


THE KINGDOM OF THAILAND
ROYAL IRRIGATION DEPARTMENT

FEASIBILITY REPORT
ON
KAENG KHOI — BAN MO
PUMPING IRRIGATION PROJECT
(APPENDIX)

JANUARY 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

A F T

82-02

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. This section also highlights the role of technology in streamlining record-keeping processes and reducing the risk of errors or data loss.

2. The second part of the document focuses on the implementation of robust internal controls and risk management frameworks. It outlines the key components of an effective control system, including the establishment of clear policies and procedures, the assignment of responsibilities, and the regular monitoring and evaluation of control effectiveness. The text also addresses the importance of fostering a culture of integrity and ethical behavior within the organization.

3. The third part of the document discusses the need for continuous improvement and innovation in public service delivery. It encourages the adoption of new technologies and best practices to enhance efficiency and effectiveness. This section also emphasizes the importance of stakeholder engagement and collaboration, particularly with citizens and other government agencies, to ensure that services are responsive to their needs and expectations.

4. The fourth part of the document addresses the challenges of budgeting and financial management. It discusses the importance of developing realistic and sustainable budgets, as well as the need for effective financial reporting and auditing mechanisms. The text also highlights the importance of ensuring that public funds are used transparently and for their intended purposes.

5. The fifth and final part of the document discusses the importance of human resource management and capacity building. It emphasizes the need for attracting, developing, and retaining a high-quality workforce. This section also discusses the importance of providing ongoing training and development opportunities to ensure that employees have the skills and knowledge needed to perform their jobs effectively.

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ROYAL IRRIGATION DEPARTMENT

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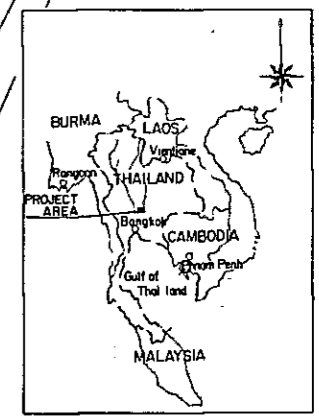
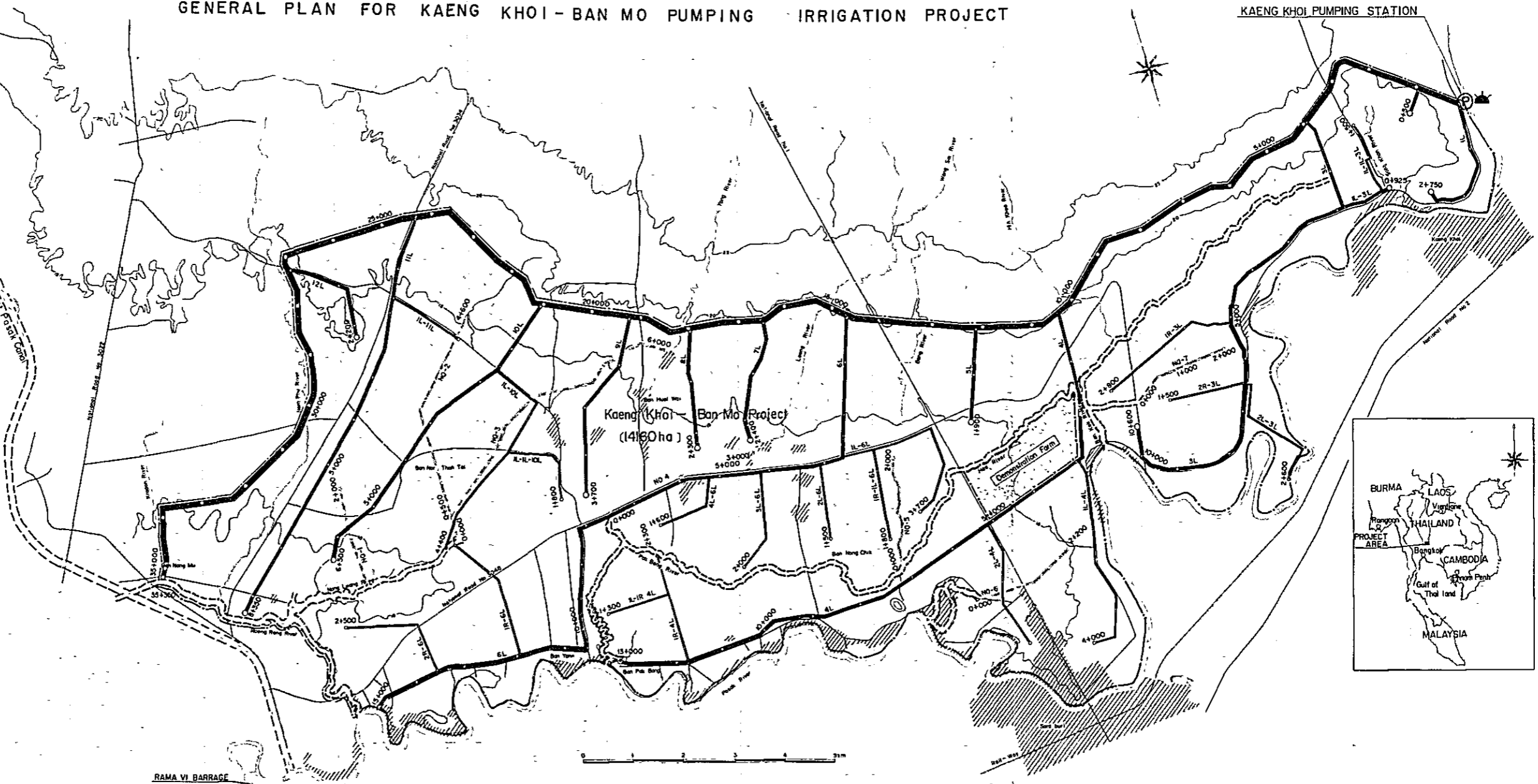
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GENERAL PLAN FOR KAENG KHOI - BAN MO PUMPING IRRIGATION PROJECT

KAENG KHOI PUMPING STATION

LEGEND

	Road
	Rail Way
	River or Stream
	Town or Village Area
	Project Boundary
IRRIGATION	
	Main Canal
	Lateral Canal
	Sub-Lateral Canal
	Pumping Station
	Main Canal (Existing)
DRAINAGE	
	Main Canal
	Main Canal (Existing)
	Drainage Sluice



1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial reporting and compliance with regulatory requirements. The text notes that incomplete or inconsistent records can lead to significant legal and financial consequences for the organization.

2. The second section addresses the challenges associated with data management and storage. It highlights the need for robust security protocols to protect sensitive information from unauthorized access, theft, or loss. The document also discusses the importance of data backup and recovery strategies to ensure business continuity in the event of a disaster or system failure.

3. The third part of the document focuses on the role of technology in streamlining operations and improving efficiency. It explores various digital tools and platforms that can be used to automate repetitive tasks, enhance communication, and facilitate data analysis. The text suggests that investing in technology is a key strategy for staying competitive in a rapidly evolving market.

4. The final section discusses the importance of human resources and employee development. It emphasizes that a skilled and motivated workforce is critical to the success of any organization. The document outlines strategies for recruitment, training, and performance management, as well as the benefits of a positive work environment and employee engagement.

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APPENDIX I. INTRODUCTION

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1.1. Minutes of Meeting 1.1-1

MINUTES OF MEETING
OF
FEASIBILITY STUDY
FOR
THE KAENG KHOI-BAN MO PUMPING IRRIGATION PROJECT
IN
THE KINGDOM OF THAILAND

The Thai Government Officials, responsible for the captioned project (the Project), headed by Mr. Sunthorn Ruanglek, Director General of the Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives, and the Japanese Supervisory Mission to the Feasibility Survey Team, headed by Mr. Yusuke Suematsu, Mission Leader, discussed and exchanged their views concerning the on-going feasibility study for the Project.

The meeting has been held on 20th July, 1981 with the attendance of General Phramarn Adireksarn, Deputy Prime Minister of the Thai Government, Mr. Phol Songpongs, Director of Technical Division, National Energy Administration (NEA), Mr. Wasuke Miyake, Minister of the Japanese Embassy, and Mr. Satoshi Kadowaki, Team Leader of the Feasibility Survey Team, under most friendly and cordial atmosphere.

The main items of understanding between both sides are as follows:-

1. Amendment of the Project boundary

Both sides agreed that approximately 800 ha of Ban Phung Ruane NEA Project is to be a part of the original project area (14,000 ha) accordance with cancellation by NEA.

2. Alternative study for combination of the Project with the NEA projects

Both sides agreed that the on-going feasibility study includes the examination of canal layout and pump capacity for the combination of the Project with the NEA projects (Ban Song Khon and Ban Tao Pan Project) from technical and economical view point. In case of non-feasible result, the combined operation and maintenance plan alone would be proposed in the report.

Signed in Bangkok
on 23rd July, 1981

末松雄祐

Mr. Yusuke Suematsu
Leader of the Japanese
Supervisory Mission

Sunthorn Ruanglek

Mr. Sunthorn Ruanglek
Director General
Royal Irrigation Department

Note: The minutes would be effective after getting the approval of the Government of Japan. The official approval would be informed to the Royal Irrigation Department through the Embassy of Japan in due course.

1.2. Notes of the Meeting on Draft Final Report 1.1-3

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. This section outlines the various methods and tools used to collect, store, and analyze data, ensuring that information is readily accessible and reliable.

2. The second part of the document focuses on the challenges and solutions associated with data management. It identifies common issues such as data fragmentation, inconsistent formats, and limited interoperability between different systems. The text provides practical advice on how to overcome these challenges, including the implementation of standardized protocols and the use of advanced data integration technologies. It also highlights the importance of regular data audits and updates to maintain the integrity and accuracy of the information.

3. The third part of the document addresses the legal and ethical considerations surrounding data collection and use. It discusses the need to comply with relevant regulations and standards, such as data protection laws and privacy policies. The text emphasizes the importance of obtaining informed consent from individuals whose data is being collected and the need to ensure that data is used only for the purposes for which it was originally intended. It also touches upon the ethical implications of data analysis and the potential for bias or discrimination.

4. The fourth part of the document explores the role of data in decision-making and policy development. It argues that data-driven insights are crucial for identifying trends, understanding public needs, and evaluating the effectiveness of various programs and services. The text provides examples of how data has been used to inform policy decisions and improve service delivery. It also discusses the importance of fostering a data-driven culture within organizations and the need for ongoing training and education for staff.

5. The fifth and final part of the document provides a summary of the key findings and recommendations. It reiterates the importance of data in public administration and offers a set of actionable steps for organizations to follow. These steps include establishing a clear data strategy, investing in the necessary infrastructure and resources, and fostering a culture of data-driven decision-making. The text concludes by emphasizing the ongoing nature of data management and the need for continuous improvement and innovation in the field.

Kaeng Khoi - Ban Mo Pumping Irrigation Project

Notes of the Meeting on Draft Final Report

Date : October 30, 1981 (PM 1:30 - PM 4:30)

Place: RID Conference Room

- I. Brief Explanation on the Project by using Summary Report
- II. Comments by RID

2-1. Canal Structure

RID asked whether the project formulation considered surface intersection of the proposed main canal and the natural rivers/streams, from view point of more effective utilization of water resources.

2-2. Water Resources for Dry Season Cropping

O & M Division commented that in the summary report, intake discharge at Manorum Regulator (16 years average) as water resource in Chainat - Pasak Canal, but intake discharge at Roeng Rang Regulator is 1,000 MCM per year on an average. Commanding area of Raphiphat Canal is not 110,000 ha but 358,000 ha. For the last four years, no water has been released from Rama VI Barrage to downstream of Pasak river during dry season. An irrigation acreage during dry season has been increasing, in which water resource depends upon Chao Phraya River. Judging from the matters above mentioned, there seems questionable for water resource of dry season cropping.

2-3. O & M Division stated it takes long period to implement a comprehensive development plan for the upper Pasak river basin, and what is the meaning of more intensive water management of the Chainat-Pasak Canal, on the page 10 of the summary report.

2-4. We would like to request to include both extensive and intensive on-farm development plan in the proposed demonstration farm.

2-5. It is desirable to increase foreign currency portion in the project cost.

2-6. To attach Hp (horse-power) for capacity of motor in the pump plant.

2-7. To mention the exchange rate between Thai baht and foreign currencies in the report.

2-8. Since it is necessary to prepare EIS (Environmental Impact Study) for those project having the beneficial area of over 80,000 rai, is there any possibility to reduce the project area below 80,000 rai by phasing the proposed project.

2-9. It is necessary to definitely locate the proposed irrigation area of 2,800 ha in the dry season, or to mention approaches or measures in the final report which enable technically to distribute the 2,800 ha in the entire project area.

III: Conclusion

As for the above comments, the followings have been confirmed through discussions held at the meeting as well as with Director of Project Planning Division.

- * About item 2-1, the surface intersection has not been considered in the Draft Report, because runoff in the present natural streams is not stable and it is rather difficult to operate gate structures during flooding period.
- * About item 2-2, Project Planning Division and O & M Division argued on this matter, and finally concluded that the proposed plan has no problem in this moment.

- * About item 2-3, according to the water balance study between water requirement and actual intake discharge at Manorom Regulator, it can be seen that there are some discrepancy between the water requirement and the intake discharge in the same 10-days period. More water resources seem available by reducing the discrepancy. (Refer to chapter IV-2 of Main Report)
- * About item 2-4, the comment could be solved during the detailed design stage, but a certain proposal would be involved in the Final Report.
- * About item 2-5, it is rather difficult to follow the comment at this stage, however some alternative plans have been included in the Draft Report.
- * About items 2-6 to 2-9, the comments will be considered in the Final Report.

Meeting on Kaeng Khoi - Ban Mo Pumping Irrigation Project

List of Participants

Date : October 30, 1981

Place: RID Conference Room

<u>Name</u>	<u>Division</u>	<u>Position</u>
<u>RID (Thai Government)</u>		
Shoombhol Chaveesuk	Design Division	Director
Boonyok Vadhanaphuti	Project Planning Division	Director
Chari Tulayanond	Medium Scale Project Construction	Director
Phyool Chantasiro	Topographic Survey Division	Director
Katsuhiko Kimura	Project Planning Division	Colombo Plan Expert
Prabhansak Bhengbhon	Small Scale Project Construction Division	Office Engineer
Adul Im-Ocha	Program & Budget Coordination Division	Engineer
Supote Rujirakul	Project Planning Division	Engineer
Supanee Rojanapremsuk	Land Classification	Agronomist
Prasong Jitseri	Hydrology Division	Hydrologist
Amphai Mathitacharoen	Soil & Geology Division	Geologist
Phairoj Nanongkai	Law and Land Procurement	Land Procurement
Dhongchart Chullasuk	Project Planning Division	Economist
Osot Charnvej	O & M Division	Agronomist
Kamol Chitapkon	Construction Division (Large)	Engineer
Charnchai Klinhom	Project Planning Division	Engineer

Japanese Government

Y. Suematsu	Advisory Group	Chairman
A. Kazama	"	Member
N. Horiguchi	"	"
S. Kadowaki	F/S Team	Leader
Y. Miyanishi	"	Agro-economist

1.3. Comments Letter of Kaeng Khoi-Ban Mo Pumping Irrigation Project	1.1-7
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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text notes that without clear documentation, it becomes difficult to track expenses and revenues, which can lead to misunderstandings and disputes.

2. The second section focuses on the role of communication in organizational success. It highlights that effective communication is not just about conveying information but also about listening and understanding the needs of others. The author suggests that regular meetings and open channels of communication can help in resolving conflicts and fostering a collaborative work environment.

3. The third part of the document addresses the challenges of time management. It points out that many professionals struggle to balance their work commitments with personal life. The text offers several strategies, such as prioritizing tasks and setting realistic deadlines, to help individuals manage their time more effectively. It also stresses the importance of taking breaks and avoiding burnout.

4. The final section discusses the impact of technology on modern business operations. It notes that while technology has brought many benefits, it also presents new challenges, such as data security and privacy concerns. The author recommends that organizations should invest in robust cybersecurity measures and ensure that their data handling practices comply with relevant regulations.



ROYAL IRRIGATION DEPARTMENT

BANGKOK, THAILAND

CABLE ADDRESS.
RID Bangkok

No. 11 /2525

January 8 , B.E. 2525 (1982)

Mr. Satoshi Kadowaki
Team Leader for Survey Team
c/o Japan International Cooperation Agency
P.O. Box 216 Mitsui Bldg.
2-1, Nishi-Shinjuku, Shinjuku TOKYO
160 JAPAN

Subject: Kaeng Khoi - Ban Mo Pumping Irrigation Project

Dear Mr, Kadowaki,

Please refer to our last discussion meeting on the subject matter, our staffs discussed with you on several topics and gave their verbal comments in the meeting. We also reviewed your draft report and found no further comments.

Please revise the report as agreed in the last meeting. We are looking forward to receive the final feasibility report in due time.

Sincerely yours,

Sunthorn Ruanglek
Director General

APPENDIX II. BACKGROUND OF THE PROJECT

APPENDIX II. BACKGROUND OF THE PROJECT

2.1. Population

2.2. Economic Index

2.1. Population

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Table A.2.1-1 Population

Year	Northern	Northeastern	Central			Southern	Whole Kingdom
			Central ^{1/}	Bangkok ^{2/}	Sub-total		
1965	6,615,750	10,217,290	7,081,470	2,896,352	9,977,822	3,760,018	30,570,880
1966	6,815,297	10,509,848	7,278,163	3,001,706	10,279,869	3,876,372	31,481,386
1967	7,029,651	10,866,388	7,449,985	3,123,602	10,573,587	3,999,329	32,468,955
1968	7,252,326	11,240,928	7,680,158	3,247,339	10,927,497	4,132,602	33,553,353
1969	7,410,227	11,613,216	7,862,444	3,382,221	11,244,665	4,256,214	34,524,322
1970	7,597,472	11,761,178	8,087,843	3,516,829	11,604,672	4,382,355	35,345,677
1971	7,857,905	12,380,301	8,373,646	3,659,474	12,033,120	4,548,771	36,820,097
1972	8,114,509	12,990,912	8,678,335	3,793,763	12,472,098	4,782,529	38,560,048
1973	8,458,087	13,695,099	8,893,164	3,967,081	12,860,245	4,928,875	39,940,506
1974	8,769,377	14,174,285	9,168,790	4,129,609	13,298,399	5,092,091	41,334,152
1975	8,903,194	14,533,715	9,369,386	4,349,494	13,718,880	5,225,656	42,381,443
1976	9,047,528	14,792,973	9,498,103	4,545,608	14,043,711	5,329,499	43,213,711
1977	9,201,920	15,148,360	9,722,955	4,742,774	14,465,729	5,456,684	44,272,693
1978	9,353,389	15,493,991	9,917,539	4,870,509	14,788,048	5,586,197	45,221,625
1979	9,493,164	15,792,825	10,112,561	4,999,515	15,112,076	5,715,691	46,113,756

Note: 1/ Bangkok Metropolis

2/ Population of Eastern Region, Western Region and Central Region except Bangkok Metropolis

Table A.2.1-2 Results of Labor Force Survey (Jan. - Mar. 1978)

(Unit: thousand)

