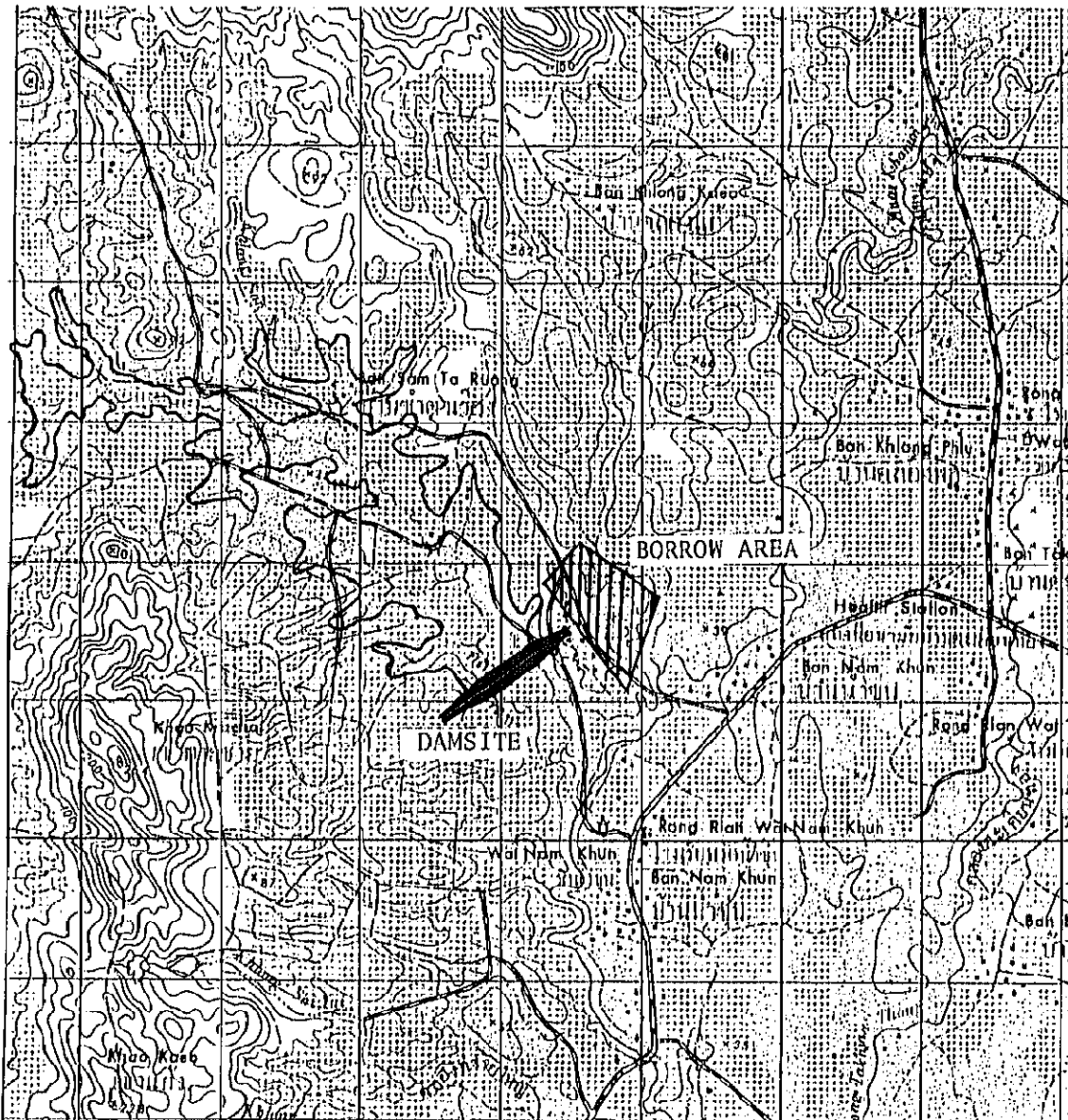


C.2 LOCATION OF FILL MATERIAL AT THE KHLONG SAN SAI DAMSITE



C.3. SUMMARY OF IMPERVIOUS MATERIAL TEST

According to the results of impervious material test, this material is classified into MH by the unified classification method. The contents of silt and clay are considerably high, however this material has enough interception against seepage because of low permeability. Shear strength is also obtained as cohesion 1.2 to 2.0 t/m^2 with internal friction angle varying from 28 to 32 degree. These values will possess sufficient strength for a small scale dam like the Khlong San Sai dam.

C.4 SUMMARY OF IMPERVIOUS MATERIAL TEST

SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	GRAIN SIZE ANALYSIS					ATTERBERG LIMIT			COMPACTION TEST					
		GRAVEL 4.76 mm	SAND 0.074 mm	SILT 0.005 mm	CLAY MAX. SIZE	SPECIFIC GRAVITY OF SOIL	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	SHRINKAGE LIMIT (%)	PLASTICITY INDEX	COMPACTION ENERGY (%)	FIELD MOISTURE CONTENT (%)	OPTIMUM MOISTURE CONTENT (%)	MAX. DRY DENSITY g/cu. cm	
CR-1	MB	4.0	32.0	23.0	41.0	20.0	2.60	55.2	35.2	28.5	20	80	24.2	22.3	1.582
												100	24.2	22.0	1.602
												120	24.2	21.6	1.623

SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	SPECIMEN INITIAL CONDITION				PERMEABILITY TEST COEFFICIENT OF PERMEABILITY (cm/s)	TRIAXIAL TEST (U-U)		TRIAXIAL TEST (C-U)		
		D-VALUE = $\frac{r_d}{MAX. r_d}$	DRY DENSITY g/cu. cm	WET DENSITY g/cu. cm	MOISTURE CONTENT (%)		VOID RATIO	DEGREE OF SATURATION (%)	COHESION (t/sq. m)	FRICTION ANGLE (° -')	COHESION (t/sq. m)
CR-1	MB	95	1.522	1.912	25.6	0.708	94.0	5.1	10-00	1.8	30-30
		98.7	1.582	1.935	22.3	0.643	90.2	3.6	20-00	2.0	28-30
		100	1.602	1.954	22.0	0.623	91.8	5.0	18-30	1.9	31-30
		101.3	1.623	1.9736	21.6	0.602	93.3	4.4	23-00	1.3	32-00

C.5. Backdata of Impervious Material Test

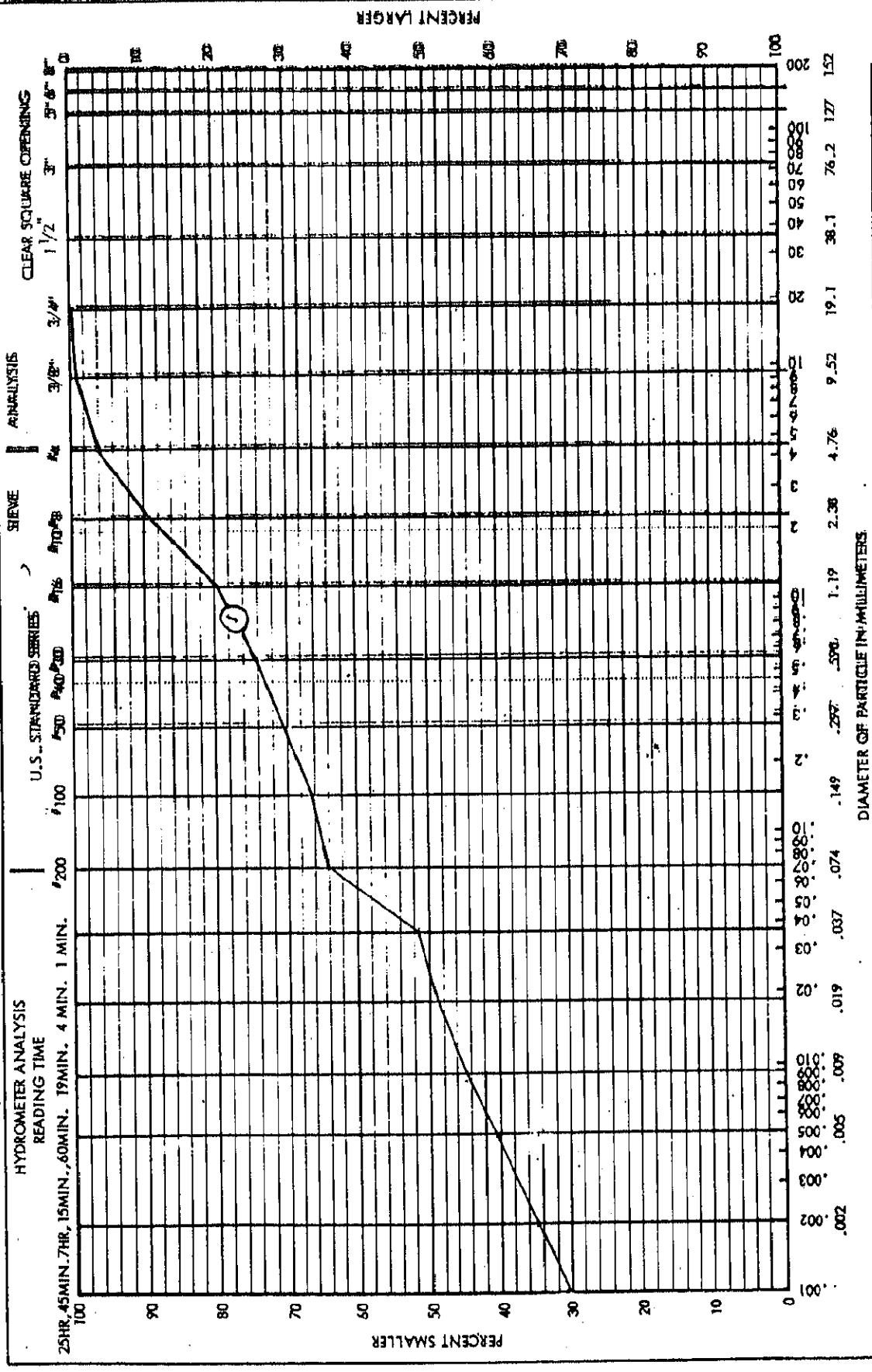


Project **CHANTHABURI RIVER BASIN**

GRAADATION TEST

DL 6-30
(R. 1-2517)

Memo. 107/2531



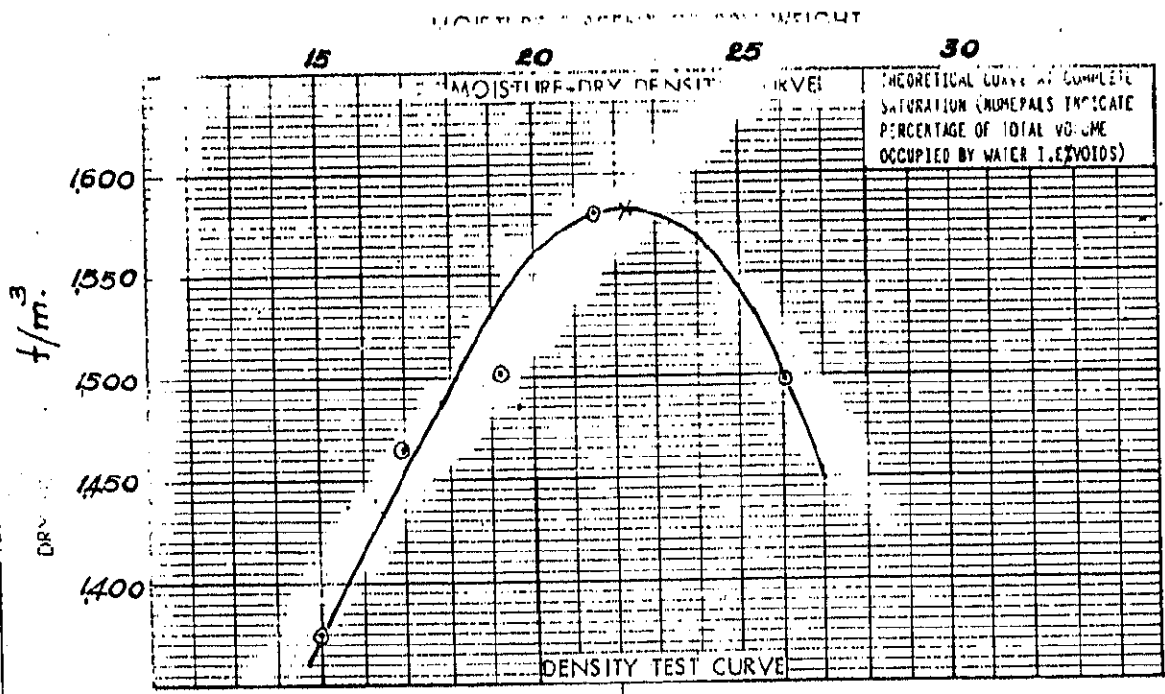
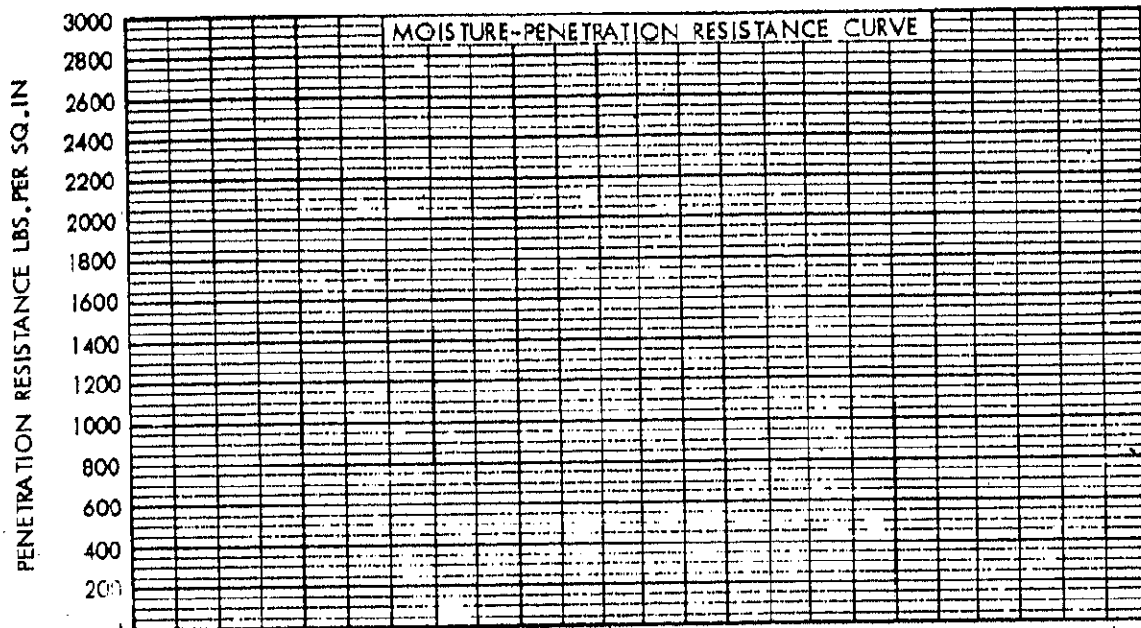
CLAY (plastic) TO SILT (non-plastic)		SAND			GRAVEL		COBBLES
		FINE	MEDIUM	COARSE	FINE	COARSE	
No.	Boring No.	Wh, %			Unified Soil Classification		
①	Sample ①	24.2	2.60	2.60	MH		
Atterberg Limit:		L.L. P.L. I.P.					
		55.2	35.2	20.0			

FORM NO. 1-11 (REV. 11-15-54) (U.S. 249-4, P. 2529-9, 1000.)



COMPACTION TEST CURVE

Project CHANTHABURI..... ① STANDARD ENERGY X 80 % Memo. 107 / 2531.....



COMPACTION

20 BLOWS PER LAYER 12

3 LAYERS 1/30 CU. FT.

5.5 LB. HAMMER

SOIL PROPERTIES

SPECIFIC GRAVITY 1.582 DENSITY

SOIL CLASSIFICATION RP-3 OPT. MOISTURE

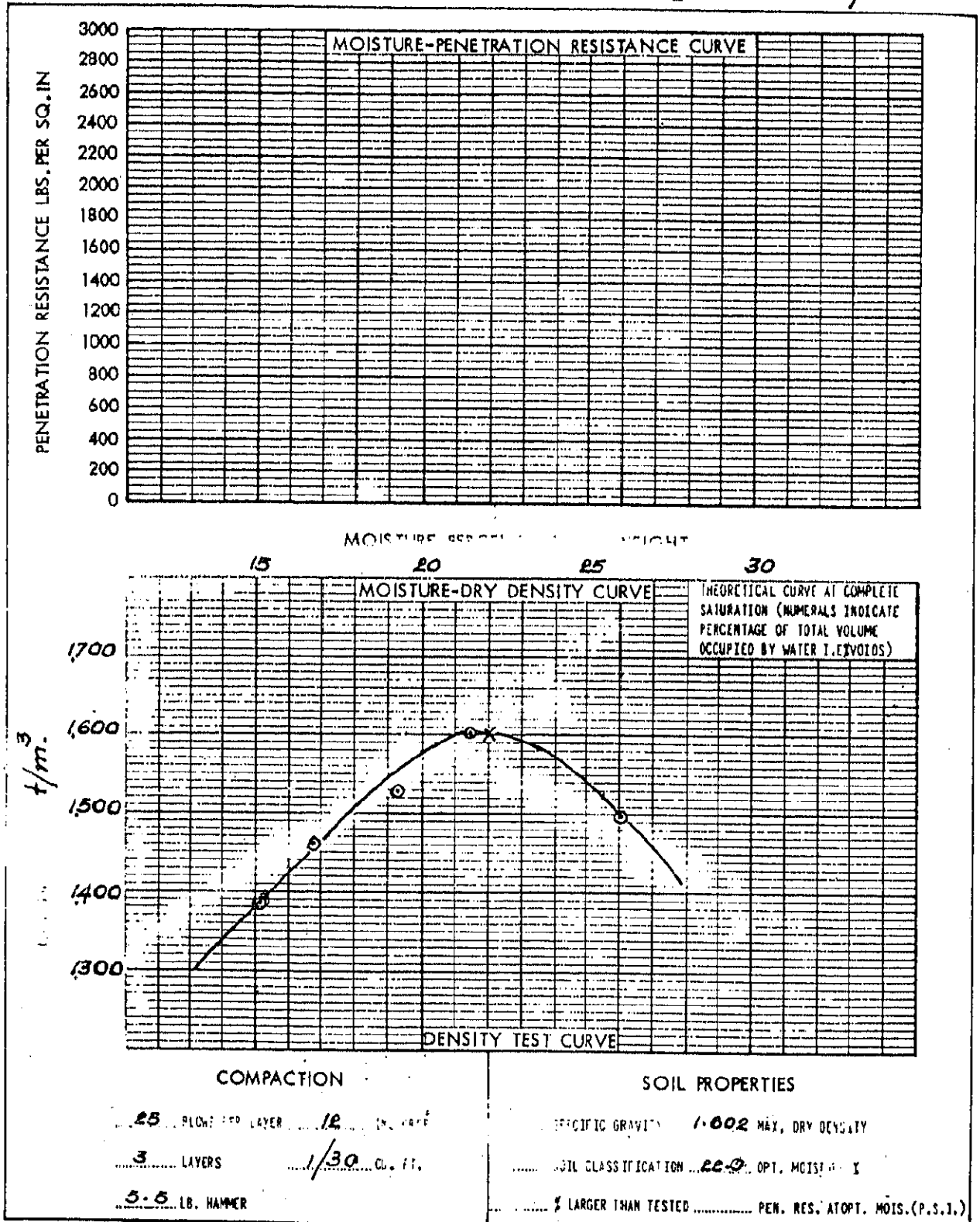
3 LARGER THAN TESTED PEN. RES. AOPT. MOIS. (P.S.I.)

Drawn VV. Checked PS. Date 13/7/31 Sheet of



COMPACTION TEST CURVE

Project CHANTHABURI (2) STANDARD ENERGY X 100 % Memo. 107/2531

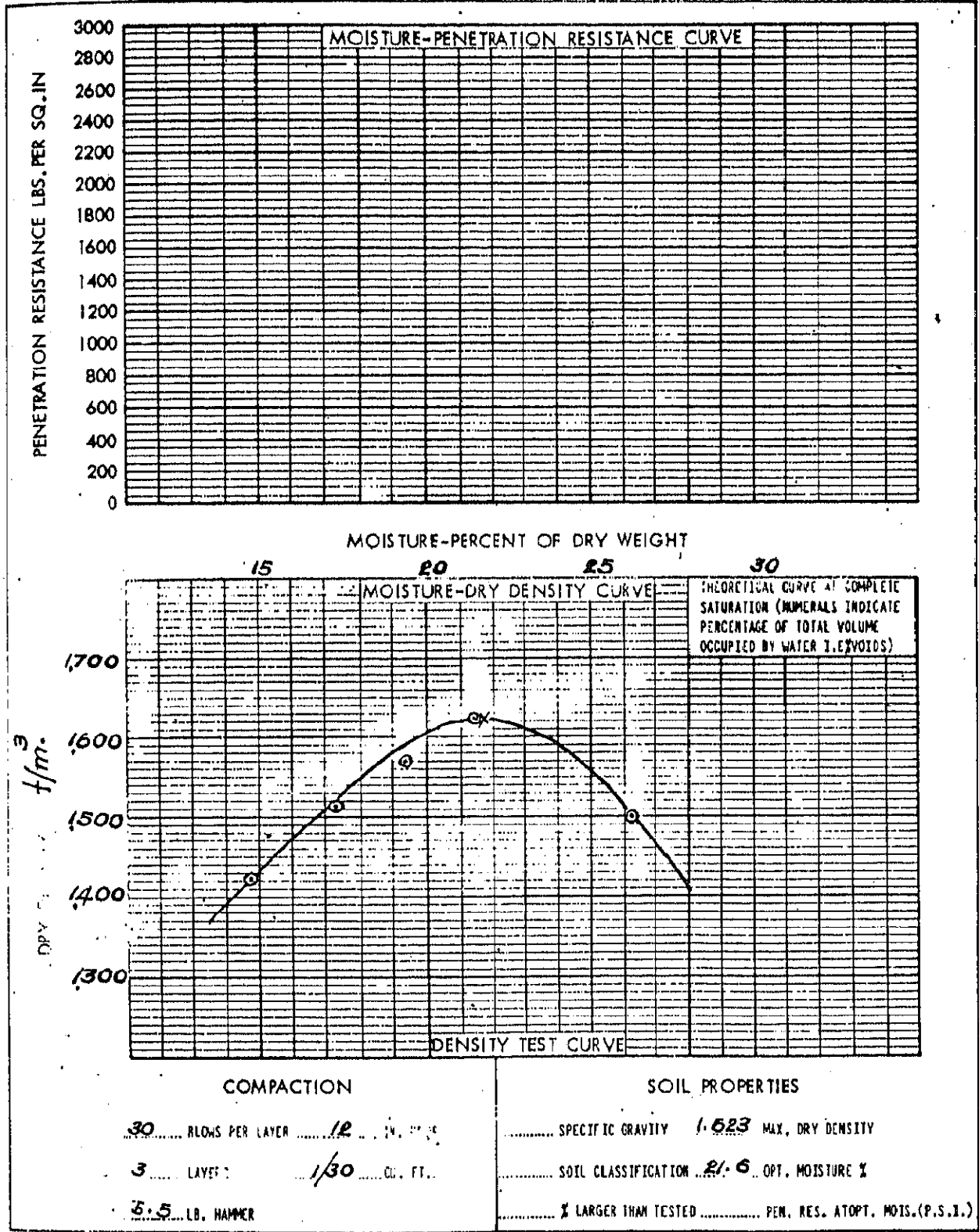


Drawn Y.Y. Checked PS. Date 13/7/31 Sheet of



COMPACTION TEST CURVE

Project CHANIKHARUBI ③ STANDARD ENERGY X 120 % Memo. 107/2531



Drawn Y.V. Checked PS. Date 13/7/31 Sheet of

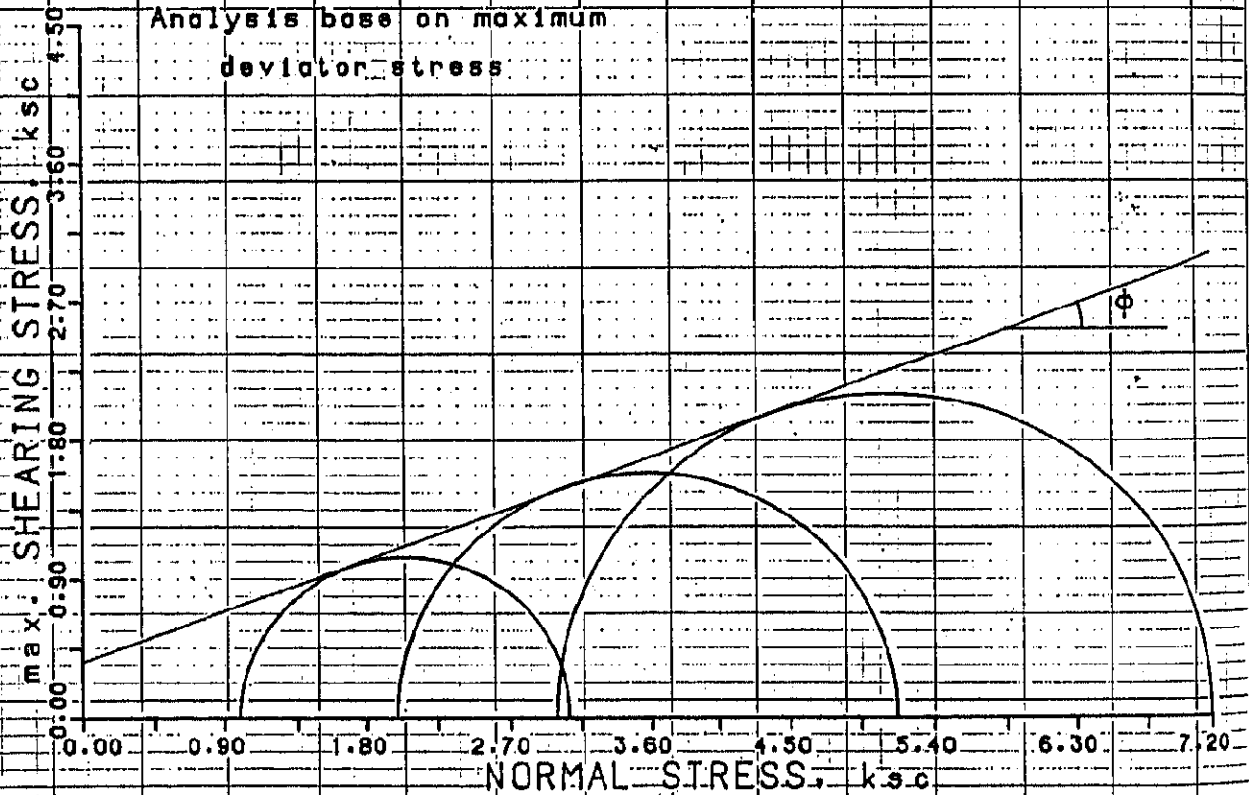
ROYAL IRRIGATION DEPARTMENT, AGRI-CULTURAL ENGINEERING, 715-A, N. 2519-

TRIAXIAL COMPRESSION TEST (UU.)

