikan	<i>Potamogeton malaianus</i>
13	Teratai	<i>Nymphaea Pubesceus</i>
14	Pandan duri	<i>Pandanus sp.</i>
15	Kumbuh	<i>Scirpus mucronatus</i>
16	Sianit	?

Sources: 1. Identification and inventory of public water.

UIR - Dinas Perikanan Tk.I Riau, 1991

2. Field survey, 1994

Table V.13 (1/2) PLANKTON DISTRIBUTION IN KAMPAR AND INDRAGIRI RIVERS

No.	Class/Species	Kampar			Indragiri
		Kampar Kanan	Kampar Kiri	Singingi	Kuantan
BACILLARIOPHYCEAE					
1	<i>Amphora sp</i>			x	
2	<i>Cocconeis sp</i>	x			x
3	<i>Diatomae vulgare</i>			x	x
4	<i>Frustulia rhomboides</i>	x	x		x
5	<i>Melosira granulata</i>	x	x	x	x
6	<i>Melosira italica</i>	x	x		x
7	<i>Navicula sp</i>	x		x	x
8	<i>Navicula spicula</i>	x	x		x
9	<i>Nitzschia seriata</i>	x	x		x
10	<i>Pleurosigma delicatum</i>				x
11	<i>Synedra ulna</i>	x	x		x
12	<i>Tabellaria fenestata</i>	x	x		x
CYANOPHYCEAE					
1	<i>Anabaena affinis</i>	x			
2	<i>Anabaena menderi</i>	x	x		
3	<i>Anabaena spiriodes</i>		x		x
4	<i>Arthospira sp</i>				x
5	<i>Chroococcus sp</i>			x	
6	<i>Gloeotrichia echinulata</i>	x	x	x	
7	<i>Lynogbya sp</i>			x	x
8	<i>Microcystis sp</i>	x	x	x	x
9	<i>Oscillatota sp.</i>				x
10	<i>Oscillatota tenuis</i>	x	x		x
11	<i>Spirulina sp</i>	x			x
CHLOROPHYCEAE					
1	<i>Ankistrodesmus spiralis</i>	x			
2	<i>Aphanizomenon sp</i>	x	x		
3	<i>Botryococcus sp</i>				
4	<i>Chroococcus sp</i>	x			
5	<i>Chroococcus turgidus</i>	x			
6	<i>Clamydomonas sp</i>				
7	<i>Closterium alerosum</i>	x	x		x
8	<i>Closterium ehrenbergii</i>	x	x	x	x
9	<i>Coelastrum sp</i>	x			
10	<i>Coleocheta soluta</i>	x			
11	<i>Cosmarium furginum</i>	x			
12	<i>Cosmarium lundelli</i>	x			
13	<i>Dictyosphaerium pulchellum</i>	x			
14	<i>Halosphaera sp</i>				x
15	<i>Hyalotheca dissilien</i>	x	x		
16	<i>Meugeotia megasphora</i>	x	x		x
17	<i>Micrasteria foliacea</i>	x	x		
18	<i>Pediastrum sp</i>				
19	<i>Pleurotenium ehrenbergii</i>	x	x		
20	<i>Pleurotenium trabecula</i>	x	x		
21	<i>Protococcus sp</i>				x
22	<i>Salenastrum sp</i>				x
23	<i>Scenedesmus spirilis</i>				
24	<i>Spirogyra minuticrassoides</i>	x	x		x
25	<i>Spirogyra setiformes</i>	x	x		x
26	<i>Staurastrum asteria</i>	x			
27	<i>Staurastrum paradoxum</i>	x			
28	<i>Stigeoclonium lumbricum</i>	x			
29	<i>Ulothrix aequalis</i>	x	x		
30	<i>Ulothrix zonata</i>	x	x		