	Bangkok	Central	Northern	Northeastern	Southern	Whole kingdom
1. Total Population ^{1/}	4,650.0	9,251.0	9,475.9	15,807.9	5,516.0	44,698.8
2. Persons in Labor Force	2,070.7	3,859.8	3,657.2	4,840.9	2,475.0	16,883.6
2.1 Adequately Utilized	1,329.1	3,090.9	2,690.3	3,346.6	1,746.2	12,203.1
2.2 Inadequately Utilized	741.6	748.9	966.9	1,494.3	728.8	4,680.5
- Unemployed	52.2	39.4	28.1	51.0	19.0	189.7
- Hours of Work	36.6	149.3	100.9	204.5	161.7	653.0
- Income	650.0	556.0	837.9	1,238.8	547.9	3,850.6
- Mismatch	2.8	4.2	0.0	0.0	0.2	7.2
3. Persons Not in Labor Force	1,442.2	2,297.5	2,622.7	5,064.0	1,107.9	12,534.1
3.1 Worked Around House	474.2	494.2	426.8	725.0	185.0	2,305.2
3.2 Student	723.1	991.8	952.0	1,182.2	670.0	4,519.1
3.3 Waiting for Agr. Season	12.9	447.1	866.1	2,677.6	39.1	4,042.8
3.4 Others	232.0	364.2	377.8	479.2	213.8	1,667.0
4. Persons Under 11 Years Old	1,157.1	3,113.9	3,194.0	5,903.0	1,933.1	15,281.0

Note: 1/ Civilian Non-institutional Population

Source: National Statistical Office

Table A.2.1-3 Results of Labor Force Survey (July - Sept. 1978)

(Unit: thousand)

	<u>Bangkok</u>	<u>Central</u>	<u>Northern</u>	<u>Northeastern</u>	<u>Southern</u>	<u>Whole kingdom</u>
<u>1. Total Population</u> ^{1/}	4,743.9	9,342.9	9,568.0	15,992.0	5,572.9	45,219.7
<u>2. Persons in Labor Force</u>	2,196.9	4,463.1	4,801.2	7,958.5	2,475.1	21,894.8
2.1 Adequately Utilized	1,465.3	3,539.9	3,323.6	4,638.3	1,758.6	14,725.7
2.2 Inadequately Utilized	731.6	923.2	1,477.6	3,320.2	716.5	7,169.1
- Unemployed	58.0	44.8	21.3	18.0	14.5	156.6
- Hours of Work	34.7	156.9	37.4	175.3	272.3	676.6
- Income	651.0	720.3	1,417.0	3,126.8	429.2	6,324.3
- Mismatch	7.9	1.2	1.9	0.1	0.5	11.6
<u>3. Persons Not in Labor Force</u>	1,394.0	1,734.9	1,541.0	2,061.8	1,144.8	7,876.5
3.1 Worked Around House	412.2	369.7	267.1	343.4	178.7	1,571.1
3.2 Student	744.4	957.3	917.7	1,101.0	639.9	4,360.3
3.3 Waiting for Agr. Season	-	38.7	12.7	164.4	116.3	332.3
3.4 Others	237.4	369.2	343.5	453.0	209.9	1,613.0
<u>4. Persons Under 11 Years Old</u>	1,153.0	3,144.9	3,225.8	5,971.7	1,953.0	15,448.4

Note: 1/ Civilian Non-institutional Population

Source: National Statistical Office

2.2. Economic Index

2.2. Economic Index

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Table A.2.2-1 Gross National Product by Industrial Origin (at Current Prices)

	1976		1977		1978		1979 ^e		1980 ^e	
	Millions of Baht	%	Millions of Baht	%	Millions of Baht	%	Millions of Baht	%	Millions of Baht	%
1. Agriculture	104,657	31.0	110,929	28.2	120,094	27.5	147,076	26.4	176,303	26.2
2. Crops	77,509	22.9	79,069	20.1	96,180	20.5	107,980	19.4	128,527	19.1
3. Livestock	12,354	3.7	14,409	3.6	13,503	2.9	16,954	3.1	23,455	3.5
4. Fisheries	9,792	2.9	12,456	3.2	13,086	2.8	13,017	2.3	13,710	2.0
5. Forestry	5,002	1.5	4,995	1.3	6,325	1.3	9,125	1.6	10,611	1.6
6. Mining and quarrying	5,174	1.5	8,139	2.1	10,610	2.2	12,614	2.3	14,444	2.1
7. Manufacturing	63,025	18.7	74,676	19.0	89,089	19.0	109,740	19.7	125,830	18.7
8. Construction	15,784	4.7	20,251	5.1	24,844	5.3	29,240	5.3	39,011	5.8
9. Electricity and water supply	3,745	1.1	4,384	1.1	5,168	1.1	6,075	1.1	5,802	0.8
10. Transportation and communication	21,828	6.4	24,706	6.3	29,606	6.3	37,844	6.8	47,746	7.1
11. Wholesale and retail trade	59,391	17.6	74,931	19.1	90,053	19.2	102,853	18.5	124,998	18.6
12. Banking insurance and real estate	16,075	4.8	19,537	5.0	24,624	5.2	31,396	5.6	39,021	5.8
13. Ownership of dwellings	4,840	1.4	5,272	1.3	5,826	1.2	6,297	1.1	7,312	1.1
14. Public administration and defence	15,571	4.0	14,810	3.8	17,943	3.8	21,623	3.9	28,831	4.3
15. Services	29,545	8.8	35,395	9.0	43,095	9.2	51,482	9.3	64,434	9.5
16. Gross Domestic Product (GDP)	337,635	100.0	393,030	100.0	469,952	100.0	556,240	100.0	673,732	100.0
17. Plus: Net income from abroad	-1,261	-	-2,014	-	-5,402	-	-9,791	-	-14,406	-
18. Gross National Product (GNP)	336,374	-	391,016	-	464,550	-	546,449	-	659,326	-
19. Less: Indirect taxes	33,438	-	43,717	-	51,733	-	60,903	-	71,083	-
20. Capital consumption allowances	24,041	-	28,609	-	34,428	-	41,887	-	50,888	-
21. National Income	278,895	-	318,690	-	378,389	-	443,659	-	537,355	-
22. Per Capita GNP (Baht)	7,830	-	8,879	-	10,300	-	11,843	-	13,977	-

Source: National Accounts Division, NESDB

Note: e estimate

Table A.2.2-2 Gross National Product by Industrial Origin (at 1972 Constant Prices)

	1976		1977		1978		1979 ^e		1980 ^e	
	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates
1. Agriculture	65,898	-0.6	65,537	-0.6	72,513	10.6	71,408	-1.5	73,924	3.5
2. Crops	49,013	-4.5	46,794	-4.5	53,583	14.5	51,804	-3.3	53,942	4.1
3. Livestock	7,622	6.3	8,102	6.3	8,515	5.1	8,931	4.9	9,704	8.7
4. Fisheries	5,898	7.2	7,499	27.2	7,414	-1.1	7,281	-1.8	6,831	-6.2
5. Forestry	3,365	-6.6	3,142	-6.6	3,001	-4.5	3,392	13.0	3,447	1.6
6. Mining and quarrying	2,906	21.3	3,526	21.3	4,104	16.4	4,531	10.4	4,896	8.0
7. Manufacturing	42,529	13.0	48,071	13.0	52,521	9.3	57,841	10.1	61,381	6.1
8. Construction	10,022	19.7	11,996	19.7	13,583	13.2	14,547	7.1	16,709	14.9
9. Electricity and water supply	3,642	13.8	4,144	13.8	4,500	8.6	5,178	15.1	5,813	12.3
10. Transportation and communication	13,366	8.3	14,474	8.3	16,205	12.0	17,663	9.0	18,996	7.5
11. Wholesale and retail trade	38,821	6.2	41,213	6.2	43,658	5.9	45,497	4.2	47,049	3.4
12. Banking, insurance and real estate	10,208	13.4	11,574	13.4	13,443	16.1	15,582	15.9	16,714	7.3
13. Ownership of dwellings	3,664	4.3	3,823	4.3	4,052	6.0	4,289	5.8	4,545	6.0
14. Public administration and defence	8,893	7.4	9,555	7.4	10,166	6.4	11,594	14.0	12,673	9.3
15. Services	21,276	9.3	23,260	9.3	26,352	13.3	28,777	9.2	31,676	10.1
16. Gross Domestic Product (GDP)	221,225	7.2	237,173	7.2	261,097	10.1	276,907	6.1	294,376	6.3
17. Plus: Net income from abroad	-1,020	-	-1,575	-	-4,054	-	-7,010	-	-9,549	-
18. Gross National Product (GNP)	220,205	7.0	235,598	7.0	257,043	9.1	269,897	5.0	284,827	5.5
19. GDP Deflator	152.6	-	165.7	-	180.0	-	200.9	-	228.9	-

Source: National Accounts Division, NESDB

Note: e estimate

Table A.2.2-3 Expenditure on Gross National Product (at Current Prices)

	1976		1977		1978		1979 ^e		1980 ^e	
	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates
1. Consumption expenditures	262,128	15.3	302,182	17.2	354,067	18.7	420,246	18.7	522,721	24.4
Private	225,044	15.8	260,506	15.3	300,470	17.6	353,309	17.6	438,053	24.0
Government	37,084	12.4	41,676	28.6	53,597	24.9	66,937	24.9	84,668	26.5
4. Gross fixed capital formation	73,272	34.6	98,632	18.3	116,650	23.7	144,356	23.7	178,705	23.8
Private business	50,122	37.6	68,962	15.9	79,928	26.7	101,267	26.7	123,506	22.0
Public sector	23,150	28.2	29,670	23.8	36,722	17.3	43,089	17.3	55,199	28.1
7. Change in stocks	5,172	-	3,608	-	10,300	-	15,931	-	9,202	-
8. Expenditures on consumption and gross capital formations	340,572	18.8	404,422	18.9	431,017	20.7	580,533	20.7	710,628	22.4
9. Plus: Exports of goods and services	71,206	15.4	82,198	22.9	101,008	30.5	131,820	30.5	168,318	27.7
Expenditures on gross domestic product and imports	411,778	18.2	486,620	19.6	582,025	22.4	712,353	22.4	878,946	23.4
11. Less: Imports of goods and services	79,387	30.2	103,377	16.0	119,867	38.4	165,846	38.4	209,672	26.4
Expenditures on gross domestic product	332,391	15.3	383,243	20.6	462,158	18.3	546,507	18.3	669,274	22.5
13. Statistical discrepancy	5,244	-	9,787	-	7,794	-	9,733	-	4,458	-
14. Gross Domestic Product (GDP)	337,635	16.4	393,030	19.6	469,952	18.4	556,240	18.4	673,732	21.1
15. Plus: Net income from abroad	-1,261	-	-2,014	-	-5,402	-	-9,791	-	-14,406	-
Expenditures on gross national product at current prices	336,374	16.2	391,016	18.8	464,550	17.6	546,449	17.6	659,326	20.7

Source: National Accounts Division, NESDB

Note: e estimate

Table A.2.2-4 Gross Saving (at Current Prices)

	1976		1977		1978		1979 ^e		1980 ^e	
	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates	Millions of Baht	Growth Rates
1. Gross Domestic Saving (GDS)	69,840	14.8	80,155	14.8	104,013	29.8	118,575	14.0	139,383	17.5
2. Households	42,071	4.7	44,062	4.7	57,387	30.2	67,830	18.2	75,986	12.0
3. Private business ^{1/}	23,078	5.2	24,277	5.2	34,358	41.5	41,559	21.0	58,324	40.3
4. Public sectors	4,691	151.9	11,816	151.9	12,268	3.8	9,186	-25.1	5,073	-44.8
5. Government	3,512	181.4	9,883	181.4	9,062	-8.3	6,170	-31.9	2,645	-57.1
6. State enterprises	1,179	64.0	1,933	64.0	3,206	65.9	3,016	-5.9	2,428	-19.5
7. Foreign Saving	8,604	156.7	22,085	156.7	22,937	3.9	41,712	81.8	48,524	16.3
8. Gross Domestic Investment (GDI)	78,444	30.3	102,240	30.3	126,950	24.2	160,287	26.3	187,907	17.2
9. Private business	50,122	37.6	68,962	37.6	79,928	15.9	101,267	26.7	123,506	22.0
10. Public sector	23,150	28.2	29,670	28.2	36,722	23.8	43,089	17.3	55,199	28.1
11. Change in stocks	5,172	-	3,608	-	10,300	-	15,931	-	9,202	-
12. GDP at Current Prices	337,636	16.4	393,030	16.4	469,952	19.6	556,240	18.4	673,732	21.1
13. Statistical discrepancies	5,244	-	9,787	-	7,794	-	9,733	-	4,458	-
14. GDS/GDP	20.7	-	20.4	-	22.1	-	21.3	-	20.7	-
15. GDI/GDP	23.2	-	26.0	-	27.0	-	28.8	-	27.9	-
16. GDS/GDI	89.0	-	78.4	-	81.9	-	74.0	-	74.2	-

Note: ^{1/} Including provision for the consumption of fixed capital
e estimate

Source: National Accounts Division, NESDB

Table A.2.2-5 Wholesale Price Index by Selected Commodity Group

(1976 = 100)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
1. All Items	92.8	96.2	100.0	107.8	115.8	128.8	154.7
2. Agricultural Products							
- Grains	107.7	107.2	100.0	105.3	129.1	120.2	150.2
- Commercial Crops	53.7	83.0	100.0	105.2	104.4	111.2	127.0
- Average	85.4	95.2	100.0	110.0	112.2	118.8	148.6
3. Foodstuffs	93.4	95.6	100.0	104.8	115.0	120.3	142.7
4. Construction Materials	96.8	98.6	100.0	108.0	118.4	146.1	164.8
5. Chemicals and Chemical Products	106.1	109.5	100.0	106.1	112.2	128.5	144.9
6. Petroleum Products	97.9	100.1	100.0	108.2	118.4	163.7	249.8
7. Transportation Equipment	87.5	96.4	100.0	104.5	120.9	131.2	159.2
8. Machinery and Equipment	90.1	92.3	100.0	107.0	116.4	119.1	129.5

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Source: Department of Business Economics, Ministry of Commerce

Table A.2.2-6 Consumer Price Indices

(1976 = 100)

	1974	1975	1976	1977	1978	1979	1980
<u>I. Whole Kingdom by Group</u>							
1. All Items	91.2	96.0	100.0	107.6	116.1	127.6	152.7
2. Food	91.0	95.7	100.0	109.4	119.1	129.9	155.4
3. Non-Food	91.1	96.2	100.0	104.9	112.0	123.8	148.4
- Clothing	91.8	96.9	100.0	104.3	109.6	124.6	149.9
- Housing	93.6	97.0	100.0	105.5	111.2	122.1	145.7
- Personal & medical care	91.5	98.8	100.0	106.4	115.1	123.0	148.4
- Transportation	85.8	91.3	100.0	103.1	118.4	138.2	171.7
- Recreation, reading & education	89.2	95.6	100.0	102.9	109.5	120.9	144.4
- Tobacco & alcoholic beverages	91.4	96.2	100.0	107.1	110.0	113.0	125.3
<u>II. Whole Kingdom by Region</u>							
1. Whole Kingdom	91.2	96.0	100.0	107.6	116.1	127.6	152.7
2. Bangkok Metropolis	91.5	95.3	100.0	108.4	117.9	130.0	155.9
3. Central & East region	90.8	95.6	100.0	107.0	113.4	125.0	150.2
4. Northern region	89.8	96.1	100.0	106.7	115.0	124.1	145.5
5. North-Eastern region	93.6	97.7	100.0	105.7	114.0	123.3	149.9
6. Southern region	88.9	96.2	100.0	106.0	113.6	125.2	148.7

Source: Department of Business Economics, Ministry of Commerce

Table A.2.2-7 Total Value of Trade ^{1/}

(Unit: million baht)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
<u>1. Exports (f.o.b.)</u>					
Domestic products:					
Port of Bangkok	50,891	57,820	64,050	82,018	101,896
Provincial Ports	9,299	12,580	17,202	24,278	28,550
Sub-total	60,190	70,400	81,252	106,296	130,446
Re-exports:					
Port of Bangkok	583	768	1,781	1,538	3,056
Provincial Ports	24	30	32	345	195
Sub-total	607	798	1,813	1,883	3,251
Total of Exports	60,797	71,198	83,065	108,179	133,697
<u>2. Imports (c.i.f.)</u>					
Port of Bangkok ^{2/}	72,422	93,543	108,134	144,337	185,776
Provincial Ports	455	634	765	1,824	2,946
Total of Imports	72,877	94,177	108,899	146,161	188,722
<u>3. Trade Balance</u>	-12,080	-22,979	-25,834	-37,982	-55,025

Note: 1/ Excluding military aids, 2/ Including gold imports

Source: Department of Customs

Table A.2.2-8 Trade by Commodity Groups ^{1/}

(Unit: million baht)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
<u>Exports</u>				
Food	35,429	40,239	40,617	50,097
Beverages & Tobacco	706	931	1,173	1,259
Crude materials	9,566	10,965	12,571	17,955
Mineral fuels & lubricant	120	20	14	33
Animal & vegetable oils & fats	39	26	40	23
Chemicals	268	298	444	722
Manufactured goods	9,336	11,963	17,479	23,427
Machinery	1,231	1,713	2,719	4,020
Miscellaneous manufactured goods	2,432	2,750	4,213	6,212
Miscellaneous transactions, etc	1,062	1,493	1,983	2,548
Re-exports	608	800	1,812	1,883
<u>Total</u>	<u>60,797</u>	<u>71,198</u>	<u>83,065</u>	<u>108,179</u>
<u>Imports</u>				
Food	2,281	2,503	2,846	3,909
Beverages & Tobacco	656	1,043	1,013	1,213
Crude materials	5,225	7,404	7,316	11,408
Mineral fuels & lubricant	16,695	20,889	22,851	32,650
Animal & vegetable oils & fats	163	292	272	473
Chemicals	10,505	13,356	14,979	21,791
Manufactured goods	11,984	15,409	18,479	25,794
Machinery	21,424	27,982	33,636	38,346
Miscellaneous manufactured goods	2,867	3,782	4,843	7,868
Miscellaneous transactions, etc	1,077	1,460	1,830	2,238
Gold	-	57	834	471
<u>Total</u>	<u>72,877</u>	<u>94,177</u>	<u>108,899</u>	<u>146,161</u>

Note: ^{1/} Excluding military aids

Source: Department of Customs

Table A.2.2-9 Balance of Payment ^{1/}

(Unit: million baht)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1. Merchandise										
Exports (f.o.b.)	14,269.7	16,692.1	21,750.2	31,252.5	49,002.4	44,364.5	60,361.2	70,462.8	82,250.8	106,681.2
Imports (c.i.f.) ^{2/}	-26,406.7	-26,606.4	-30,634.8	-42,054.9	-63,304.6	-64,525.7	-71,446.1	-96,004.8	-109,956.1	-153,463.5
Non-monetary gold	-107.8	-26.6	-	-	-	-	-	56.8	-834.7	-470.8
Balance of Trade	-12,243.8	-9,940.9	-8,881.6	-10,802.4	-14,302.2	-20,161.2	-11,084.9	-25,538.8	-28,540.0	-47,053.1
2. Services										
Receipts	10,094.8	9,899.6	11,322.7	12,723.1	15,634.2	16,551.6	13,993.3	14,771.7	22,123.9	29,163.6
Payments	-4,058.6	-4,495.5	-4,739.7	-5,886.7	8,033.5	-10,390.8	-12,350.8	-12,366.5	-17,844.8	-25,925.7
Net Services	6,036.2	5,404.1	6,583.0	6,836.4	7,600.7	6,160.8	1,642.5	2,405.2	4,279.1	3,237.9
3. Unrequited Transfers										
Private	57.4	131.1	630.7	2,398.9	4,375.6	1,134.5	100.8	443.3	128.0	461.9
Central Government	954.3	773.0	608.1	569.9	541.3	497.6	363.7	358.6	688.0	762.1
Total	1,011.7	904.1	1,238.8	2,968.8	4,916.9	1,632.1	464.5	801.9	816.0	1,224.0
4. Capital Movements										
Direct Investment	890.5	808.4	1,427.1	1,604.9	3,836.3	1,744.8	1,614.1	2,163.8	1,010.8	1,047.7
Other Private Long-term	1,342.8	560.1	2,008.7	-614.5	4,007.3	3,554.2	2,507.1	5,738.0	6,059.1	20,603.9
Other Private Short-term	183.4	154.8	309.1	1,292.4	1,131.3	2,600.3	2,778.5	5,226.4	1,696.2	3,567.2
Local Government Project	53.1	50.9	-25.4	-25.5	-24.1	-23.0	-13.1	-	-6.3	-
Central Government	9.0	158.9	-76.3	680.3	103.9	-121.6	2,577.0	838.7	6,098.5	8,548.0
Total	2,478.8	1,733.1	3,643.2	2,937.6	9,054.7	7,754.7	9,263.6	13,966.9	14,858.3	33,766.8
5. Allocation of SDRs										
	-	298.2	320.7	-	-	-	-	-	-	493.6
6. Recorded Balance (1 to 5)	-2,718.1	-1,601.4	2,901.1	1,940.4	7,270.1	-4,613.6	265.7	-8,424.8	-8,586.6	-8,330.8
7. Net Errors and Omissions	66.1	1,266.2	1,090.3	-1,076.2	741.9	1,755.6	-368.5	886.9	-4,711.4	405.6
8. Overall Balance (6 + 7)	-2,652.0	-355.2	3,991.4	804.2	8,012.0	-2,858.0	-82.8	-7,537.9	-13,298.0	-7,925.0

Note: ^{1/} No sign indicates credit, minus sign does debit

^{2/} Excluding military and imports

Source: Bank of Thailand

Table A.2.2-10 Macro Economic Targets of the Fifth Plan

	Fourth plan 1977-1981	Fifth plan (1982-1986)	
		Reference Run	Target
<u>GDP growth rate (% per year)</u>	7.9	6.6	6.9
agriculture	3.9	3.1	4.7
non-agriculture	9.4	7.6	7.5
mining (excluding natural gas)	16.2	10.0	13.1
natural gas ^{1/}	-	84.0	94.3
manufacturing	9.5	7.6	7.6
construction	12.5	7.0	6.5
<u>Export of goods (f.o.b.)</u>			
average value per year (billion baht)	111.5	287.7	315.4
value growth rate (% per year)	22.8	17.9	21.8
volume growth rate (% per year)	9.1	7.1	11.2
<u>Import of goods (c.i.f.)</u>			
average value per year (billion baht)	156.0	411.7	374.3
value growth rate (% per year)	26.3	20.0	17.1
volume growth rate (% per year)	11.3	10.4	7.5
<u>Import of fuel & lubricants</u>			
average value per year (billion baht)	41.4	111.8	105.0
value growth rate (% per year)	33.7	15.8	13.5
volume growth rate (% per year)	8.2	2.1	0.0
<u>Trade balance</u>			
average value per year (billion baht)	-44.5	-123.9	-59.0
trade balance/GDP (%)	-7.3	-9.0	-4.6

Note: ^{1/} It is assumed that the production of natural gas starts in 1981.