PROJECT: CHANTHABURI...SE. 80%

NO.	σ_1	σ_3	$\sigma_1 - \sigma_3$
1.	3.09	1.00	2.09
2.	5.18	2.00	3.18
3.	7.20	3.00	4.20

Analysis base on maximum deviator stress.



COHESION 0.365 KSC. FRICTION ANGLE 20.204 DEGREE

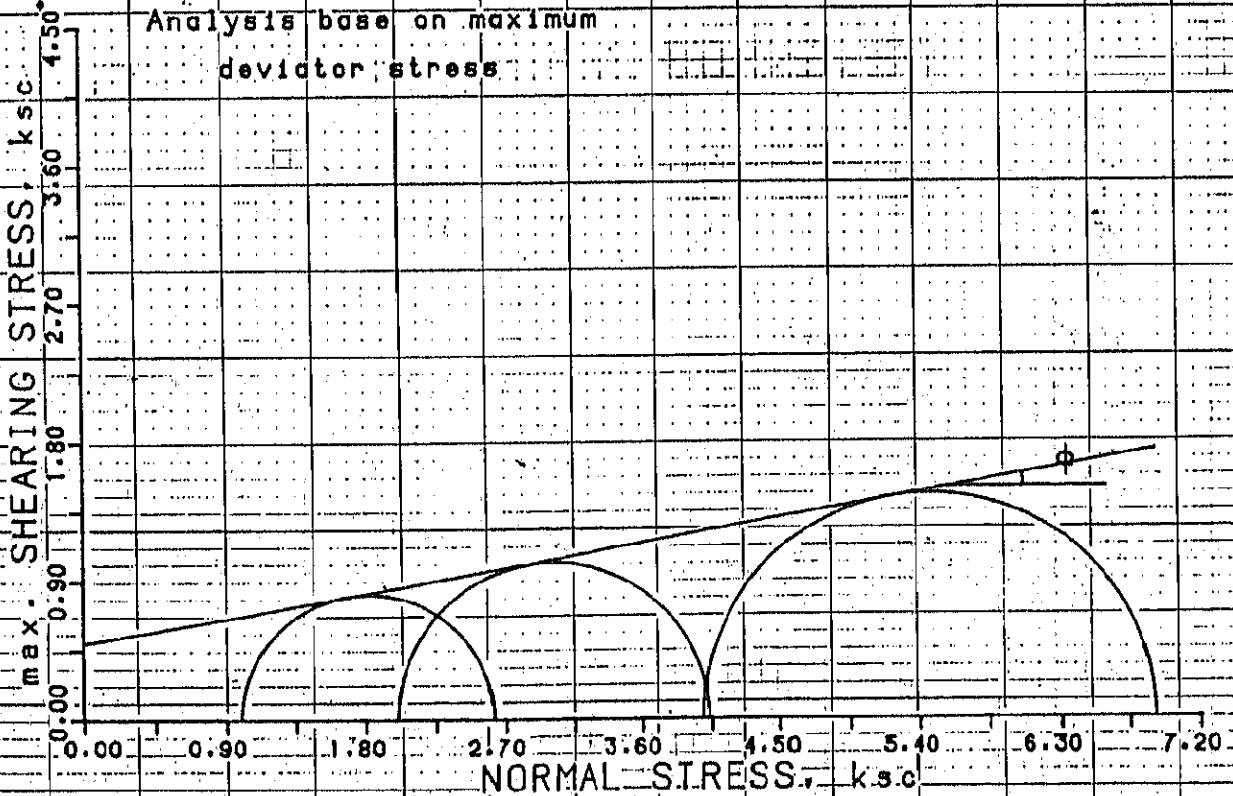
SHEET OF

TRIAxIAL COMPRESSION TEST (UU.)

PROJECT: CHANTHABURI... SE. 95%

NO.	σ_1	σ_3	$\sigma_1 - \sigma_3$
1.	2.63	1.00	1.63
2.	4.04	2.00	2.04
3.	6.92	4.00	2.92

Analysis base on maximum deviator stress



COHESION 0.497 KSC

FRICTION ANGLE 10.221 DEGREE

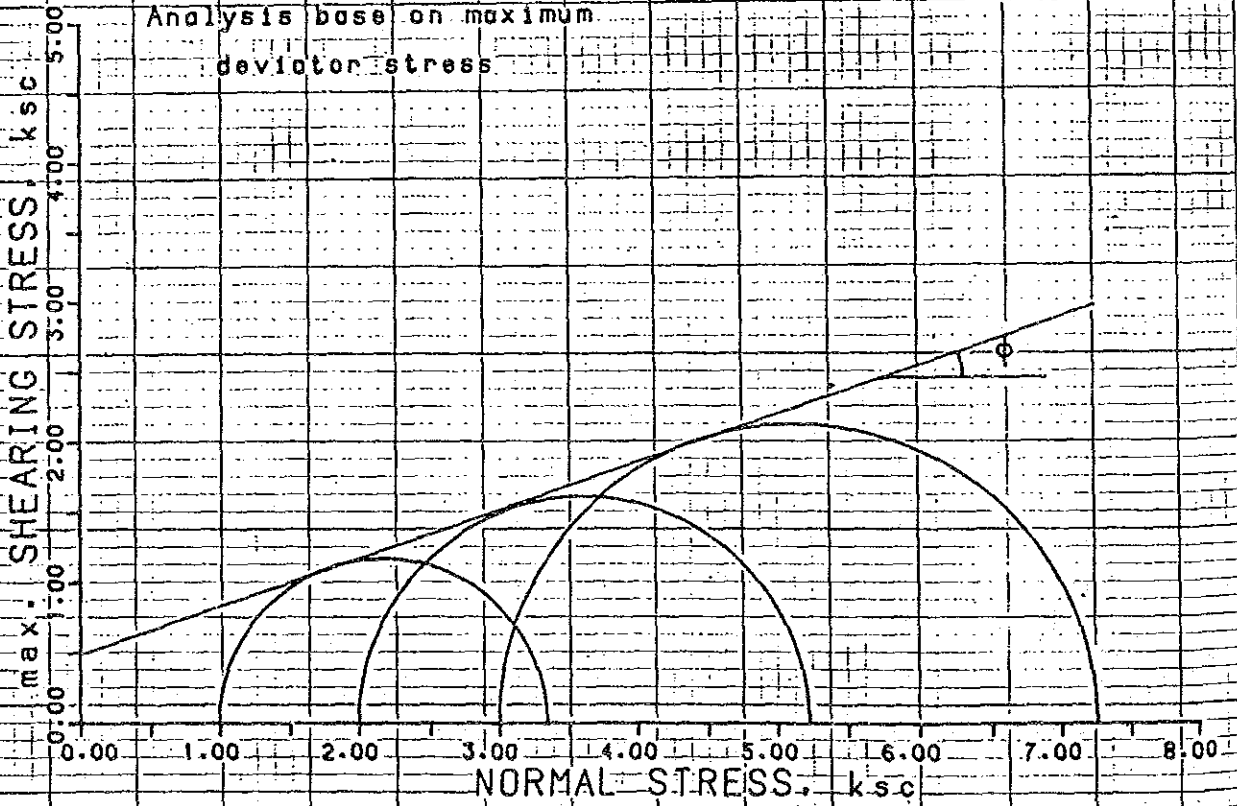
SHEET OF

TRIAXIAL COMPRESSION TEST (UU.)

PROJECT: CHANTHABURI... SE. 100%

NO.	σ ₁	σ ₃	σ ₁ -σ ₃
1.	3.35	1.00	2.35
2.	5.23	2.00	3.23
3.	7.25	3.00	4.25

Analysis base on maximum deviator stress



COHESION 0.489 KSC.

FRICTION ANGLE 18.864 DEGREE

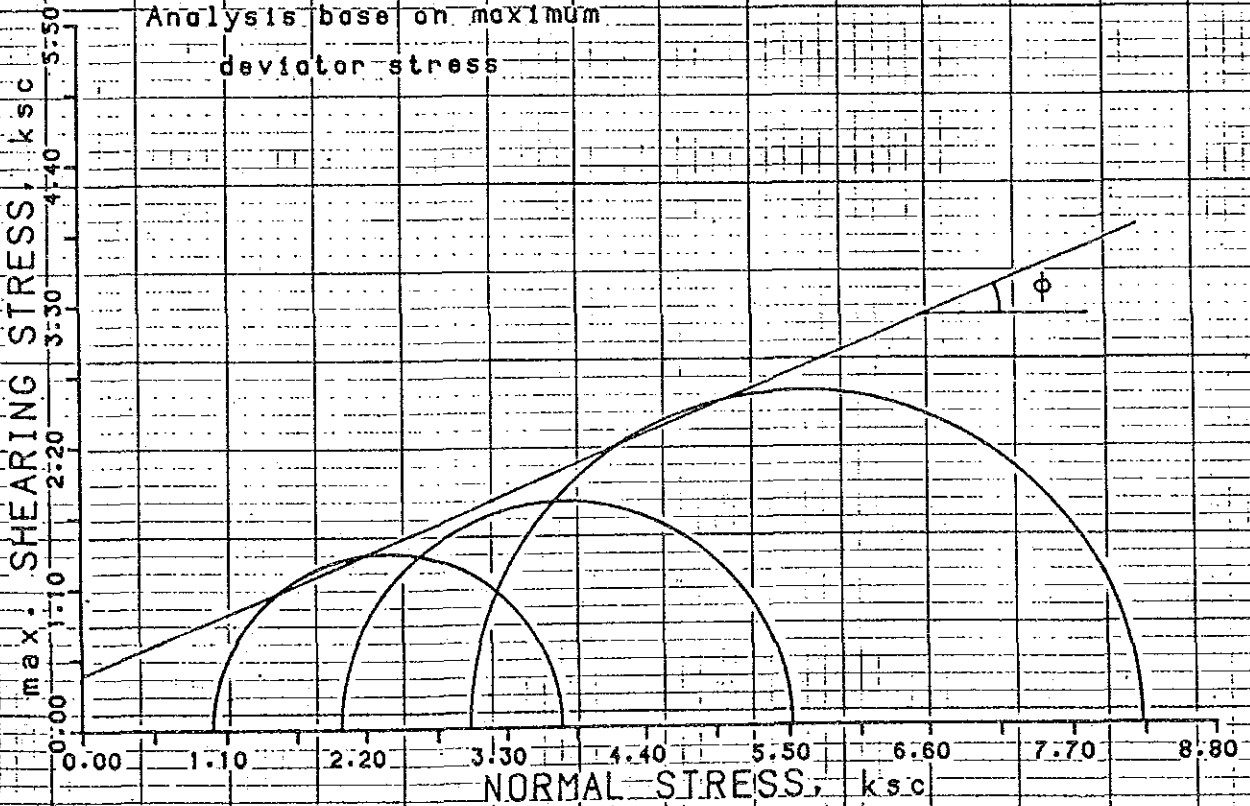
SHEET OF

TRIAxIAL COMPRESSION TEST (UU.)

PROJECT: CHANTHABURI... SE. 120%

NO.	σ_1	σ_3	$\sigma_1 - \sigma_3$
1.	3.74	1.00	2.74
2.	5.53	2.00	3.53
3.	8.23	3.00	5.23

Analysis base on maximum deviator stress



COHESION 0.432 KSC.

FRICTION ANGLE 22.810 DEGREE

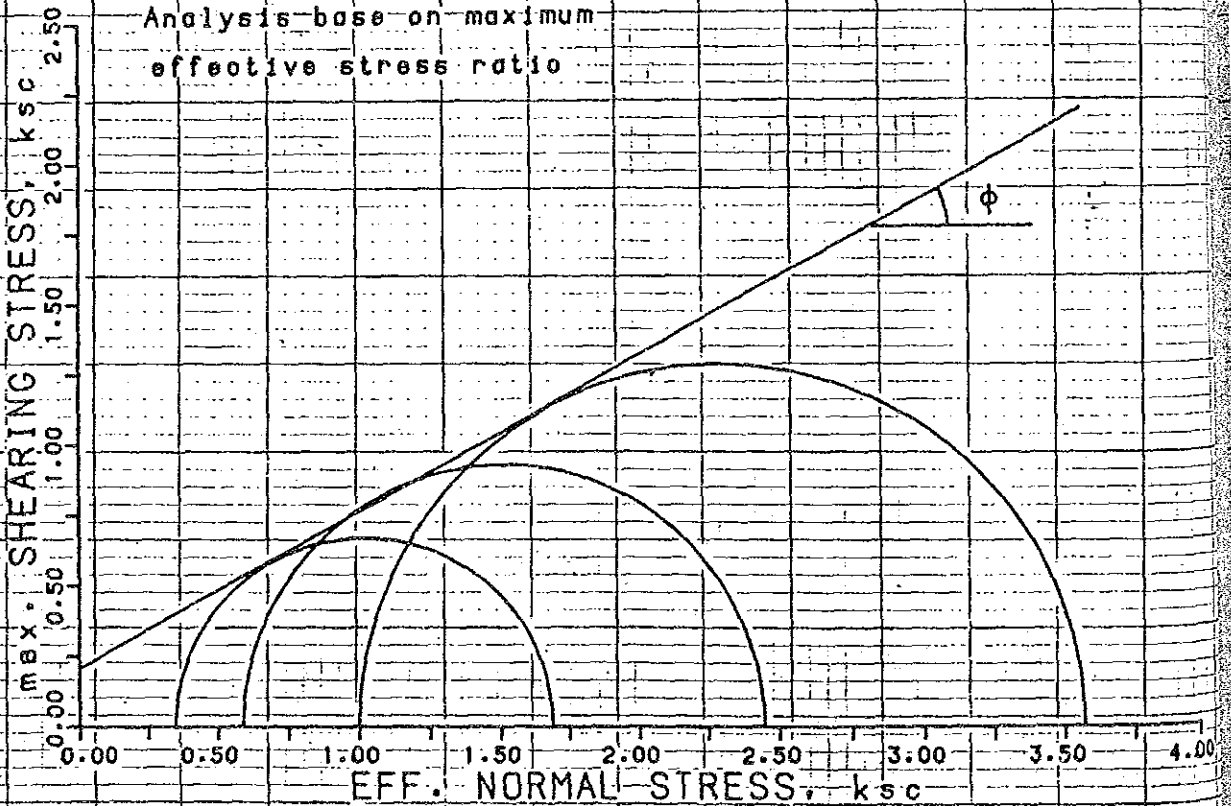
SHEET OF

TRIAXIAL COMPRESSION TEST (CU.)

PROJECT: CHAN-THABURI... SE80%

NO.	σ ₁	σ ₃	σ ₁ -σ ₃
1.	1.69	0.35	1.34
2.	2.45	0.59	1.86
3.	3.57	1.00	2.57

Analysis base on maximum
effective stress ratio



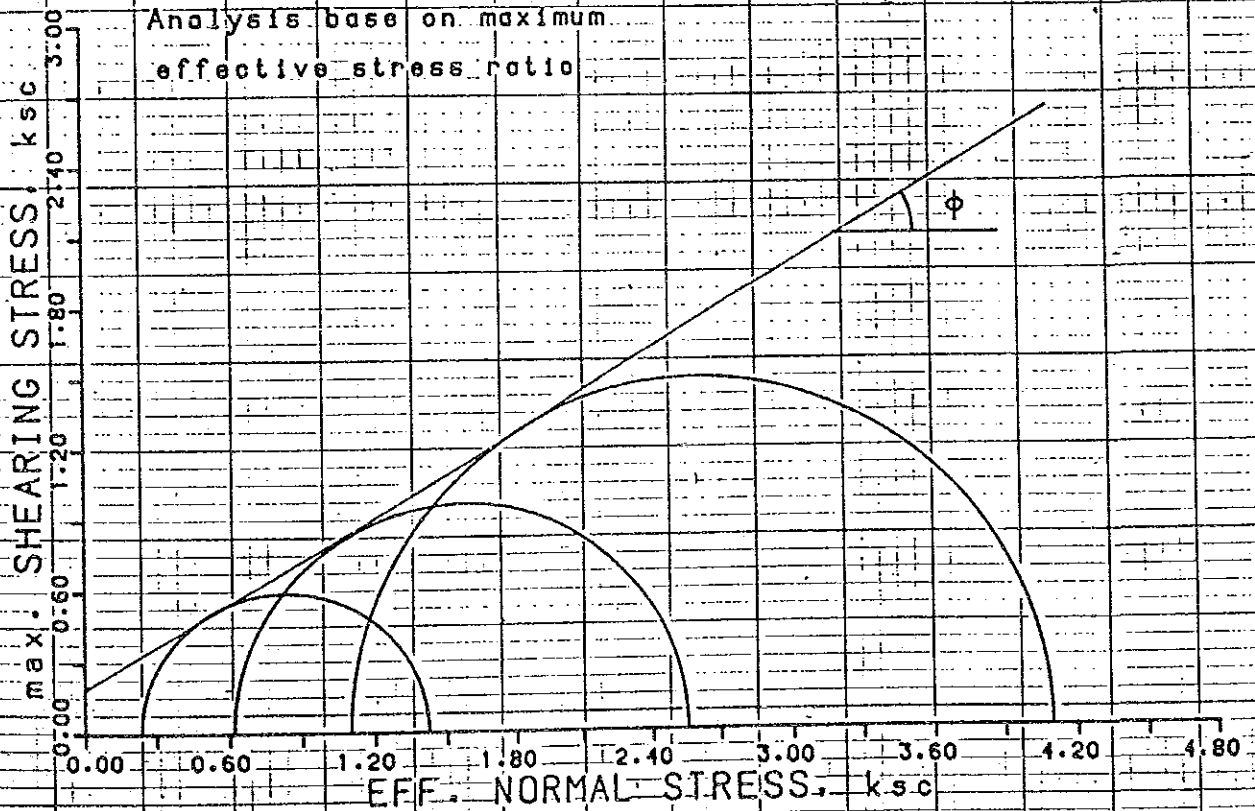
COHESION 0.209 KSC. FRICTION ANGLE 28.968 DEGREE

TRIAXIAL COMPRESSION TEST (CU.)

PROJECT: CHANTHABURI...SE. 95%

NO.	σ ₁	σ ₃	σ ₁ -σ ₃
1.	1.43	0.24	1.19
2.	2.55	0.62	1.94
3.	4.10	1.10	3.00

Analysis base on maximum effective stress ratio



Cohesion, 0.188 KSC Friction Angle 30.891 Degree

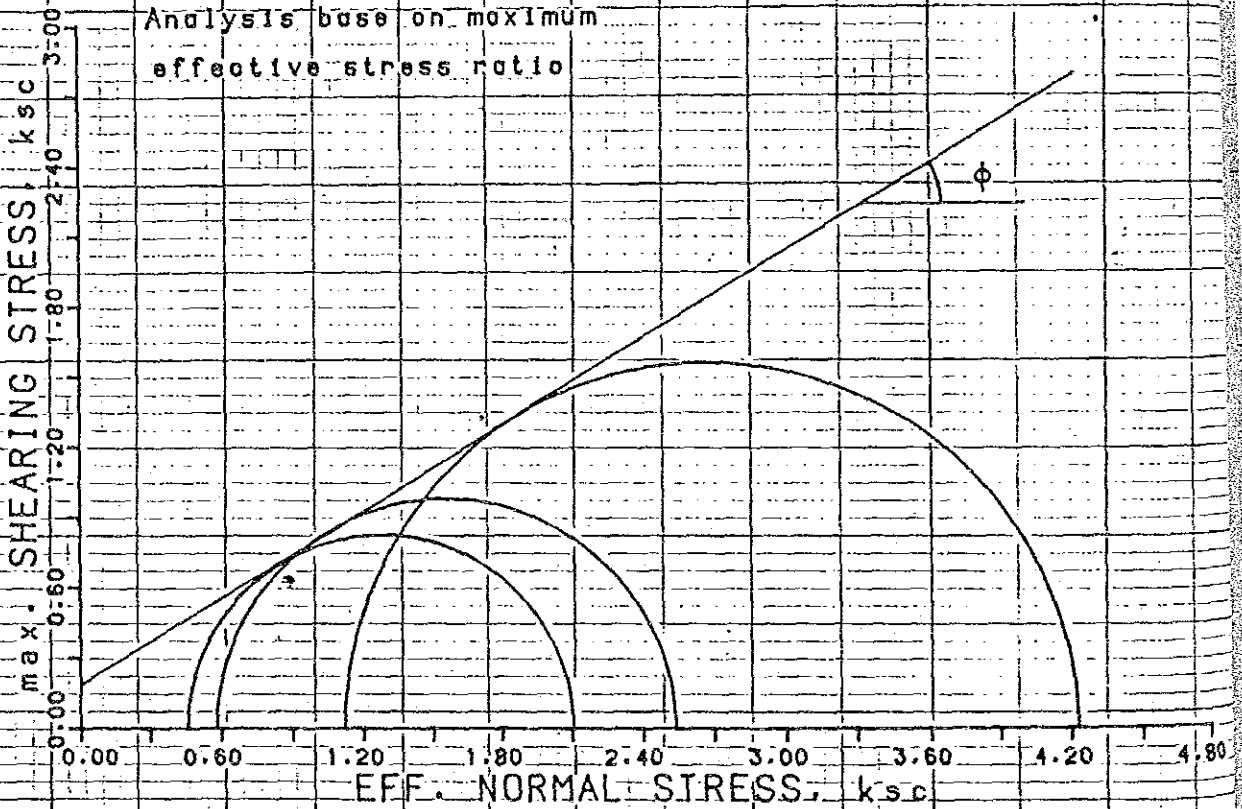
SHEET OF

TRIAxIAL COMPRESSION TEST (CU...)