Table V.13 (2/2) PLANKTON DISTRIBUTION IN KAMPAR AND INDRAGIRI RIVERS

No.	Class/Species	Kampar			Indragiri
		Kampar Kanan	Kampar Kiri	Singingi	Kuantan
31	<i>Zygnema decussatum</i>	x			
32	<i>Zygnema pectinatum</i>	x	x		
COPEPODA					
1	<i>Bathynella sp</i>	x			x
2	<i>Cyclops sp</i>	x	x		x
3	<i>Eudiaptomus sp</i>	x	x		x
CRUSTACEA					
1	<i>Alona sp</i>	x			x
2	<i>Chanthocamps sp</i>	x	x		
3	<i>Chydones sp</i>				x
4	<i>Daphnia sp</i>	x	x		x
5	<i>Diaphanosoma bashyurum</i>	x			x
6	<i>Diaptomus sp</i>				x
7	<i>Leptodora sp</i>				x
8	<i>Moina sp</i>	x			x
9	<i>Stentor ruselli</i>		x		
INSECTA					
1	<i>Dragonfly larvae</i>	x	x		
2	<i>Water fleas</i>	x	x		x
PROTOZOA					
1	<i>Arcella sp</i>	x	x		x
2	<i>Didinium sp</i>	x			x
3	<i>Paramecium sp</i>	x	x		x
4	<i>Phalus sp</i>	x			x
5	<i>Stentor russelli</i>	x			x
TROCHELMINTHES					
1	<i>Keratella sp</i>				x
2	<i>Trichocerca sp</i>	x			x

Data Sources:

Nurdin (1991), Sumiarsih (1991)
 Efriyeldi (1992), Riauwati (1993)

Table V.14 HOUSES, POPULATION AND ANNUAL GROWTH RATE IN THE STUDY AREAS OF KAMPAR-INDRAGIRI RIVER BASIN, 1992.

Name of project Administrative region	Area (km ²)	Houses (n)	Population (n)	Density (n/km ²)	* Annual growth rate (%)
Kampar river basin					
a. Rantau Berangin weir and canal					
1. Bangkinang	547.39	11900	59,143	108	2.3
2. Kampar	895.45	18058	87,577	98	2.2
3. Siak Hulu	3,875.41	10,041.00	78,738	20	12.8
Sub-total a	5,318.25	39,999.00	225,358	42	4.8
b. Kampar Kiri #1 dam					
1. Kampar Kiri	1,961.41	10,150.00	46,714	24	5.6
c. Kampar Kiri #2 dam					
1. Singingi	3,484.63	6,436.00	29,471	8	14.2
Total a + b + c	10,764.29	56,585.00	301,543	28	5.5
Indragiri river basin					
a. Sinamar Dam					
1. North Payak	26.35	6738	31,824	1,208	1.2
2. Ezst Payak	20.28	4054	19,459	960	1.2
3. Harau	416.8	7721	35,549	85	1.7
4. Luhak	530.71	17055	72,407	136	0.8
5. Lintau Buo	280.86	10290	51,452	183	0.6
Sub-total a	1,274.99	45,858.00	210,691	165	1.1
b. Sukam dam					
1. Sijunjung	395.6	9947	45,712	46	1.9
2. Tjg. Gadang	1,961.80	8,758.00	41,124	21	2.6
Sub-total b	2,897.40	14,177.00	86,836	30	2.2
c. Kuantam dam					
1. Tjg. Gadang	1,961.80	8,758.00	41,124	21	2.6
2. Kuantan Mudik	1,935.57	8,212.00	36,120	19	2.6
Sub-total c	3,897.37	16,970.00	77,244	20	2.6
d. Lubuk Jambi weir and canal					
1. Kuantan Mudik	1,935.57	8,062.00	36,120	19	2.6
2. Kuantan Tengah	541.1	11476	50,971	94	1.9
3. Kuantan Hilir	788.72	10011	41,607	53	3.9
4. Cerenti	906.01	4552	21,736	24	2.1
5. Peranap	1,700.94	5,158.00	21,584	13	4.0
6. Pasir Penyau	1,485.94	16,133.00	87,135	59	5.2
Sub-total d	7,358.32	58,497.00	259,153	35	3.5
Total a + b + c + d	11,530.71	118,532.00	556,680	48	2.3

Source : Kecamatan dalam angka

* Annual growth rate is an average between 1980 and 1992.

Table V.15 CHANGE OF GROSS REGIONAL DOMESTIC PRODUCT IN RIAU
AND WEST SUMATRA PROVINCES, 1987 - 1990.

	Riau *PDRB(%)		West Sumatra PDRB (%)	
	1987	1990	1987	1990
1. agriculture	28.0	29.2	31.9	29.6
2. mining	6.6	6.1	1.1	1.4
3. industry	7.7	10.2	10.2	11.7
4. electric, gas & drinking water	0.9	1.4	1.4	1.5
5. construction	2.0	1.7	3.8	3.9
6. commerce	27.0	24.7	22.0	23.3
7. transportation	11.8	11.1	11.1	10.7
8. Bank	2.4	4.1	2.3	2.8
9. house rent	5.9	4.1	3.4	3.1
10. public	6.1	5.0	8.9	8.5
11. profit	1.6	1.8	4.0	3.6
total	100.0	100.0	100.0	100.0

Data source : statistics of Riau and West Sumatra, 1988 and 1991.