(cont'd)

	Fourth plan 1977-1981	Fifth plan (1982-1986)	
		Reference Run	Target
<u>Current account balance</u>			
average value per year (billion baht)	-36.3	-119.6	-41.7
Current account/GDP (%)	-6.0	-8.7	-3.4
<u>Public sector's foreign debt outstanding</u>			
foreign debt outstanding (billion baht)	85.0	400.0	222.4
(billion US \$)	(4.2)	(19.6)	(10.9)
	(End of fiscal year 1981)	(End of fiscal year 1986)	
public debt service ratio (compared to export earnings)	7.1	15.0	7.4
	(End of fiscal year 1981)	(End of fiscal year 1986)	
<u>Central government revenue ^{1/}</u>			
growth rate per year (%)	23.0	17.4	22.0
revenue/GDP (%)	13.9	14.8	17.2
<u>Central government expenditure ^{2/}</u>			
growth rate per year (%)	19.7	21.1	19.5
expenditure/GDP (%)	16.7	18.9	18.2
<u>Central government cash surplus</u>			
average value per year (billion baht)	-15.6	-58.3	-15.0
cash surplus/GDP (%)	-2.7	-4.2	-1.1

Note: 1/ Calendar year

2/ Actual expenditure

Source: NESDB

Table A.2.2-11 Production Targets

	1981	1986	Average annual growth rate (%)	
			Fourth plan	Fifth plan Target
GDP at current prices (billion baht)	846.9	1,819.4	20.2	16.5
GDP at constant prices (billion baht)	325.0	452.7	7.9	6.9
GDP per capita at current prices (baht)	17,833.0	34,929.0	19.5	14.4
GDP per capita at constant prices (baht)	6,844.0	8,691.0	5.5	4.9
Agriculture value added at constant prices (billion baht)	79.58	100.3	3.9	4.7
<u>Production targets of major crops ^{1/}</u>				
Rice (million tons)	17.6	20.5		
Maize (million tons)	3.3	4.2		
Rubber (million tons)	0.585	0.900		
Cassava (million tons)	14.0	16.8		
Sugar Cane (million tons)	15.7	24.5		
Manufacturing value added at constant prices (billion baht)	66.9	96.6	9.5	7.6
Manufacturing exports			14.6	15.0
Manufacturing output for domestic consumption			9.0	6.0

Note: ^{1/} Crop year 1980/1981 and 1985/1986

Source: NESDB

Table A.2.2-12 Population and Employment Targets

	Fourth plan (1977-1981)	Fifth plan target (1982-1986)
Population (million)	48.5 (1981)	52.1 (1986)
Population growth rate (% per year)	2.3	1.9 (1.5% in 1986)
<u>Labourforce</u>		
growth rate of labor force (% per year)	3.6	3.1
growth of labor force (million workers)		
- 5 years	3.8	3.9
- average per year	0.77	0.78
<u>Employment growth rate (% per year)</u>		
- agriculture	2.2	2.2
- non-agriculture	7.3	4.6
<u>Growth of employment (million workers/year)</u>		
- agriculture	0.352	0.390
- non-agriculture	0.394	0.330

Source: NESDB

Table A.2.2-13 Export-Import Targets and Current Account Deficit

	1981	1986	average annual growth rate (%)	
			Fourth plan	Fifth plan Target
<u>Export of goods (at current prices)</u>				
- Value (billion baht)	168.4	451.9	22.8	21.8
- Volume			9.1	11.2
<u>Rice</u>				
- Value (billion baht)	24.6	51.2	25.0	15.7
- Volume (million tons)	3.2	3.9	9.9	4.3
<u>Rubber</u>				
- Value (billion baht)	15.3	38.3	23.7	20.1
- Volume (million tons)	0.51	0.8	6.6	9.2
<u>Maize</u>				
- Value (billion baht)	7.7	15.5	6.3	15.0
- Volume (million tons)	2.2	2.7	-1.9	4.2
<u>Sugar</u>				
- Value (billion baht)	7.2	15.1	1.0	16.0
- Volume (million tons)	0.60	1.24	-11.8	15.6
<u>Tin</u>				
- Value (billion baht)	13.7	34.8	35.7	20.0
- Volume (million tons)	0.036	0.056	12.5	9.6
<u>Export of services</u>				
- Value (billion baht)	45.3	113.4	33.1	20.2
<u>Import of goods (at current prices)</u>				
- Value (billion baht)	229.5	505.6	26.3	17.1
- Volume			11.3	7.5
<u>Oil import</u>				
- Value (billion baht)	71.3	134.4	33.7	13.5
- Growth rate of volume			8.2	0.0
Trade balance (billion baht)	-44.5 ^{1/}	-59.0 ^{2/}		
Current account balance (billion baht)	-36.3 ^{1/}	-41.7 ^{2/}		

Note: 1/ average Fourth plan 2/ average Fifth plan

Source: NESDB

Table A.2.2-14 Foreign Debt Target and Financing of Current Account Deficit

1. Government's Foreign Loan Commitment

Direct Government Loan	63 billion baht
Guarantee of Payment	<u>147 billion baht</u>
	<u>210 billion baht</u>

2. External Debt and Debt service obligations

2.1 External Public Debt outstanding

<u>End of Fiscal year 1981</u>	<u>End of Fiscal year 1986</u>
85 billion baht	222.4 billion baht

2.2 Debt Services Ratio

<u>End of Fiscal year 1981</u>	<u>End of Fiscal year 1986</u>
7.1	7.4

3. Foreign Borrowing and the Financing of Current Account Deficit

(Unit: billion baht)

3.1. Current account deficit target (1982-1986)

<u>average per year</u>	<u>total</u>
417	2,085

3.2 Financing of current account deficit

Public sector ^{1/}	275	1,374
Private sector	<u>142</u>	<u>711</u>
Total	<u>417</u>	<u>2,085</u>

Note: ^{1/} Public sector's capital movement (disbursement minus repayment) is projected by using the rate of disbursement for projects of the Third and Fourth Plans and by using total commitment of 210 billion baht for the Fifth plan.

Source: NESDB

Table A.2.2-15 The Projection of National Government Finance
- during the Fifth Plan

(Unit: million baht)

	Fourth Plan		Fifth Plan	
	amount	%	amount	%
Expenditure	499,347		1,247,670	
Revenue	397,150		1,125,800	
Budget deficit (-) or surplus (+)	-102,197		-121,870	
<u>Sources of Finance</u>				
A. Domestic Borrowing	80,730	78.99	109,680	90.00
- Bank of Thailand	37,520	36.72	48,750	40.00
- Government Savings Bank	13,000	12.72	18,280	15.00
- Commercial Banks and Private Sector	30,200	29.55	42,650	35.00
B. Use of Treasury Cash Balances	21,467	21.01	12,190	10.00

Note: The 1981 annual budget includes the official salaries adjustment amounting to 3,000 million baht in the middle of the fiscal year 1981.

Source: NESDB

APPENDIX III. The Project Area

Appendix III The Project Area

- 3.1. Meteorology and Hydrology
- 3.2. Geology and Soil
- 3.3. Irrigation
- 3.4. Drainage
- 3.5. Agriculture
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- 3.7. Agricultural Institution

3.1 Meteorology and Hydrology

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Table A.3.1 - 1 Status of Hydro-Meteorological Observation

<u>Item</u>	<u>Station</u>	<u>Code Number</u>	<u>Available Period</u>	<u>Note</u>
Rainfall	Saraburi	54012	1952 - 1980	No record period included
	Kaeng Khoi	54032	"	- do -
	Sao Hai	54022	"	- do -
	Rama VI Barrage	42520	"	- do -
	Lopburi	19013	"	- do -
	Wang Noi	42062	"	- do -
River discharge	Pasak	S2(S9)	1948 - 1980	- do -
Regulator discharge	Manorom		1965 - 1980	
Summary of Meteorological Data	Lopburi		1951 - 1975	

Table A.3.1-2 Rainy Days in Amphoc Muang Saraburi Station

YEAR	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	YEAR
1952	2	6	11	11	13	6	10	2	0	0	0	1	62
1953	2	10	9	6	10	13	7	2	0	0	2	3	64
1954	4	6	9	7	20	18	4	0	1	0	1	4	74
1955	5	8	18	12	13	15	7	3	0	0	2	5	88
1956	7	15	15	11	11	16	7	2	0	0	1	8	91
1957	6	4	9	4	12	16	11	5	0	0	0	0	67
1958	0	9	9	8	14	17	2	0	0	0	1	4	64
1959	6	11	3	18	7	17	8	4	0	0	0	0	74
1960	1	12	11	10	10	16	8	8	0	1	3	4	84
1961	3	8	10	11	16	11	12	1	1	0	1	0	74
1962	5	7	9	9	9	11	8	0	0	0	0	1	59
1963	1	2	10	8	11	9	8	11	0	0	5	1	64
1964	5	17	6	9	11	7	6	0	1	0	1	1	64
1965	1	9	11	6	11	12	3	5	0	0	1	1	60
1966	2	16	11	13	17	9	10	3	4	0	0	0	85
1967	2	6	5	16	9	13	5	0	0	0	5	0	61
1968	4	8	8	11	5	8	1	1	0	3	0	0	49
1969	1	6	11	14	8	15	5	3	0	0	2	0	65
1970	3	8	10	9	8	13	6	1	3	0	1	1	63
1971	3	5	5	7	10	7	7	0	1	0	1	2	48
1972	6	4	13	11	16	15	7	14	2	0	1	3	92
1973	0	11	14	14	18	16	8	5	0	1	1	6	94
1974	9	16	7	13	18	14	16	3	1	6	1	4	108
1975	3	12	19	13	15	13	10	5	4	0	0	0	94
1976	0	13	13	18	20	13	12	2	0	1	1	5	98
1977	3	10	9	16	15	20	10	1	1	2	7	0	94
1978	3	15	13	19	16	20	6	1	0	3	1	0	97
1979	4	13	11	12	13	15	1	0	0	0	2	4	75
1980	5	9	15	15	15	18	12	0	0	0	0	0	89
Mean	3	9	10	11	13	14	7	3	1	1	1	2	76

Data source: RID Hydrology Section

Table A.5.1 - 3 Monthly Rainfall, Amphoc Muang Saraburi Station (54012)

(Unit : mm)

YEAR	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	TOTAL
1952	47.0	70.6	144.3	278.9	249.2	129.9	269.4	25.1	0.0	0.0	0.0	4.6	1219.6
1953	19.8	132.3	200.6	139.1	259.0	250.4	154.9	22.1	0.0	0.0	17.9	30.5	1206.6
1954	41.1	114.4	189.5	84.7	522.0	402.1	62.2	0.0	12.1	0.0	5.4	51.5	1284.8
1955	130.0	144.1	247.3	132.7	252.9	222.9	85.8	3.9	0.0	0.0	3.8	59.0	1413.6
1956	71.0	357.5	409.7	256.2	252.5	295.0	150.2	40.5	0.0	0.0	1.8	52.0	1844.8
1957	142.7	75.1	254.3	217.7	258.6	578.7	373.3	135.5	0.0	0.0	0.0	0.0	2015.9
1958	0.0	232.0	232.0	284.8	568.6	458.5	47.0	0.0	0.0	0.0	16.7	90.9	1750.5
1959	105.7	139.7	36.7	526.1	201.6	552.6	199.9	15.1	0.0	0.0	0.0	0.0	1577.4
1960	18.5	123.1	296.1	319.4	165.1	288.3	223.6	111.5	0.0	3.2	35.0	60.7	1644.5
1961	148.8	179.5	170.4	187.5	284.5	241.1	176.4	20.2	8.7	0.0	2.8	0.0	1419.9
1962	210.9	114.9	182.7	300.3	180.2	560.8	141.6	0.0	0.0	0.0	0.0	8.5	1699.9
1963	24.5	7.1	281.5	159.8	290.1	268.5	187.4	131.1	0.0	0.0	39.9	8.5	1598.4
1964	24.1	281.6	97.9	164.0	191.1	239.5	107.0	0.0	10.2	0.0	39.5	17.8	1172.7
1965	23.8	285.8	194.0	132.3	532.7	296.6	74.9	58.6	0.0	0.0	27.8	46.8	1473.3
1966	52.6	445.0	245.7	329.0	597.7	223.9	296.0	42.0	36.4	0.0	0.0	0.0	2063.3
1967	58.0	129.1	105.4	183.6	185.2	335.4	106.3	0.0	0.0	0.0	84.6	0.0	1187.6
1968	77.3	135.7	225.0	175.3	226.7	174.1	21.2	48.3	0.0	114.9	0.0	0.0	1198.5
1969	11.8	125.5	505.4	288.6	199.9	330.1	83.0	26.6	0.0	0.0	50.3	0.0	1421.2
1970	58.0	206.0	383.8	312.1	217.5	410.8	65.1	6.8	83.7	0.0	47.5	17.5	1808.8
1971	89.7	64.3	154.1	189.6	477.4	198.1	158.5	0.0	1.9	0.0	6.8	49.5	1589.9
1972	92.6	42.8	230.2	161.6	184.8	527.7	68.1	259.5	49.3	0.0	2.4	51.7	1670.7
1973	0.0	189.0	197.0	268.8	234.7	298.0	114.8	35.2	0.0	0.5	3.8	63.1	1404.9
1974	80.1	134.5	92.7	259.1	184.0	188.7	215.3	75.0	4.2	92.4	3.8	68.0	1397.8
1975	72.4	144.6	276.4	209.8	174.0	165.2	106.1	45.0	36.5	0.0	0.0	0.0	1250.0
1976	0.0	82.3	176.8	284.1	299.1	167.0	204.1	11.7	0.0	9.2	12.7	94.7	1341.7
1977	45.1	138.3	113.3	190.2	111.6	236.4	103.1	4.1	1.5	4.6	146.4	0.0	1094.6
1978	28.2	225.3	131.6	302.9	136.5	434.1	92.2	0.8	0.0	12.9	0.8	0.0	1564.7
1979	31.8	130.8	118.9	143.6	139.7	411.5	21.8	0.0	0.0	0.0	14.4	82.0	1094.5
1980	35.1	84.8	221.2	208.4	268.7	214.8	175.0	0.0	0.0	0.0	0.0	0.0	1208.0
Mean	61.8	457.8	203.5	223.1	242.2	313.7	140.8	41.0	8.4	8.2	19.5	29.6	1449.4

Table A.3.1 - 4 Monthly Rainfall, Kaeng Khoi Station (54032) (Unit: mm)

YEAR	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL
1952	19.0	142.2	196.0	299.5	302.2	131.4	220.1	25.0	0.0	7.3	129.9	27.4	1500.0
1953	71.9	139.0	197.4	204.9	277.8	427.1	1601	18.5	0.0	19.8	11.1	33.9	1561.5
1954	86.7	102.5	240.6	121.1	299.5	359.1	57.1	11.6	0.0	0.0	0.0	136.8	1415.0
1955	90.7	79.9	518.6	129.2	197.7	469.5	96.3	106.9	0.0	0.0	6.7	46.3	1541.8
1956	93.0	224.5	431.0	218.8	362.6	531.2	145.7	72.1	0.0	21.2	0.0	27.2	1925.3
1957	105.5	89.6	272.3	370.0	278.3	676.0	420.8	125.4	0.0	0.0	0.0	0.0	2337.9
1958	0.0	39.9	132.9	185.0	195.9	338.1	64.6	0.0	0.0	0.0	0.0	18.5	974.9
1959	40.8	20.4	80.2	502.4	243.9	377.2	152.4	0.0	0.0	0.0	6.8	2.0	1226.1
1960	0.0	51.0	158.4	222.9	273.4	232.1	263.4	128.4	0.0	0.0	0.0	15.0	1344.6
1961	161.1	143.5	354.8	401.8	235.7	387.0	257.5	0.0	0.0	0.0	0.0	0.0	1941.4
1962	147.6	200.9	300.6	357.6	200.4	613.6	210.2	0.0	0.0	25.9	0.0	0.0	2056.8
1963	0.0	41.6	273.5	259.9	318.9	420.3	282.4	154.9	0.0	0.0	51.5	6.3	1809.3
1964	47.8*	259.3*	108.5*	162.7*	185.0*	224.7*	115.9*	0.0*	36.5*	0.0*	60.5*	42.7*	1243.6*
1965	47.6	262.7	187.4	136.7	310.2	271.6	89.6	76.2	0.0	0.0	27.8	46.8	1456.6
1966	8.5	209.6	118.0	206.0	359.3	207.4	163.1	0.0	27.1	0.0	7.4	35.0	1341.4
1967	100.3	153.4	200.0	217.3	192.4	304.5	195.7	5.9	0.0	0.0	54.0	0.0	1403.5
1968	189.1	84.8	218.5	140.6	190.8	164.4	36.5	29.8	3.1	0.0	0.0	34.9	1092.5
1969	34.9	72.3	357.9	406.9	152.2	422.2	103.8	17.9	0.0	0.0	0.0	31.3	1579.4
1970	89.7	149.3	356.7	263.4	270.2	249.3	80.2	12.1	15.1	3.9	12.4	41.3	1543.6
1971	106.3	174.3	97.9	211.7	365.9	204.0	139.6	13.8	6.7	0.0	14.5	26.3	1361.0
1972	116.3	44.8	100.6	130.5	174.0	447.9	142.0	102.6	11.4	0.0	0.0	62.9	1333.0
1973	0.0	117.5	297.1	262.2	246.8	206.3	140.6	27.8	0.0	0.1	10.0	90.0	1398.4
1974	67.4	129.1	42.1	253.1	144.9	156.6	176.4	87.3	29.1	0-0	5.0	120.4	1191.4
1975	11.7	153.8	199.4	238.7	255.5	118.8	119.5	115.7	21.0	0.0	17.8	124.8	1376.7
1976	0.8	107.0	124.0	222.0	299.2	187.0	133.9	24.3	0.0	7.0	0.0	60.5	1165.7
1977	103.1	98.5	84.3	180.5	210.8	175.9	51.3	1.0	0.7	4.9	108.1	0.0	1019.1
1978	53.0	225.0	83.4	208.0	123.0	457.0	37.0	0.0	0.0	0.0	40.0	0.0	1186.4
1979	53.0	186.0	179.4	143.7	92.0	266.0	7.5	0.0	0.0	0.0	48.9	2.6	959.1
1980	46.1	80.4	183.5	100.1	255.0	274.0	119.7	27.7	0.0	0.0	58.1	14.1	1138.7
Mean	63.9	129.8	203.3	225.4	241.2	313.1	144.2	40.9	5.2	3.1	22.4	36.1	1428.4