PROJECT: CHANTHABURI...SE. 100%

NO.	σ_1	σ_3	$\sigma_1 - \sigma_3$
1.	2.11	0.46	1.65
2.	2.54	0.58	1.96
3.	4.23	1.12	3.11

Analysis base on maximum effective stress ratio



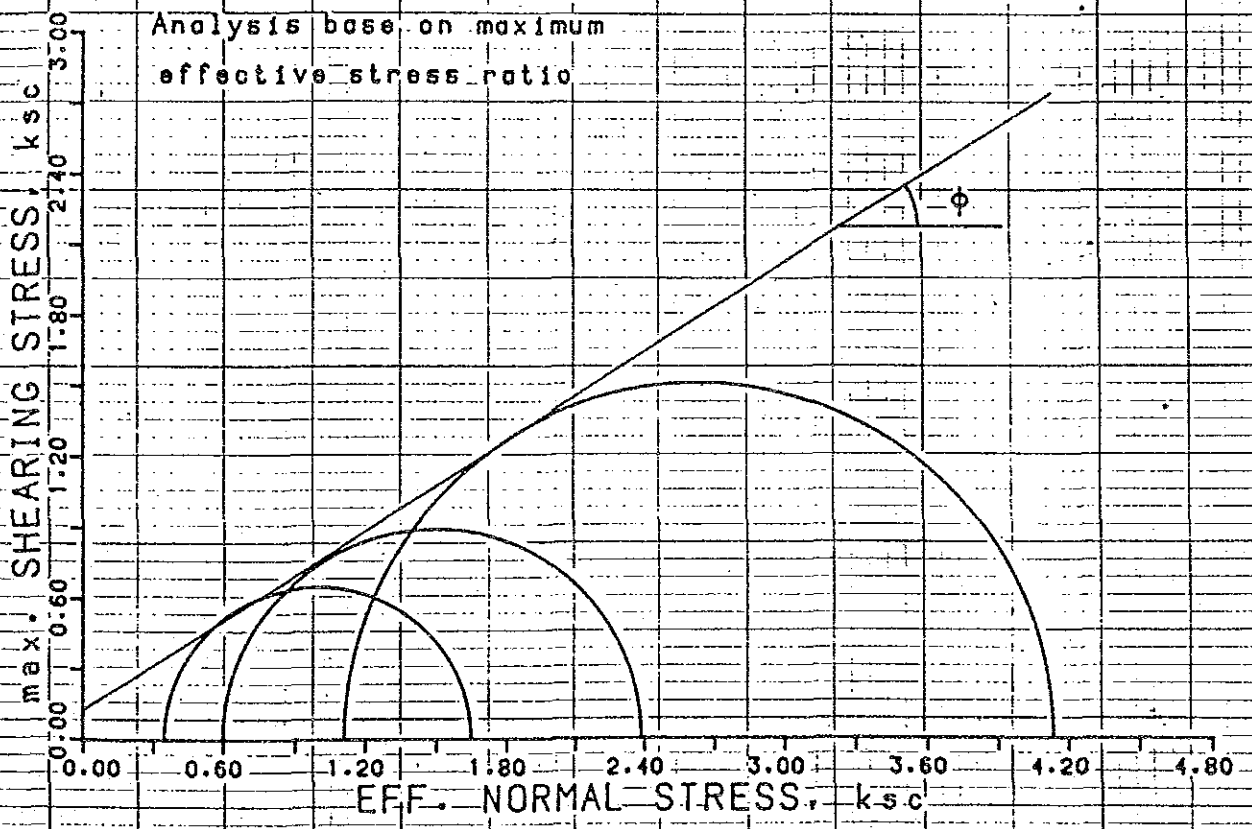
COHESION 0.186 KSC FRICTION ANGLE 31.496 DEGREE

SHEET OF

TRIAXIAL COMPRESSION TEST (CU.)

PROJECT: CHANTHABURI...SE.120%

NO.	σ_1	σ_3	$\sigma_1 - \sigma_3$
1.	1.65	0.35	1.30
2.	2.39	0.60	1.79
3.	4.14	1.11	3.03



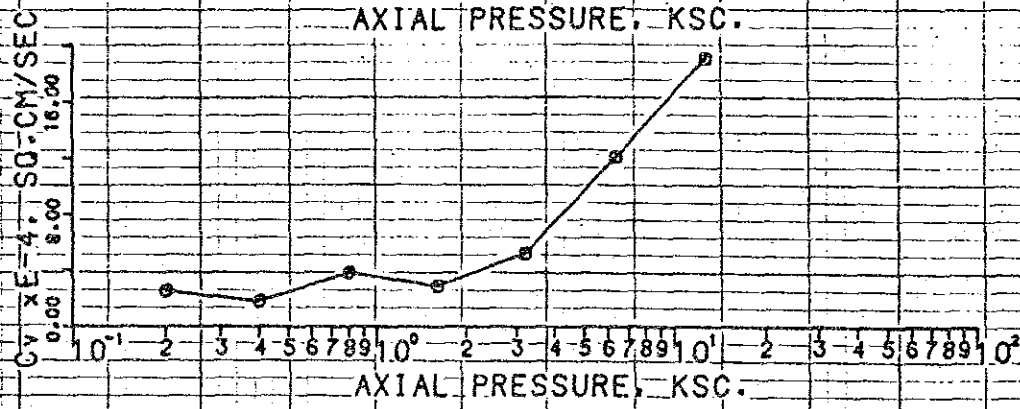
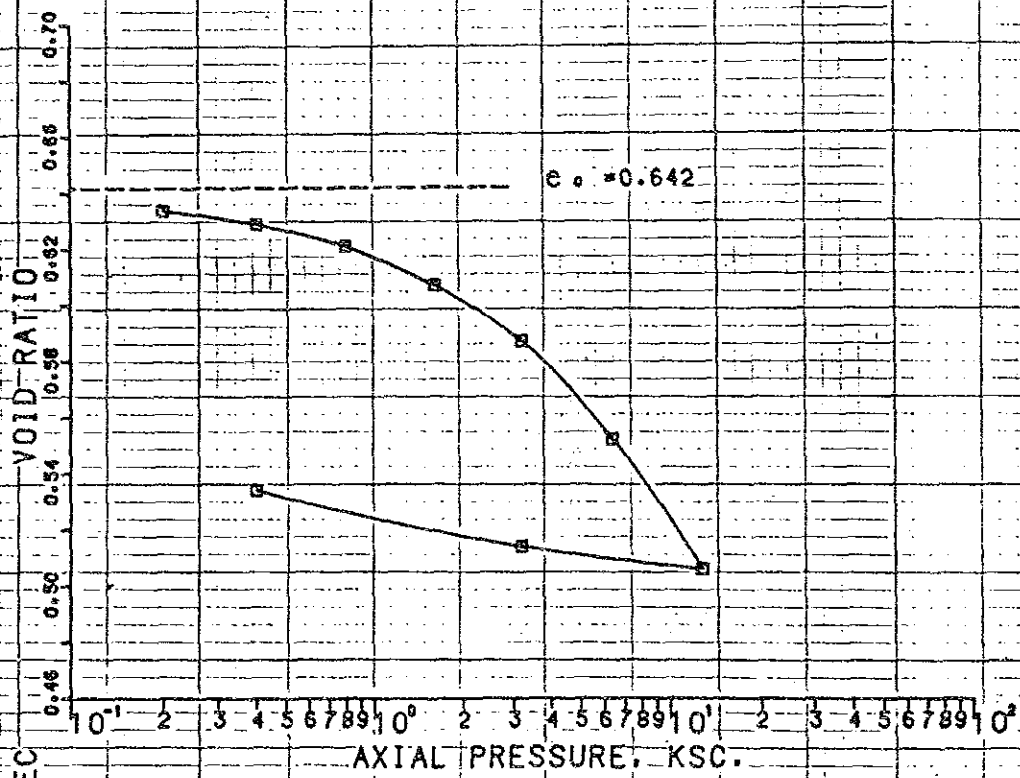
COHESION 0.126 KSC. FRICTION ANGLE 32.353 DEGREE

SHEET OF

CONSOLIDATION TEST RESULT

CHANTHABURI...NO.3 (SE, 80%)

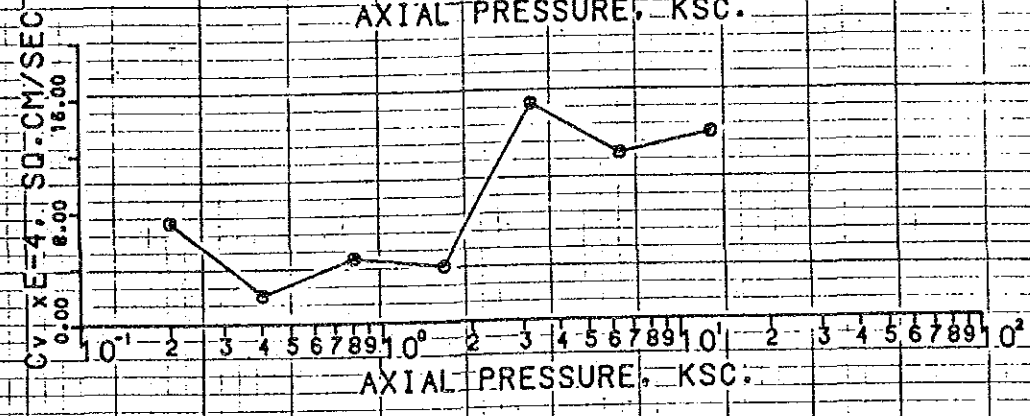
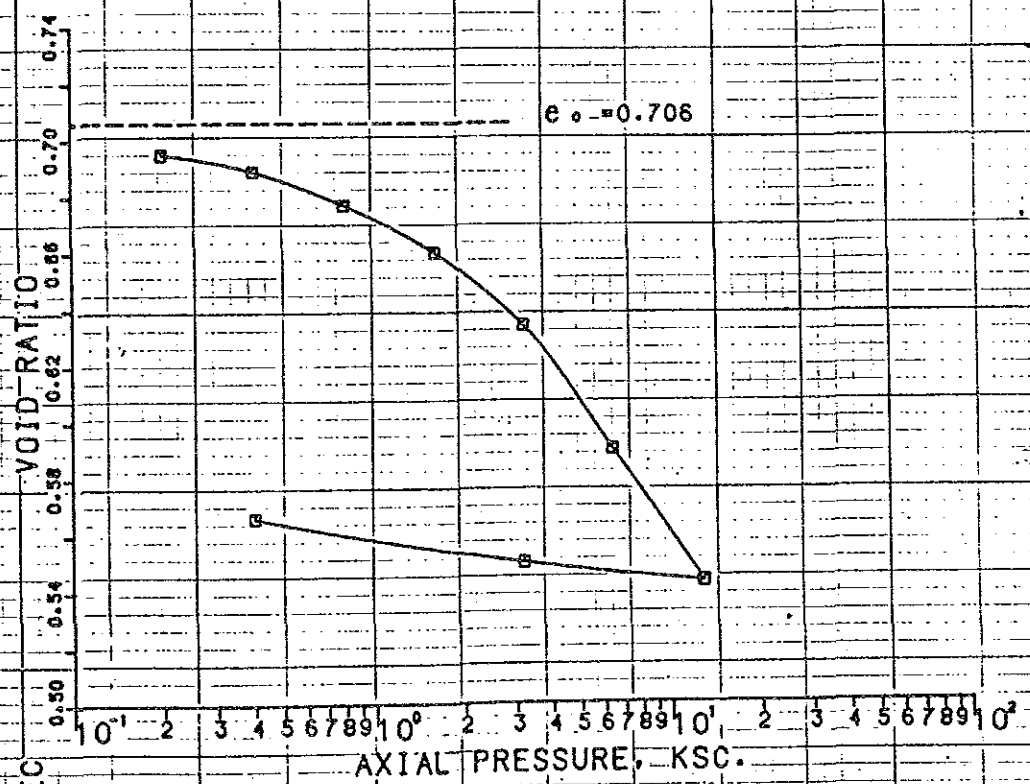
	INITIAL	FINAL
Sample Height cm.	2.000	1.870
Water Content %	22.20	23.00
Dry Unit Weight $\gamma_{d,u.m.}$	1.583	1.695
Void Ratio	0.642	0.534
Saturation %	89.91	100.00



CONSOLIDATION TEST RESULT

CHANTHABURI...NO.2 (SE: 95%)

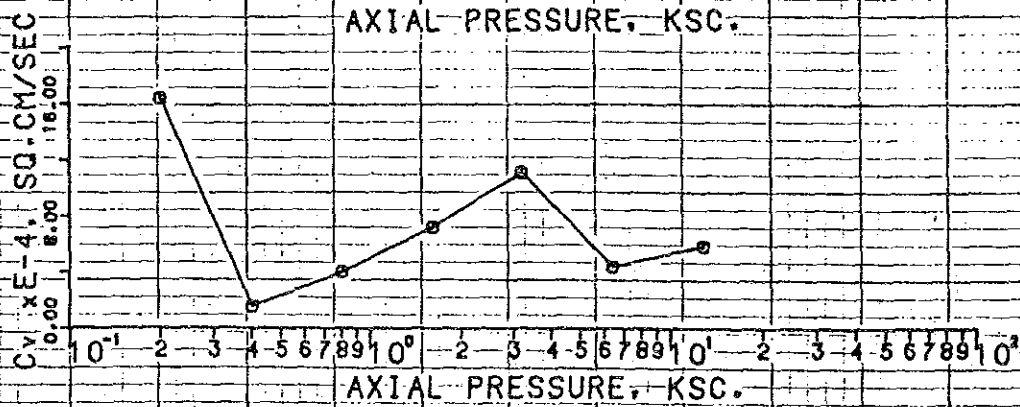
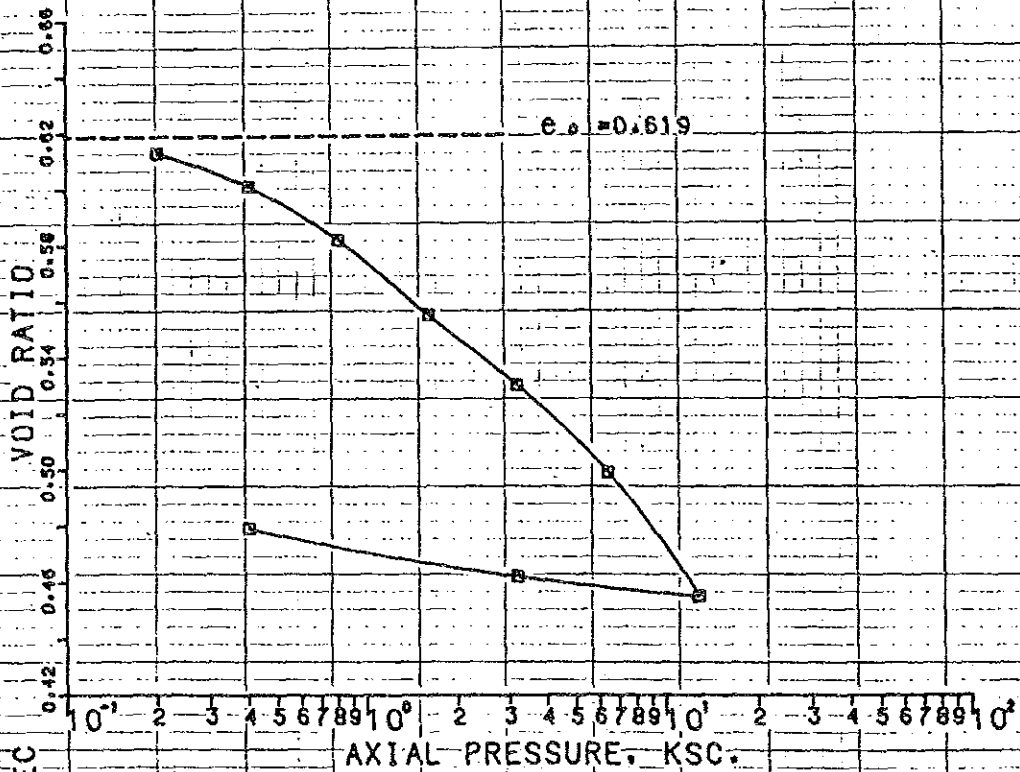
	INITIAL	FINAL
Sample Height cm.	2.000	1.840
Water Content %	25.40	23.00
Dry Unit Weight t/cu.m.	1.524	1.661
Void Ratio	0.706	0.566
Saturation %	93.54	100.00



CONSOLIDATION TEST RESULT

CHANTHABURI...NO.1 (SE. 100%)

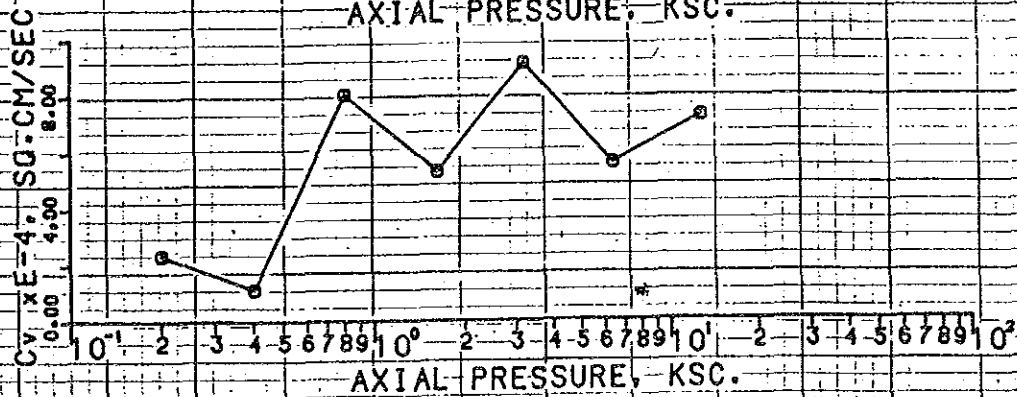
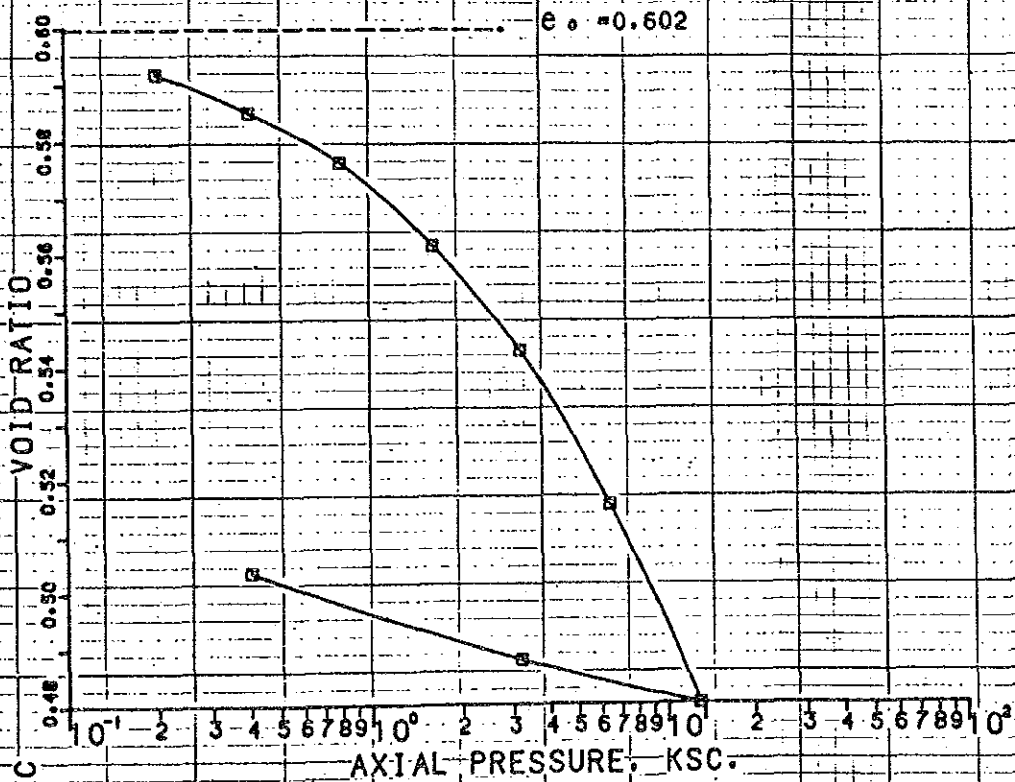
	INITIAL	FINAL
Sample Height cm.	2.000	1.830
Water Content %	21.70	22.50
Dry Unit Weight t/cu.m.	1.606	1.759
Void Ratio	0.619	0.479
Saturation %	91.15	100.00



CONSOLIDATION TEST RESULT

CHANTHABURI... NO. 4 (SE. 120%)

	INITIAL	FINAL
Sample Height cm.	2.000	1.880
Water Content %	21.60	22.20
Dry Unit Weight t/cu.m.	1.623	1.728
Void Ratio	0.602	0.504
Saturation %	93.29	100.00



APPENDIX-D. SOILS

APPENDIX-D SOILS

LIST OF CONTENTS

D.1	REPRESENTATIVE SOIL PROFILE	D-1
D.2	RESULTS OF SOIL ANALYSIS (Profile Pit)	D-7
D.3	RESULTS OF SOIL ANALYSIS (Hand Anger Boring)	D-9

D. 1. REPRESENTATIVE SOIL PROFILE

Huai Pong Series

Profile No. : 1
 Location : Amphoe Muang
 Classification : 1. Gray Podzolic Soils.
 2. Typic Paleudults. (USDA)
 Parent material : Colluviated materials from granite and quartzite.
 Topography and slope : Undulating
 Physiography : Foothill slope
 Drainage : Imperfect
 Permeability : Moderate
 Runoff : Moderate
 Vegetation and land use:

Horizon	Depth(cm)	Description
Ap	0-10	Brown(10YR 5/3) sandy clay loam; moderate medium subangular blocky; firm, slightly sticky; slightly plastic; many fine and medium roots; strongly acid (pH 5.1); clear smooth boundary.
B21t	10-22	Pale brown (10YR 6/3) sandy clay loam; moderate medium subangular blocky; firm, slightly sticky, slightly plastic; many fine tubular pores; common fine and medium roots; very strongly acid(pH 4.9); unclear wavy boundary.
B22t	22-42	Brown(10YR 4/4) sandy clay loam; moderate medium subangular blocky; firm, slightly sticky, slightly plastic; few fine and medium roots; very strongly acid(pH 4.8); gradual wavy boundary.
B23t	42-120	Yellowish brown(10YR 5/4) sandy clay loam; moderate medium subangular blocky; firm, sticky, plastic; common fine tubular pores; few fine roots; very strongly acid(pH 4.9).

Klaeng Series

Profile No. : 2
 Location : Amphoe Muang
 Classification : 1. Low Humic Gley.
 2. Oxic Plinthaquils. (USDA)
 Parent material : Alluvium
 Topography and slope : Flat
 Physiography : Low terrace.
 Drainage : Poorly drained
 Permeability : Slow
 Runoff : Slow
 Vegetation and land use: Paddy field

Horizon	Depth(cm)	Description
Ap	0-15	Grayish brown(10YR 5/2) sandy loam, few fine and strong brown (7.5YR 4/6) mottles; weak fine and medium angular blocky; slightly firm, sticky and plastic; common fine and very fine interstitial pores; many fine roots; strongly acid (pH 5.3); clear smooth boundary.