*PDRB : Sum of Regional domestic Production.

Table V.16 AREA AND PRODUCTION OF MAJOR AGRICULTURAL CROPS AT ADMINISTRATIVE REGENCIES IN THE STUDY AREA OF KAMPAR-INDRAGIRI RIVER BASEIN, 1993.

Administrative district Item	Paddy		Rubber		Coconut	
	area (Ha)	Production (Ton)	area (Ha)	Production (Ton)	area (Ha)	Production (Ton)
A. KAMPAR river basin	22,545	72,108	60,080	21,988	3,842	21,988
a. Rantau Berangin Weir						
1. Kec. Bangkinang	5,187	13,876	10,840	5,312	481	515
2. Kec. Kampar	10,692	40,956	13,778	6,752	2,069	2,213
3. Kec. Siak Hulu	1,932	5,719	12,089	5,948	593	556
Sum of a	17,811	60,551	36,707	18,012	3,143	3,284
b. Kampar Kiri 1 dam						
Kec. Kampar Kiri	3,734	9,207	16,232	1,884	639	599
c. Kampar Kiri 2 dam						
Kec. Singingi	1,000	2,350	7,141	2,092	60	20
B. INDRAGIRI river basin	44,861	173,203	125,950	58,633	8,063	3,584
a. Dam Sinamar						
1. Kec. Pyk. Utara	1,279	5,512	-	-	247	315
2. Kec. Pyk. Timur	680	3,078	-	-	190	239
3. Kec. Harau	5,326	22,582	737	346	317	386
4. Kec. Luhak	9,014	41,104	1,375	640	356	392
5. Kec. Lintau-Buo	6,678	29,784	2,972	1,397	165	207
Sum of a	22,977	102,060	5,084	2,383	1,275	1,539
b. Dam Sukam						
1. Kec. Sijunjung	3,513	15,282	4,677	2,224	786	1,003
2. Kec. Tjg. Gadang	3,329	13,982	4,871	2,314	284	360
Sum of b	6,742	29,264	9,548	4,538	1,070	1,363
c. Dam Kuantan						
1. Kec. Tjg. Gadang	3,329	13,892	4,871	2,314	284	360
2. Kec. Ktn. Mudik	2,517	8,457	11,461	5,383	4,114	89
Sum of c	5,746	22,439	16,332	7,697	4,398	449
d. Bendung dan Kanal Lubuk Jambi						
1. Kec. Ktn. Mudik	2,517	8,457	11,461	5,383	4,114	89
2. Kec. Ktn. Tengah	4,739	13,506	27,376	9,433	447	175
3. Kec. Ktn. Hilir	4,787	14,265	27,927	13,350	581	12
4. Kec. Cirenti	1,876	4,128	12,588	2,600	190	150
5. Kec. Peranap	796	957	8,636	1,927	73	6
6. Kec. Pasir Penyau	427	566	32,328	19,019	313	250
Sum of d	15,142	41,879	111,318	51,712	5,718	682

Data source : Beauru of agricultural crops and Beauru of agricultural plantation in Riau and West Sumatra, 1993.

Table V.17 LAND USE AT ADMINISTRATIVE REGENCIES IN THE STUDY AREA OF KAMPAR-INDRAGIRI RIVER BASIN, 1993.