* Estimated from rainfall at Saraburi

Table A.3.1 - 5 Monthly Rainfall, Sao Hai Station (54022)

(Unit: mm)

YEAR	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL
1952	67.2	114.5	128.2	313.5	271.2	113.8	249.5	34.0	0.0	7.5	80.1	43.5	1423.0
1953	40.6	50.4	302.5	176.6	175.5	236.8	84.1	85.6	0.0	23.6	12.8	39.1	1227.6
1954	66.8	168.8	212.6	153.3	415.4	370.7	71.9	0.0	0.0	0.0	0.0	39.2	1498.7
1955	126.8	142.6	439.1	112.4	226.7	352.4	81.8	125.0	0.0	0.0	14.1	18.5	1619.4
1956	171.4	0.0	313.2	201.1	377.7	360.4	92.6	33.4	0.0	21.0	0.0	102.7	1673.5
1957	94.7	44.9	184.6	239.0	292.8	600.6	366.8	15.6	0.0	0.0	46.4	44.7	1930.1
1958	33.7	149.8	268.9	212.4	351.6	386.8	50.2	0.0	0.0	0.0	5.2	88.3	1546.9
1959	112.1	87.2	107.9	575.0	102.1	467.0	177.2	23.1	0.0	0.0	0.0	15.7	1467.3
1960	0.0	118.8	128.3	262.7	176.8	310.5	232.0	77.2	0.0	0.0	43.5	13.8	1363.6
1961	101.8	206.0	159.8	201.1	262.8	177.3	213.1	0.0	0.0	0.0	0.0	13.7	1335.6
1962	130.7	97.4	187.2	344.6	127.6	337.9	118.7	3.8	0.0	0.0	0.0	14.8	1362.7
1963	35.5	28.5	301.7	238.9	215.9	260.9	300.5	115.5	12.8	24.4	13.0	0.0	1547.4
1964	36.8	256.0	81.4	244.9	255.2	188.4	127.4	0.0	25.1	0.0	69.9	21.1	1286.2
1965	30.4	551.3	162.7	86.2	202.4	308.3	115.2	30.7	4.1	0.0	55.6	81.8	1408.7
1966	52.8	349.7	120.7	202.6	435.0	238.7	169.5	21.5	29.6	0.0	0.4	0.0	1700.5
1967	76.9	191.5	112.5	150.9	141.1	295.3	42.2	0.0	0.0	0.0	150.6	0.0	1161.0
1968	176.7	72.5	141.9	115.3	176.0	194.8	5.3	16.1	45.8	0.0	0.0	41.1	985.5
1969	46.5	133.0	257.0	374.7	130.0	400.3	53.0	13.9	0.0	0.0	74.1	30.5	1513.0
1970	167.5	162.5	246.5	254.0	333.1	345.3	78.2	5.7	14.8	4.4	11.2	63.4	1686.6
1971	22.5	92.0	195.3	105.6	309.9	300.7	90.2	0.0	2.8	0.0	0.0	13.8	1132.8
1972	67.9	9.8	220.7	84.3	158.0	434.4	110.4	123.9	39.5	0.0	0.0	18.2	1378.1
1973	0.0	129.3	158.1	302.6	192.5	266.1	91.2	36.2	0.0	4.2	9.5	33.7	1223.4
1974	32.8	101.2	108.6	225.3	170.5	190.4	137.8	68.7	0.0	86.6	0.0	8.8	1130.7
1975	0.0	128.1	173.1	240.6	236.8	147.7	91.4	17.1	49.5	0.0	16.8	17.1	1118.2
1976	59.6	190.1	112.5	178.0	357.2	274.0	142.4	14.8	0.0	0.0	1.3	85.6	1375.5
1977	52.6	133.4	104.2	97.6	73.5	241.5	167.8	27.5	0.0	0.0	170.2	0.0	1068.5
1978	51.0	186.1	142.4	202.8	135.8	411.5	33.4	0.0	0.0	0.0	0.0	0.0	1163.0
1979	86.6	109.4	96.7	231.3	254.2	296.2	0.0	0.0	0.0	0.0	19.5	9.0	1102.9
1980	18.1	91.9	140.3	211.8	420.2	154.6	166.1	11.2	0.0	0.0	35.4	0.0	1249.6
Mean	66.2	133.0	183.1	215.1	239.9	301.9	126.2	31.1	7.7	5.9	28.6	29.6	1368.3

Tanjore A.S.1 - 6 Monthly Rianfall, Rama VI Barrage Station (42520)
(Unit: mm)

YEAR	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL
1952	*****	*****	*****	331.8	182.1	135.6	230.4	0.0	0.0	0.0	75.6	49.8	*****
1953	25.9	125.1	208.9	168.4	127.9	229.1	117.8	34.9	0.0	0.0	0.0	14.2	1052.7
1954	19.0	191.6	241.3	201.8	254.1	373.8	95.8	0.0	0.0	0.0	3.2	16.8	1397.4
1955	108.5	126.7	372.2	177.3	172.3	363.8	61.6	0.0	0.0	0.0	0.0	147.2	1529.6
1956	107.7	479.2	441.0	150.5	*****	299.7	202.1	*****	*****	*****	*****	*****	*****
1957	63.6	50.2	87.3	120.6	277.2	*****	*****	*****	*****	13.7	0.0	*****	*****
1958	0.0	35.3	223.5	172.5	265.9	542.5	83.2	0.0	0.0	0.0	15.7	26.8	1165.4
1959	82.7	41.7	*****	*****	*****	*****	240.1	*****	*****	*****	*****	5.2	*****
1960	9.8	244.4	173.1	217.8	118.7	361.4	318.7	98.9	11.8	0.0	18.4	10.7	1583.7
1961	149.0	289.5	155.0	126.5	352.5	121.9	276.5	25.5	1.9	0.0	10.3	47.4	1556.0
1962	29.8	162.9	199.4	451.9	180.6	471.0	111.2	0.0	0.0	0.0	0.0	4.7	1611.5
1963	50.6	52.3	211.0	267.6	244.9	335.9	240.0	128.4	0.0	0.0	4.0	0.0	1532.7
1964	55.3	263.6	84.9	219.3	141.1	199.1	217.4	5.6	30.5	0.0	83.9	58.4	1359.1
1965	4.3	289.8	199.7	117.0	275.3	440.4	103.3	71.8	21.3	1.1	8.0	42.4	1574.4
1966	67.0	221.0	179.2	313.1	387.4	222.5	221.9	9.5	28.1	2.0	0.0	0.0	1651.7
1967	216.8	180.2	167.1	213.7	178.2	257.4	66.0	48.6	0.0	2.3	87.1	0.0	1417.4
1968	98.5	139.2	172.4	129.3	194.7	277.6	36.0	22.5	0.0	2.8	0.0	132.1	1205.1
1969	51.7	97.8	308.8	388.0	140.1	440.0	82.2	15.2	3.8	6.7	73.7	42.4	1630.4
1970	41.7	193.6	395.4	322.3	330.5	319.7	119.4	16.5	63.9	0.0	10.0	62.4	1875.4
1971	95.3	114.7	211.2	119.7	204.2	275.5	81.9	16.2	8.3	0.0	0.0	23.6	1150.6
1972	50.5	7.3	214.3	56.4	253.3	356.0	136.4	89.0	35.0	0.0	0.0	82.5	1280.7
1973	0.0	130.5	237.0	285.9	167.7	191.0	112.9	27.0	12.3	0.0	3.2	21.9	1189.4
1974	106.9	231.4	158.8	222.7	209.3	192.6	235.9	45.1	0.0	0.0	3.2	21.9	1427.8
1975	20.7	152.6	229.9	222.9	235.9	184.0	186.7	58.6	55.8	0.0	41.2	17.4	1365.7
1976	58.9	205.4	76.8	209.1	284.9	411.2	251.4	23.3	15.0	5.5	0.0	107.6	1629.1
1977	39.0	89.6	107.2	38.5	71.3	235.1	219.8	21.5	25.4	2.0	66.2	0.0	915.6
1978	71.8	162.1	196.2	195.5	119.4	536.6	14.5	0.0	0.0	2.0	1.0	0.0	1099.1
1979	34.7	173.3	110.4	139.9	121.2	277.9	1.7	0.0	0.0	0.0	6.4	4.3	869.8
1980	20.7	184.2	135.6	190.4	240.6	200.3	154.6	18.0	0.0	0.0	13.3	9.5	1167.2
Mean	59.3	164.8	203.6	206.1	212.3	290.7	149.9	29.9	11.3	1.4	19.4	35.2	1369.4

Tanje A.5.1 - 7 Monthly Rainfall, Lopburi Station (19015)
(Unit: mm)

YEAR	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL
1952	23.8	135.1	129.2	120.1	157.9	97.5	219.1	55.0	0.0	2.2	44.4	70.8	1055.1
1953	92.0	258.7	85.0	168.9	153.8	321.1	154.9	88.1	0.0	0.0	17.0	22.5	1362.0
1954	0.0	72.8	188.9	114.5	304.5	341.0	40.2	5.8	6.0	0.0	2.0	35.3	1111.0
1955	75.7	111.5	233.0	241.0	184.4	324.7	30.1	59.0	0.0	0.0	14.2	63.8	1337.4
1956	95.0	257.5	192.1	185.0	188.2	343.6	98.9	27.3	0.0	0.0	4.1	0.0	1391.7
1957	91.8	70.8	140.0	117.1	121.2	496.9	494.7	103.0	0.0	7.8	0.0	271.2	1914.5
1958	91.8	112.5	214.5	166.7	121.9	317.1	88.3	0.0	0.0	1.3	13.6	123.9	1251.6
1959	92.4	283.5	70.8	196.9	73.8	321.8	193.7	10.8	0.2	0.0	40.0	25.4	1309.3
1960	8.5	46.0	113.7	159.3	78.9	120.5	272.6	55.0	0.4	0.0	10.3	62.3	927.5
1961	153.7	165.3	197.7	153.7	164.5	82.5	285.7	12.8	0.8	0.0	0.0	2.1	1218.8
1962	47.5	289.1	107.0	317.0	167.6	234.8	115.9	1.5	2.0	0.0	0.0	0.8	1283.0
1963	75.4	64.3	144.8	163.3	118.9	360.2	197.1	98.0	0.1	2.6	31.0	3.9	1259.6
1964	182.1	352.8	113.7	183.7	176.4	319.4	245.1	9.4	52.5	0.0	12.1	16.2	1643.4
1965	28.4	189.1	133.8	119.7	285.1	295.0	127.0	75.7	10.7	137.5	1.1	12.0	1415.1
1966	90.9	340.2	159.7	183.6	281.7	150.5	159.8	13.1	68.0	2.2	0.8	0.0	1450.5
1967	129.7	125.7	174.6	188.8	67.9	281.2	81.0	71.8	0.0	0.0	20.4	0.3	1141.4
1968	45.5	182.1	100.8	112.7	130.1	239.4	71.5	27.2	0.5	59.3	0.0	56.0	1025.1
1969	4.1	73.5	118.9	213.8	179.2	430.9	97.6	14.3	0.2	0.0	14.8	139.3	1286.6
1970	70.7	132.8	288.5	160.5	234.6	168.5	158.0	11.0	49.1	0.0	26.6	42.3	1342.6
1971	68.1	184.7	126.2	51.2	328.0	179.2	120.1	7.6	4.1	0.0	1.1	21.2	1091.4
1972	91.8	4.9	179.7	98.3	125.4	516.5	172.4	108.8	33.9	0.0	0.0	46.2	1377.9
1973	0.0	126.7	151.0	97.5	85.8	279.1	67.0	11.6	0.1	0.0	0.0	67.6	886.4
1974	108.7	181.4	155.3	142.7	138.7	297.1	252.4	44.9	2.7	35.2	18.4	24.6	1402.1
1975	31.0	102.6	95.7	172.3	227.7	197.4	139.2	64.2	8.4	23.2	20.4	59.8	1139.9
1976	56.3	219.7	59.7	207.2	3.3.4	163.8	176.5	14.0	0.0	11.7	0.0	14.6	1226.9
1977	50.8	196.8	80.6	66.8	192.7	301.2	95.0	5.0	27.4	1.2	100.6	0.0	1181.1
1978	10.5	179.2	87.1	217.2	83.7	375.6	10.7	0.0	0.0	0.8	38.6	0.0	1003.4
1979	119.9	191.2	47.2	85.0	53.0	230.0	0.0	0.0	0.0	0.0	0.0	6.8	753.1
1980	141.4	99.5	195.7	206.8	221.3	183.0	122.5	44.6	0.0	0.0	12.8	71.1	1298.7
Mean	71.6	163.8	140.8	159.0	170.7	274.8	147.8	35.8	8.5	9.8	15.3	43.4	1241.5

Table A.3.1 - 8 Monthly Rainfall, Wang Noi Station (42062) (Unit: mm)

YEAR	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL
1952	97.1	94.0	148.8	145.8	*****	165.3	315.3	6.6	0.0	7.3	52.3	14.8	*****
1953	101.1	168.8	159.7	118.1	48.4	94.9	39.0	14.2	0.0	2.4	5.8	0.0	752.4
1954	*****	*****	*****	260.5	274.5	273.4	24.5	0.0	0.0	0.0	0.0	0.0	*****
1955	43.4	188.1	219.6	90.3	177.5	308.3	68.1	29.4	0.0	1.3	0.0	77.5	1203.5
1956	145.2	164.4	154.1	134.0	210.2	241.7	152.7	22.6	7.5	4.5	0.0	116.2	1353.1
1957	55.4	65.3	120.9	178.2	224.5	645.3	393.7	93.0	3.5	0.0	0.0	1.8	1781.6
1958	23.1	227.3	225.4	135.3	150.5	256.6	42.5	0.0	0.0	0.0	3.8	13.2	1077.7
1959	46.9	103.5	123.3	286.5	82.8	179.0	222.9	4.6	0.0	0.0	4.5	0.0	1254.0
1960	14.8	103.1	139.6	178.7	225.5	378.9	174.5	73.0	0.0	14.2	67.4	43.1	1412.8
1961	134.4	173.1	186.0	143.9	151.6	121.3	405.12	14.2	0.0	0.0	8.4	10.9	1349.0
1962	25.3	175.3	145.5	282.2	222.1	443.1	239.2	0.0	5.8	0.0	10.2	12.5	1561.2
1963	36.8	148.3	196.8	163.6	257.7	273.0	425.2	96.6	0.0	0.0	0.0	0.0	1598.0
1964	46.1	596.7	46.6	143.1	65.2	178.4	149.5	0.0	18.4	0.0	159.5	26.0	1429.5
1965	52.0	196.9	93.1	67.6	208.6	310.2	102.1	13.1	7.0	1.4	78.6	31.6	1162.2
1966	79.0	251.6	170.4	234.7	249.8	146.3	147.6	63.8	19.5	7.2	0.0	0.0	1369.9
1967	99.1	106.0	131.4	268.5	64.6	314.1	48.4	7.2	0.0	0.0	46.1	9.4	1094.6
1968	38.4	159.0	89.2	130.8	195.8	225.9	155.9	23.6	0.0	20.5	0.0	7.4	1046.5
1969	54.4	59.7	143.8	320.2	216.8	277.7	237.0	20.9	0.0	14.7	7.8	47.3	1400.3
1970	55.0	212.8	172.3	161.0	251.2	233.4	203.5	21.5	65.8	0.0	0.0	4.5	1381.0
1971	68.5	140.7	130.7	65.8	215.9	111.8	146.9	0.0	0.0	0.0	0.0	24.1	904.4
1972	87.8	86.4	108.4	64.8	117.1	501.9	72.4	137.1	28.2	0.0	0.0	38.1	1242.2
1973	0.0	83.6	146.7	148.4	129.1	147.3	66.4	33.6	0.0	0.0	26.0	56.0	837.1
1974	79.2	85.7	75.4	264.3	103.5	205.7	326.2	150.8	0.5	65.8	0.0	62.1	1419.2
1975	0.0	17.5	156.5	142.5	126.4	310.8	213.8	18.3	38.0	46.0	0.0	0.0	1069.6
1976	22.8	103.0	110.3	229.8	374.4	201.7	98.7	10.2	0.0	0.0	0.0	0.0	1150.9
1977	58.8	42.0	37.1	145.8	137.0	312.7	80.5	1.5	0.0	18.2	89.8	0.0	921.4
1978	6.0	207.2	247.5	197.5	53.8	209.8	119.5	0.0	0.0	0.0	20.5	0.0	1061.6
1979	11.5	173.9	31.2	203.8	245.3	257.5	53.7	0.0	0.0	0.0	11.6	18.4	1006.9
1980	107.1	61.7	336.3	182.7	303.5	280.5	334.1	0.0	0.0	0.0	0.0	7.0	1612.9
Mean	56.8	149.8	144.5	175.4	180.6	269.2	174.4	29.5	6.7	7.0	20.4	21.4	1239.0

Table A.3.1 - 9 Correlation Coefficient of Monthly Rainfall in Each Station

	<u>Saraburi</u>	<u>Kaeng Khoi</u>	<u>THA Luang</u>	<u>Sao Hai</u>	<u>Lopburi</u>	<u>Wang Noi</u>
Saraburi	-	0.810	0.813	0.858	0.752	0.679
Kaeng Khoi	-	-	0.775	0.818	0.739	0.661
THA Luang (Rama VI)	-	-	-	0.861	0.763	0.720
Sao Hai	-	-	-	-	0.735	0.731
Lopburi	-	-	-	-	-	0.702

3.2. Geology and Soil

3.2. Geology and Soil

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3.2.1. Soils

Pits and auger observations were conducted in the project area of 16,390 ha at a rate of one site per about 125 hectares. Physical and chemical analyses were conducted on soil samples.

Also, additional soil survey was conducted on profiles of soils. At the same time, farmers who cultivate the survey site were interviewed and asked for questionnaires on crop yield, limitations for yield, water condition of their field such as drought or flood (Table A.3.2-2).

Fig. A.3.2-2 shows the location of sites investigated.

Fourteen soil series are found in the area, and the relation between soils series and higher classification of soils is shown in Table A.3.2-3. Brief descriptions on soil profiles are presented in Table A.3.2-4.

Oxidation-reduction nature was tested on the soil of plough layer in the additional soil survey sites and oxidation-reduction potentials and poisoning capacity were determined (Fig. A.3.2-3). Lopburi soils showed the type of upland soil and Wattana soil showed good redox nature of rice soil. However Kao Yoi, Hin Kong, Nakhon Pathoj and Chong Kae soils fall into deep reduction without addition of organic matter. Deum Bang soils have very weak poisoning (buffer) action against reduction caused by decomposition of organic matter. As a result of redox tests, iron rich materials such as rendina soils should be dressed to the soils mentioned above, except Lopburi and Wattana soils. The dressing will prevent damage of rice roots caused by deep reduction and will attain higher rice yield.