- AB 15-35 Light brownish gray(10YR 6/2), sandy clay loam, common fine and strong brown(7.5YR 5/8)mottles; weak medium plate blocky; friable, slightly sticky and plastic; many very fine and fine interstitial pores; strongly acid(pH 5.0); clear smooth boundary.
- B11g 35-48 Brown(7.5YR 5/2), sandy clay loam, many strong brown(7.5YR 5/8) mottles; weak medium angular blocky; friable, slightly sticky and plastic; common fine interstitial pores; strongly acid(pH 5.1); clear and wavy boundary.
- B21tg 48-73 Pinkish gray(7.5YR 7/2), clay, many yellowish red(5YR 5/8) mottles; strong medium angular blocky; firm, sticky and plastic; very strongly acid(4.5); clear and wavy boundary.
- B22tg 73-120 Pinkish gray(5YR 7/2), clay, strong medium angular blocky; firm, sticky and plastic; extremely acid(pH 4.2)

Klong Chack

Profile No. : 4
 Location : Amphoe Muang
 Classification : 1. Reddish Brown Lateritic Soils.
 2. Typic Paleudults. (USDA)
 Parent material : Shale and phyllite.
 Topography and slope : Undulating, slope 6-18 %
 Physiography : Ridges upper slope
 Drainage : Well drained
 Permeability : Moderate to rapid
 Runoff : Moderate to rapid
 Vegetation and land use: Fruits

Horizon	Depth(cm)	Description
Ap	0-10	Dark reddish gray(5YR 4/2), clay loam; moderate medium subangular blocky; friable, slightly sticky, slightly plastic; many fine and medium interstitial and tubular pores; many fine and medium roots; slightly acid(pH 6.2); clear wavy boundary.
AB	10-27	Reddish brown(5YR 5/4), clay; moderate medium subangular blocky; friable, slightly sticky, slightly plastic; many fine and medium interstitial and tubular pores; many medium roots; slightly acid(pH 6.1); clear wavy boundary.
B21t	27-55	Yellowish red(5YR 4/8), clay; moderate medium subangular blocky; friable, slightly sticky, slightly plastic; many fine and medium interstitial and tubular pores; many medium roots; medium acid(pH 5.9) unclear wavy boundary.
B22t	55-100	Yellowish red(5YR 5/8), clay; moderate medium subangular blocky; friable, slightly sticky, slightly sticky, slightly plastic; common fine tubular pores; few fine roots; medium acid(pH 5.7); unclear wavy boundary.
C	100-120	Reddish yellow(5YR 6/6), clay, moderate medium subangular blocky; slightly firm, slightly sticky, slightly plastic; common fine tubular pores; few fine roots; strongly acid(pH 5.4).

Tha Mai

Profile No. : 5
 Location : Amphoe Muang
 Classification : 1. Reddish Brown Latosols.
 2. Typic Umbriorthox. (USDA)
 Parent material : Basalt
 Topography and slope : Flat
 Physiography : Dissected lava flow
 Drainage : Well drained
 Permeability : Moderate to slow
 Runoff : Moderate
 Vegetation and land use: Fruits

Horizon	Depth(cm)	Description
Ap	0-13	Dark reddish brown(5YR 3/4), silty clay; moderate medium subangular blocky; friable, slightly sticky, slightly plastic; many fine interstitial pores; many medium roots; strongly acid(pH 5.0), clear smooth boundary.
B21t	13-44	Reddish brown(5YR 4/3), clay, weak medium subangular blocky; friable, sticky, plastic; many fine tubular pores; common fine and medium roots; very strongly acid(4.9); clear smooth boundary.
B22t	44-120	Reddish brown(5YR 5/3), clay, moderate medium subangular blocky; friable, sticky, plastic; many fine tubular pores; few fine roots; strongly acid (pH 5.2).

Chumporn

Profile No. : 6
 Location : Amphoe Muang
 Classification : 1. Red/Yellow Podzolic Soils.
 2. Typic Paleudults. (USDA)
 Parent material : Old alluvium
 Topography and slope : Undulating, slope 3-8 %
 Physiography : Middle terrace
 Drainage : Imperfect to moderately well
 Permeability : Moderately slow
 Runoff : Rapid
 Vegetation and land use: Rubber tree.

Horizon	Depth(cm)	Description
Ap	0-21	Brown to dark brown(7.5YR 4/2), sandy loam; moderate medium subangular blocky; firm, slightly sticky, slightly plastic; common fine interstitial and tubular pores; common medium roots, few coarse roots; very strongly acid(4.5); clear wavy boundary.
B21t	21-49	Yellowish brown(10YR 5/6), gravelly sandy loam; moderate medium subangular blocky; firm, slightly sticky, slightly plastic; common medium interstitial and tubular pores; many medium rounded ironstone; strongly acid(pH 5.3); clear smooth boundary.
B22t	49-92	Reddish yellow(7.5YR 6/8); very many dark red(2.5YR 3/6) mottles, gravelly sandy clay loam; moderate fine subangular blocky; firm, slightly sticky, slightly sticky, slightly plastic; common fine tubular pores; few medium roots; many medium rounded ironstone; strongly acid(pH 5.4); clear smooth boundary.
B23t	92-130	Light gray(10YR 7/1); many medium dark reddish brown (2.5YR 3/6) mottles; gravelly sandy clay loam; moderate medium subangular blocky; firm, sticky, slightly plastic; common medium tubular pores; few fine roots; many medium subrounded ironstone; strongly acid(pH 5.3).

Unnamed Soil Unit 1

Profile No. : 7
 Location : Amphoe Tha Mai
 Classification : Raddish-brown Latosols
 Parent material : Residuum from basalt
 Topography and slope : Flat
 Physiography : Foot
 Drainage : Poor
 Permeability : Slow
 Runoff : Medium
 Vegetation and land use: Paddy

Horizon	Depth(cm)	Description
Ap	0-11	Dark brown(10YR 3/3), clay loam; moderate medium subangular blocky; firm, sticky and plastic; many fine tubular pores; many medium to fine roots; very strongly acid(pH 4.8); clear smooth boundary.
B21tg	11-25	Brown(7.5YR 4/3); many reddish brown(2.5YR 4/8)mottle; clay; strong to moderate angular blocky; firm, sticky, and plastic; many fine tubular and interstitial pores; few fine roots; very strongly acid(pH 4.8); clear wavy boundary.
B22tg	25-53	Brownish gray(7.5YR 5/1); common yellowish brown(10YR 3/6); clay; moderate medium angular blocky; many fine tubular and interstitial pores; few fine roots; very strongly acid(pH 4.9); clear wavy boundary.
B23tg	53-110	Brownish gray(7.5YR 4/1); many dark reddish brown(5YR 3/6) mottle; clay loam; moderate medium angular blocky; firm, sticky, slightly plastic; many fine tubular and interstitial pores; few fine roots; very strongly acid (pH 4.9).

Ratchaburi

Profile No. : 8
 Location : Amphoe Muang
 Classification : 1. Hydromorphic Alluvial Soils
 2. Aeric Trophaquepts
 Parent material : Recent alluvium
 Topography and slope : Flat
 Physiography : Levees and river basins
 Drainage : Poor
 Permeability : Slow
 Runoff : Slow
 Vegetation and land use: Fruits

Horizon	Depth(cm)	Description
Ap	0-11	Brown(10YR 5/3), silty clay loam; few bright brown (7.5YR 5/8) mottles; weak medium subangular blocky; sticky, plastic, firm; many fine interstitial pores; many fine roots; very strongly acid(pH 4.9); clear smooth boundary.
Alg	11-40	Dark yellowish brown(10YR 4/4), clay; common yellowish red

(5YR 4/8) mottles; moderate medium subangular blocky; sticky, plastic, firm; many fine tubular pores; few fine roots; very strongly acid(pH 4.9); unclear smooth boundary.

- C1g 40-74 Yellowish brown(10YR 5/4), clay; common dark reddish brown(5YR 3/6) mottles; moderate medium subangular blocky; sticky, plastic, firm; many fine tubular pores; common fine roots; strongly acid(pH 5.1); clear smooth boundary.
- C2g 74-130 Brown to dark brown(10YR 4/3), clay; common reddish brown(5YR 4/4); moderate medium subangular blocky; few fine roots; strongly acid(pH 5.1).

Lamphu La

- Profile No. : 11
 Location : Amphoe Makham
 Classification : 1. Yellowish Brown Lateritic soils.
 2. Typic Paleudults. (USDA)
 Parent material : Old allvium
 Topography and slope : Undulating, slope 8-16 %
 Physiography : Ridge of upper slope
 Drainage : Imperfect
 Permeability : Moderate
 Runoff : Moderate
 Vegetation and land use: Fruits

Horizon	Depth(cm)	
Ap1	0-21	Dark yellowish brown(10YR 3/4); clay loam; moderate subangular blocky; slightly sticky, slightly plastic; many medium interstitial pores; many medium to fine roots; extremely acid(pH 4.3); clear smooth boundary.
Ap2	21-33	Strong brown(7.5YR 4/6); clay; weak medium subangular blocky; firm, sticky, slightly plastic; many fine interstitial and medium tubular pores; many medium to fine roots; few fine rounded iron-stones; extremely acid(pH 4.3); clear smooth boundary.
B21t	33-60	Strong brown(7.5YR 5/8); sandy clay; moderate medium subangular blocky; firm, sticky, slightly plastic; many medium pores; few fine and medium roots; many fine rounded iron-stones; very strongly acid(pH 4.7); clear smooth boundary.
B22t	60-120	Reddish yellow(5YR 6/8); clay; moderate medium subangular blocky; firm, sticky, slightly plastic; many fine interstitial and tubular pores; very few fine roots; very strongly acid(pH 4.6).

D. 2. RESULTS OF SOIL ANALYSIS (Profile Pit)

Pit No.	Depth cm	Text.	Exchangeable Cation				CEC	Sat. (%)	pH		EC Avail. P (ppm)	Orga. Matter (%)	Exch. Al (meq/100)	SO ₄ (meq/l)	Lime Req. (ton/ha)	Hardness	
			Na	K	Ca	Mg			1:1	CaCl 1:2							
Huai Pong Series																	
1	0-10	SCL	0.01	0.12	1.10	0.70	10.0	19.3	5.1	4.0	0.2	37.0	3.40	1.10	0.26	7.4	14
	-22	SCL	0.01	0.05	0.33	0.22	9.5	6.4	4.9	4.0	<0.2	6.5	1.70	1.40	0.01		17
	-42	SCL	0.01	0.07	0.12	0.51	9.6	7.4	4.8	3.9	<0.2	9.5	1.90	-	0.03		20
	-100	SCL	0.01	0.02	0.62	0.31	9.0	11.3	4.9	4.0	<0.2	7.4	2.00	-	0.04		8
Klaeng Series																	
2	0-15	SL	0.01	0.02	0.37	0.25	4.8	13.5	5.3	3.9	0.2	4.5	1.90	0.53	0.46	2.9	5
	-35	SCL	0.01	0.00	0.25	0.50	7.6	10.0	5.0	3.8	0.2	2.1	0.99	0.84	0.07		17
	-48	SCL	0.01	0.07	0.75	0.75	7.5	21.0	5.1	3.8	<0.2	1.6	0.80	-	0.03		18
	-73	C	0.01	0.17	0.75	0.65	37.0	4.3	4.5	3.6	<0.2	4.1	0.74	-	0.04		18
	-120	C	0.34	0.14	0.76	1.14	39.0	6.1	4.2	3.6	0.3	2.1	1.10	-	0.36		13
Sumut Prakan Series																	
3	0-22	SiCL	8.90	0.77	1.70	2.20	23.0	59.0	4.5	4.5	2.8	50.0	5.20	0	58.00	9.9	18
	-49	SiCL	7.30	0.68	1.90	4.20	26.0	54.1	3.8	3.7	2.7	16.0	2.10	0.97	93.00		8
	-68	L	5.70	0.86	3.30	5.80	29.0	54.0	3.6	3.6	3.6	9.8	3.20	-	124.00		8
	-82	L	9.70	0.83	3.40	6.60	36.0	57.0	3.4	3.4	4.0	39.0	4.90	-	185.00		7
	-120	L	7.50	0.93	2.50	7.50	34.0	54.2	3.6	3.6	3.9	12.0	3.60	-	126.00		9
Klong Chack Series																	
4	0-10	CL	0.10	0.23	10.00	0.20	17.0	72.5	6.2	5.5	1.8	7.6	5.00	0	3.20	0	16
	-27	C	0.01	0.02	1.60	0.90	12.0	21.0	6.1	5.0	<0.2	2.9	1.70	0	0.01		14
	-55	C	0.01	0.02	1.40	0.80	12.0	18.6	5.9	4.6	<0.2	2.5	0.67	-	0.05		16
	-100	C	0.01	0	0.38	0.62	12.0	8.4	5.7	4.2	<0.2	2.9	0.73	-	0.07		17
	-120	C	0.01	0.02	0.26	0.39	12.0	5.7	5.4	4.1	<0.2	2.3	0.80	-	0.04		18
Tha Mai Series																	
5	0-13	SiL	0.01	0.41	0.94	0.76	34.0	6.2	5.0	4.2	<0.2	156.0	3.9	0.55	0.28	10.4	18
	-44	C	0.01	0.05	0.27	0.40	26.0	2.8	4.9	4.3	<0.2	17.0	2.4	0.22	0.05		14
	-120	C	0.01	0.33	0.26	0.74	24.0	5.6	5.2	4.6	0.3	17.0	1.0	-	0.04		20
Chumorn Series																	
6	0-21	SL	0.01	0.14	0.25	0.49	9.4	9.5	4.5	3.9	0.3	3.6	3.4	1.30	0.12	8.7	18
	-49	SL	0.01	0.34	0.38	0.13	5.4	15.9	5.3	4.3	<0.2	1.6	0.9	0.11	0.09		19
	-92	SCL	0.01	0.55	0.75	0.55	8.3	22.4	5.4	4.1	<0.2	1.2	0.7	-	0.04		20
	-130	SCL	0.01	0.38	0.25	1.05	10.0	16.9	5.3	4.1	<0.2	36.0	0.4	-	0.05		20
Unnamed Soil Unit																	
7	0-11	CL	0.01	0.46	1.3	1.0	27.0	10.3	4.8	4.0	0.2	55.0	5.0	2.20	0.01	8.6	11
	-25	C	0.01	0.42	1.3	1.3	23.0	13.2	4.8	3.9	<0.2	16.0	2.5	1.20	0.05		20
	-53	C	0.01	0.07	2.1	3.4	31.0	18.0	4.9	4.1	<0.2	23.0	1.5	-	0.03		23
	-120	CL	0.01	0.15	2.3	2.0	31.0	14.4	4.9	4.2	<0.2	53.0	0.8	-	0.03		20
Ratchaburi Series																	
8	0-11	SiCL	0.01	0.32	1.3	1.1	14.0	19.5	4.9	4.0	<0.2	6.6	2.4	1.40	0.01	5.3	15
	-40	C	0.01	0.27	1.8	1.8	13.0	29.8	4.9	4.2	<0.2	2.4	1.1	0.64	0.01		18
	-74	C	0.01	0.10	3.1	1.3	17.0	26.5	5.1	4.4	<0.2	2.5	1.0	-	0.03		20
	-130	C	0.01	0.19	3.3	1.7	15.0	34.7	5.1	4.3	<0.2	27.0	1.3	-	0.01		15
Puket, Yellow Variant																	
9	0-23	SL	0.01	0.19	1.70	2.90	7.8	61.5	5.2	4.7	0.4	6.0	2.3	0	0.79	1.8	18
	-42	SCL	0.01	0.41	0.13	0.38	4.1	22.7	4.7	4.1	<0.2	5.1	0.86	0.63	0.05		20
	-68	SCL	0.01	0.22	0.25	0.26	5.4	13.7	4.6	4.1	<0.2	6.9	0.55	-	0.05		20
	-130	SCL	0.01	0.17	0.51	0.49	6.7	17.6	4.9	4.1	<0.2	4.8	0.16	-	0.05		20
Huai Pong Series																	
10	0-12	C	0.01	0.42	1.60	1.00	22.0	13.8	4.9	4.3	0.3	4.9	6.50	1.30	0.01	14.5	24
	-34	C	0.01	0.20	0.64	1.26	18.0	11.7	4.9	4.2	<0.2	10.0	2.80	2.20	0.04		20
	-38	C	0.01	0.19	0.62	0.58	12.0	11.7	5.0	4.0	<0.2	3.9	0.96	-	0.04		22
	-54	C	0.01	0.10	0.87	0.33	12.0	10.9	4.9	4.0	<0.2	4.1	0.63	-	0.05		21
	-120	C	0.01	0.21	0.63	0.97	13.0	14.0	5.0	4.0	<0.2	2.8	0.30	-	0.07		22
Lamphu La Series																	
11	0-21	CL	0.01	0.22	0.25	0.39	17.0	5.1	4.3	3.9	<0.2	5.6	4.70	3.00	0.03	16.7	21
	-33	C	0.01	0.15	0.13	0.39	12.0	5.7	4.3	4.0	<0.2	5.6	2.10	2.20	0.05		23
	-60	SC	0.01	0.17	0.26	0.94	12.0	11.5	4.7	4.1	<0.2	2.4	1.00	-	0.04		20
	-120	C	0.01	0.20	0.39	0.61	12.0	10.1	4.6	4.1	<0.2	2.7	0.63	-	0.04		25
Phuket, Yellow Variant																	
12	0-12	SCL	0.01	0.37	0.38	0.52	16.0	8.0	4.4	3.7	0.2	3.7	3.90	2.10	0.01	11.0	22
	-80	SC	0.01	0.20	0.13	0.64	13.0	7.5	4.5	3.8	<0.2	2.3	2.10	2.80	0.01		22
	-120	C	0.01	0.17	0.25	0.26	15.0	4.6	4.7	3.8	<0.2	2.2	0.30	-	0.03		26

Pit No.	Depth cm	Text.	Exchangeable Cation				CEC meq/100g	Sat. (%)	pH		EC Avail. P (ppm)	Orga. Matter (%)	Exch. Al meq/100	SO4 meq/l	Lime Req. ton/ha	Hardness	
			Na	K	Ca	Mg			H2O 1:1	CaCl 1:2							
Phuket Series																	
13	0-7	SCL	0.01	0.17	0.76	0.54	11.0	13.5	4.9	4.0	0.4	8.0	5.20	0.74	0.76	7.5	18
	-31	C	0.01	0.07	0.38	0.26	13.0	5.5	4.6	3.8	<0.2	2.7	1.90	1.80	0.08		22
	-62	C	0.01	0.12	0.50	0.25	13.0	6.8	4.6	3.9	<0.2	2.4	0.98	-	0.10		24
	-120	C	0.01	0.12	0.38	0.26	12.0	6.4	4.5	3.9	<0.2	2.2	0.59	-	0.11		23
Ratchaburi Series																	
14	0-22	L	0.01	0.07	0.50	0.37	8.8	10.8	4.4	3.8	<0.2	3.7	2.10	1.40	0.03	11.4	18
	-41	CL	0.01	0.12	0.51	0.26	9.2	9.8	4.3	3.8	<0.2	2.4	1.10	1.90	0.11		22
	-62	CL	0.01	0.12	0.12	0.50	9.7	7.7	4.5	3.8	<0.2	4.3	0.72	-	0.10		23
	-120	C	0.01	0.17	0.63	0.25	12.0	8.8	4.7	3.8	<0.2	2.7	0.26	-	0.13		22
Huai Yod																	
15	0-28	SL	0.01	0.14	2.50	1.00	10.0	36.5	5.5	4.4	0.2	4.5	2.80	0.11	0.03	4.1	13
	-36	SC	0.01	0.12	2.70	1.10	19.0	20.7	5.3	4.0	<0.2	3.2	1.20	4.60	0.11		20
	-110	C	0.01	0.17	0.78	2.22	29.0	11.0	5.5	3.8	<0.2	2.1	0.68	-	0.10		20
Makham																	
16	0-21	L	0.01	0.09	0.50	0.12	5.3	13.6	4.8	4.0	0.3	6.4	1.00	0.63	0.01	5.0	16
	-28	CL	0.01	0.10	1.00	1.00	12.0	17.6	5.5	4.2	<0.2	3.1	0.50	0.64	0.13		16
	-100	C	0.01	0.10	1.10	1.50	15.0	18.1	5.3	4.2	<0.2	1.9	0.50	-	0.15		18
Phuket Series																	
17	0-18	SCL	0.01	0.54	4.20	1.40	13.0	47.3	5.6	4.8	0.3	4.7	2.60	0	0.23	1.5	15
	-33	CL	0.01	0.26	3.80	1.20	13.0	40.5	6.0	5.0	<0.2	7.0	1.60	0	0.11		19
	-76	CL	0.01	0.24	2.70	1.00	15.0	26.3	6.2	4.9	<0.2	3.3	1.10	-	0.13		20
	-120	SL	0.01	0.17	1.40	1.00	11.0	23.5	5.9	4.6	<0.2	5.9	0.43	-	0.13		13
Khlung Teng/Huai Yod/Phak Ka Association																	
18	0-8	CL,L	0.01	0.55	3.90	1.30	12.0	48.0	6.2	5.4	0.3	24.0	3.10	-	0.36	5.0	10
	-41	CL	0.01	0.34	0.13	0.75	12.0	10.3	5.2	4.0	<0.2	3.3	1.20	1.70	0.03		18
	-120	C	0.01	0.12	0.37	0.62	16.0	7.0	4.9	4.0	<0.2	3.4	0.37	-	0.15		22