Administrative district Item	Land Use (Ha)					
	Home garden	paddy	planta- tion	forest	others	Sum
A. KAMPAR river basin	8,479 (0,79)	22,545 (2,09)	199,864 (18,57)	294,625 (27,37)	550,916 (51,18)	1,076,429 (100,0)
a. Rantau Berangin Weir						
1. Kec. Bangkinang	1,785	5,187	22,683	7,289	17,795	54,739
2. Kec. Kampar	2,709	10,692	39,200	1,037	35,907	89,545
3. Kec. Siak Hulu	1,506	1,932	76,990	10,299	296,814	387,541
sum of a (%)	6,000 (1,13)	17,811 (3,35)	138,873 (26,11)	18,625 (3,50)	350,516 (65,91)	531,825 100.00
b. Kampar Kiri 1 dam						
Kec. Kampar Kiri (%)	1,523 (0,78)	3,734 (1,9)	42,759 (21,80)	140,000 (71,38)	8,125 (4,14)	196,141 100.00
c. Kampar Kiri 2 dam						
Kec. Singingi (%)	956 (0,27)	1,000 (0,29)	18,232 (5,23)	136,000 (39,03)	192,275 (55,18)	348,463 100.00
B. INDRAGIRI river basin	20,680 (1,79)	44,861 (3,89)	185,269 (16,07)	390,426 (33,86)	511,835 (44,39)	1,153,071 (100,0)
a. Sinamar dam						
1. Kec. Pyk. Utara	673	1,279	535	-	147	2,634
2. Kec. Pyk. Timur	405	680	486	-	457	2,028
3. Kec. Harau	1,158	5,326	3,098	31,101	997	41,680
4. Kec. Luhak	3,216	9,014	9,534	30,396	911	53,071
5. Kec. Lintau-Buo	1,544	6,678	6,608	12,327	929	28,086
sum of a (%)	6,996 (5,49)	22,977 (18,02)	20,261 (15,89)	73,824 (57,90)	3,441 (2,70)	127,499 100.00
b. Sukam dam						
1. Kec. Sijunjung	1,741	3,513	7,161	32,840	48,305	93,560
2. Kec. Tjg. Gadang	1,533	3,229	8,434	65,455	117,529	196,180
sum of b (%)	3,274 (1,13)	6,742 (2,33)	15,595 (5,38)	98,295 (33,92)	165,834 (57,24)	289,740 100.00
c. Kuantan dam						
1. Kec. Tjg. Gadang	1,533	3,229	8,434	65,455	117,529	196,180
2. Kec. Ktn. Mudik	1,642	2,517	29,554	159,545	299	193,557
sum of c (%)	3,175 (0,81)	5,746 (1,47)	36,715 (9,75)	225,000 (57,73)	117,828 (30,23)	389,737 100.00
d. Lubuk Jambi Weir						
1. Kec. Ktn. Mudik	1,642	2,517	29,554	159,545	299	193,557
2. Kec. Ktn. Tengah	2,008	4,739	12,619	416	34,328	54,110
3. Kec. Ktn. Hilir	1,998	4,787	16,750	3,444	51,893	78,872
4. Kec. Cirenti	910	1,876	15,595	4,550	67,670	90,601
5. Kec. Peranap	1,032	796	14,955	34,885	118,430	170,098
6. Kec. Pasir Penyu	2,820	427	59,940	15,467	69,940	148,594
sum of d (%)	10,410 (1,41)	15,142 (2,06)	149,413 (20,31)	218,307 (29,67)	342,560 (46,55)	735,832 100.00

Data Source : Monograph of each district in 1992.

Table V.18 PERCENTAGE OF FAMILIES RELATED TO WATER USE ALONG THE RIVERS IN KAMPAR-INDRAGIRI RIVER BASIN, 1994.

Administrative district Item	Water Use (%)					Total
	Family	Agri- culture	Industry	Transp- ortation	Others	
A. KAMPAR river basin						
a. Rantau Berangin						
1. Kec. Bangkinang	15	12	3	5	5	40
2. Kec. Kampar	20	16	3	4	3	46
3. Kec. Siak Hulu	25	8	3	6	4	46
Avg. of Sum	20	12	3	5	4	44
b. Kampar Kiri 1 dam						
Kec. Kampar Kiri	30	5	3	10	2	50
c. Kampar Kiri 2 dam						
Kec. Singingi	25	5	2	3	5	40
B. INDRAGIRI river basin						
a. Sinamar dam						
1. Kec. Pyk. Utara	9	25	6	1	4	45
2. Kec. Pyk. Timur	12	20	4	1	3	40
3. Kec. Harau	16	30	3	1	4	54
4. Kec. Luhak	18	30	4	1	2	55
5. Kec. Lintau-Buo	20	25	3	1	2	51
Avg. of Sum	15	26	4	1	3	49
b. Sukam dam						
1. Kec. Sijunjung	15	25	1	3	3	47
2. Kec. Tjg. Gadang	17	21	-	3	2	43
Avg. of Sum	16	23	1	3	2	45
c. Kuantan dam						
1. Kec. Tjg. Gadang	17	23	-	3	2	45
2. Kec. Ktn. Mudik	17	21	-	3	2	43
Avg. of Sum	17	22	-	3	2	44
d. Lubuk Jambi Weir						
1. Kec. Ktn. Mudik	22	21	-	6	5	54
2. Kec. Ktn. Tengah	20	18	2	5	5	50
3. Kec. Ktn. Hilir	18	18	-	5	5	46
4. Kec. Cirenti	20	15	-	5	3	43
5. Kec. Peranap	20	10	-	5	7	42
6. Kec. Pasir Penyu	20	14	10	10	5	59
Avg. of Sum	20	16	2	6	5	49

Data Source : Key Informations at each districts, 1994