Land is classified according to their suitability for crop cultivations under sustained irrigation. The specification for land classification is shown in Table A.3.2-5.

The analytical data on soil samples are shown in Table A.3.2-6.

Table A.3.2-1 Records of Wells

Well No.	Well No. by D.M.R.	Location	Depth (ft.)	Geological Log (ft)	Remarks
W-1	MC84 SBR2	Wat Nong Kae Phra Phutthabat	330	Tp. soil 0 ~ 5 Lt. Cl. 5 ~ 50 Gr. 50 ~ 80 Cl. 80 ~ 170 Gr. 170 ~ 200 Cl. 200 ~ 230 Gr. 230 ~ 240 Cl. 240 ~ 330	A1
W-2	C323 SR4	Phattha Rat School Ban Mo	450	Cl. 0 ~ 110 Cl & Ml. 110 ~ 450	A1
W-3	S125 SR28	Wat Thamma Sena Ban Mo	130	Cl. 0 ~ 35 Gr. 35 ~ 100 Cl. 100 ~ 130	A1
W-4	S121 SR24	Wat Saraphi Ban Mo	295	Cl. 0 ~ 100 Gr. 100 ~ 180 Cl. 180 ~ 240 Ml. 240 ~ 295	A1
W-5	MG94 SR12	Ban Som Poi School Phra Putthabat	150	Cl. 0 ~ 35 Cl & Ml. 35 ~ 150	Fd
W-6	MC90 SR8	Wat Ban Tan Sian School Phra Phutthabat	75	Lt. Cl. 0 ~ 30 Ml. 30 ~ 75	Fd
W-7	S120 SR23	Wat Ban Panchaphirom Ban Bo	150	Cl. 0 ~ 15 Ml. 15 ~ 110 Cl. 110 ~ 150	M1
W-8	S28 SR3	Wat Mai Sang Sok Ban Mo	260	Cl. 0 ~ 5 Ml. 5 ~ 75 LS. 75 ~ 260	M1
W-9	Q324 SR44	Ban Nong Bua School Ban Mo	70	Ml. 0 ~ 70	M1

Well No.	Well No. by D.M.R.	Location	Depth (ft.)	Geological Log	Remarks
W-10	MC88 SR6	Wat Ban Nong Khon Thi Phra Phutthabat	150	M1..... 0 ~ 150	M1
W-11	Q256 SR3	Ban Bo Sok Public Area Ban Mo	100	Cl..... 0 ~ 20 M1..... 20 ~ 100	M1
W-12	S12b SR30	-	100	M1..... 0 ~ 100	M1
W-13	S123 SR26	Wat Ban Bo Phra In Ban Mo	50	Tp.Soil... 0 ~ 5 M1..... 5 ~ 50	M1
W-14	Q280 SR27	Ban Nong Bo Phang Health Center Ban Mo	100	M1..... 0 ~ 100	M1
W-15	S106 SR9	Ban Khao Liao School Phra Phutthabat	150	M1..... 0 ~ 80 Cl..... 80 ~ 140 LS..... 140 ~ 150	M1
W-16	S116 SR19	Wat Ban Pong Phra Phutthabat	55	M1..... 0 ~ 55	M1
W-17	S124 SR26	Wat Bang Nong Song Ton Phra Phutthabat	245	M1..... 0 ~ 200 LS..... 200 ~ 245	M1
W-18	MC89 SR7	Ban Buk Tong School Phra Phutthabat	70	M1..... 0 ~ 70	M1
W-19	S119 SR22	Ban Khao Wong Health Center Phra Phutthabat	80	Cl..... 0 ~ 15 LS..... 15 ~ 80	Fd

Well No.	Well No. by D.M.R.	Location	Depth (ft.)	Geological Log	Remarks
W-20	C322 SR3 (No. 1)	Ban Nong Suttha School Phra Phutthabat	80	Ml..... 0 ~ 75 LS..... 75 ~ 80	Fd
	C322 SR3 (No. 2)	" " "	80	Gr..... 0 ~ 40 Cl..... 40 ~ 65 LS..... 65 ~ 80	Fd
W-21	Q326 SR46	Tambon Hua Pluak Health Center Sao Hai	100	Cl..... 0 ~ 30 Gr..... 30 ~ 100	Tr.
W-22	S114 SR17	Ban Hua Pluak Public Area	250	Cl..... 0 ~ 40 Gr..... 40 ~ 110 Rh..... 110 ~ 250	Tr.
W-23	S113 SR16	Ban Thung Masen Public Area	85	Cl..... 0 ~ 15 Ml..... 15 ~ 70 Cl..... 70 ~ 75 Gr..... 75 ~ 85	Fd
W-24	Q143 SR1	Wat Ban Huai Wai	120	Tp. Soil... 0 ~ 5 Cl..... 5 ~ 60 Cg..... 60 ~ 120	Fd Sample lost
W-25	Q255 SR2	Wat Samuha Pradit School Sao Hai	60	Cl..... 0 ~ 40 Gr..... 40 ~ 60	Tr.
W-26	S105 SR8	Wat Suan Dok Sao Hai	160	Cl..... 0 ~ 85 Lt..... 85 ~ 100 Gr..... 100 ~ 160	Tr.
W-27	Q320 SR41	Ph. Khae Witthaya School Muang	70	Sh..... 0 ~ 70	
W-28	G257 SBR3	Wat Nong Muang Muang	85	Gr..... 0 ~ 5 Cl..... 5 ~ 30 Gr..... 30 ~ 65 Br..... 65 ~ 85	Fd

Table A.3.2-2 Crop Yield, Yield Limitation and Flood at the Sites of Soil Survey

Site No.	Village	Sub-village	Ban	Crop	Yield kg/rai		Yield Limitation	Flood	
					1976	1978		Average Year	1978 Flood
101M211	Keem Khai	Song Khom Mue	Song Khom Mue	Paddy (HYV)	500	143	Drought	no	80 cm (10 days)
101M22	"	Song Khom	Mong Hai	Paddy	258	63	Drought	30 - 40 cm	70 cm (10 days)
101CN23	"	Tao Pun	Mong Chak	Paddy (HYV)	400	225	Drought	20 cm	100 cm (10 days)
103DM20E	Muang	Ban Keeng	Lat Khao Pun	Paddy	270	79	Drought	50 cm	70 cm (7 days)
103DM19M	"	"	Ban Koh	Paddy (HYV)	400	279	Drought	20 cm	180-200 cm (10 days)
103DM18	"	Pung Kuane	Phaa Khak	Paddy	350	280	Drought	no	50 cm (10 days)
064BH17	"	Pak Pieu	Kang Thanoon	Paddy	330	305	-	10 - 15 cm	40 - 50 cm (7)
064H2	"	Dao Ruang	"	Paddy	500	125	Flood	40 - 50 cm	200 cm (20 days)
064H1	"	Dao Ruang	"	Paddy	500	200	Flood	40 - 50 cm	210 cm (20 days)
103CN0	"	"	Phaa Khok	Paddy	-	-	-	-	-
103CN3	"	"	Sophon Hoo Hie	Paddy	400	173	Flood	-	150-180 cm (7)
103CH4	"	Huai Bong	Huai Bong	Paddy	35	9	Drought	no	no flood
103CHP	"	"	Mong Muang	"	-	-	-	no	no flood
103CN5	"	"	"	Paddy (HYV)	500	125	Drought	30 - 50 cm	no flood
103CN6	Sao Hai	Phraya Thut	Mong Chai	Paddy	400	100	Drought	30 - 40 cm	100 cm (10 days)
103CN7	"	"	Phraya Thud	Paddy (HYV)	300	250	Drought	50 cm	200 cm (15 days)
103CN8	"	The Cheng	Huai Boon	Paddy	350	88	Drought	30 - 50 cm	50 cm (7)
105DN9E	"	Mgiu Ngaa	Khok Kraton	Paddy	300	78	Drought	50 cm	140 cm (10 days)
105DN10	"	Mual Ngaa	Khok Kraper	Paddy	350	90	Drought	no	50 cm (7)
105DN15	"	Chak Puak	Khok Puak	Paddy (HYV)	270	143	Drought	30 cm	30 cm (7)
105DN12	"	Ban Yang	Sanpraboo	Paddy	350	163	Flood	20 - 30 cm	100 cm (7)
105CR16	"	"	Ban Yang	Paddy (HYV)	400	125	Flood-Drou	40 - 50 cm	300 cm (15 days)
003AN11V	"	"	"	Paddy (HYV)	520	360	Flood	15 - 30 cm	60 cm (15 days)
105CN25	"	"	Ban No	Paddy (HYV)	580	470	-	20 - 30 cm	190 cm (15 days)
016DN22T	"	Bueng Rang	Ban Chung	Paddy (HYV)	700	600	Irrigation Dry Season Mo.	30 cm	120 cm (15 days)
105M14	Pha Phuetthabat Hua Pa Mai	"	"	Dry S. HYV	350	265	Drought	20 - 30 cm	50 cm (3 days)
105AN15	"	"	Hua Sanchoe	Paddy	220	-	F	15 - 30 cm	F
105AN20	"	"	Teen Non	Maize	300	-	F	no	no
105CN26	Ban Mo	Mong Bua	Mong Than	Paddy	300	233	Flood	10 - 20 cm	70 cm (3-5 days)
106DN26	"	"	Ban Krua	Paddy	400	-	Drought	40 - 50 cm	180-200 cm (3-5 days)
106AN27S	"	"	Mong Than Tai	Paddy	300	228	Drought	10 cm	50 cm (7 days)
015CNF	"	"	Mong Bua	Maize	750	-	-	no	no
106AN8	"	"	Litlou Sab	Maize	750	-	-	no	no
015CNE	"	"	Ban Pho	Maize	N.G.	-	-	30 cm	no

Note: 1. Yield Mean: Mean of four years (1977, 1978, 1979, 1980). In 1978, most of the sites had flood damage.
 2. HYV: whole field of farmer is planted to HYV. 3. (HYV) Partly HYV is used. 4. Paddy only: Local varieties

Table A.5.2-3 Relation between Soil Series and Higher Soil Classifications

U. S. A.	Soil Series	Thai National
1. Entisols Fluvents.	Typic Ustifluvents 1. Tha Muang (Tm)	[L: Mixed, nonacid] Alluvial Soils
	Aqueptic Chromuderts 2. Chong Kae (Ck)	[C. Mont.] Grumsols
Uderts.	Aqueptic Chromuderts 3. Tha Rua (Tr)	[C. Mont.] Grumsols
2. Vertisols.	Entic Pelluderts 4. Ban Mi (Bm)	[C. Mont.] Grumsols
	Udic Pellusterts 5. Wathana (Wa)	[C. Mont.] Grumsols
Usterts.	Typic Pellusterts 6. Lop Buri (Lb)	[C. Mont.] Grumsols
3. Inceptisols. Aquepts.	Sulfic Tropaquepts 7. Ongkharak (Ok)	[C. Kaol. Acid] Hydromorphic Alluvial Soils
	Aeric Tropaquepts 8. Saraburi (Sb)	[C. Mixed, nonacid] Hydromorphic Alluvial Soils
	Aeric Tropaqualfs 9. Nakhon Pathom (Np)	[C. Mixed] Hydromorphic Alluvial Soils
7. Alfisols. Aqualfs.	Aeric Tropaqualfs 10. Khao Yoi (Kyo)	[L. Mixed] Low Humic Gley Soils
	Aeric Tropaqualfs 11. Deum Bang (Db)	[C. Mixed] Low Humic Gley Soils
	Aeric Paleaqualts 12. Hin Kong (Hk)	[FSi. Mixed] Low Humic Gley Soils
8. Utisols. Aquults.	Aeric Paleaqualts 13. Nakhon Phanom (Nn)	[FC. Mixed] Low Humic Gley Soils
	Aeric Paleaqualts 14. Manorm (Mn)	[C. Kaol.] Low Humic Gley Soils
5. Mollisols. Ustolls.	Typic Calcicustolls 15. Takhli (Tk)	[C. Mont.?] Renzinas

Table A.3.2-4 Characteristics of Soils -1

Soil Series	Classification		Texture	Color	Mottling	Drainage	Organic Matter	pH
	Thai National	USDA						
Ok			Clay or Silty clay	Very dark grey to Black	Yellowish red & Brown Mottles	Poorly	Modera- tely	6.0-6.5
Ong Kharak	Hydromorphic Alluvial Soils	Sulfic Tropaquepts	---over--- Clay	---over--- Brown or Greyish brown	---over--- Yellow Mottles			---over---
Tm			Sandy loam or Loam	Greyish brown or Brown		Modera- tely well	Medium	6.0-6.5
Tha Maung	Alluvial Soils	Typic Ustifluvents	---over--- Loam or Sandy clay loam	---over--- Brown				---over---
UA								6.0-6.5
Undifferentiated Alluvium								
Np			Loam Silty clay loam or Clay loam	Dark brown or Brown		Somewhat poorly	Medium	5.5-6.6
Nakhon Pathom	Hydromorphic Non Calcic Brown Soils	Aeric Tropaqualfs	---over--- Clay or Silty Clay	---over--- Dark greyish brown	---over--- Strong brown & Yellowish brown Mottles throughout			---over---
								7.0-8.0

Continue to next page.

Source: Department of Land Development, M.A.F., Thailand.

Table A.3.2-4 Characteristics of Soils -2 (Continued)

Soil Series	Classification		Texture	Color	Mottles	Drainage	Organic Matter	pH
	Thai National	USDA						
Bm			Clay or Silty clay	Very dark grey or Dark grey		Poorly somewhat	Medium	6.5-7.0
Ban Mi	Grumsols	Entric Pelluderts	---over--- Clay	---over--- Dark grey & Grey in deeper subsoil				--over-- 8.0
Bm-con.			Clay or Silty clay				Moderately low	
Ban Mi concretionary variant	Grumsols	Entric Pelluderts	---over--- Gravelly clay	ditto	ditto	ditto		ditto
Ck			Clay	Dark grey to Greyish brown	Brownish & Reddish Mottles	Poorly	Medium	4.0-6.0
Chong Kae	Grumsols	Aquentic Chromuderts	Clay throughout	---over--- Greyish brown, Prominent Light brownish very fine red grey or Grey	---over--- Mottles			--over-- 4.5-6.0
Tr			Clay or Silty clay	Dark greyish brown to Greyish brown		Somewhat poorly	Medium	5.0-6.0
Tha Rua	Grumsols	Aquentic Chromuderts	---over--- Clay	---over--- Mixed color in shade of Brown				--over-- 6.0-7.0
Wa			Silty clay	Very dark grey		Somewhat	medium	6.5-8.0
Wathana	Grumsols	Udic Pelluderts	---over--- Clay	---over--- Dark grey to Grey				--over-- 7.0-8.0

Table A.3.2-4 Characteristics of Soils -3 (Continued)

Soil Series	Thai National Classification	USDA	Texture	Color	Mottles	Drainage	Organic Matter	pH
Lb Lop Buri	Grumsols	Typic Pelluderts	Clay with CaCO ₃ concretions	Very dark grey or Black	Brown Mottles in Plough layer	Somewhat poorly	Medium	6.5-7.5
Sb Saraburi	Hydromorphic Alluvial Soil	Aeric Trophaquepts	Clay or Silty clay ---over--- Clay	Dark Grey or Dark Greyish ---over--- Brown	---over--- Strong brown Yellowish brown Mottles throughout	Somewhat poorly	Medium	5.5-6.5
Mn Manorom	Loe Humic Gley Soils	Aeric Paleaquultes	Clay or Silty clay ---over--- Clay	Dark Brown to Brown ---over--- Brown or Greyish brown & Brownish grey	---over--- Prominent red & Yellowish red Mottles	Somewhat poorly	Medium	4.5-5.5
Nn Nakhon Phanom	Low Humic Gley Soils	Aeric peleaquultes	Loam, Silt loam or Silty clay loam ---over--- Silty clay loam to Silty clay or Pale brown Clay	Pale brown to Brown ---over--- Light brown ish grey to Pale brown	Yellowish brown Mottles ---over--- Brown & Red Mottles	Somewhat poorly	Modera- tely low	5.0-5.5
								4.5-5.5

Table A.3.2-4 Characteristics of Soils -4 (Continued)

Soil Series	Classification Thai National	USDA	Texture	Color	Mottles	Drainage	Organic Matter	pH
Kyo Khao Yoi	Low Humic Gley Soils	Aric Tropaqualfs	Loam or Sandy loam	Light brownish grey, Light brown or Light reddish brown ---over---	---over--- Light brownish Yellowish red mottles	Somewhat poorly	Low	6.0-7.0
			---over--- Sandy or Silty clay loam or Clay loam	grey, Pinkish grey or light red- dish brown, Brown				---over---
								5.5-6.5
Hk Hin Kong	Low Humic Gley Soils	Aeric Peleaquults	Silt loam ---over--- Silt loam or Silty clay	Pale brown or Brown ---over--- Pale brown to Pinkish grey ---over--- Grey	Strong brown Mottles ---over--- Brown Mottles ---over--- Brown & Red Mottles	Somewhat poorly	Low	5.0-6.0 ---over--- 4.5-5.5 ---over---
Db Duem Bang	Low Humic Gley Soils	Aeric Tropaqualfs	Sandy clay loam or Clay loam & Clay ---over--- Clay	Dark greyish brown or Greyish brown ---over--- Brow, Yellowish brown & greyish brown, Light brownish grey or Light gray.		Somewhat poorly	Moderat- ly low	6.5-8.0 ---over---
								7.0-7.8

Table A.3.2-4 Characteristics of Soils -5 (Continued)

Soil Series	Thai National Classification	USDA Classification	Texture	Color	Mottles	Drainage	Organic Matter	pH
TK			Silt loam, Clay loam to Clay	Black to Dark Brown		Well	Medium	7.0-8.0
Takli	Rendzinas	Typic Calcicustolls	---over--- Silty clay to Clay	---over--- Very dark greyish brown to Dark brown				---over--- 7.0-8.0

Table A.3.2-5 Specification for Land Classification

Classification Characteristic	Upland			Rice Land		
	U-1	U-2	U-3	R-1	R-2	R-3
	SL-fri. CL	LS-p C	LS-sp C	CL-vsp C	SL-vsp C	LS-vsp C
Soil Texture		LS 30cm	LS 60cm	CL 30cm	SL 15cm L 30cm CL 30cm	LS 15cm
Depth of soil	150cm	120cm	90cm	90cm	60cm	30cm
pH (Paste)	5.5-8.0	5.0-8.5	4.5-8.5	5.0-8.0	4.5-8.5	4.0-8.5
Salinity EC x10 ⁵	4	6	8	4	6	8
Exchangeable Na meq/100g	2	2	3	3	4	4
Water-holding capacity in 120cm depth	15cm	11cm	8cm	Not applicable	Not applicable	Not applicable
Topographic relief	Smooth	Uneven	Rough	Smooth	Uneven	Rough
Slope	2%	4%	6%	2%	4%	4%
Leveling requirements	Low	Medium	High	Low	Low	Medium
Gravel or rock	Few	Few	Some but tillable	Few	Few	Some but tillable
Rock removal	None	None	Some	None	None	Some
Trees or brush cover	Slight clearing	Moderate clearing	Heavy clearing	Slight clearing	Moderate clearing	Heavy clearing
Surface Drainage	Good	Good-fair	Good-poor	Good	Good-fair	Good-poor
Sub-surface drainage	Good	Good-fair	Fair-poor	Poor	Good-fair	Good
Flood (1)	No	No	Occasional	Infrequent	Periodic	Annual

Class 6 is the lands which the soils do not meet minimum requirements for other land classes.

Note(1) Water depth of frequent floods in the average years are classified into three categories, that is (fo) under 25 cm, f1 25-50cm and f2 over 50 cm.