D. 3. RESULTS OF SOIL ANALYSIS (Hand Auger Boring)

Depth cm	Text.	Exchangeable Cation				CEC meq/100g	Sat. (%)	pH		EC Avail. P (ppm)	Orga. Matter (%)	Exch. Al meq/100	SO ₄ meq/l	Lime Req. ton/ha		
		Na	K	Ca	Mg			1:1	1:2							
Cha Am Series																
1	0-10	SiL	0.80	0.52	1.90	5.60	27.0	32.6	4.0	3.9	1.4	7.9	6.10	0.43	30.00	28.4
	-40	SiL	0.93	0.46	2.50	6.00	20.0	37.0	3.7	3.6	1.0	3.0	5.90	0.53	35.00	
	-60	L	1.80	0.81	-	-	-	-	4.9	4.9	2.7	15.0	5.40	-	72.00	
Tha Chin Series																
2	0-15	SL	2.00	0.59	4.10	3.10	20.0	49.0	5.3	5.2	2.6	7.8	9.30	0	26.00	15.0
	-60	SL	-	0.66	5.50	5.50	44.0	-	3.7	3.6	3.5	5.2	23.00	1.80	188.00	
	-150	SL	-	0.83	5.90	5.10	47.0	-	3.6	3.5	4.7	8.2	22.00	-	208.00	
Sattahip Series																
3	0-15	SL	0.01	0.21	0.47	0.02	10.0	7.1	4.9	4.1	0.3	3.6	3.60	1.7	0.07	4.5
	-40	SCL	0.01	0.17	0.24	0.06	6.2	7.7	4.9	4.1	<0.2	1.0	1.10	1.5	0.04	
	-65	SL	0.01	0.16	0.29	0.08	8.3	6.5	4.7	3.9	<0.2	1.0	0.65	-	0.01	
	-110	SC	0.01	0.24	0.25	0.08	12.0	4.8	4.9	4.0	<0.2	1.8	0.35	-	0.24	
	-150	C	0.01	0.22	0.22	0.10	12.0	4.6	5.2	4.1	<0.2	0.2	0.34	-		
Lamphu La Series																
4	0-10	SCL	0.01	0.26	0.58	0.36	13.0	9.3	4.7	4.2	0.4	8.2	5.30	1.7	0.07	5.8
	-40	SC	0.01	0.17	0.32	0.22	12.0	6.0	4.8	4.2	<0.2	1.0	2.10	2.0	0.01	
	-70	SCL	0.01	0.12	0.21	0.08	10.0	4.2	5.0	4.2	<0.2	1.0	1.10	-	0.04	
	-130	SCL	0.01	0.09	0.26	0.12	11.0	4.4	5.2	4.4	<0.2	1.0	0.53	-	0.04	
5	0-8	CL	0.01	0.26	0.51	0.18	17.0	5.6	4.7	4.2	<0.2	11.0	5.10	1.7	0.22	6.7
	-60	C	0.01	0.12	0.18	0.18	16.0	3.1	5.1	4.3	<0.2	2.1	1.20	1.5	0.01	
	-110	C	0.01	0.24	0.12	0.12	17.0	2.9	5.2	4.4	<0.2	2.3	0.76	-	0.01	
	-150	C	0.01	0.24	0.14	0.12	15.0	3.4	5.7	4.4	<0.2	1.7	0.63	-	0.01	
Makham Series																
6	0-8	SCL	0.01	0.38	1.20	0.30	11.0	17.0	5.2	4.8	0.3	51.0	4.30	0	0.16	1.4
	-40	SCL	0.01	0.21	0.36	0.12	8.7	8.0	4.8	4.3	0.3	4.6	1.70	0.5	0.01	
	-75	SCL	0.01	0.14	0.40	0.14	8.2	8.4	4.9	4.4	<0.2	2.8	0.95	-	0.01	
	-150	SC	0.01	0.14	0.19	0.14	9.6	5.0	5.1	4.6	<0.2	0.9	0.34	-	0.01	
Sawi Series																
7	0-8	SL	0.01	0.16	0.27	0.13	7.9	7.2	4.5	4.1	0.3	5.2	3.00	0.8	0.11	3.0
	-35	SCL	0.01	0.09	0.28	0.08	7.1	6.5	4.6	4.2	<0.2	1.4	1.50	1.1	0.06	
	-90	SCL	0.01	0.09	0.13	0.19	8.3	3.5	4.9	4.2	<0.2	2.0	0.60	-	0.01	
	-150	SCL	0.01	0.09	0.13	0.06	9.8	3.7	4.8	4.1	<0.2	3.0	0.64	-	0.06	
Phuket Yellow Variant																
8	0-10	SL	0.01	0.14	0.17	0.12	7.0	6.3	4.5	4.2	<0.2	12.0	2.00	0.9	0.25	2.7
	-40	SCL	0.01	0.10	0.26	0.08	6.1	7.4	4.4	4.2	0.3	8.4	1.20	0.8	0.02	
	-60	SCL	0.01	0.12	0.16	0.08	5.6	6.6	4.8	4.5	<0.2	5.3	0.72	-	0.01	
	-120	SCL	0.01	0.09	0.24	0.10	6.5	6.8	5.0	4.4	<0.2	3.4	0.41	-	0.01	
9	0-10	SL	0.01	0.12	0.51	0.31	7.4	13.0	4.8	4.2	0.3	10.0	3.30	0.7	1.40	2.1
	-60	SC	0.01	0.07	0.14	0.10	11.0	2.9	5.0	4.3	<0.2	1.9	1.60	1.3	0.01	
	-85	SCL	0.01	0.02	0.16	0.10	7.4	3.9	4.7	4.3	<0.2	2.2	0.49	-	0.04	
	-150	SCL	0.01	0.07	0.15	0.10	7.1	4.6	5.3	4.4	<0.2	0.6	0.56	-	0.04	
10	0-10	SCL	0.01	0.12	0.66	0.17	10.0	9.6	5.2	4.6	0.3	8.3	4.20	0.4	0.02	5.2
	-30	SCL	0.01	0.07	0.24	0.12	8.9	4.9	5.0	4.3	<0.2	4.6	2.90	1.2	0.01	
	-90	SL	0.01	0.07	0.11	0.10	10.0	2.9	5.4	4.3	<0.2	2.3	1.10	-	0.01	
	-150	SCL	0.01	0.07	0.17	0.10	9.0	3.9	5.4	4.4	<0.2	1.3	0.76	-	0.01	
11	0-10	CL	0.01	0.46	2.50	0.90	24.0	16.0	5.4	4.9	0.4	7.8	6.70	0	0.01	4.5
	-40	C	0.01	0.22	1.20	0.40	18.0	10.0	5.1	4.3	0.3	4.6	3.80	1.2	0.06	
	-90	C	0.01	0.12	0.20	0.20	13.0	4.1	4.8	4.0	<0.2	0.8	0.64	-	0.01	
	-150	C	0.01	0.17	0.15	0.27	12.0	5.0	4.7	4.0	<0.2	0.2	0.31	-	0.01	
Phuket Series																
12	0-10	SCL	0.01	0.17	0.82	0.15	12.0	9.6	4.8	4.2	0.3	8.9	5.40	1.3	0.11	7.9
	-60	SCL	0.01	0.17	0.20	0.12	12.0	4.2	4.9	4.1	<0.2	7.1	4.80	1.9	0.11	
	-120	SC	0.01	0.12	0.08	0.10	7.9	3.9	4.9	4.1	<0.2	2.7	0.70	-	0.07	
	-150	SC	0.01	0.10	0.15	0.10	9.8	3.7	5.4	4.2	<0.2	2.8	0.74	-	0.02	
Chumphon Series																
13	0-10	SL	0.01	0.17	0.97	0.43	12.0	13.0	5.2	4.6	0.3	13.0	4.90	0.1	0.27	3.1
	-30	SL	0.01	0.09	0.11	0.16	6.6	5.6	5.1	4.3	0.2	3.0	2.50	0.6	0.09	
	-60	SL	0.01	0.10	0.16	0.20	6.8	6.9	5.4	4.4	<0.2	3.8	0.68	-	0.04	
	-	Hard Pan														

Depth cm	Text.	Exchangeable Cation				CEC meq/100g	Sat. (%)	pH		EC Avail. (ppm)	Orga. Matter (%)	Exch. Al meq/100	SO4 meq/l	Lime Req. ton/ha		
		Na	K	Ca	Mg			H2O 1:1	CaCl 1:2							
Huai Pong Series																
14	0-15	SCL	0.01	0.24	0.59	0.35	12.0	9.9	4.8	4.3	0.4	7.2	5.70	0.9	0.11	7.0
	-30	SC	0.01	0.09	0.21	0.14	11.0	4.1	4.5	4.2	0.3	2.4	3.10	1.4	0.02	
	-60	SCL	0.01	0.09	0.34	0.13	8.5	6.7	4.7	4.3	<0.2	3.2	1.20	-	0.01	
	-85	SC	0.01	0.09	0.16	0.02	12.0	2.3	4.9	4.3	<0.2	3.7	1.10	-	0.01	
	-125	SC	0.01	0.07	0.24	0.02	10.0	3.4	5.0	4.3	<0.2	2.7	1.10	-	0.04	
	-150	SC,C	0.01	0.07	0.26	0.12	10.0	4.6	5.3	4.3	<0.2	1.7	0.59	-	0.01	
15	0-8	SCL	0.01	0.22	1.40	0.20	13.0	14.0	4.7	4.2	0.3	28.0	6.60	1.0	0.31	7.2
	-60	CL	0.01	0.14	0.30	0.20	13.0	5.0	4.9	4.3	<0.2	3.0	1.80	1.7	0.04	
	-90	C	0.01	0.09	0.22	0.16	13.0	3.7	4.8	4.3	<0.2	2.2	1.30	-	0.02	
	-150	C	0.01	0.10	0.22	0.16	13.0	3.8	4.9	4.2	<0.2	1.4	0.77	-	0.04	
Ao Luk Series																
16	0-10	C	0.01	0.43	2.60	1.20	18.0	23.0	5.2	4.4	0.3	15.0	4.90	0	0.36	-
	-55	C	0.01	0.12	1.80	0.50	13.0	19.0	5.5	5.1	<0.2	11.0	2.10	0	0.01	
	-150	C	0.01	0.05	1.20	0.50	14.0	13.0	5.6	5.1	<0.2	7.6	0.51	-	0.02	

APPENDIX-E. LAND USE AND AGRICULTURE

APPENDIX-E LAND USE AND AGRICULTURE

LIST OF CONTENTS

E.1	EXISTING LAND USE BY TAMBON	E-1
E.2	CROP CONVERSION PLAN BY SUB-PROJECT	E-2
E.3	HORTICULTURE STATISTICS	E-3
E.4	PROPOSED AGRICULTURAL PRODUCTION BY SUB-PROJECT	E-10
E.5	AGRICULTURAL STATISTICS OF MAIN CROPS AT AMPHOE MAKHAM	E-11
E.6	FARMERS' INVESTIGATION - DURIAN, RAMBUTAN, MANGOSTEEN, RUBBER, and FEILD CROPS	E-12

APPENDIX E-1 EXISTING LAND USE BY TAMBON (Unit : ha)

Tambon	Paddy	Upland	Orchard	Rubber	Sub -Total	Idle Land	Swamp	Forest	Others	Total
Khlung Phlu	242.0	6874.3	1780.0	2119.4	11015.7	2332.3	56.0	16011.0	1015.0	30430.0
Takian Thong	318.1	671.2	1321.6	919.9	3230.8	729.2	-	7180.0	530.0	11670.0
Pluang	14.0	71.5	4086.6	2377.0	6549.1	1516.4	44.5	1110.0	1080.0	10300.0
Wang Saem	17.7	-	397.5	140.2	555.4	210.1	14.5	-	150.0	930.0
Tha Luang	4.8	-	227.5	189.4	421.7	909.2	89.1	-	80.0	1500.0
Salang	50.0	12.8	945.1	1326.6	2334.5	1898.7	116.8	150.0	230.0	4730.0
Tha Chang	-	8.0	90.1	128.6	226.7	33.3	-	-	10.0	270.0
THA MAI	-	218.3	2551.6	1165.6	3935.5	1964.5	-	1260.0	740.0	7900.0
SUB-TOTAL	646.6	7856.1	11400.0	8366.7	28269.4	9593.7	320.9	25711.0	3835.0	67730.0
NEA-1 (PUMP)	14.2	1.9	1278.7	269.9	1564.7	928.3	97.0	110.0	290.0	2990.0
NEA-2 (KING)	35.6	15.5	3416.8	776.2	4244.1	1316.6	9.3	6190.0	1070.0	12830.0
TOTAL	696.4	7873.5	16095.5	9412.8	34078.2	11838.6	427.2	32011.0	5195.0	83550.0

APPENDIX E-2 CROP CONVERSION PLAN BY SUB-PROJECT

Unit: ha

TAMON	PADDY		UPLAND		RUBBER		ORCHARD		TOTAL			
	(1) PREST	(2) UP-CR	(3) ORCHD	(4) PREST	(5) ORCHD	(6) 4-5	(7) PREST	(8) ORCHD		(9) 7-8	(10) PREST	(11) 10+3+5+8
Khlong San Sai Sub Project												
Khlong P.	42.0	8.4	-	207.1	62.0	145.0	72.5	-	72.5	286.5	348.6	608.1
Takian T.	-	-	-	16.4	6.6	9.8	-	-	-	250.6	257.2	267.0
Pluang	10.5	-	-	4.5	4.0	0.5	351.1	70.2	280.9	632.2	706.4	998.3
Wang Saem	17.7	-	3.0	-	-	-	140.2	28.0	112.2	397.5	428.5	555.4
Tha Luang	4.8	-	-	-	-	-	173.8	34.5	139.3	201.6	236.1	380.2
Salang	-	-	-	-	-	-	22.8	-	22.8	-	-	22.8
Sub Total	75.0	8.4	3.0	228.0	72.7	155.3	760.4	132.7	627.7	1,768.4	1,976.8	2,831.8
Khlong Ta Liu Sub Project												
Khlong P.	200.0	40.0	-	6,667.2	1,927.7	4,739.5	2,046.9	188.2	1,858.7	1,493.5	3,601.5	10,407.6
Takian T.	318.1	13.5	50.2	654.8	200.7	454.1	919.9	123.9	796.0	1,071.0	1,455.8	2,963.8
Pluang	3.5	-	-	67.0	20.1	46.9	2,025.9	405.1	1,620.8	3,454.4	3,879.6	5,550.8
Tha Luang	-	-	-	-	-	-	15.6	3.1	12.5	25.9	29.0	41.5
Salang	50.0	-	-	12.8	-	12.8	1,303.8	260.7	1,043.1	945.1	1,205.8	2,311.7
Tha Chang	-	-	-	8.0	-	8.0	128.6	25.7	102.9	90.1	115.8	226.7
Tha Mai	-	-	-	218.3	62.5	155.8	1,165.6	-	1,165.6	2,551.6	2,614.1	3,935.5
Sub Total	571.5	53.5	50.2	7,628.1	2,211.0	5,417.1	7,606.3	1,006.7	6,599.6	9,631.6	12,891.6	25,437.6
G. TOTAL	646.6	61.9	53.2	7,856.1	2,283.7	5,572.4	8,366.7	1,139.4	7,227.3	11,400.0	14,868.4	28,269.4

APPENDIX B. LAND USE AND AGRICULTURE

E. 3. HORTICULTURE STATISTICS, 1983/84-1986/87.

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks
Para Rubber	Whole Kingdom	1983/84	451,550	445,439	211,131	469	Old Variety
		Total	966,983	570,556	631,871	1,106	H.Y.V.
			1,418,533	1,015,995	843,002	830	
		1984/85	350,346	346,180	182,013	525	Old Variety
		Total	1,048,658	617,856	810,005	1,313	H.Y.V.
			1,399,004	964,036	992,018	1,029	
		1985/86	310,468	307,788	166,236	540	Old Variety
		Total	1,168,637	749,952	953,309	1,269	H.Y.V.
			1,479,105	1,057,740	1,119,545	1,058	
		1986/87	277,531	275,414	147,359	535	Old Variety
		Total	1,179,920	753,728	1,006,873	1,336	H.Y.V.
			1,457,451	1,029,142	1,154,232	1,125	
Average			343,705	176,685	514	Old Variety	
			673,023	850,515	1,264	H.Y.V.	

-continued-

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks
Para Rubber	Eastern Region	1983/84	25,541	24,754	13,923	563	Old Variety
		Total	152,123	87,364	97,889	1,119	H.Y.V.
		1984/85	177,664	112,118	111,812	997	
		Total	20,030	19,852	10,238	512	Old Variety
		1985/86	149,934	90,259	104,245	1,156	H.Y.V.
		Total	169,964	110,091	114,483	1,040	
		1986/87	7,008	6,840	3,975	581	Old Variety
		Total	165,856	97,375	105,345	1,082	H.Y.V.
		1986/87	172,864	104,215	109,320	1,049	
		Total	6,017	5,839	3,648	625	Old Variety
		Average	173,902	107,063	126,334	1,180	H.Y.V.
			179,919	112,902	129,982	1,805	
			14,316	7,946	555	Old Variety	
			95,515	108,453	1,135	H.Y.V.	

- continued -

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks		
Para Rubber	Chanthaburi	1983/84	16,168	16,168	9,095	563	Old Variety H.Y.V.		
		Total	41,593	28,999	30,811	1,063			
			57,761	45,167	39,906	884			
				1984/85	15,094	15,094	7,264	481	Old Variety H.Y.V.
		Total	44,467	30,072	31,388	1,043			
			59,561	45,166	38,652	856			
				1985/86	4,050	4,025	2,264	350	Old Variety H.Y.V.
		Total	55,511	33,453	28,226	844			
			59,561	37,478	30,490	814			
				1986/87	3,670	3,365	1,998	594	Old Variety H.Y.V.
		Total	60,019	37,246	41,902	1,125			
			63,689	40,611	43,900	1,719			
		Average		9,663	5,155	534	Old Variety H.Y.V.		
				32,443	33,082	1,020			

-continued-

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks
Durian	Whole Kingdom	1983/84	55,171	42,514	238,725	5,613	
		1984/85	57,427	45,376	335,498	7,394	
		1985/86	70,370	53,985	401,379	7,438	
		1986/87	76,169	55,095	532,806	9,672	
	Average		49,243	377,102	7,658		
	Eastern Region	1983/84	28,549	21,982	118,695	5,400	
		1984/85	28,987	23,290	210,863	9,054	
		1985/86	36,863	27,658	255,826	9,238	
		1986/87	41,614	29,687	292,721	9,863	
	Average		25,654	219,526	8,557		
Chanthaburi	1983/84	18,409	14,566	74,650	5,125		
	1984/85	19,724	17,111	151,862	8,875		
	1985/86	21,298	17,111	159,669	9,331		
	1986/87	25,752	18,995	154,336	8,125	Provincial data	
	1987/88	25,857	19,604	162,390	8,284	- ditto -	
Average		17,477	140,581	8,048			

- continued -

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks
Rambutan	Whole Kingdom	1983/84	61,693	48,832	429,846	8,800	
		1984/85	87,330	50,886	465,579	9,150	
		1985/86	67,640	52,716	478,398	9,075	
		1976/77	70,747	57,265	476,375	8,319	
		Average		52,425	462,550	8,823	
	Eastern Region	1983/84	23,887	19,094	174,131	9,119	
		1984/85	23,839	20,118	208,550	10,363	
		1985/86	31,816	22,240	221,012	9,938	
		1986/87	34,216	26,701	235,978	8,838	
		Average		22,038	209,918	9,525	
Chanthaburi	1983/84	17,052	13,977	135,398	9,688		
	1984/85	16,821	15,077	150,776	10,000		
	1985/86	23,584	16,424	169,372	10,313		
	1986/87	25,088	18,533	159,847	8,625	Provincial data	
	1987/88	25,128	19,839	173,630	8,752	- ditto -	
Average		16,770	157,805	9,410			

-continued-

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remark
Mangosteen	Whole Kingdom	1983/84	11,071	8,782	60,930	6,938	
		1984/85	11,549	9,278	61,889	6,669	
		1985/86	12,399	10,062	68,746	6,831	
		1986/87	13,508	9,853	64,562	6,550	
		Average		9,494	64,032	6,744	
	Eastern Region	1983/84	3,354	2,367	15,376	6,494	
		1984/85	3,505	2,717	21,278	7,831	
		1985/86	3,844	3,054	22,817	7,469	
		1986/87	4,420	3,113	23,797	7,644	
		Average		2,813	20,817	7,400	
	Chanthaburi	1983/84	2,460	1,704	11,928	7,000	
		1984/85	2,507	2,008	16,943	8,438	
		1985/86	2,436	2,023	16,435	8,125	
1986/87		2,432	2,058	16,725	8,125	Provincial data	
1987/88		2,500	2,023	17,066	8,438	- ditto -	
	Average		1,963	15,819	8,059		

-continued-

Crops	Location	Year	Planted A ha	Harvested A ha	Production t	Yield kg/ha	Remarks
Cassava	Whole Kingdom	1985	1,476,818	1,376,485	19,262,639	13,994	
		1986	1,239,663	1,204,540	15,254,850	12,663	
		1987	1,411,193	1,370,668	19,554,133	14,269	
		1988	1,580,697	1,546,808	22,306,999	14,419	
	Average Chanthaburi	1985	39,041	38,833	538,772	13,875	
		1986	22,465	22,216	296,152	13,331	
		1987	26,775	26,043	387,590	14,881	
		1988	37,480	37,422	580,035	15,500	
	Average		31,440	31,129	450,637	14,476	

-end-

TABLE E.4 PROPOSED AGRICULTURAL PRODUCTION BY SUB-PROJECT

	Target Yield (t/ha)	Existing Plant		New Plant		Total	
		Area (ha)	Production (t)	Area (ha)	Production (t)	Area (ha)	Production (t)
Khlong Ta Liu - Rambutan	16.2	5,150.9	83,445	1,821.7	29,512	6,972.6	112,957
- Durian	13.2	3,267.1	42,126	1,143.7	15,097	4,410.8	58,223
- Mangosteen	17.3	933.4	16,148	326.8	5,654	1,260.2	21,801
Sub-total	-	9,351.4	141,719	3,292.2	50,263	12,643.6	192,981
- Groundnuts	1.9	-	-	21.4	41	21.4	41
- Soybean	1.9	-	-	21.4	41	21.4	41
- Vegetables	15.0	-	-	10.7	161	10.7	161
Sub-total	-	-	-	53.5	243	53.5	243
TOTAL	-	9,351.4	141,719	3,345.7	50,506	12,697.1	193,224
Khlong San Sai - Rambutan	16.2	1,122.4	18,183	101.3	1,641	1,223.7	19,824
- Durian	13.2	714.2	9,427	64.4	850	778.6	10,277
- Mangosteen	17.3	204.1	3,531	18.4	318	222.5	3,849
Sub-total	-	2,040.7	31,141	184.1	2,809	2,224.8	33,950
- Groundnuts	1.9	-	-	3.4	6	3.4	6
- Soybean	1.9	-	-	3.3	6	3.3	6
- Vegetables	15.0	-	-	1.7	26	1.7	26
Sub-total	-	-	-	8.4	38	8.4	38
TOTAL	-	2,040.7	114,695	192.5	2,847	2,233.2	33,988
GRAND TOTAL	-	11,392.1	198,140	3,538.2	53,353	14,930.3	227,212

APPENDIX E.5 AGRICULTURAL STATISTICS OF MAIN CROPS AT AMPHOE MAKHAM

Year	Rambutan		Durian		Mangosteen		Para Rubber		Cassava	
	Area ha	Yield kg/ha	Area ha	Yield kg/ha	Area ha	Yield kg/ha	Area ha	Yield kg/ha	Area	Yield
1985	8,261	12,586	4,500	9,375	250	7,500	8,484	1,375	1,754	13,750
1986	7,264	12,500	4,440	9,375	434	9,375	10,448	1,250	2,480	12,500
1987	7,595	12,500	3,899	9,300	615	7,500	11,035	1,250	3,499	15,625
Average	7,707	12,500	4,308	9,350	433	8,125	9,989	1,292	2,578	13,958

Source : Amphoe Makham Agri. Extension Office

APPENDIX E.6. FARMERS' INVESTIGATION --- DURIAN

No.	Tree Ages	Plant Distance	Fertilizer (kg/tree) Chemical	Orga. M.	Pesticide (l/ha, time)	Weeding (l/ha, time)	Irrigation (interval, day)	Water Source	Others	Yield (kg/tree)
1.	1	10x10m	15-15-15 0.2 kg	dried grass hopper 0.5 kg	5 l/ha x 2	M x 7 H 5 l x 1	Spri.	Stream		-
2.	2	10x10m	15-15-15 0.2kg x 3	dung 5kg x 9	1.88 l x 3	H 6.5 l x 2	Spri. 7 Hose 7	Well	Pruning 2 times	-
3.	3	Mix		1 kg		Man. x 7 H 6.5 l x 2	Spri. 5-7	Pond (shortage)	Pruning 1 time	-
4.	4	12x6m Mix Mangosteen	15-15-15 0.5 kg	dung 0.5 kg		M. x 2	Spri. 4	Pond		-
5.	5	10x10m	15-15-15 1 kg	dung 4 kg	2 l x 4	H 2 l x 2 Man. x 2	Spri. 5-7	River Well	Pruning 1 time	-
6.	5	10x10m	16-16-16 1 kg 8-24-24 1 kg		2.8 l x 12	M x 3 H 2.8 l x 2	Spri. 4	River - Pond		11.1 kg
7.	6	8x8m	13-0-46 2 kg Urea 0.5kg	1 kg	3.3 kg x 1	Man. x 7 H 6.5 l x 2	Spri. 5-7	Pond (shortage)	Pruning 1 time Hormone 1 cc/tree	

M: Mower H: Herbicide Spr.: Sprinkler

(continued)

--- DURIAN ---

<u>No.</u>	<u>Tree Ages</u>	<u>Plant Distance</u>	<u>Fertilizer (kg/tree)</u> <u>Chemical</u> <u>Orga. M.</u>	<u>Pesticide</u> <u>(l/ha, time)</u>	<u>Weeding</u> <u>(l/ha, time)</u>	<u>Irrigation</u> <u>(interval, day)</u>	<u>Water Source</u>	<u>Others</u>	<u>Yield</u> <u>(kg/tree)</u>
8.	8	10x10m	15-15-15 2 kg 12-24-12 2 kg	2.1 1 x 4	H 2.1 1 x 2 Man. x 2	Spri. 7	Pond (Shortage)	Pruning 1 time	Chani 100 kg. Monthong 50 kg
9.	8	10x10m	16-16-16 2 kg x 2 9-24-24 2 kg	4.4 1 x 12	M. x 5 H. 6.3 1 x 3	Spri. Hose	River	Pruning 2 times	Chani 160 kg Monthong 100 kg
10.	15	12x12m	15-15-15 1.5 kg Caster Bean Cake, 5 kg	6.25 1 x 24	M x 3 H x 1	Spri.	Stream	Pruning 3 times	Chani 300 kg.

M: Mower H: Herbicide Spri.: Sprinkler

(continued)

--- RAMBUTAN ---

No.	Tree Ages	Plant Distance	Fertilizer (kg/tree) Chemical Orga. M.	Pesticide (1/ha, time)	Weeding (1/ha, time)	Irrigation (interval, day)	Water Source	Others	Yield (kg/tree)
11.	2	8x8m	16-16-16 1.5 - 3.0kg 7-24-24 2 - 4 kg	2.5 1 x 2	H x 2 Man x 2	Spri. 3	River	Sandy loam	
12.	5	Mix	13-0-46 1.5 kg 0-46-0 0.5 kg Urea 0.5kg	4.5 kg 3.3kg x 1	H 6.25 1 x 2 Man x 6	Hose 7	Pond (shortage)		35.3kg.
13.	8	10x10m	15-15-15 2 kg x 1 3 kg x 1	6.25 1 x 6	H 4.2 1 x 1	Spri. 7	Stream		104 kg.
14.	10	12x12m	15-15-15 1.5 kg Caster Bean Cake, 5 kg	6.25 1 x 24	M x 3 H x 1	Spri. 7 Hose 7	Stream		450 kg.
15.	10	10x10m	15-15-15 2 kg. 12-24-12 2 kg.	2.1 1 x 4	H 2.1 1 x 2 Man x 2	Spri. 7	Stream (shortage)	Pruning	100 kg.
16.	10		15-15-15 3 kg x 2	6.25 1 x 4	H 7.5 1 x 1 M x 2	Spri. 4	Pond		
17.	15	Mix	15-15-15 2.5 kg 9-24-24 2.5 kg	1.25 1 x 1	6.25 1 x 2	Spri. 7	Pond	Pruning 2 times	120 kg.

M: Mower H: Herbicide Spr.: Sprinkler

--- MANGOSTEEN ---

No.	Tree Ages	Plant Distance	Fertilizer (kg/tree) Chemical	Orga. M.	Pesticide (1/ha, time)	Weeding (1/ha, time)	Irrigation (interval, day)	Water Source	Others	Yield (kg/tree)
18.	2	8x8m	15-15-15 0.6 kg	dung 4kg x 2	4.4 1 x 24	M x 2	Hose 7	River		-
19.	4	Mix		dung, 2kg		M x 2	Spri. 2-4	Pond		-
20.	7	Mix	15-15-15 1 kg 9-24-24 1 kg		2 1 x 2	H x 2	Spri. 7	Pond 1 Well 2		2 t/ha.
21.	8	Mix	15-15-15 3 kg	dung 10-15kg	2.1 1 x 3	H 4.2 1 x 2	Spri. 3-7	River		50 kg
22.	10	Mix	15-15-15 3 kg	dung 2 kg	0.63 1 x 5	M x 3	Spri. 3-5	Pond 3		
23.	20 -	10x10m	15-15-15 3 kg x 2	dung 10 kg	1.7 1 x 3	H 2 1 x 2 M x 2	Hose 7 Spr. 7	Pond 6		210 kg

M: Mower H: Herbicide Spr.: Sprinkler

(continued)

--- RUBBER ---

No.	Tree Ages	Plant Distance	Fertilizer (kg/tree) Chemical Orga. N.	Pesticide (l/ha, time)	Weeding (l/ha, time)	Others	Yield
24.	1	8x2.5m	15-15-15 0.2kg x 1			Planting, 5 men x 2 days Inter-crop for cassava.	
25.	1	8x3m	18-10-6 31 kg/ha x 2	1.7 t/ha	by hand x 1		
26.	3	8x3m	15-15-15 0.4 kg x 2		Mower x 2		
27.	4	6x4m	16-16-16 0.2 kg x 1		Mower x 3 2.8 l x 1		
28.	4	8x3m	15-15-15 0.5 kg x 2		by hand x 2		
29.	6	8x3m	15-15-15 0.5kg x 2		by hand x 1	Harvest time - Nov, Dec, Jan, mid. of March, Apr - 4.5 mos.	316kg/ha

M: Mower H: Herbicide Spri.: Sprinkler

---- FIELD CROPS ----

Sample No.	Crops	Transplant. Season	Variety	Planting Distance	Fertilizer	Pesticide (time)	Weeding (time)	Harvest Season	Others	Yield (kg/ha)
30	Paddy	July	Local V.	0.3x0.3m	16-20-0 250kg/ha	-	-	Nov.	Threshing- by tiller - by hand Plowing - by tractor	1,250
31	-do-	June	Local V.	0.3x0.3m	-	-	-	Nov.	Threshing - by hand Winnow - by hand	1,042
32	-do-	July	-do-	-	15-15-15 156kg/ha	0.3 1 x 2	-	Nov.	Plowing - tiller Threshing - by hand Winnow - by hand	938
33	Cassava	March	-do-	1x1 m	-	-	hand x 1	Nov.	continuous cropping	2,500
34	-do-	Feb.	-do-	1x1 m	-	-	-	Nov.	-do-	3,000
35	-do-	Feb.	-do-	1x1 m	-	10.4 1 x 1	hand x 1 herbicide 10.4 1 x 1	Nov-Dec.	-do-	7,080
36	-do-	Mar.	-do-	-	-	-	herbicide 5.2 1 x 3	Nov.-Dec.	-do-	7,300
37	-do-	Mar.	-do-	-	-	-	herbicide x 1 hand x 1	Nov-Dec.	-do-	14,000
38	Cassava	Mar.	Local V.	1x1 m	-	-	herbicide 6.25 1 x 1	Jan.	-	20,000

(continued - Field Crops)

<u>Sample No.</u>	<u>Crops</u>	<u>Transplant. Season</u>	<u>Variety</u>	<u>Planting Distance</u>	<u>Fertilizer</u>	<u>Pesticide (time)</u>	<u>Weeding (time)</u>	<u>Harvest Season</u>	<u>Others</u>	<u>Yield (kg/ha)</u>
39	-do-	Mar.	-do-	1x1 m	-	-	herbicide 3.1 1 x 2	Dec.	contract Plowing, Planting herbicide, harvest	19,375
40	-do-	Feb.	-do-	1x1 m	-	-	herbicide 5.25 1 x 2	Dec.		11,250
41	-do-	Feb.	-do-	-	-	-	hand x 1 herbicide x 1 cattle x 2	Dec.	plowing tractor 2 times	24,000
42	-do-	Feb.	-do-	-	15-15-15 125 kg/ha	-	hand x 1 herbicide x 1 cattle x 1	Dec.		12,500

APPENDIX-F. IRRIGATION AND DRAINAGE

APPENDIX-F IRRIGATION AND DRAINAGE

LIST OF CONTENTS

F.1	Irrigation Water Application in the Field	
F.1.1	Irrigation Water Application for Durian	F-1
F.1.2	Irrigation Water Application for Rambutan	F-2
F.1.3	Summary of Interview Survey	F-3
F.1.4	Layout Map of Sprinkler and Intake-Rate Test Field	F-6
F.1.5	Result of Sprinkler Test	F-7
F.1.6	Result of Intake-Rate Test	F-9
F.2	Crop Water Requirement	
F.2.1	Kc Value Developed for Upland Crop	F-10
F.2.2	Crop Water Requirement by Various Methods	F-11
F.2.3	Justification of Crop Water Requirement	F-12
F.3	Land Use and Crop Conversion Plan	
F.3.1	Existing Land Use by Irrigation Block	F-13
F.3.2	Crop Conversion Plan by Irrigation Block	F-15
F.4	Farmpond Capacity	
F.4.1	Farmpond Capacity in Sample Survey Area-2	F-17
F.4.2	Farmpond Capacity in Sample Survey Area-3	F-18

F.1 IRRIGATION WATER APPLICATION IN THE FIELD

F.1.1 Irrigation Water Application for Durian

(Unit = liter/day/tree)

SITE NO.	IRRIGATED FROM	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	TOTAL	
1	RIVER/TRIBUTARY	-	70	70	300	300	300	300	mm/ season	
2	-do-	-	70	70	100	100	100	100		
3	-do-	-	-	60	60	80	80	80		
4	PONDS	-	-	60	60	90	90	90		
5	-do-	-	140	140	140	140	140	-		
6	RIVER/TRIBUTARY	-	40	40	140	140	140	140		
7	-do-	-	170	170	170	170	170	-		
9	-do-	-	60	60	120	120	120	120		
10	PONDS	-	90	90	90	90	90	90		
11	-do-	-	90	90	90	90	90	90		
12	-do-	-	120	120	90	90	90	90		
13	RIVER/TRIBUTARY	-	120	120	120	240	240	240		
15	-do-	-	140	140	240	240	240	240		
16	-do-	-	110	110	160	160	200	200		
17	PONDS	-	70	70	70	70	70	70		
18	-do-	-	100	190	190	370	370	190		
19	-do-	-	70	70	70	70	70	70		
20	-do-	-	120	120	120	120	120	120		
21	RIVER/TRIBUTARY	-	120	120	120	120	120	120		
22	-do-	-	150	150	200	200	250	250		
24	-do-	-	110	110	160	160	200	200		
25	PONDS	70	70	70	70	70	70	70		
26	-do-	100	100	230	230	100	100	100		
27	-do-	-	70	100	180	180	180	-		
28	-do-	170	170	170	170	170	170	170		
29	-do-	100	100	180	180	100	100	-		
30	RIVER/TRIBUTARY	50	50	60	120	180	180	-		
31	-do-	90	90	150	150	90	90	-		
32	-do-	60	60	300	300	300	80	80		
33	PONDS	-	-	80	80	80	80	-		
34	-do-	-	-	100	100	100	100	100		
35	RIVER/TRIBUTARY	-	-	140	140	140	140	-		
36	-do-	-	-	150	150	150	150	150		
37	PONDS	-	-	140	140	140	140	140		
38	RIVER/TRIBUTARY	-	-	250	250	20	250	250		
39	PONDS	-	60	80	60	120	120	-		
40	-do-	-	75	100	60	90	100	90		
41	RIVER/TRIBUTARY	-	150	150	200	200	200	120		
42	PONDS	-	-	50	100	100	100	-		
43	-do-	-	-	40	40	40	100	100		
44	-do-	-	50	70	100	100	50	-		
45	RIVER/TRIBUTARY	-	-	250	250	250	250	250		
46	PONDS	-	90	100	150	185	300	-		
AVE. : RIVERS/TRIBUTARIES		70	110	140	180	180	180	180		314.5
AVE. : PONDS		110	100	110	120	120	130	110		242.0
ARITHMATIC MEAN		90	100	120	140	150	150	140		269.3

Notes: (1) One tree occupies 10m x 10m = 100 sqm, or 16 trees per rai.
 (2) Irrigation interval 3 to 7 days.

F.1.2 Irrigation Water Application for Rambutan

(Unit = liter/day/tree)

SITE NO.	IRRIGATED FROM	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	TOTAL
1	RIVER/TRIBUTARY	-	70	70	300	300	300	300	mm/ season
2	-do-	-	70	70	100	100	100	100	
3	-do-	-	-	-	90	120	120	120	
4	PONDS	-	-	60	110	110	110	110	
5	-do-	-	90	90	90	200	200	-	
6	RIVER/TRIBUTARY	-	-	120	120	240	240	240	
7	-do-	-	120	120	120	120	120	-	
8									
9	-do-	-	60	60	120	120	120	120	
10	PONDS	-	90	90	90	90	90	90	
11	-do-	-	90	90	90	90	90	90	
12	-do-	-	120	120	90	90	90	90	
13	RIVER/TRIBUTARY	-	120	120	120	240	240	240	
14									
15	-do-	-	140	140	240	240	240	240	
16	-do-	-	110	110	160	160	200	200	
17	PONDS	-	70	70	70	70	70	70	
18	-do-	-	100	190	190	370	370	190	
19	-do-	-	70	70	70	70	70	70	
20	-do-	-	120	120	120	120	120	120	
21	RIVER/TRIBUTARY	-	120	120	120	120	120	120	
22	-do-	-	150	150	200	200	250	250	
23									
24	-do-	-	110	110	160	160	200	200	
25	PONDS	70	70	70	70	70	70	70	
26	-do-	100	100	230	230	100	100	100	
27	-do-	-	70	100	180	180	180	-	
28	-do-	170	170	170	170	170	170	170	
29	-do-	100	100	180	180	100	100	-	
30	RIVER/TRIBUTARY	50	50	60	120	180	180	-	
31	-do-	90	90	150	150	90	90	-	
32	-do-	60	60	300	300	300	80	80	
33	PONDS	-	-	80	80	80	80	-	
34	-do-	-	-	100	100	100	100	100	
35	RIVER/TRIBUTARY	-	-	140	140	140	140	-	
36	-do-	-	-	150	150	150	150	150	
37	PONDS	-	-	140	140	140	140	140	
38	RIVER/TRIBUTARY								
39	PONDS	-	-	75	80	100	100	-	
40	-do-	-	-	50	80	100	100	90	
41	RIVER/TRIBUTARY	-	140	140	300	200	140	130	
42	PONDS	-	-	70	70	100	100	-	
43	-do-	-	-	40	40	40	100	100	
44	-do-	-	-	100	100	100	70	-	
45	RIVER/TRIBUTARY								
46	PONDS	-	200	200	200	200	200	-	
AVE. : RIVERS/TRIBUTARIES		70	110	130	170	180	170	180	305.6
AVE. : PONDS		110	110	120	120	130	120	110	248.3
ARITHMATIC MEAN		90	100	120	140	150	140	140	266.3

Notes: (1) One tree occupies 10m x 10m = 100 sqm, or 16 trees per rai.
 (2) Irrigation interval 3 to 7 days.

F.1.3 Summary of Interview Survey

Month	11	12	1	2	3	4	5	WATER SOURCE	IRRIGATION	FARMING SIZE	REMARKS
1. T.Chaman(1)		500 7	500 7	1500 5	1500 5	1500 5	1500 5	Tributary	Sprinkler	35 rai	
2. T.Chaman(2)		500 7	500 7	500 5	500 5	500 5	500 5	Tributary + Shallow Well (Dec. to Mar.)	Hose		
3. T.Wang Seem(1)			400 7	400 7	400 5	400 5	400 5	-do-	Hose		
4. T.Wang Seem(2)			400 7	400 7	800 7	800 7	800 7	Shallow Well(d=8m)	Hose	27 rai	
5. T.Angkiri(1)		1000 7	1000 7	1000 7	1000 7	1000 7	1000 7	Pond 50m x 30m x (4-6m) x 7 =52500cu.m	Sprinkler	50 rai	1000/7 x (31x3+28+30) x50rai x16trees = 17257cu.m * 17257/52500=0.33times * 52500/50=1050cum/rai
6. T.Angkiri(2)		600 15	600 15	1000 7	1000 7	1000 7	1000 7	Tributary	Basin(50%) Sprinkler (50%)	390 rai	
7. T.Angkiri(3)		1000 6	1000 6	1000 6	1000 6	1000 6	1000 6	Tributary	Sprinkler	176 rai	
8. T.Tha Luang(1)	1hr 7	1hr 1	2hr 1	1hr 1	1hr 1	1hr 1	3hr 7	Pond 20m x 60m x 2.5m =3000cu.m	Sprinkler	35 rai	
9. T.Tha Luang(2)		300 5	300 5	600 5	600 5	600 5	600 5	Natural Pond	Sprinkler	39 rai	

Summary of Interview Survey (continued)

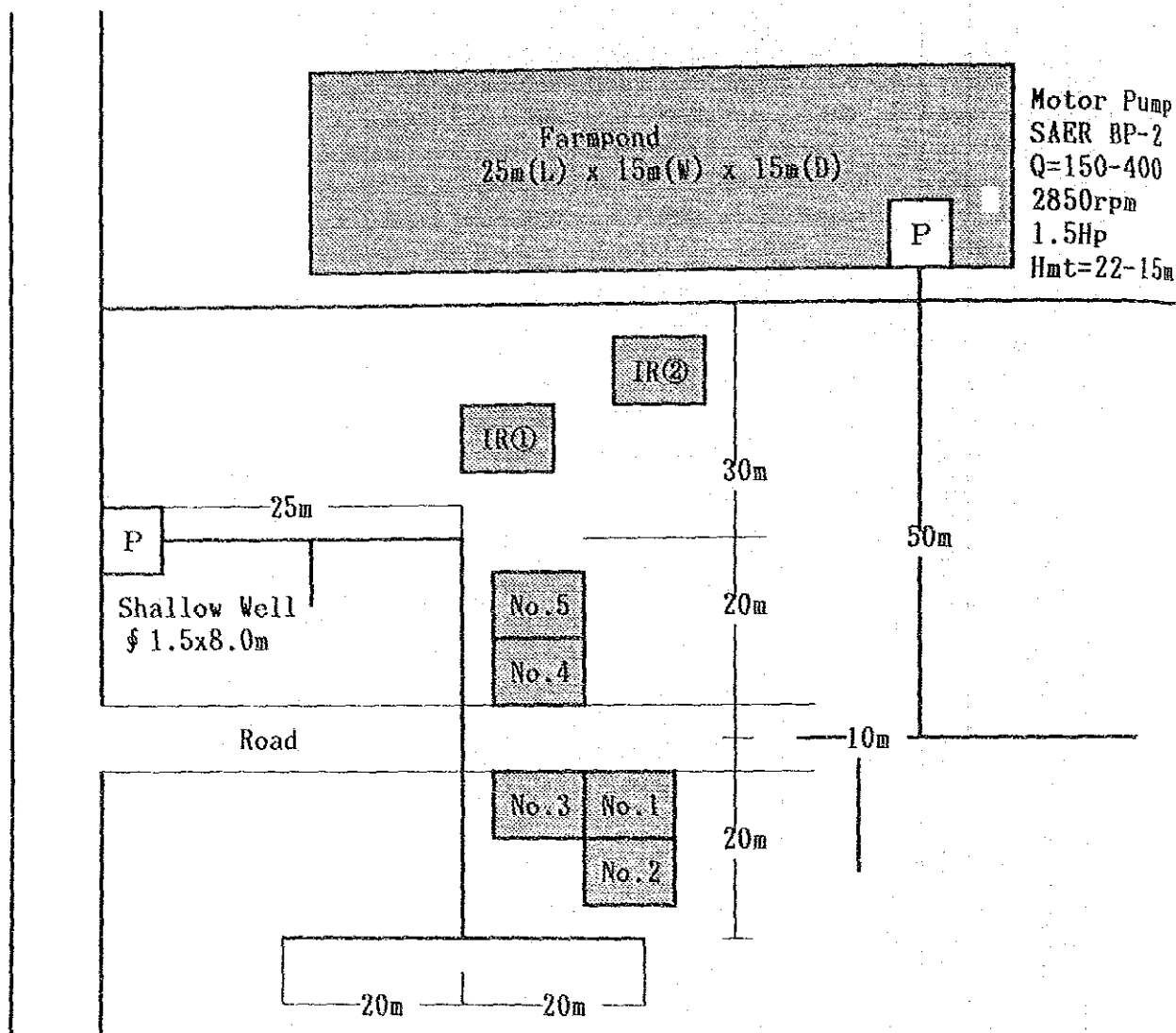
Month	11	12	1	2	3	4	5	WATER SOURCE	IRRIGATION	FARMING SIZE	REMARKS
10. T. Tha Luang (3)	600 7	600 7	600 7	600 7	600 7	600 7	600 7	Pond 40m x 30m x 4m = 4800cu.m	Sprinkler	25 rai	600/7x(31x4+28+30)x25x16=6240cu.m * 6240/4800=1.3 * 4800/24=192
11. T. Makham (1)	600 7	600 7	600 7	600 7	600 7	600 7	600 7	Pond 40m x 30m x 4.5m = 5400	Sprinkler	24 rai	600/7x(31x4+28+30)x24x16=5990cu.m * 5990/5400=1.1 * 5400/24=225
12. T. Makham (2)	600 5	600 5	600 5	600 5	600 5	600 5	600 5	Pond 40m x 70m x 6m = 5600cu.m	Sprinkler	25 rai	(600/5(31x2)+600/7(28+31x2+30))x25 x16=7090: 1.3times and 224cum/rai
13. T. Chanar (3)	600 5	600 5	600 5	600 5	600 5	600 5	600 5	Chanthaburi River	Hose	10 rai	
14. T. Wang Saem (3)								Shallow Well 8m depth x 2		4 rai	
15. T. Wang Saem (4)	720 5 720 2	720 5 720 2	720 3 720 2	720 3 720 2	720 3 720 2	720 3 720 2	720 3 720 2	Chanthaburi River + Shallow Well (12m depth)	Sprinkler	100 rai (including rubber)	
16. T. Pluang (1)	800 7	800 7	800 5	800 5	800 5	800 4	800 4	Tributary + Pond (6m x 40m x 4m x 3)	Hose	46 rai	
17. T. Salang (1)	500 7	500 7	500 7	500 7	500 7	500 7	500 7	Shallow Well (8m depth)	Sprinkler	5 rai	Rambutan only
18. T. Pluang (2)	280 5	280 5	560 5	560 5	1100 5	1100 5	560 5	Pond 50m x 30m x 4m = 6000cu.m	Sprinkler	80 rai	(280/3x31+560/3(31x3)+1100/3(31+30)) x80x16=38615: 9.8times and 75cum/rai
19. T. Pluang (3)	360 5	360 5	360 5	360 5	360 5	360 5	360 5	Pond 50m x 30m x 4m = 6000cu.m	Sprinkler	24 rai	360/5x(31x4+28+30)x24x16=5032cu.m * 5032/6000=0.8 * 6000/24=250
20. T. Takian Thong (1)	600 5	600 5	600 5	600 5	600 5	600 5	600 5	Pond 10m x 40m x 6m x 2=4800cum	Hose	30 rai	600/5x(31x4+28+30)x30x16=10483 * 10483/4800=2.2 * 4800/30=160
21. T. Takian Thong (2)	600 5	600 5	600 5	600 5	600 5	600 5	600 5	Chanthaburi River	Hose	24 rai	
22. T. Takian Thong (3)	450 3	450 3	600 3	600 3	600 3	750 3	750 3	Tributary	Hose	20rai	

Summary of Interview Survey (continued)

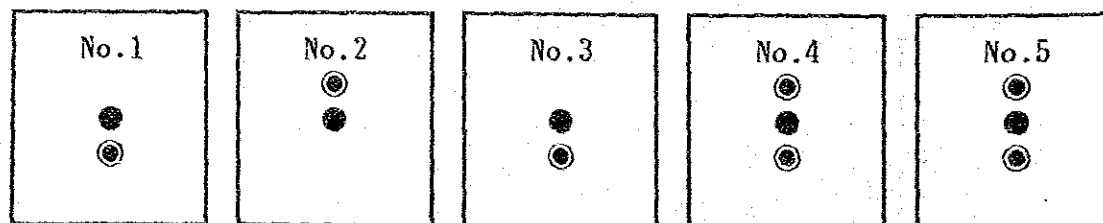
Month	11	12	1	2	3	4	5	WATER SOURCE	IRRIGATION	FARMING SIZE	REMARKS
23. T. Khlong Phlu	10m 7	10m 7	10m 7	10m 7	10m 7	10m 7	10m 7	Tributary	Hose	82 rai	
24. T. Takian Thong (4)	800 7	800 7	800 7	800 5	800 5	800 4	800 4	Tributary	Hose	12 rai	
25. T. Salang (2)	360 5	360 5	360 5	360 5	360 5	360 5	360 5	Pond 15m x 20m x 5m x 2 = 3000	Sprinkler	35 rai	$360/5 \times (31 \times 4 + 28 + 30 \times 2) \times 35 \times 16 = 8548 \text{ cu. m}$ * 8548/3000=2.8 * 3000/35=86
26. T. Khao Wang (A. Tha Mai)	700 7	900 4	900 4	900 4	700 7	700 7	700 7	Pond 12m x 5m x 10m x 2 = 1200	Hose	26 rai	$(700/7(31+30)+800/4(31+28)+700/7(31 \times 2+30)) \times 25 \times 16 = 11887$: 9.9 and 46
27. T. Khao Yai Sri (1) (T. Tha Mai)	500 7	900 7	900 7	900 5	900 5	900 5	900 5	Pond 18m x 6m x 6m = 650 cu. m	Hose	7 rai	$(500/7 \times 31 + 700/7 \times 31 + 900/5(28+31+30)) \times 7 \times 16 = 2389$: 3.7 times and 93 cu. m/rai
28. T. Khao Yai Sri (2) (T. Tha Mai)	500 3	500 3	500 3	500 3	500 3	500 3	500 3	Pond 20m x 20m x 6m x 2 = 4800	Sprinkler Hose	70 rai	$170(1) \times (31 \times 4 + 30 \times 2 + 28) \times 70 \times 16 = 40365$ * 40365/4800=8.4 * 4800/70=69
29. T. Pluang (4)	500 5	900 5	900 5	900 5	500 5	500 5	500 5	Pond 10m x 30m x 7m = 2100 cu. m	Hose	30 rai	$(500/5(30+31)+900/5(31+28)+500/5(31+30)) \times 30 \times 16 = 10954$: 5.2 and 70
30. T. Pluang (5)	180 4	180 4	180 3	360 3	360 2	360 2	360 2	Khlong Thalu	Sprinkler	70 rai	
31. T. Pluang (6)	360 4	360 4	600 4	600 4	600 4	360 4	360 4	Chanthaburi River	Hose	50 rai	
32. T. Pluang (7)	300 5	300 5	600 2	600 2	600 2	300 4	300 4	Chanthaburi River	Sprinkler	200 rai	
AVERAGE											* 135 cu. m/rai = 850 cu. m/ha 1/

Note: excluding no. 5 farm.