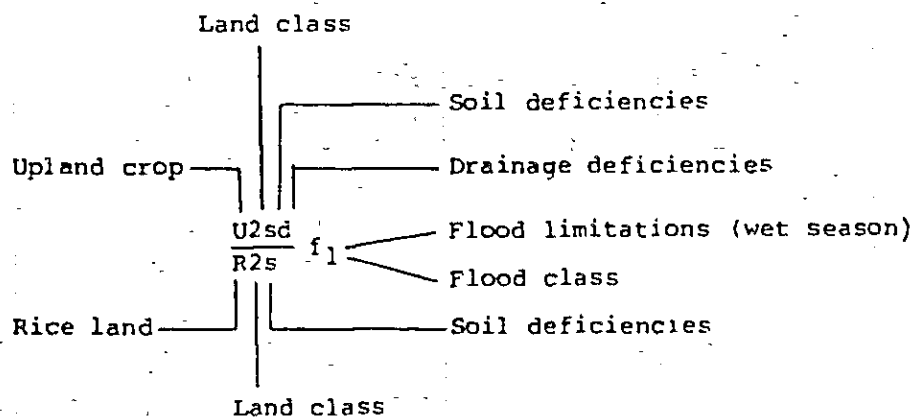


Table A.3.2-6 Analysis of Soil Samples (1)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15	Paste	1:5				
003A5	0-15	CL	21	34	45	C	24.0	19.1	15.1	30	5.4	5.9	49.3	0	<5
	15-60	VPC	19	35	46	C	26.4	17.7	14.7	32	5.1	5.9	47.6	-	<5
	60-120	PC	22	26	52	C	34.3	23.3	19.3	172	5.3	6.2	83.3	-	<5
	120-250	VPC	19	25	56	C	34.5	24.6	18.8	158	5.5	6.5	70.6	-	<5
003A10	0-30	SiCL	33	44	23	L	19.4	9.5	6.8	18	6.1	6.3	31.8	-	<5
	30-80	PC	27	30	43	C	25.4	17.6	14.8	33	5.7	6.5	61.6	-	<5
	80-150	VPC	29	35	36	CL	26.0	19.0	14.2	47	7.0	8.1	47.9	-	<5
003A11	0-15	CL+	13	30	57	C	35.1	25.6	19.7	33	5.2	5.6	64.9	8.5	<5
	15-60	PC	17	21	62	C	37.9	27.5	21.7	131	5.9	6.8	81.9	-	<5
	60-80	PC	12	17	71	C+	37.4	27.3	22.1	56	7.0	8.1	73.0	-	<5
	80-150	PC	11	25	64	C	38.0	26.6	22.2	73	7.9	8.8	84.4	-	<5
003B2	0-15	L	27.4	38.8	33.8	CL	23.3	16.8	10.5	22	5.1	5.3	40.5	5.9	<5
	15-80	PC	23.0	16.6	60.4	C	33.8	24.8	20.3	96	5.3	6.2	83.1	-	<5
	80-150	VPC	25.4	20.4	54.2	C	36.0	26.4	19.9	44	7.8	8.8	68.6	-	<5
003B5	0-20	CL	17.2	34.6	48.2	C	29.0	21.2	13.2	29	5.2	5.4	49.0	5.4	<5
	20-90	PC	19.4	20.4	60.2	C	30.0	25.0	19.8	92	5.3	6.0	99.0	-	<5
	90-120	PC	27.0	18.8	54.2	C	30.8	23.0	17.8	66	5.8	6.7	74.3	-	<5
	120-210	VPC	31.0	19.8	49.2	C	26.7	20.0	15.5	45	7.1	7.9	67.9	-	<5
	210-300	PC	47.0	12.6	40.4	SC	24.0	17.7	14.7	43	7.5	8.2	62.0	-	<5
003B8	0-15	CL	19.4	22.4	58.2	C	31.9	20.4	14.2	27	5.0	5.5	52.6	6.1	<5
	15-60	PC	19.4	17.6	63.0	C	32.3	22.2	18.1	110	5.4	6.2	71.5	-	<5
	60-150	SPC	21.0	16.4	62.6	C	34.4	24.8	18.3	140	6.2	6.5	10.3	-	<5

Analysis of Soil Samples (2)

Site No.	Depth cm	Particle Size Hydrometer			Texture	Text. Class	Moisture Retention %			pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %			1/3 Tension in bars	3 Tension in bars	15 Tension in bars	Settling Volume ml	Paste				
003B15	0-15	44.6	19.6	35.8	SiCL	CL+	22.0	13.0	11.6	23	6.2	6.3	38.2	-	<5
	15-40	28.8	12.6	58.6	PC	C	29.3	20.7	17.1	41	5.9	6.3	87.5	-	<5
	40-90	28.4	5.2	66.4	PC	C+	37.2	27.5	21.7	45	5.3	6.0	100.4	-	<5
	90-150	26.0	7.2	66.8	PC-SPC	C+	36.7	25.8	22.3	72	5.3	6.3	94.2	-	<5
103B21	0-20	25.0	30.4	44.6	CL	C-	24.0	15.8	12.7	26	6.4	6.6	42.9	-	<5
	20-70	22.6	20.4	57.8	PC	C	26.7	19.0	16.7	58	7.2	7.4	78.6	-	<5
	70-150	18.6	19.4	62.0	SPC	C	29.8	21.2	18.2	101	7.4	7.6	91.3	-	<5
003B29	0-20	20.0	18.6	61.4	CL+	C	32.5	21.3	17.3	30	5.4	5.7	72.6	3.3	<5
	20-150	25.2	7.2	67.6	PC	C+	36.5	24.7	21.5	79	5.6	6.2	105.0	-	<5
003B31	0-30	20.2	20.6	59.2	VPC	C	30.8	20.4	16.8	45	5.7	5.9	59.7	1.8	<5
	30-70	21.8	14.8	63.4	PC	C	32.7	22.4	18.5	120	6.3	7.1	87.7	-	<5
	70-150	20.0	14.6	65.4	SPC	C+	35.6	25.3	20.6	104	6.2	6.9	100.5	-	<5
004-8	0-30	17.6	12.8	69.6	CL	C+	32.5	-	20.6	30	4.9	5.4	79.7	6.2	<5
	30-90	16.8	9.0	74.2	PC	C+	32.7	-	-	39	4.8	5.4	96.9	-	<5
	90-150	18.0	10.8	71.2	PC	C+	36.3	-	20.9	83	5.2	6.4	131.1	-	<5
004-13	0-15	23.6	16.0	60.4	SL	C	27.5	-	17.7	95	4.9	5.3	94.1	6.1	<5
	15-50	54.8	28.2	37.0	CL	CL	19.5	-	8.8	24	5.1	6.0	40.8	2.9	<5
	50-100	17.6	14.8	67.6	PC	C+	40.8	-	21.2	34	4.9	6.0	112.0	-	<5
	100-150	51.0	32.0	17.0	PC	L-	12.7	-	2.8	16	4.5	5.1	20.8	-	<5
005A31	0-20	11.0	34.8	54.2	CL	C	35.7	23.5	15.7	34	5.5	6.3	56.2	-	<5
	20-80	16.0	19.8	64.2	PC	C	37.7	26.5	21.1	106	6.3	7.3	63.5	-	<5
	80-150	14.4	16.4	69.2	PC	C+	41.2	29.2	22.0	80	8.0	9.1	80.7	-	<5

Analysis of Soil Samples (3)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
015C36	0-70	PC	24	5	71	C+	56.8	45.4	41.5	55	7.2	7.8	104.6	0.50	-	<5
	70-150	SPC	25	5	72	C+	63.3	45.2	39.9	20	7.4	8.2	104.7	0.70	-	<5
015C38	0-15	CL	20	20	60	C	64.5	45.1	42.8	38	7.6	8.1	110.4	0.79	-	<5
	15-90	PC	23	9	68	C+	68.0	48.3	44.7	37	7.4	7.7	107.0	0.31	-	<5
	90-150	CL	36	44	20	L	25.3	10.9	7.7	21	7.4	8.8	36.8	0.82	-	36
015D12	0-10	CL	20	25	55	C	52.7	40.3	36.5	45	7.3	8.1	87.1	0.50	-	<5
	10-60	VPC	24	30	46	C	41.4	30.3	23.0	36	7.6	8.0	76.1	0.29	-	<5
	60-150	SiCL	24	54	22	SiL	20.0	10.5	7.3	21	7.6	8.5	36.8	0.26	-	42
015D22	0-20	VPC	19	21	60	C	63.4	43.2	38.0	38	7.5	8.1	94.9	0.50	-	<5
	20-110	SPC	21	10	69	C+	41.4	30.6	25.9	41	7.0	7.4	99.5	0.32	-	<5
	110-150	VPC	33	45	22	L	24.7	12.0	9.4	22	7.6	8.7	40.8	0.31	-	49
015D37	0-20	SPC	21	14	65	C	55.7	35.8	33.5	55	6.7	7.0	103.1	0.42	-	<5
	20-100	SPC	20	14	66	C+	57.9	38.3	36.3	73	7.3	8.1	103.5	0.40	-	<5
	100-150	SPC	26	16	58	C	47.7	32.2	29.6	50	7.7	8.8	85.9	0.33	-	<5
016D16	0-25	PC	18	16	66	C+	48.2	37.6	33.5	33	7.3	8.3	93.8	0.72	-	<5
	25-120	SPC	27	17	56	C	37.9	28.9	19.0	30	7.5	8.4	74.9	0.49	-	<5
	120-150	SPC	20	15	65	C+	45.2	34.2	28.4	31	7.6	8.3	88.0	0.50	-	<5
064A31	0-15	CL	22.0	43.0	35.0	CL	25.0	-	8.8	24	5.0	5.7	36.0	0.31	2.1	<5
	15-60	PC	21.4	30.8	47.8	C	28.7	-	14.8	35	5.4	6.7	53.0	0.33	1.0	<5
	60-150	PC	30.4	22.0	47.6	C	30.9	-	15.4	39	8.0	9.0	59.7	0.38	-	<5
064A34	0-40	VPC	15.0	33.4	53.6	C	29.0	-	16.6	39	5.4	6.8	74.5	<0.20	1.8	<5
	40-100	PC	13.8	24.6	61.6	C	36.3	-	19.2	67	8.0	8.9	65.2	0.63	-	<5
	100-150	PC	16.8	21.6	61.6	C	36.1	-	20.5	140	8.1	9.0	73.3	0.48	-	<5

Analysis of Soil Samples (4)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		Lab. Hyd.	1/3 Tension in bars	3 Tension in bars		15 Tension in bars	Paste				
064A35	0-15	10.0	33.4	56.6	C	28.1	-	12.1	33	4.5	5.0	40.9	0.22	6.5	<5
	15-60	10.0	17.2	72.8	C+	28.6	-	16.3	42	4.8	5.6	65.4	<0.20	9.1	<5
	60-150	15.2	9.6	77.2	C+	33.6	-	23.9	184	4.9	5.8	110.3	<0.20	-	<5
064B1	0-30	19.2	44.4	36.4	SiCL	23.2	-	9.0	28	6.1	6.8	36.2	<0.20	-	<5
	30-60	20.0	34.4	45.6	C	28.0	-	14.1	38	4.8	6.3	53.7	<0.20	-	<5
	60-140	23.6	28.4	48.0	C	33.2	-	16.5	392	5.3	6.7	57.4	<0.20	-	<5
	140-210	14.0	21.0	65.0	C+	44.5	-	21.2	870	6.4	6.9	84.4	<0.20	-	<5
	210-300	8.0	22.8	69.2	C+	46.2	-	21.7	800	5.1	6.3	102.5	<0.20	-	<5
064B5	0-15	34.0	33.0	33.0	CL	21.7	-	8.6	23	6.2	6.5	32.6	0.22	-	<5
	15-45	29.4	27.0	43.6	C-	23.0	-	11.4	52	6.8	7.6	36.2	0.22	-	<5
	45-100	27.8	22.8	49.4	C	27.3	-	14.8	60	6.0	6.5	61.6	0.85	-	<5
	100-150	25.4	17.0	59.6	C	34.0	-	18.8	237	5.6	6.2	89.1	0.75	-	<5
065C17	0-20	30.8	33.2	36.0	CL	23.8	16.7	14.0	22	5.7	6.2	44.5	0.65	-	<5
	20-100	18.0	14.8	67.2	C+	30.1	23.8	20.9	22	4.7	4.9	53.2	<0.20	-	<5
	100-200	24.8	11.2	64.0	C	27.8	21.4	19.6	21	4.6	4.8	48.6	<0.20	-	<5
	200-300	20.0	14.8	65.2	C+	30.4	43.5	20.0	23	4.6	4.9	54.2	<0.20	-	<31
101A1	0-60	24.0	6.4	69.6	C+	42.5	27.0	22.2	45	7.5	7.9	85.8	0.28	-	<5
	60-100	23.6	7.2	69.2	C+	46.9	28.1	22.0	54	7.6	8.2	85.4	0.23	-	<5
	100-150	24.6	13.0	62.4	C	41.4	26.9	21.5	45	7.9	8.3	77.5	0.25	-	<5
101A4	0-60	27.2	13.4	59.4	C	30.7	22.5	18.1	45	7.9	8.9	68.5	0.39	-	<5
	60-90	24.6	16.6	59.0	C	35.4	24.8	19.3	75	8.0	9.3	77.3	0.90	-	<5
	90-130	24.2	14.4	61.4	C	38.4	26.1	20.3	71	8.0	9.2	83.9	2.1	-	<5
	130-150	26.2	16.4	57.4	C	28.9	21.6	17.8	60	7.9	8.7	82.0	3.9	-	<5

Analysis of Soil Samples (5)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		1/3 Tension in bars	3 Tension in bars	15 Tension in bars		Paste	1:5				
101A10	0-30	SPC	23.8	15.2	61.0	C	38.3	26.6	21.5	31	6.3	6.7	74.8	<0.20	<5
	30-120	SPC	23.2	16.6	60.2	C	41.7	30.8	23.6	36	6.6	7.1	88.8	<0.20	<5
	120-150	SPC	29.6	9.0	61.4	C	38.6	26.9	22.3	34	7.2	7.2	89.2	<0.20	<5
101A12	0-20	CL	39.2	28.4	52.4	CL	21.1	15.1	11.5	20	6.2	6.4	33.5	0.27	<5
	20-70	VPC	39.0	10.2	50.8	C	22.9	18.8	16.3	23	5.3	5.8	46.7	<0.20	<5
	70-150	PC	53.2	9.0	37.8	SL	22.7	17.5	14.6	22	6.4	6.5	47.9	<0.20	<5
101A17	0-20	SiL	24.4	54.8	20.8	SiL	23.5	8.1	5.5	19	7.0	7.4	28.9	0.54	<5
	20-50	SiCL	38.2	45.0	16.8	L	17.5	13.3	9.4	19	6.2	6.8	25.5	<0.20	<5
	50-120	PC	31.2	19.2	49.6	C	25.5	18.9	16.1	24	5.6	6.2	-	<0.20	<5
	120-150	PC	30.4	21.0	48.6	C	27.2	18.2	15.4	45	5.4	5.8	70.6	<0.20	<5
101A42	0-30	PC	27.8	20.4	51.8	C	36.4	26.6	22.8	52	7.2	7.4	70.6	0.40	<5
	30-70	SPC	34.8	19.4	45.8	C	36.4	26.7	24.3	38	7.0	7.9	63.4	0.25	<5
	70-120	PC	28.6	24.6	46.8	C	36.0	25.8	21.1	32	7.2	7.6	69.9	0.25	<5
	120-150	PC	50.6	17.6	31.8	SCL	31.1	22.0	18.8	28	7.8	8.4	54.1	0.34	<5
101A44	0-20	PC	22.6	29.6	47.8	C	35.9	24.6	23.0	45	6.5	7.0	64.0	<0.20	<5
	20-40	SPC	22.6	23.6	53.8	C	38.4	24.9	20.8	28	7.0	7.6	68.4	0.36	<5
	40-100	SPC	20.6	24.6	54.8	C	37.2	25.1	23.8	45	6.7	7.7	69.5	<0.20	<5
	100-150	PC	46.6	21.6	31.8	SCL	28.6	19.7	17.7	22	7.0	7.6	46.8	<0.20	<5
101B21	0-50	SPC	18.4	6.8	74.8	C+	38.9	28.3	27.5	88	6.8	7.5	81.5	0.24	<5
	50-90	SPC	16.4	4.8	78.8	C+	44.8	31.9	30.5	93	7.0	7.9	94.6	<0.20	<5
	90-150	SPC	18.8	8.8	72.4	C+	43.2	30.9	25.2	80	7.7	8.5	92.5	0.24	<5
101B31	0-20	SiCL	26.8	52.6	20.6	SiL	26.4	11.9	7.0	42	5.9	6.8	31.0	<0.20	<5
	20-60	VPC	20.6	36.8	42.6	C-	29.4	21.2	16.6	250	6.8	8.0	48.7	0.35	<5
	60-150	VPC	20.6	36.8	42.6	C-	27.8	20.6	15.9	148	7.8	9.1	48.0	0.70	<5

Analysis of Soil Samples (6)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class	Moisture Retention %			pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3 Tension in bars	3 15	15	Paste 1:5	Settling Volume ml				
101C14	0-30	SiC	14.6	36.0	49.4	C	35.8	23.0	14.4	5.3	6.1	53.3	<0.20	-	<5
	30-60	PC	12.6	27.6	59.8	C	35.9	24.9	18.4	5.7	6.9	58.3	<0.20	-	<5
	60-90	PC	16.2	30.4	53.4	C	34.7	24.5	18.5	5.7	6.9	60.2	<0.20	-	<5
	90-150	PC	15.4	20.0	64.6	C	35.3	26.5	20.3	6.0	6.9	77.6	0.50	-	<5
101C16	0-20	VPC	14.8	23.8	61.4	C	36.0	24.5	16.8	5.1	5.8	59.6	<0.20	7.6	<5
	20-60	PC	41.2	15.4	43.4	C-	30.9	21.1	15.6	7.1	7.2	52.3	0.50	-	<5
	60-100	PC	24.4	16.6	59.0	C	37.4	25.1	20.2	5.4	6.3	90.2	<0.20	-	<5
	100-150	SPC	28.4	6.8	64.8	C	44.3	30.2	23.4	5.3	6.5	114.1	<0.20	-	<5
101C17	0-20	SiC	17.0	43.0	40.0	SiCL, SiC	30.0	19.1	11.5	5.3	6.2	39.7	<0.20	-	<5
	20-120	PC	13.0	30.6	56.4	C	38.1	24.9	19.6	5.5	6.6	71.0	0.26	-	<5
	120-150	PC	17.6	14.0	68.4	C+	39.3	26.6	22.1	7.5	8.5	87.5	0.76	-	<5
101C20	0-60	SPC	21.4	26.8	51.8	C	38.5	25.1	22.8	7.4	8.3	60.2	0.36	-	<5
	60-120	SPC	17.8	28.6	53.6	C	39.0	26.7	25.7	6.9	8.0	67.5	<0.20	-	<5
	120-150	PC	55.4	15.6	29.0	SCL	23.9	17.3	15.2	7.4	8.2	48.5	0.30	-	<5
101C25	0-60	PC	20.8	19.8	59.4	C	35.2	24.0	19.5	5.6	6.1	64.1	<0.20	-	<5
	60-120	PC	9.8	26.4	63.8	C	35.6	25.8	20.6	5.6	6.3	85.4	<0.20	-	<5
	120-150	SPC	31.4	13.0	55.6	C	35.6	24.9	20.7	7.4	8.4	77.8	1.2	-	<5
101C30	0-20	SiCL	18.0	46.0	36.0	SiCL	25.1	16.1	10.6	5.6	6.3	36.4	<0.20	-	<5
	20-60	VPC	16.0	31.8	52.2	C	33.9	23.4	18.5	6.0	7.1	67.0	0.20	-	<5
	60-150	PC	17.0	20.4	62.6	C	37.8	26.2	20.4	8.1	9.3	72.3	0.50	-	<5
101C31	0-50	VPC	20.8	20.6	58.6	C	35.7	23.5	18.6	5.4	6.2	59.7	<0.20	-	<5
	50-60	PC	19.6	14.0	66.4	C+	41.8	29.6	23.1	6.7	7.3	76.4	0.45	-	<5
	60-120	PC	21.6	12.0	66.4	C+	45.5	29.4	24.2	7.7	8.8	103.6	0.65	-	<5
	120-150	SPC	23.6	10.0	66.4	C+	44.9	30.2	23.7	8.0	9.2	85.4	0.78	-	<5