F.1.4 Layout Map of Sprinkler and Intake-Rate Test Field



- Remarks: (1) Location = Mr. Leuchai Hoonsiri's Orchard, Amphoe Tha Mai.
 (2) Pump Installed in a shallow well has the same dimension as given for the pump at the pond.
 (3) IR stands for the intake-rate test field (No.1 & No.2).
 (4) Arrangement of sprinkler as follows;



(●:Fruit Tree ⊙:Sprinkler)

F.1.5 Result of Sprinkler Test

(1) TEST-1

-	-	-	-	-	-	-	-	-	-	1m
-	-	-	1	-	-	-	-	-	-	1m
-	-	-	4	T	-	-	-	-	-	1m
-	T	1	23	5	2	4	-	-	-	1m
1	1	17	36	1	12	2	-	-	-	1m
-	3	29	17	66	3	2	-	-	-	1m
-	T	12	19	57	10	-	-	-	-	1m
-	-	13	15	11	T	-	-	-	-	1m
-	-	-	1	1	-	-	-	-	-	1m
-	-	-	-	-	-	-	-	-	-	1m
-	-	-	-	-	-	-	-	-	-	1m
-	-	-	-	-	-	-	-	-	-	1m
1m	1m	1m	1m	1m	1m	1m	1m	1m	1m	

Application Rate = $369\text{mm}\cdot\text{sqm}/29\text{sqm/hr}$
 = $12.72\text{mm/hr}=369\text{li/hr}$

(2) TEST-2

(unit: mm)

-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	T	1	-	-	-	-	-
-	-	1	4	7	9	-	-	-	-	-
-	1	5	6	x	6	4	5	-	-	-
-	1	4	5	48	8	6	7	-	-	-
-	-	4	T	7	9	9	6	-	-	-
-	-	-	4	5	9	6	1	-	-	-
-	-	-	1	7	7	2	-	-	-	-
-	-	-	-	T	T	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Application Rate = $214\text{mm}\cdot\text{sqm}/33\text{sqm/hr}$
 = $6.48\text{mm/hr}=214\text{li/hr}$

(3) TEST-3

-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
2	2	1	1	13	-	-	14	-	-
-	15	7	48	15	-	5	12	-	-
8	10	12	12	23	8	12	3	-	-
2	13	29	16	57	-	3	-	-	-
-	4	8	15	13	15	3	T	-	-
-	27	5	50	10	5	4	5	-	-
-	1	4	15	15	2	11	2	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Application Rate = $557\text{mm}\cdot\text{sqm}/46\text{sqm/hr}$
 = $12.11\text{mm/hr}=557\text{li/hr}$

(4) TEST-4

-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	T	20	42	48	30	3	-	-
-	20	59	38	61	36	2	28	1	-
-	28	33	15	70	25	60	T	-	-
14	65	32	21	4	16	30	13	2	-
T	2	61	40	1/	2/	68	9	10	-
-	-	3	9	23	1	3	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Application Rate = $1288\text{mm}\cdot\text{sqm}/41\text{sqm/hr}$
 = $31.41\text{mm/hr}=1288\text{li/hr}$

Note: 1/=134mm, 2/=109mm

(5) TEST-5

-	-	-	-	-	-	-	-	-	-	1m
-	-	-	-	-	-	-	-	-	-	1m
-	-	-	2	3	1	-	-	-	-	1m
-	-	7	13	10	7	17	1	-	-	1m
-	4	13	14	9	14	13	10	3	-	1m
2	9	11	15	23	11	10	10	-	-	1m
T	2	7	12	13	15	8	11	15	-	1m
-	4	10	3	13	16	7	16	3	-	1m
-	2	17	14	13	10	9	11	T	-	1m
-	-	-	2	2	6	6	1	-	-	1m
-	-	-	-	-	-	-	-	-	-	1m

Application Rate = $480\text{mm} \cdot \text{sqm} / 53\text{sqm} / \text{hr}$
 $= 9.06\text{mm} / \text{hr} = 480\text{li} / \text{hr}$

(6) TEST-6

-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	1	3	T	-	-	-	-
-	-	2	8	7	7	T	20	T	-	-
-	-	8	6	48	x	3	-	-	-	-
-	T	2	28	5	3	5	-	-	-	-
-	-	-	2	8	2	T	1	-	-	-
-	-	-	-	T	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Application Rate = $130\text{mm} \cdot \text{sqm} / 21\text{sqm} / 30\text{min}$
 $= 12.38\text{mm} / \text{hr} = 260\text{li} / \text{hr}$

(7) TEST-7

-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	T	-	-	-	-	-	-
-	-	-	4	3	4	2	-	-	-
-	-	4	2	2	3	5	1	-	-
-	-	3	3	9	2	4	3	-	-
-	3	3	1	8	4	3	3	-	-
-	-	-	T	3	2	6	3	-	-
-	-	-	x	4	2	T	2	-	-
-	-	-	T	1	2	-	-	-	-
-	-	-	-	-	-	-	-	-	-

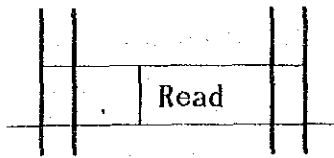
Application Rate = $104\text{mm} \cdot \text{sqm} / 32\text{sqm} / 30\text{min}$
 $= 6.50\text{mm} / \text{hr} = 208\text{li} / \text{hr}$

(8) TEST-8

-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	T	12	5	-	4	3	-	-
T	1	1	21	13	4	-	1	-	-
1	-	T	7	9	8	3	5	-	-
-	T	1	40	32	6	4	-	-	-
-	4	10	18	6	13	9	3	-	-
-	-	5	6	8	12	13	6	-	-
-	-	-	1	14	9	11	6	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Application Rate = $334\text{mm} \cdot \text{sqm} / 38\text{sqm} / 30\text{min}$
 $= 17.58\text{mm} / \text{hr} = 668\text{li} / \text{hr}$

F.1.6 Result of Intake-Rate Test

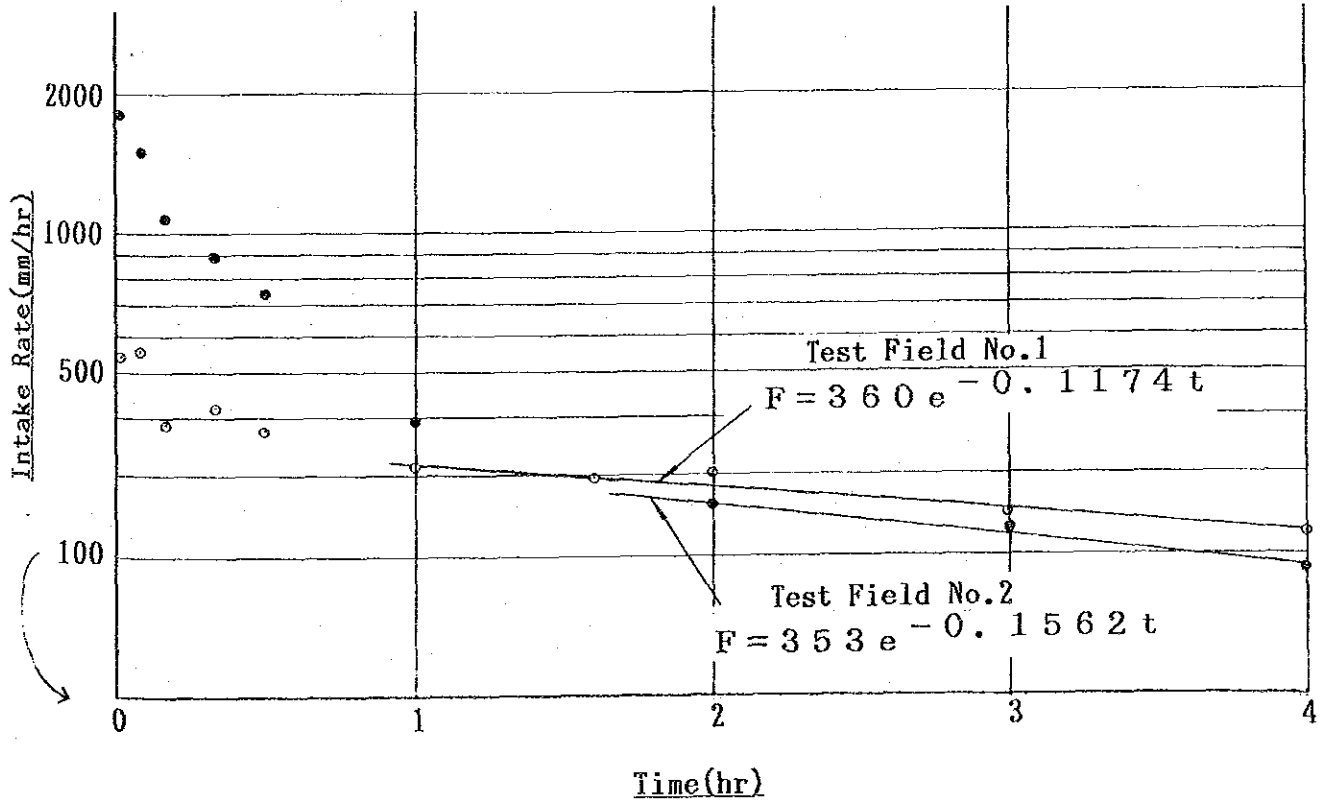


Soil Profile

S.C.L
S.C

S:Sandy Soil
C:Clay Soil
L:Loamy Soil

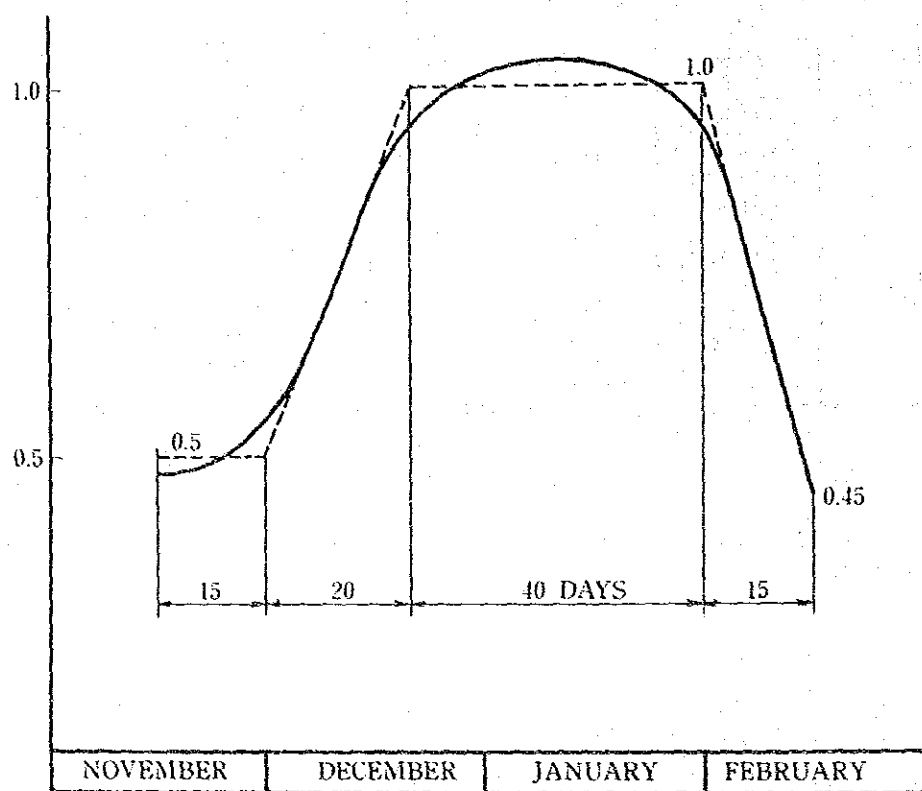
TEST FIELD NO.1			TEST FIELD NO.2		
Time	Read	Difference	Time	Read	Difference
0sec.	283mm	-	0sec.	270mm	-
5	283	0	5	268	2
10	283	0	10	265	3
20	281	2	20	260	5
30	279	2	30	255	5
40	276	3	40	249	6
50	275	1	50	246	3
1min.	274	1	1min.	240	3
5	237(283)	37	5	140(270)	100
10	251(283)	32	10	181(270)	89
20	213(283)	70	20	122(270)	148
30	220(283)	63	30	147(270)	123
60	126(283)	157	60	75(270)	195
96	106(283)	177			
2hr	163(283)	120	2hr	15(270)	255
3	36(283)	247	3	42(270)	228
4	46(283)	237	4	84(270)	186
5	63(283)	220			



F.2 CROP WATER REQUIREMENT

F.2.1 Kc Value Developed for Upland Crop (Groundnuts)

Kc VALUE DEVELOPED FOR UPLAND CROP



F.2.2 Crop Water Requirement by Various Methods

MODIFIED PENMAN METHOD

ITEMS	(UNIT)	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1 Tmax	(°C)	31.9	32.2	32.8	33.2	32.2	30.9	30.4	30.3	30.5	31.3	31.4	31.3
2 Tmin	(°C)	19.9	21.8	23.0	23.8	24.4	24.5	24.3	24.3	23.9	23.3	22.1	20.5
3 Tmean	(°C)	25.9	27.0	27.8	28.5	28.3	27.7	27.4	27.3	27.2	27.3	26.8	25.9
4 ea	(mbar)	33.4	35.7	37.4	39.0	38.5	37.2	36.5	36.3	36.1	36.3	35.3	33.4
5 Rf/mean	(%)	71.5	77.4	79.3	80.8	84.6	86.0	86.2	86.6	87.9	83.9	75.9	70.5
6 ed	(mbar)	23.9	27.6	29.7	31.5	32.6	32.0	31.5	31.4	31.7	30.5	26.8	23.5
7 (ea-ed)		9.5	8.1	7.7	7.5	5.9	5.2	5.0	4.9	4.4	5.8	8.5	9.9
8 U (h=2m)	(Km/day)	94	62	53	50	43	59	56	59	34	59	112	124
9 f(u)		0.52	0.44	0.41	0.41	0.39	0.43	0.42	0.43	0.36	0.43	0.57	0.60
10 1-W	(Elevation=3m)	0.25	0.24	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.25
11 (1-W)f(u)	(ea-ed)	1.24	0.86	0.73	0.71	0.53	0.51	0.50	0.51	0.38	0.60	1.16	1.49
12 Ra	(12.36°N)	12.7	13.8	15.0	15.7	15.7	15.6	15.6	15.6	15.2	14.3	13.2	12.4
13 n/N		0.56	0.50	0.47	0.42	0.29	0.18	0.17	0.14	0.18	0.36	0.51	0.57
14 0.25+0.5n/N		0.53	0.50	0.49	0.46	0.40	0.34	0.34	0.32	0.34	0.43	0.51	0.54
15 Rs=(12)*(14)		6.73	6.90	7.35	7.22	6.28	5.30	5.30	4.99	5.17	6.15	6.73	6.70
16 Rns=0.75Rs		5.05	5.18	5.51	5.42	4.71	3.98	3.98	3.74	3.88	4.61	5.05	5.03
17 f(T)		15.9	16.1	16.3	16.4	16.4	16.2	16.2	16.2	16.1	16.2	16.1	15.9
18 f(ed)		0.12	0.11	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.11	0.13
19 f(n/N)		0.60	0.55	0.54	0.48	0.36	0.26	0.25	0.23	0.26	0.42	0.56	0.61
20 Rn1=(17)*(18)*(19)		1.14	0.97	0.88	0.71	0.53	0.38	0.36	0.34	0.38	0.68	0.99	1.26
21 Rn=Rns-Rn1		3.91	4.21	4.63	4.71	4.18	3.60	3.62	3.40	3.50	3.93	4.06	3.77
22 W		0.75	0.76	0.77	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.76	0.75
23 W*Rn		2.93	3.20	3.57	3.63	3.22	2.77	2.75	2.58	2.66	2.99	3.09	2.83
24 (11)+(23)		4.17	4.06	4.30	4.34	3.75	3.28	3.25	3.09	3.04	3.59	4.25	4.32
25 c		1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
26 ETO	(mm/day)	4.42	4.30	4.56	4.60	3.98	3.48	3.45	3.28	3.22	3.81	4.51	4.58
27 Kc		0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
28 ET	(mm/day)	3.98	3.87	3.88	3.91	3.38	2.96	2.93	2.79	2.74	3.24	3.83	3.89

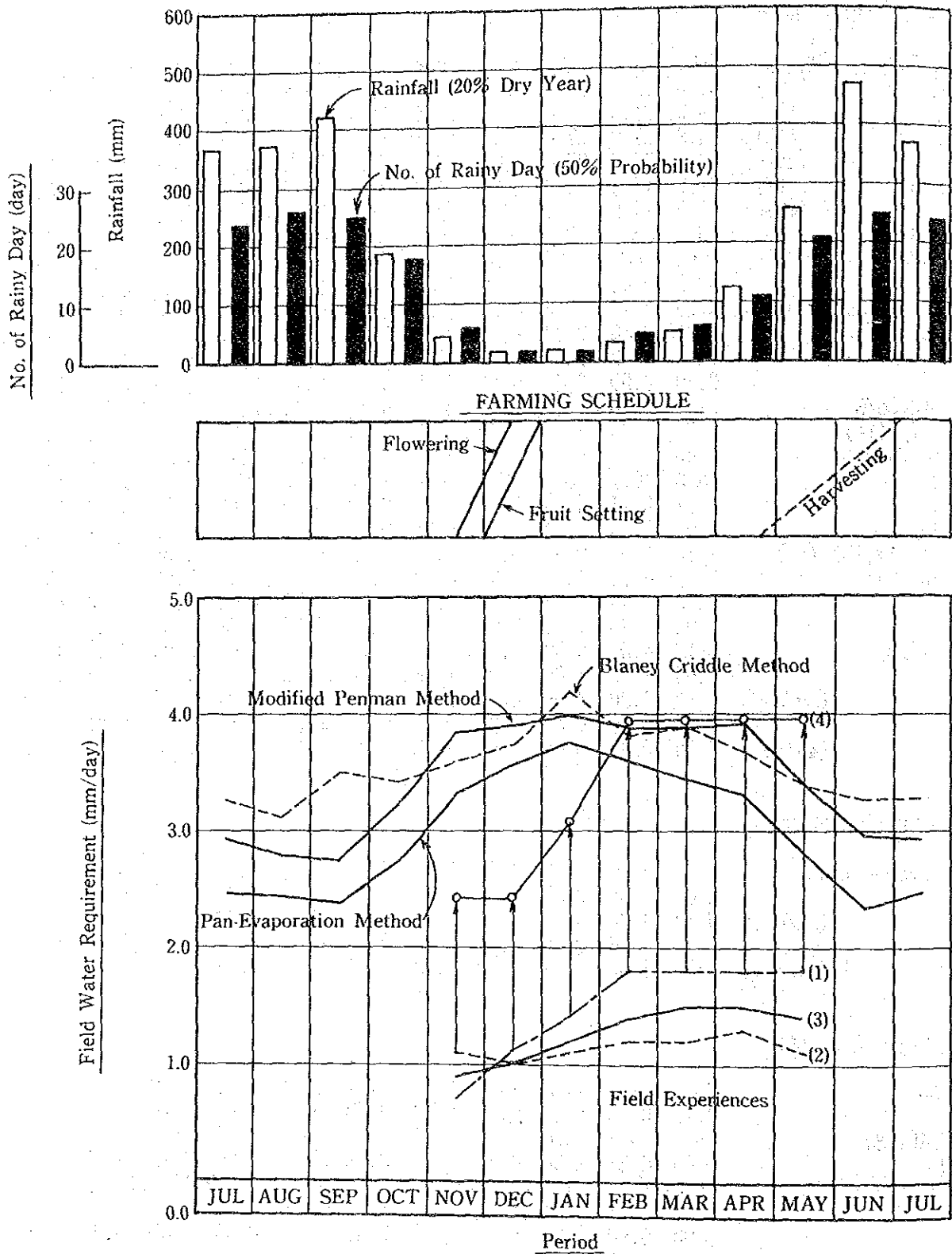
PAN EVAPORATION METHOD

1 Pan-Evaporation	(mm)	4.91	4.70	4.75	4.56	3.85	3.23	3.40	3.37	3.29	3.81	4.60	4.94
2 Kp		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
3 ETO	(mm/day)	4.17	4.00	4.04	3.88	3.27	2.75	2.89	2.86	2.80	3.24	3.91	4.20
4 Kc		0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
5 ET	(mm/day)	3.75	3.60	3.43	3.30	2.78	2.34	2.46	2.43	2.38	2.75	3.32	3.57

BLANEY CRIDDLE METHOD

1 Tmean		25.9	27.0	27.8	28.5	28.3	27.7	27.4	27.3	27.2	27.3	26.8	25.9
2 p		0.26	0.26	0.27	0.28	0.29	0.29	0.29	0.28	0.28	0.27	0.26	0.25
3 p(0.46T+8)		5.2	5.3	5.6	5.9	6.1	6.0	6.0	5.8	5.7	5.6	5.3	5.0
4 ETO		4.66	4.23	4.56	4.32	3.95	3.85	3.85	3.66	4.12	4.02	4.23	4.40
		(V-1)	(VIII-1)	(VIII-1)	(VIII-1)	(IX-1)	(IX-1)	(IX-1)	(VIII-1, IX-1)	(VIII-1, IX-1)	(VIII-1)	(IX-1)	(IX-1)
5 Kc		0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
6 ET		4.19	3.81	3.88	3.67	3.36	3.27	3.27	3.11	3.50	3.42	3.60	3.74

F.2.3 Justification of Crop Water Requirement



- Notes : (1) Interview Survey for Area Using River Water
 (2) -do- for Area Using Pond Water
 (3) -do- Average
 (4) -do- After Areal Conversion
 (5) Areal Conversion Rate=2.200

F.3 LAND USE AND CROP CONVERSION PLAN

F.3.1 Existing Land Use by Irrigation Block

(Unit : ha)

No	Irr. Block	Paddy	Upland	Orchard	Rubber	Sub-Total	Idle Land	Swamp	Forest	Others	Total	Z	Old Block
1	KP-1	-	-	-	-	-	-	-	4570.0	-	4570.0	U	KP-1
2	-2	-	242.1	7.9	88.7	338.7	11.3	-	330.0	20.0	700.0	U	2
3	-3	-	388.3	7.7	105.3	501.3	198.7	-	-	100.0	800.0	U	2
4	-4	22.5	818.0	130.0	36.0	1006.5	246.5	-	7157.0	40.0	8450.0	U	3
5	-5	11.3	319.0	-	138.0	468.3	81.7	-	100.0	40.0	690.0	U	4
6	-6	65.5	657.6	-	5.0	728.1	194.9	-	67.0	30.0	1020.0	U	5
7	-7	-	226.0	215.4	5.8	447.2	122.8	-	2570.0	240.0	3380.0	U	6
8	-8	33.2	208.5	225.2	-	466.9	110.6	2.5	30.0	20.0	630.0	U	7
9	-9	-	438.0	110.3	-	548.3	137.7	-	54.0	30.0	770.0	U	8
10	-10	-	175.4	92.4	16.8	284.6	45.4	-	60.0	20.0	410.0	U	9
11	-11	-	112.2	158.6	-	270.8	89.2	20.0	-	30.0	410.0	U	9
12	-12	42.0	207.1	286.5	72.5	608.1	69.9	-	32.0	20.0	730.0	U	10
13	-13	-	1092.9	34.0	536.0	1662.9	424.6	33.5	319.0	140.0	2580.0	U	11
14	-14	67.5	1952.0	-	92.0	2111.5	456.5	-	382.0	220.0	3170.0	U	12
15	-15	-	-	316.0	-	316.0	134.0	-	340.0	50.0	840.0	U	12
16	-16	-	17.2	-	804.3	821.5	8.5	-	-	10.0	840.0	U	13
17	-17	-	20.0	196.0	219.0	435.0	-	-	-	5.0	440.0	U	13
		242.0	6874.3	1780.0	2119.4	11015.7	2332.3	56.0	16011.0	1015.0	30430.0		
18	TT-1	-	-	-	-	-	-	-	4980.0	-	4980.0	U	TT-1
19	2	67.3	472.2	180.6	221.6	921.7	218.3	-	560.0	150.0	1850.0	U	3
20	3	250.8	42.2	386.1	364.2	1043.3	236.7	-	1090.0	230.0	2600.0	M	4
21	4	-	-	26.6	-	26.6	13.4	-	520.0	50.0	610.0	M	5
22	5	-	60.4	203.8	2.3	266.5	123.5	-	30.0	30.0	450.0	U	6
23	6	-	16.4	250.6	-	267.0	73.0	-	-	30.0	370.0	U	7
24	7	-	80.0	283.2	214.4	577.6	52.4	-	-	30.0	660.0	U	8
25	8	-	-	10.7	117.4	128.1	11.9	-	-	10.0	150.0	U	8
		318.1	671.2	1321.6	919.9	3230.8	729.2	-	7180.0	530.0	11670.0		
26	1	-	4.0	266.8	35.2	306.0	74.0	-	-	80.0	460.0	M	6
27	2	3.0	-	355.4	75.4	433.8	106.2	-	-	130.0	670.0	M	7
28	3	-	39.2	725.0	684.0	1448.2	368.8	4.0	229.0	180.0	2230.0	M	8
29	4	-	7.0	1091.9	279.7	1378.6	355.4	15.0	221.0	180.0	2150.0	M	8
30	5	-	5.5	267.1	94.2	366.8	70.7	2.5	-	50.0	490.0	M	9
31	6	-	-	109.8	41.3	151.1	28.9	-	-	20.0	200.0	M	9
32	7	-	-	423.7	234.9	658.6	128.4	3.0	-	100.0	890.0	M	9
33	8	-	-	10.3	15.4	25.7	4.3	-	-	-	30.0	M	9
34	9	-	-	553.0	385.2	938.2	181.8	-	-	140.0	1260.0	M	9
35	10	3.5	15.3	273.6	291.2	583.6	13.4	-	253.0	100.0	950.0	M	10
36	11	7.5	0.5	2.6	109.5	120.1	180.9	20.0	89.0	40.0	450.0	M	10
37	12	-	-	7.4	131.0	138.4	3.6	-	318.0	60.0	520.0	M	10
		14.0	71.5	4086.6	2377.0	6549.1	1516.4	44.5	1110.0	1080.0	10300.0		
38	1	2.6	-	67.3	27.2	97.1	32.9	-	-	30.0	160.0	M	3
39	2	-	-	24.6	14.5	39.1	46.4	14.5	-	20.0	120.0	M	4
40	3	-	-	17.8	23.1	40.9	9.1	-	-	10.0	60.0	M	4
41	4	-	-	-	-	-	50.0	-	-	10.0	60.0	M	4
42	5	15.1	-	287.8	75.4	378.3	71.7	-	-	80.0	530.0	M	WS-6+TL
		17.7	-	397.5	140.2	555.4	210.1	14.5	-	150.0	930.0		
43	TL-1	-	-	25.9	15.6	41.5	8.5	-	-	-	50.0	M	TL-3+4
44	2	-	-	139.5	26.5	166.0	14.0	-	-	20.0	200.0	M	-NEA
45	3	4.8	-	45.1	24.5	74.4	135.6	-	-	20.0	230.0	M	-do-
46	4	-	-	17.0	121.5	138.5	572.7	88.8	-	30.0	830.0	M	-do-
47	5	-	-	-	1.3	1.3	118.7	-	-	10.0	130.0	M	-do-
48	6	-	-	-	-	-	59.7	0.3	-	-	60.0	M	TL-5-N
		4.8	-	227.5	189.4	421.7	909.2	89.1	-	80.0	1500.0		

Existing Land Use by Irrigation Block (continued)

(Unit : ha)

No	Irr. Block	Paddy	Upland	Orchard	Rubber	Sub-Total	Idle Land	Swamp	Forest	Others	Total	Z	Old Block
49	SL-1	2.5	-	39.5	31.7	73.7	46.3	-	-	-	120.0	M	SL-1
50	2	18.8	-	88.4	106.0	213.2	265.1	61.7	-	10.0	550.0	M	1
51	3	-	3.5	55.5	32.8	91.8	195.2	13.0	-	30.0	330.0	M	1
52	4	-	-	-	22.8	22.8	27.2	-	-	-	50.0	M	1
53	5	2.2	-	76.6	21.2	100.0	43.9	16.1	-	20.0	180.0	M	1
54	6	26.5	-	22.3	67.8	116.6	280.0	13.4	-	20.0	430.0	M	1
55	7	-	-	23.9	11.7	35.6	44.4	-	-	-	80.0	M	2
56	8	-	-	312.9	272.2	585.1	456.3	-	8.6	60.0	1110.0	M	2
57	9	-	9.3	189.3	448.2	646.8	291.8	-	21.4	60.0	1020.0	M	2
58	10	-	-	56.8	104.9	161.7	57.2	1.1	-	10.0	230.0	M	2
59	11	-	-	11.9	13.2	25.1	63.4	11.5	-	-	100.0	M	2
60	12	-	-	8.0	26.8	34.8	35.2	-	-	-	70.0	M	3
61	13	-	-	20.2	116.8	137.0	28.3	-	14.7	10.0	190.0	M	3
62	14	-	-	29.6	23.1	52.7	32.0	-	75.3	10.0	170.0	M	3
63	15	-	-	10.2	27.4	37.6	32.4	-	30.0	-	100.0	M	3
		50.0	12.8	945.1	1326.6	2334.5	1898.7	116.8	150.0	230.0	4730.0		
64	TC-1	-	-	5.0	15.0	20.0	-	-	-	-	20.0	M	TC-2
65	2	-	8.0	85.1	113.6	206.7	33.3	-	-	10.0	250.0	M	2
		-	8.0	90.1	128.6	226.7	33.3	-	-	10.0	270.0		
66	TM-1	-	-	-	-	-	-	-	100.0	-	100.0	U	TM-1
67	2	-	208.3	605.0	14.0	827.3	202.7	-	450.0	150.0	1630.0	U	2
68	3	-	-	120.7	25.2	145.9	82.1	-	2.0	20.0	250.0	M	3
69	4	-	7.5	557.8	268.5	833.8	495.2	-	291.0	170.0	1790.0	M	3
70	5	-	-	26.0	7.7	33.7	16.3	-	-	-	50.0	M	3
71	6	-	2.5	301.0	251.9	555.4	337.6	-	217.0	120.0	1230.0	M	3
72	7	-	-	204.3	122.6	326.9	183.1	-	-	50.0	560.0	M	3
73	8	-	-	83.2	51.2	134.4	89.6	-	6.0	20.0	250.0	M	3
74	9	-	-	653.6	424.5	1078.1	557.9	-	194.0	210.0	2040.0	M	3
		-	218.3	2551.6	1165.6	3935.5	1964.5	-	1260.0	740.0	7900.0		

F.3.2 Crop Conversion Plan by Irrigation Block

CROP CONVERSION PLAN BY IRRIGATION BLOCK(1)

Z	V	No	BLCK	PADDY			UPLAND			RUBBER			ORCHARD		TOTAL
				(1) PREST	(2) UP-CR	(3) ORCHD	(4) PREST	(5) ORCHD	(6) 4-5	(7) PREST	(8) ORCHD	(9) 7-8	(10) PREST	(11) 10+3+5+8	
UR	1	KP-1	-	-	-	-	-	-	-	-	-	-	-	-	-
UR	2	-2	-	-	-	242.1	-	242.1	88.7	-	88.7	7.9*	-	338.7	
UR	3	-3	-	-	-	388.3	116.5	271.8	105.3	21.1	84.2	7.7	145.3	501.3	
UR	4	-4	22.5	4.5	-	818.0	245.4	572.6	36.0	7.2	28.8	130.0	382.6	1006.5	
UR	6	-6	65.5	13.1	-	657.6	197.3	460.3	5.0	-	5.0	-	197.3	728.1	
UR	7	-7	-	-	-	226.0	67.8	158.2	5.8	-	5.8	215.4	283.2	447.2	
UR	8	-8	33.2	6.6	-	208.5	62.6	145.9	-	-	-	225.2	287.8	466.9	
UR	10	-10	-	-	-	175.4	52.6	122.8	16.8	6.7	10.1	92.4	151.7	284.6	
UR	11	-11	-	-	-	112.2	33.7	78.5	-	-	-	158.6	192.3	270.8	
UR	12	-12	42.0	8.4	-	207.1	62.1	145.0	72.5	-	72.5	286.5	348.6	608.1	
UR	18	TT-1	-	-	-	-	-	-	-	-	-	-	-	-	
UR	19	-2	67.3	13.5	-	472.2	141.7	330.5	221.6	44.3	177.3	160.6	346.6	921.7	
UR	23	-6	-	-	-	16.4	6.6	9.8	-	-	-	250.6	257.2	267.0	
UR	66	TM-1	-	-	-	-	-	-	-	-	-	-	-	-	
Sub-total			230.5	46.1	-	3523.8	986.3	2537.5	551.7	79.3	472.4	1534.9	2592.6	5840.9	
UP	5	KP-5	11.3	2.3	-	319.0	95.7	223.3	138.0	27.6	110.4	-	123.3	468.3	
UP	9	-9	-	-	-	438.0	131.4	306.6	-	-	-	110.3	241.7	548.3	
UP	13	-13	-	-	-	1092.9	327.9	765.0	536.0	107.2	428.8	34.0	469.1	1662.9	
UP	14	-14	67.5	13.5	-	1952.0	585.6	1366.4	92.0	18.4	73.6	-	604.0	2111.5	
UP	15	-15	-	-	-	-	-	-	-	-	-	316.0	316.0	316.0	
UP	16	-16	-	-	-	17.2	5.2	12.0	804.3	-	804.3	-	5.2	821.5	
UP	17	-17	-	-	-	20.0	6.0	14.0	219.0	-	219.0	196.0	202.0	435.0	
UP	22	TT-5	-	-	-	60.4	18.1	42.3	2.3	-	2.3	203.8	221.9	266.5	
UP	24	-7	-	-	-	80.0	24.0	56.0	214.4	6.8	207.6	283.2	314.0	577.6	
UP	25	-8	-	-	-	-	-	-	117.4	-	117.4	10.7	10.7	128.1	
UP	67	TM-2	-	-	-	208.3	62.5	145.8	14.0	-	14.0	605.0	667.5	827.3	
Sub-total			78.8	15.8	-	4187.8	1256.4	2931.4	2137.4	160.0	1977.4	1759.0	3175.4	8163.0	
U.Z. TOTAL			309.3	61.9	-	7711.6	2242.7	5468.9	2639.1	239.3	2449.8	3293.9	5768.0	14003.9	
MR	20	TT-3	250.8	-	50.2	42.2	16.9	25.3	364.2	72.8	291.4	386.1	526.0	1043.3	
MR	21	-4	-	-	-	-	-	-	-	-	-	26.6	26.6	26.6	
MR	26	PL-1	-	-	-	4.0	4.0	-	35.2	7.0	28.2	266.8	277.8	306.0	
MR	27	-2	3.0	-	-	-	-	-	75.4	15.1	60.3	355.4	370.5	433.8	
MR	38	WS-1	2.6	-	-	-	-	-	27.2	5.4	21.8	67.3	72.7	97.1	
MR	42	-5	15.1	-	3.0	-	-	-	75.4	15.1	60.3	287.8	305.9	378.3	
MR	48	TL-6	-	-	-	-	-	-	-	-	-	-	-	-	
Sub-total			271.5	-	53.2	46.2	20.9	25.3	577.4	115.4	462.0	1390.0	1579.5	2285.1	
MP	28	PL-3	-	-	-	39.2	12.4	26.8	684.0	136.8	547.2	725.0	874.2	1448.2	
MP	29	-4	-	-	-	7.0	-	7.0	279.7	55.9	223.8	1091.9	1147.8	1378.6	
MP	30	-5	-	-	-	5.5	-	5.5	94.2	18.8	75.4	267.1	285.9	366.8	
MP	31	-6	-	-	-	-	-	-	41.3	8.3	33.0	109.8	118.1	151.1	
MP	32	-7	-	-	-	-	-	-	234.9	47.0	187.9	423.7	470.7	658.6	
MP	33	-8	-	-	-	-	-	-	15.4	3.1	12.3	10.3	13.4	25.7	
MP	34	-9	-	-	-	-	-	-	385.2	77.0	308.2	553.0	630.0	938.2	
MP	35	-10	3.5	-	-	15.3	7.7	7.6	291.2	58.2	233.0	273.6	339.5	583.6	
MP	36	-11	7.5	-	-	0.5	-	0.5	109.5	21.9	87.6	2.6	24.5	120.1	
MP	37	-12	-	-	-	-	-	-	131.0	26.2	104.8	7.4	33.6	138.4	
MP	39	WS-2	-	-	-	-	-	-	14.5	2.9	11.6	24.6	27.5	39.1	
MP	40	-3	-	-	-	-	-	-	23.1	4.6	18.5	17.8	22.4	40.9	
MP	41	-4	-	-	-	-	-	-	-	-	-	-	-	-	

CROP CONVERSION PLAN BY IRRIGATION BLOCK(2)

Z	W	No	BLCK	PADDY			UPLAND			RUBBER			ORCHARD		TOTAL
				(1) PREST	(2) UP-CR	(3) ORCHD	(4) PREST	(5) ORCHD	(6) 4-5	(7) PREST	(8) ORCHD	(9) 7-8	(10) PREST	(11) 10+3+5+8	
M P 43	TL	-1	-	-	-	-	-	-	15.6	3.1	12.5	25.9	29.0	41.5	
M P 44	-2	-	-	-	-	-	-	-	28.5	5.3	21.2	139.5	144.8	168.0	
M P 45	-3	4.8	-	-	-	-	-	-	24.5	4.9	19.6	45.1	50.0	74.4	
M P 46	-4	-	-	-	-	-	-	-	121.5	24.3	97.2	17.0	41.3	138.5	
M P 47	-5	-	-	-	-	-	-	-	1.3	-	1.3	-	-	1.3	
M P 49	SL	-1	2.5	-	-	-	-	-	31.7	6.3	25.4	39.5	45.8	73.7	
M P 50	-2	18.8	-	-	-	-	-	-	106.0	21.2	84.8	88.4	109.6	213.2	
M P 51	-3	-	-	-	-	3.5	-	-	32.8	6.6	26.2	55.5	62.1	91.8	
M P 52	-4	-	-	-	-	-	-	-	22.8	-	22.8	-	-	22.8	
M P 53	-5	2.2	-	-	-	-	-	-	21.2	4.2	17.0	76.6	80.8	100.0	
M P 54	-6	26.5	-	-	-	-	-	-	67.8	13.6	54.2	22.3	35.9	116.6	
M P 55	-7	-	-	-	-	-	-	-	11.7	2.3	9.4	23.9	26.2	35.6	
M P 56	-8	-	-	-	-	-	-	-	272.2	54.4	217.8	312.9	367.3	585.1	
M P 57	-9	-	-	-	-	9.3	-	-	448.2	89.6	358.6	189.3	278.9	646.8	
M P 58	-10	-	-	-	-	-	-	-	104.9	21.0	83.9	56.8	77.8	161.7	
M P 59	-11	-	-	-	-	-	-	-	13.2	2.6	10.6	11.9	14.5	25.1	
M P 60	-12	-	-	-	-	-	-	-	26.8	5.4	21.4	8.0	13.4	34.8	
M P 61	-13	-	-	-	-	-	-	-	116.8	23.4	93.4	20.2	43.6	137.0	
M P 62	-14	-	-	-	-	-	-	-	23.1	4.6	18.5	29.6	34.2	52.7	
M P 63	-15	-	-	-	-	-	-	-	27.4	5.5	21.9	10.2	15.7	37.6	
M P 64	TC	-1	-	-	-	-	-	-	15.0	3.0	12.0	5.0	8.0	20.0	
M P 65	-2	-	-	-	-	8.0	-	-	113.6	22.7	90.9	85.1	107.8	206.7	
M P 68	TH	-3	-	-	-	-	-	-	25.2	-	25.2	120.7	120.7	145.9	
M P 69	-4	-	-	-	-	7.5	-	-	268.5	-	268.5	557.8	557.8	833.8	
M P 70	-5	-	-	-	-	-	-	-	7.7	-	7.7	26.0	26.0	33.7	
M P 71	-6	-	-	-	-	2.5	-	-	251.9	-	251.9	301.0	301.0	555.4	
M P 72	-7	-	-	-	-	-	-	-	122.6	-	122.6	204.3	204.3	326.9	
M P 73	-8	-	-	-	-	-	-	-	51.2	-	51.2	83.2	83.2	134.4	
M P 74	-9	-	-	-	-	-	-	-	424.5	-	424.5	653.6	653.6	1078.1	
Sub-total		65.8	-	-	98.3	20.1	78.2	5100.2	784.7	4315.5	6716.1	7520.9	11980.4		
M.R TOTAL		337.3	-	53.2	144.5	41.0	103.5	5677.6	900.1	4777.5	8106.1	9100.4	14265.5		
GRAND TOTAL		646.6	61.9	53.2	7856.1	2283.7	5572.4	8366.7	1139.4	7227.3	11400.0	14868.4	28269.4		

Note: (*) Existing orchard of 7.9 ha situated in KP-2 are excluded from crop conversion plan.

F.4 FARMPOND CAPACITY

F.4.1 Farmpond Capacity in Sample Survey Area-2

Farm No.	Planted Area (ha)	Pond Capacity (cu.m)	Unit Capacity (cu.m/ha)	Farm No.	Planted Area (ha)	Pond Capacity (cu.m)	Unit Capacity (cu.m/ha)
1	10.2	39,000	3,824	51	2.1	1,200	571
2	3.2	600	188	52	3.9	1,200	308
3	1.3	600	462	53	3.5	2,160	617
4	3.5	600	171	54	3.4	8,160	2,400
5	1.4	800	571	55	2.5	6,400	2,560
6	1.1	800	727	56	1.2	1,440	1,200
7	2.7	800	296	57	1.7	1,440	847
8	4.7	3,000	638	58	1.5	1,800	1,200
9	3.6	1,440	400	59	6.7	5,400	806
10	5.1	3,580	702	60	4.3	8,000	1,860
11	3.4	2,400	706	61	5.2	4,800	923
12	12.8	22,200	1,734	62	6.5	12,800	1,969
13	8.4	6,400	762	63	1.2	1,600	1,333
14	2.8	No Pond	-	64	4.1	800	195
15	8.0	32,000	4,000	65	2.9	3,120	1,076
16	5.7	5,040	884	66	1.1	1,080	982
17	10.7	7,200	673	67	4.1	19,200	4,683
18	8.0	5,700	713	68	3.6	12,800	3,556
19	3.7	1,800	486	69	1.9	3,360	1,768
20	3.3	1,800	545	70	1.4	2,160	1,543
21	4.1	No Pond	-	71	4.2	No Pond	-
22	4.1	1,500	366	72	1.0	No Pond	-
23	5.1	4,200	824	73	3.8	12,800	3,368
24	4.1	8,100	1,976	74	1.0	No Pond	-
25	2.8	2,700	964	75	2.4	12,800	5,333
26	5.9	9,600	1,627	76	3.5	4,800	1,371
27	2.0	No Pond	-	77	7.4	7,200	973
28	0.6	1,200	2,000	78	3.4	6,000	1,765
29	2.0	3,600	1,800	79	1.6	3,000	1,875
30	0.6	1,200	2,000	80	4.5	7,200	1,600
31	1.6	3,600	2,250	81	1.8	12,800	7,111
32	0.4	900	2,250	82	3.6	14,400	4,000
33	1.6	2,700	1,688	83	0.7	1,800	2,571
34	3.3	1,200	364	84	0.3	800	2,667
35	5.3	4,800	906	85	8.1	8,850	1,093
36	2.7	3,600	1,333	86	6.4	15,000	2,344
37	2.4	900	375	87	6.6	5,400	818
38	1.9*			88	2.3	No Pond	-
39	1.5*	16,800*	2,366*	89	3.2	7,200	2,250
40	4.3	No Pond	-	90	6.6	9,600	1,455
41	3.7*			91	5.5	16,000	2,909
42	3.3	1,800	545	92	10.4	No Pond	-
43	2.3	1,200	522	93	1.3	2,400	1,846
44	8.3	2,400	289				
45	4.0	720	180				
46	1.1	190	173				
47	1.4	190	136				
48	2.2	1,600	727				
49	1.6	190	119				
50	1.9	1,200	632				
				Total	342.1	458,820	1,341
				$- 458,820/342.1 = 1,341 \text{cu.m/ha}$ $- 1,341 \times 0.7 = 940 \text{cu.m/ha}$			

F.4.2 Farmpond Capacity in Sample Survey Area-3

Farm No.	Planted Area (ha)	Nos of Pond	Pond Capacity (cu.m)	Unit Capacity (cu.m/ha)
1	4.4	1	8,750	1,989
2	5.4	1	1,440	267
3	6.2	1	1,200	194
4	6.8	1	4,900	721
5	4.9	2	2,400	490
6	3.3	1	1,200	364
7	2.5	1	1,200	480
8	5.6	1	4,000	714
9	4.4	2	7,840	1,782
10	5.0	1	1,680	336
11	2.6	1	2,700	1,038
12	30.8	2	37,380	1,214
13	5.0	1	2,000	400
14	6.2	1	15,000	2,419
15	9.7	5	39,120	4,033
16	2.5	1	4,480	1,792
17	5.0	2	5,600	1,120
18	3.2	2	1,280	400
19	11.2	1	12,000	1,071
20	1.8	1	600	333
21	4.0	3	5,760	1,440
22	7.6	2	2,920	384
23	13.1	5	9,180	701
24	1.8	1	360	200
25	17.2	1	25,600	1,488
26	1.4	1	600	429
27	1.5	1	1,680	1,120
28	1.3	1	4,000	3,077
29	3.5	1	2,400	686
30	4.2	2	2,000	476
31	1.8	1	9,600	5,333
32	2.7	1	2,700	1,000
33	8.5	2	6,800	800
34	15.4	3	2,340	152
35	10.7	1	22,400	2,093
36	0.8	1	840	1,050
37	5.7	2	30,100	5,281
38	11.6	3	23,000	1,983
39,40	25.9	6	56,000	2,162
41	7.1	1	4,000	563
42	5.9	1	2,500	424
43	3.8	1	7,200	1,895
44	0.8	1	72	90
45	6.5	1	2,400	369
Total	289.3	72	379,222	1,311

$$1,311 \times 0.7 = 920$$