Analysis of Soil Samples(7)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meg/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
101C35	0-60	PC	19.2	14.0	66.8	C+	36.1	23.9	18.8	82	5.9	6.9	60.9	<0.20	-	<5
	60-120	SPC	23.2	8.0	68.8	C+	59.2	28.0	22.4	138	7.7	8.7	94.4	0.53	-	<5
	120-210	PC	17.2	14.0	68.8	C+	45.3	29.1	23.3	423	7.9	8.9	85.6	0.65	-	<5
	210-270	SPC	18.8	8.4	72.8	C+	50.3	33.6	25.4	495	8.2	9.1	109.4	0.80	-	<5
	270-300	SPC	19.6	10.0	70.4	C+	52.8	35.7	27.2	800	8.3	8.9	121.7	0.75	-	<5
101D20	0-50	SPC	20.0	7.6	72.4	C+	34.3	26.1	25.0	126	5.9	6.8	72.3	<0.20	-	<5
	50-150	SPC	18.4	6.0	75.6	C+	42.6	31.6	29.4	142	6.8	7.8	109.6	<0.20	-	<5
101D25	0-30	SiCL	36.6	38.8	24.6	L	23.6	11.8	7.7	24	6.2	7.0	28.7	0.29	-	<5
	30-80	VPC	35.0	25.6	39.4	CL+	29.6	20.0	14.5	65	5.8	6.8	47.7	0.90	-	<5
	80-150	VPC	33.0	30.8	36.2	CL	30.1	18.9	16.4	206	6.7	8.2	43.1	0.82	-	<5
003A16	0-10	PC	15.0	20.8	64.2	C	35.6	23.8	20.3	62	5.3	5.7	70.0	<0.20	4.9	<5
	10-120	SPC	23.0	12.8	64.2	C	36.5	27.1	21.3	125	5.3	6.1	112.5	<0.20	-	<5
	120-150	SPC	28.6	15.6	55.8	C	30.1	22.8	18.1	62	5.8	6.4	94.3	<0.20	-	<5
003A18	0-30	SiCL	24.6	39.8	35.6	CL	25.7	14.8	9.5	23	5.6	6.2	39.6	0.29	-	<5
	30-60	PC	17.0	32.8	50.2	C	29.5	20.1	15.9	62	5.5	6.4	73.2	<0.20	-	<5
	60-120	PC	17.0	32.4	50.6	C	31.1	21.7	17.3	90	6.1	6.7	66.1	0.60	-	<5
	120-150	PC	28.2	31.2	40.6	C-	27.1	18.9	16.0	41	7.5	8.3	60.0	0.89	-	<5
003A20	0-20	SiCL	21.0	44.8	34.2	CL	29.8	16.0	14.9	23	3.1	5.3	47.9	0.28	4.8	<5
	20-60	PC	21.0	26.6	52.4	C	32.1	22.9	18.5	45	5.9	6.3	70.1	0.20	-	<5
	60-150	PC	21.2	32.6	46.2	C	30.9	21.0	17.3	46	7.8	8.7	63.9	0.60	-	<5
003A26	0-15	SiL	17.6	54.0	27.6	SiCL-	19.1	10.7	6.7	27	5.0	5.2	35.4	0.26	5.0	<5
	15-70	SPC	17.0	25.6	57.4	C	34.8	27.5	19.8	88	5.2	5.6	93.1	<0.20	-	<5
	70-150	PC	12.2	28.4	59.4	C	30.2	24.0	20.3	198	5.3	6.3	78.1	<0.20	-	<5

Analysis of Soil Samples (8)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
003A30	0-10	VPC	12.4	16.0	71.6	C+	35.1	23.5	19.3	39	5.0	5.6	64.3	<0.20	6.4	<5
	10-70	PC	16.4	10.0	73.6	C+	32.0	25.7	21.9	120	5.2	5.8	88.2	<0.20	-	<5
	70-150	PC	18.4	11.2	70.4	C+	37.8	27.0	21.4	123	5.2	6.1	96.4	<0.20	-	<5
003A33	0-30	SiCL	20.6	44.4	27.0	L, CL	22.5	9.7	6.3	21	7.4	8.2	35.2	0.84	-	<5
	30-80	SiCL	25.0	49.4	25.6	L+	21.6	11.1	7.8	22	6.6	6.0	31.8	0.36	-	<5
	80-130	PC	30.8	34.6	34.6	CL	24.4	14.5	12.0	28	5.5	6.3	44.5	<0.20	-	<5
	130-150	PC	34.6	30.8	34.6	CL	23.2	14.3	11.8	24	7.3	7.5	56.6	0.40	-	<5
103-A60	0-10	CL	25.6	44.4	30.0	CL	24.4	-	10.2	21	7.0	7.3	34.4	1.1	-	<5
	10-65	CL	22.6	41.4	36.0	CL	27.7	-	13.1	21	4.7	5.3	41.5	<0.20	-	<5
	65-110	VPC	21.6	34.8	43.6	C-	25.3	-	16.1	23	4.6	4.8	46.7	<0.20	-	<5
	110-180	VPC+Lat	16.6	37.8	45.6	C	23.6	-	15.4	22	4.6	5.1	54.4	<0.20	-	<5
103B17	0-10	SiCL	18.2	50.8	31.0	SiCL	28.5	13.3	10.2	21	6.6	6.8	40.3	2.4	-	<5
	10-40	CL	21.6	43.8	34.6	CL	24.8	13.8	10.6	23	6.7	7.2	39.3	0.72	-	<5
	40-80	VPC	18.2	45.2	36.6	SiCL	24.8	14.8	11.3	26	6.3	7.1	42.6	0.62	-	<5
	80-120	PC	36.2	29.2	34.6	CL	22.7	15.0	12.3	41	7.2	8.0	56.4	0.98	-	<5
	120-140	PC	34.4	26.6	39.0	CL+	21.2	14.1	11.5	40	7.9	9.0	53.5	1.1	-	<5
103B29	0-50	CL	34.4	38.0	27.6	CL-	22.8	15.9	11.1	22	6.5	6.7	40.5	0.35	-	<5
	50-150	PC	36.2	26.2	37.6	CL	21.9	17.1	13.7	32	7.7	8.4	53.1	0.20	-	<5
103C1	0-20	L	29	49	22	L+	26.4	11.9	6.6	20	4.8	5.2	33.4	<0.20	19.8	14.5
	20-60	CL	16	45	39	SiCL+	27.3	19.1	14.0	28	4.3	4.6	58.9	0.25	13.3	8.2
	60-90	PC	19	38	43	C-	28.3	20.9	16.6	28	4.2	4.5	68.7	0.20	11.7	7.4
	90-150	PC	29	16	55	C	32.5	25.3	19.4	40	4.4	4.7	75.7	0.20	13.1	7.2
103C1P	0-20	SiCL	23.4	46.0	30.6	CL	20.3	15.2	7.4	22	7.4	7.9	34.3	1.1	-	<5
	20-75	CL	23.8	48.4	27.8	CL	19.4	11.6	6.6	19	5.1	5.4	34.8	0.32	-	<5
	75-150	VPC	27.8	40.4	31.8	CL	19.7	12.4	8.1	22	5.4	5.9	40.2	<0.20	-	<5

Analysis of Soil Samples (9)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		1/3	3	15	Paste	1:5				
103C3	0-20	22.0	49.8	28.2	CL-	20.5	12.0	6.5	7.4	7.9	32.7	1.1	-	<5
	20-90	15.0	54.8	30.2	SiCL	24.8	13.8	8.1	5.3	5.5	36.1	<0.20	-	<5
	90-150	19.2	42.6	38.2	SiCL	26.3	16.5	11.7	5.0	5.5	47.7	<0.20	-	<5
103C9	0-30	15.8	52.4	21.8	SiL	19.2	7.5	3.9	7.4	7.6	25.8	0.72	-	<5
	30-60	17.4	50.4	32.2	SiCL	21.9	13.7	8.7	7.0	7.7	42.8	0.40	-	<5
	60-120	25.4	36.8	37.8	CL	21.7	15.4	11.1	7.3	7.9	50.3	0.45	-	<5
	120-150	19.8	31.4	40.8	C	24.2	16.8	12.8	7.9	9.0	59.3	0.30	-	<5
103C11	0-30	21.6	44.4	34.0	CL	25.7	14.8	11.3	7.2	7.8	39.3	0.61	-	<5
	30-60	23.6	42.4	34.2	CL	25.3	15.6	12.5	6.7	7.5	44.8	0.55	-	<5
	60-150	21.4	45.4	33.2	CL	24.4	16.0	13.6	7.6	8.6	52.0	0.53	-	<5
103C14	0-30	14.8	52.6	32.6	SiCL	24.2	12.7	6.5	7.3	7.8	36.4	0.23	-	<5
	30-100	12.8	50.6	36.6	SiCL	22.3	14.2	7.9	7.7	8.6	33.0	0.52	-	<5
	100-150	23.0	34.6	42.4	C-	22.7	15.6	11.7	8.2	9.2	52.1	0.50	-	<5
103C15	0-30	17.0	46.0	36.2	SiCL	26.4	14.1	9.8	7.3	7.8	40.9	0.46	-	<5
	30-60	17.0	42.8	40.2	SiC-	26.7	15.5	12.8	7.3	7.9	46.1	0.28	-	<5
	60-150	16.6	40.4	43.0	SiC	27.9	17.7	14.4	6.7	7.0	59.1	<0.20	-	<5
103C20	0-30	23.0	42.4	34.6	CL	22.7	13.0	8.5	6.4	6.7	34.4	0.44	-	<5
	30-60	22.0	34.6	43.4	C-	25.8	15.7	12.2	5.1	5.6	42.8	<0.20	-	<5
	60-150	22.8	50.2	47.0	C	25.8	16.7	14.4	5.2	6.8	64.9	<0.20	-	<5

Analysis of Soil Samples (10)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3 Tension in bars	3	15		Paste	1:5				
103C21	0-30	SiCL	28.6	36.2	35.2	CL	21.8	13.0	10.0	22	6.6	7.0	35.1	0.50	-	<5
	30-70	VPC	26.8	26.6	46.6	C	22.4	15.5	13.6	37	6.7	7.5	73.1	0.21	-	<5
	70-150	PC	10.6	26.4	55.0	C	23.0	16.5	14.0	80	7.0	7.9	71.9	0.20	-	<5
103C25	0-30	PC	21.2	24.4	54.4	C	30.0	20.3	18.3	32	6.1	6.2	56.9	0.47	-	<5
	30-90	PC	28.8	14.4	56.8	C	35.0	21.0	19.0	38	5.7	6.5	85.7	<0.20	-	<5
	90-150	PC	29.0	14.4	56.6	C	30.9	21.4	17.3	41	7.8	8.5	82.3	0.40	-	<5
103C27	0-60	VPC	16.8	21.4	61.8	C	25.3	20.8	17.3	77	5.2	5.7	69.2	<0.20	3.8	<5
	60-90	PC	20.0	24.6	55.4	C	23.5	18.6	15.1	35	5.2	5.8	67.7	<0.20	-	<5
	90-150	PC	19.2	20.4	60.4	C	26.3	21.7	16.7	95	5.2	5.9	75.4	<0.20	-	<5
103C31	0-20	SiCL	23.0	49.6	27.4	CL-	24.2	10.8	7.2	21	6.8	6.9	36.4	0.90	-	<5
	20-70	CL	19.8	44.6	35.6	SiCL	24.9	14.5	9.7	24	5.3	5.4	49.8	0.22	-	<5
	70-120	VPC	21.8	38.4	39.8	CL+	27.0	15.8	12.4	32	5.0	5.3	45.4	<0.20	-	<5
	120-150	SiCL	24.2	38.4	37.4	CL	24.6	14.3	10.6	25	5.1	5.6	46.7	<0.20	-	<5
103C34	0-30	SiCL	18.2	50.8	31.0	SiCL	26.8	12.1	9.4	23	6.1	6.2	49.8	0.47	-	<5
	30-90	CL	21.6	45.4	33.0	CL	26.5	14.4	11.0	24	6.9	6.7	44.8	0.68	-	<5
	90-150	VPC	22.0	36.4	40.8	C-	27.3	17.3	14.4	28	6.9	6.5	61.8	0.49	-	<5
103C40	0-30	SiCL	15.8	48.8	35.4	SiCL	19.9	12.3	6.6	26	7.0	7.1	33.8	0.84	-	<5
	30-50	CL	13.0	47.6	39.4	SiCL+	23.2	14.1	8.9	25	6.5	7.4	38.5	0.25	-	<5
	50-150	SiC	20.6	35.6	43.8	C-	24.9	15.7	12.0	24	5.3	5.9	55.4	<0.20	-	<5
103C44	0-30	VPC	27.8	30.4	41.0	C-	23.9	15.4	10.7	26	6.5	6.7	42.4	0.34	-	<5
	30-90	PC	29.0	23.2	51.0	C	27.3	18.3	15.1	63	7.6	8.3	70.0	0.28	-	<5
	90-150	PC	22.8	25.0	52.2	C	28.6	19.4	15.6	79	8.0	8.8	76.0	0.43	-	<5

Analysis of Soil Samples (11)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %	
		Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5					
103C54	0-20	VPC	13.0	34.4	52.6	C	30.0	19.0	15.2	34	5.6	6.0	49.8	0.20	-	<5
	20-70	PC	20.0	17.4	62.6	C	32.1	21.3	18.7	36	5.7	6.5	71.5	<0.20	-	<5
	70-130	SPC	26.0	9.4	64.6	C	30.9	27.6	24.0	44	6.0	6.5	103.7	<0.20	-	<5
	130-180	SPC	20.4	12.0	67.6	C+	35.5	24.2	21.6	170	7.7	8.3	109.7	0.30	-	<5
	180-300	SPC	10.0	15.2	66.0	C+	34.3	23.4	19.4	259	7.4	8.2	95.8	0.23	-	<5
103C59	0-20	PC	21.6	34.2	44.2	C-	27.2	17.0	12.2	26	6.1	6.4	44.7	0.40	-	<5
	20-60	PC	24.8	22.6	52.6	C	25.6	17.3	13.9	40	7.1	7.8	54.6	0.29	-	<5
	60-150	SPC	22.2	21.2	56.6	C	29.6	20.8	16.6	63	7.7	8.5	77.8	0.40	-	<5
103C62	0-10	SiL	26.6	33.6	39.8	CL+	25.7	13.6	11.7	21	6.8	7.3	30.4	1.9	-	<5
	10-40	SiCL	32.2	35.2	32.6	CL	15.6	11.9	6.0	23	7.2	7.7	29.8	0.48	-	<5
	40-70	CL	13.8	51.2	35.0	SiCL	22.7	14.0	9.1	28	5.5	5.8	37.9	0.22	-	<5
	70-150	SiC	13.8	43.2	43.0	SiC	23.0	16.8	12.9	30	6.0	6.1	52.3	<0.20	-	<5
	0-30	SiCL	16.2	46.6	37.2	SiCL	24.5	11.7	7.0	23	7.3	7.7	34.5	0.83	-	<5
103C65	30-60	CL	16.2	49.6	34.2	SiCL	23.4	14.4	10.5	22	5.5	6.0	48.6	<0.20	-	<5
	60-100	VPC	15.0	45.2	39.0	SiCL+	25.5	14.4	11.2	47	5.6	6.2	67.1	0.20	-	<5
	100-150	SiC	17.6	39.2	43.2	C-	26.2	15.9	13.4	104	5.6	6.5	89.3	<0.20	-	<5
	0-60	SiCL	18.6	55.2	26.2	SiL+	22.3	8.2	5.6	21	7.2	7.2	27.8	0.80	-	<5
103C69	60-100	SiCL	19.0	48.0	32.2	SiCL	21.6	11.7	8.7	47	7.9	8.9	51.6	1.8	-	<5
	100-150	SiCL	19.2	46.2	34.6	SiCL	27.5	15.6	10.0	158	8.1	9.5	42.9	1.3	-	<5
	0-30	SiCL	19.2	44.2	36.6	SiCL	24.3	13.7	8.8	27	7.2	7.9	40.6	0.66	-	<5
103C71	30-70	CL	13.0	42.2	44.0	SiC	25.5	16.4	12.5	26	5.4	5.7	31.1	0.31	-	<5
	70-100	VPC	15.6	34.2	50.2	C	30.3	19.3	16.3	27	5.0	5.3	69.7	<0.20	-	<5
	100-240	SiC	23.4	36.0	40.6	C-	25.0	16.3	13.2	25	5.0	5.6	56.7	<0.20	-	<5
	240-250	SiC	16.6	30.4	45.0	C-	23.6	15.8	12.7	30	6.0	5.9	61.3	0.53	-	<5
	250-300	SPC	15.8	33.6	50.6	C	26.7	15.8	13.5	68	5.8	6.6	115.9	0.20	-	<5
	0-30	SiCL	19.2	44.2	36.6	SiCL	24.3	13.7	8.8	27	7.2	7.9	40.6	0.66	-	<5

Analysis of Soil Samples (12)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class	Moisture Retention %			pH		Sat. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %	
		Texture	Sand %	Silt %		Clay %	1/3	3	15	Paste				1:5
103C79	0-30	SiCL	24.4	48.0	27.6	CL-	24.5	11.8	8.6	6.8	7.0	32.1	1.2	<5
	30-90	CL	22.4	48.2	29.4	CL	22.9	13.7	10.3	5.2	5.8	34.1	<0.20	<5
	90-150	VPC	32.2	34.8	33.0	CL	26.1	15.4	14.5	5.5	6.4	46.0	<0.20	<5
103D4	0-10	SiL	20.6	58.4	21.0	SiL	25.5	7.8	5.1	7.2	7.4	31.5	1.9	<5
	10-50	SiCL	20.6	56.4	23.0	SiL	23.3	10.2	6.8	7.8	8.2	29.7	0.60	<5
	50-110	PC	18.8	56.2	25.0	SiL+	28.1	16.7	11.8	7.1	7.6	58.8	0.28	<5
	110-150	VPC	14.4	14.0	71.6	C+	27.7	17.0	12.2	8.3	9.4	56.3	0.35	<5
103D11	0-20	CL	23.2	44.6	32.2	CL	25.5	18.7	10.4	7.4	8.1	43.8	0.96	<5
	20-50	CL	19.6	48.2	32.2	SiCL	24.7	17.7	10.0	7.4	9.0	40.4	0.32	<5
	50-110	VPC	21.2	46.2	32.6	CL	24.3	17.9	11.6	7.2	7.8	48.4	0.26	<5
	110-150	PC	26.6	37.2	36.2	CL	22.2	17.9	12.6	6.9	7.4	58.1	0.20	<5
103D17	0-20	SiCL	28.2	35.2	36.6	CL	30.7	17.7	15.0	7.5	8.2	48.9	0.72	<5
	20-90	PC	24.4	34.8	40.8	C-	30.2	19.4	15.8	6.8	7.3	52.4	0.50	<5
	90-150	PC	32.2	30.8	37.0	CL	28.1	17.6	14.5	6.6	7.5	55.6	0.26	<5
103D19	0-50	SiCL	36.6	38.8	24.6	L	23.7	11.5	9.0	7.2	7.7	35.7	0.63	<5
	50-100	Pc+Pi	61.6	19.8	18.6	SL+	19.3	12.2	10.4	6.6	7.1	33.0	0.51	<5
103D20	0-15	CL	16.0	56.6	27.4	SiCL-	24.1	11.3	7.9	6.7	7.2	35.2	1.2	<5
	15-50	SiCL	12.0	57.0	31.0	SiCL	23.0	12.4	8.4	5.6	6.4	33.8	0.28	<5
	50-150	PC	16.4	45.6	38.0	SiCL+	26.5	16.3	13.4	5.1	5.8	51.6	<0.20	<5
103D26	0-20	CL	24.2	48.0	27.8	CL-	25.2	13.8	9.1	7.0	7.6	38.6	0.64	<5
	20-60	VPC	26.2	46.0	27.8	CL-	24.9	14.8	10.5	6.2	6.4	47.5	0.25	<5
	60-120	PC	22.2	44.0	33.8	CL	25.3	16.6	12.6	6.3	6.7	51.7	<0.20	<5
	120-150	Pc+Pi	39.2	31.2	29.6	CL	22.5	16.2	12.2	6.7	7.3	46.2	<0.20	<5

Analysis of Soil Samples (13)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
103D30	0-20	22.0	12.8	65.2	C+	35.7	25.6	19.7	48	6.4	7.0	68.5	0.30	-	<5
	20-100	24.0	6.8	69.2	C+	40.5	32.8	24.8	47	6.7	7.4	106.3	<0.20	-	<5
	100-150	45.8	9.6	44.6	SC	30.1	19.6	15.5	27	6.7	7.4	61.0	<0.20	-	<5
103D31	0-15	26.4	35.0	38.6	CL+	23.7	16.0	10.7	21	5.5	6.1	44.6	<0.20	-	<5
	15-70	19.6	24.2	56.2	C	28.5	22.7	17.7	38	5.9	6.8	75.9	<0.20	-	<5
	70-150	23.6	22.2	54.2	C	29.4	20.9	16.4	43	7.7	8.5	81.8	0.20	-	<5
103D33	0-10	22.0	11.2	66.8	C+	32.9	25.2	19.5	28	5.2	6.0	70.6	<0.20	-	<5
	10-45	22.0	9.2	68.8	C+	37.5	28.0	22.6	40	6.5	7.3	84.0	<0.20	-	<5
	45-90	23.2	15.8	63.0	C	34.4	25.3	19.6	33	7.8	8.4	73.5	0.22	-	<5
	90-150	22.0	11.2	66.8	C+	36.1	26.3	20.6	41	7.8	8.7	81.0	0.20	-	<5
103D39	0-40	23.0	34.6	42.4	C-	27.5	17.9	13.4	23	5.3	6.0	47.8	<0.20	-	<5
	40-120	19.0	17.6	63.4	C	35.2	26.8	22.2	104	5.2	6.2	80.2	<0.20	-	<5
	120-150	25.4	13.6	61.0	C	31.6	23.1	19.7	44	5.4	5.6	89.9	<0.20	-	<5
103D41	0-10	25.4	44.6	30.0	CL	24.2	9.4	5.3	20	5.1	5.3	29.9	0.52	5.6	<5
	10-50	33.0	23.6	43.4	C-	25.4	15.9	12.8	24	5.6	6.2	51.4	<0.20	-	<5
	50-90	22.8	15.4	61.8	C	38.5	25.9	21.8	63	5.6	5.7	101.7	<0.20	-	<5
	90-150	27.8	17.4	54.8	C	32.7	20.6	18.7	98	5.4	6.4	83.9	<0.20	-	<5
103D43	0-20	20.6	37.6	41.8	C-	27.2	15.2	12.9	23	5.6	6.4	44.2	<0.20	-	<5
	20-60	21.6	30.4	48.0	C	28.7	19.1	17.6	28	5.4	6.3	57.3	<0.20	-	<5
	60-150	22.8	20.4	56.8	C	32.8	24.3	22.3	38	5.5	6.3	80.1	<0.20	-	<5
103D45	0-20	18.0	12.8	69.2	C+	33.4	23.5	21.3	73	5.7	6.7	59.3	<0.20	-	<5
	20-150	17.6	5.2	77.2	C+	41.9	29.4	27.8	54	7.0	7.6	102.8	0.56	-	<5

Analysis of Soil Samples (14)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention %			Settling Volume ml	pH		Sat. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3 Tension in bars	3 Tension in bars	15 Tension in bars		Paste 1:5	Sat. % SP			
103D55	0-20	CL	19.8	21.6	58.6	C	32.4	19.5	15.7	30	5.1	5.8	51.4	-	<5
	20-120	PC	26.0	6.0	68.0	C+	39.6	27.4	24.1	121	5.2	6.1	107.8	-	<5
	120-150	PC	17.6	7.2	75.2	C+	39.5	27.1	23.9	94	5.4	5.8	118.7	-	<5
103D56	0-15	CL	14.2	26.8	59.0	C	32.8	20.7	16.7	36	5.5	6.4	60.0	-	<5
	15-50	PC	16.2	19.2	64.6	C	35.5	23.3	19.9	91	5.7	6.7	75.7	-	<5
	50-90	SPC	20.2	15.2	64.6	C	37.3	24.9	20.2	62	6.4	7.2	84.4	-	<5
	90-150	SPC	19.2	13.6	67.2	C+	40.1	27.1	21.9	65	7.7	8.6	85.3	-	<5
103D57	0-15	CL	32.2	39.0	28.8	CL-	23.9	12.3	8.4	20	7.2	7.8	53.2	-	<5
	15-50	VPC	18.0	45.4	36.6	SiCL	25.5	14.9	10.0	25	6.6	7.1	36.2	-	<5
	50-160	SPC	20.2	37.2	42.6	C-	24.1	15.5	12.3	35	6.8	7.6	50.3	-	<5
	160-190	SPC	22.6	35.2	42.2	C-	23.4	15.9	12.9	38	7.5	8.6	49.5	-	<5
	190-270	SPC	56.0	19.2	24.8	SCL	18.4	13.3	10.2	34	7.2	7.9	38.0	-	<5
103D62	0-40	CL	22.0	44.4	33.6	CL	28.1	15.1	12.3	22	7.2	7.5	43.2	-	<5
	40-120	Pc+Pi	57.8	18.6	23.6	SCL	20.7	14.4	12.4	29	7.0	7.8	38.0	-	<5
	120-150	PC	44.6	18.8	36.6	CL+	26.7	16.4	12.4	37	7.1	8.0	54.8	-	<5
103D69	0-10	CL	19.2	15.6	65.2	C+	32.7	25.0	17.6	57	5.4	6.1	44.2	-	<5
	10-60	PC	21.6	9.2	69.2	C+	36.0	28.0	24.5	110	5.2	6.2	69.7	-	<5
	60-150	SPC	23.2	11.6	65.2	C+	41.9	19.5	25.7	87	5.8	6.8	89.7	-	<5
103D70	0-40	SiCL	23.4	52.2	24.4	SiL+	25.9	11.4	8.3	20	5.7	6.3	31.1	-	<5
	40-90	VPC	17.8	42.0	40.2	SiC-	29.5	18.8	15.8	26	5.3	6.1	50.6	-	<5
	90-150	PC	28.6	35.8	35.6	CL	26.8	17.1	14.4	24	5.3	6.2	48.8	-	<5

Analysis of Soil Samples (15)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
103D71	0-30	PC	18.6	18.4	63.0	C	33.0	-	25.7	30	5.9	6.3	75.0	0.60	2.6	<5
	30-70	SPC	19.6	14.4	66.0	C+	37.6	-	28.6	43	5.3	5.9	91.5	<0.20	-	<5
	70-140	SPC	17.2	14.4	68.4	C+	41.4	-	33.3	54	6.0	6.7	121.2	0.28	-	<5
	140-220	CL-VPC	34.8	13.2	52.0	C	-	-	34.1	33	7.4	8.8	90.6	0.90	-	<5
105A3	0-20	PC	15	13	72	C+	41.2	33.4	28.4	72	7.3	8.1	86.4	0.68	-	<5
	20-80	SPC	16	13	71	C+	44.0	35.0	33.0	61	7.4	8.2	85.4	1.0	-	<5
	80-150	SPC	18	11	71	C+	42.3	34.1	31.7	61	7.5	8.3	88.5	1.4	-	<5
105A6	0-15	CL+	14	33	53	C	34.1	23.2	19.6	64	7.0	7.5	65.3	0.50	-	<5
	15-60	PC	15	29	56	C	37.1	24.4	20.3	55	6.8	7.8	74.5	0.25	-	<5
	60-90	SPC	13	29	58	C	39.6	25.8	21.3	62	7.5	8.2	76.4	0.31	-	<5
	90-150	SiC	20	30	50	C	30.4	19.3	15.0	35	7.6	8.6	60.1	0.40	-	<5
	0-15	PC	16	13	71	C+	42.0	31.3	27.5	58	7.3	8.0	86.2	0.64	-	<5
105A12	15-90	SPC	23	10	67	C+	45.3	31.7	26.5	39	7.5	8.4	86.0	0.45	-	<5
	90-150	SPC	23	13	64	C	44.6	30.9	26.7	37	7.5	8.6	86.4	0.50	-	<5
	0-20	PC	18	17	65	C+	51.2	39.4	32.5	46	7.3	8.1	91.6	4.5	-	<5
105A20	20-60	SPC	17	14	69	C+	55.2	41.5	33.6	56	7.4	8.1	102.7	5.6	-	<5
	60-120	SiC	42	22	36	CL	25.3	17.3	12.9	40	7.7	9.0	52.3	4.3	-	65
	120-150	CL-	28	57	15	SiL	17.2	6.4	3.5	27	7.9	9.5	27.4	3.4	-	36
	0-20	PC	16	6	78	C+	57.6	43.5	40.4	82	6.9	7.6	118.5	1.2	-	<5
105A29	20-70	SPC	18	3	79	C+	65.3	47.8	38.8	60	7.2	8.1	114.3	0.74	-	<5
	70-110	SPC	17	4	79	C+	62.6	46.0	39.1	42	6.8	7.4	116.1	1.1	-	<5
	110-150	VPC	33	24	43	C-	33.1	23.6	21.1	27	7.5	8.4	68.4	1.7	-	66
	0-25	PC	21	9	70	C+	50.1	35.9	29.3	70	7.6	8.5	118.5	0.24	-	<5
105A37	25-120	SPC	22	12	66	C+	50.2	34.6	26.1	107	7.7	9.1	132.9	0.25	-	<5
	120-150	SPC	21	21	58	C	46.1	31.2	23.1	128	8.1	9.2	130.8	0.50	-	55

Analysis of Soil Samples (16)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		1/3 Tension in bars	3 Tension in bars	15 Tension in bars		Paste 1:5					
105A39	0-25	20	24	56	C	39.4	27.8	18.0	41	6.5	7.4	70.5	0.25	-	<5
	25-130	22	20	58	C	41.6	29.0	24.4	44	6.3	6.8	78.4	0.20	-	<5
	130-150	34	20	46	C	36.5	22.9	18.5	32	7.5	8.4	61.0	0.25	-	<5
105A43	0-30	14	22	64	C	35.0	25.2	20.4	60	7.2	8.0	73.7	0.55	-	<5
	30-110	16	19	65	C+	37.6	25.5	20.4	65	7.4	8.5	75.5	0.30	-	<5
	110-150	24	18	58	C	34.5	23.6	18.7	46	7.7	8.6	66.1	0.80	-	<5
105A44	0-30	12.8	17.2	70.0	C+	56.1	-	38.3	53	6.9	8.3	103.9	0.90	-	<5
	30-130	17.6	19.2	63.2	C+	54.5	-	34.8	73	7.2	8.7	104.7	0.85	-	<5
	130-210	25.6	13.8	60.6	C	48.2	-	52.0	60	7.3	8.7	102.5	2.2	-	<5
	210-240	29.6	20.8	49.6	C	39.0	-	23.8	37	7.3	8.3	86.0	4.2	-	<5
240-270	31.6	38.8	29.6	CL	-	-	25.3	28	7.4	8.9	51.6	2.6	-	<5	
105B5	0-10	17.0	37.0	46.0	C	29.9	19.1	14.9	27	7.4	7.7	54.6	0.95	-	<5
	10-50	21.0	28.0	51.0	C	31.8	19.4	16.3	35	7.8	8.5	55.6	1.1	-	<5
	50-90	26.0	29.0	45.0	C-	27.0	18.0	13.8	28	7.8	8.6	51.6	2.9	-	<5
	90-150	25.0	28.0	47.0	C	29.2	19.0	14.3	33	7.5	8.6	53.7	5.1	-	<5
105B8	0-30	17.0	56.4	26.6	SiL+	24.9	11.4	7.8	21	5.3	5.4	38.7	7.9	1.7	<5
	30-70	15.0	50.2	34.8	SiCL	26.8	15.9	11.7	42	5.5	6.3	62.4	3.8	-	<5
	70-150	14.6	49.0	36.4	SiCL	29.5	17.9	13.3	132	8.1	9.4	63.1	1.0	-	<5
105B12	0-40	17.4	46.4	36.4	SiCL	16.6	11.7	7.0	22	7.1	7.5	34.4	<0.20	-	<5
	40-90	17.2	41.0	41.8	SiC-	25.6	16.2	12.1	28	5.2	5.5	70.4	0.58	-	<5
	90-150	17.2	33.0	49.8	C	27.4	16.0	12.8	50	7.9	9.1	57.2	0.70	-	<5
105B16	0-20	25.4	49.4	25.2	L+	27.8	12.2	6.9	21	5.4	5.5	39.3	5.7	2.0	<5
	20-60	25.0	43.2	33.8	CL	28.1	16.3	13.1	23	4.7	4.9	43.9	1.2	5.5	<5
	60-120	20.4	43.8	35.8	CL	27.6	17.1	12.1	26	5.0	5.4	53.9	0.50	-	<5
	120-150	28.2	36.6	35.2	CL	25.5	15.6	11.6	40	7.2	7.7	51.1	0.42	-	<5

Analysis of Soil Samples (17)

Site No.	Depth cm	Particle Size Hydrometer			Textl. Class Lab. Hyd.	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Texture	Sand %	Silt %		Clay %	1/3	3		15	Paste				
105B30	0-25	Cl+	20.6	36.0	43.4	C-	28.7	20.6	14.8	28	7.2	7.8	0.48	-	<5
	25-70	PC	21.0	33.8	45.2	C	30.3	22.2	16.3	37	7.5	8.2	0.30	-	<5
	70-110	PC	20.8	37.0	42.2	C-	30.5	21.8	16.0	43	7.4	8.0	0.30	-	<5
	110-150	PC	23.0	36.4	40.6	C-	28.4	20.1	14.3	32	7.6	8.5	0.34	-	<5
105B65	0-15	CL	12.2	40.6	47.2	SiC+	29.2	18.5	13.8	26	6.8	7.4	0.44	-	<5
	15-40	VPC	13.4	35.2	51.4	C	31.4	18.1	13.1	24	5.4	5.8	<0.20	-	<5
	40-90	PC	11.8	28.8	59.4	C	31.7	21.1	18.2	63	5.0	5.5	<0.20	-	<5
	90-120	PC	13.4	28.8	57.8	C	30.8	19.6	16.6	45	5.0	5.6	<0.20	-	<5
105B61	0-30	CL	12.2	43.8	44.0	SiC	19.5	17.5	12.1	26	6.9	7.3	1.3	-	<5
	30-100	PC	11.4	37.2	51.4	C	29.6	21.9	16.6	41	4.9	5.3	0.40	-	<5
	100-180	PC	12.2	38.0	49.8	C-	24.6	18.9	12.6	38	6.0	6.5	0.38	-	<5
	180-210	VPC	22.0	36.6	41.4	C-	21.3	15.6	11.2	29	7.5	8.3	0.49	-	<5
105C5	0-25	PC	16	20	64	C	35.3	25.1	19.8	67	6.4	6.5	0.35	-	<5
	25-60	SPC	20	13	67	C+	36.7	26.9	23.0	28	5.4	5.7	<0.20	-	55
	60-210	SPC	20	17	63	C	35.8	27.2	22.5	48	5.3	5.8	<0.20	-	<5
	210-270	SPC	20	15	65	C+	39.2	27.7	22.9	42	5.3	5.8	<0.20	-	<5
105C11	0-15	PC	19	19	62	C	32.5	23.7	17.3	39	6.3	6.8	<0.20	-	<5
	15-60	SPC	19	15	66	C+	36.9	27.3	22.1	30	6.9	6.7	0.35	-	<5
	0-30	PC	18	21	61	C	32.7	22.4	17.7	33	6.4	6.8	0.41	-	<5
	30-60	SPC	19	19	62	C	34.5	24.2	19.0	45	7.2	7.4	0.30	-	<5
105G16	60-150	SPC	14	20	66	C+	36.7	24.2	19.2	43	7.7	8.4	0.23	-	<5

Analysis of Soil Samples (18)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste 1:5					
105C21	0-20	PC	10	16	74	C+	41.2	30.1	23.4	90	6.6	7.3	84.2	0.25	-	<5
	20-60	SPC	18	8	74	C+	45.2	31.7	24.8	85	7.3	7.9	100.8	0.25	-	<5
	60-150	SPC	21	8	71	C+	43.4	30.8	24.2	73	7.6	8.5	104.6	0.35	-	<5
105C24	0-40	PC	17	12	71	C+	42.7	33.2	26.8	73	7.1	7.9	101.5	0.43	-	<5
	40-90	SPC	16	17	67	C+	42.1	31.8	26.9	60	7.0	7.9	87.4	0.41	-	<5
	90-150	SPC	18	12	70	C+	45.6	35.1	27.5	76	7.6	8.6	103.1	0.28	-	<5
105C30	0-30	CL-PC	17	15	68	C+	44.3	31.1	27.1	62	7.2	8.0	91.7	0.32	-	<5
	30-60	SPC	23	11	66	C+	43.9	31.5	25.4	77	7.4	8.4	92.4	0.28	-	<5
	60-150	SPC	19	13	68	C+	45.6	31.7	25.2	83	7.5	8.6	100.8	0.40	-	<5
105C33	0-20	CL+	22	29	49	C	27.0	18.8	15.6	40	6.8	7.2	72.2	0.26	-	<5
	20-60	PC	25	22	53	C	30.4	21.9	17.6	33	5.5	6.3	84.3	<0.20	-	<5
	60-150	SPC	21	23	56	C	31.9	22.2	18.3	45	5.3	6.2	100.9	<0.20	-	<5
105C35	0-20	PC	17	20	63	C	32.7	23.3	19.2	45	6.9	7.5	71.1	0.45	-	<5
	20-80	SPC	15	20	65	C+	39.8	26.0	20.5	48	7.5	8.3	97.9	0.27	-	<5
	80-150	SPC	15	23	62	C	40.3	28.2	21.3	71	8.1	8.7	120.8	0.36	-	<5
105D2P	0-15	L	16	46	38	SiCL+	32.9	16.1	8.4	27	4.8	5.3	38.8	<0.20	24.5	16.8
	15-50	VPC-CL ₁	14	45	41	SiC-	27.9	17.8	11.4	27	4.5	5.2	45.3	<0.20	16.5	10.1
	50-120	PC	14	39	47	C-	28.7	20.7	16.6	38	4.2	4.6	65.5	<0.20	12.1	8.0
	120-150	PC	9	14	77	C+	37.0	28.7	25.5	36	4.1	4.4	110.0	<0.20	11.5	8.3
105D3	0-30	CL	15.0	36.8	48.2	C	24.0	15.1	9.5	25	7.6	8.4	36.3	0.90	-	<5
	30-85	VPC	15.0	38.4	46.6	C-	24.4	14.6	10.4	27	6.9	7.2	47.1	0.24	-	<5
	85-150	PC	17.4	30.8	51.8	C	25.7	15.3	13.3	33	5.6	6.0	70.6	<0.20	-	<5
105D8	0-25	CL-	11.4	44.4	44.2	SiC	23.6	14.2	7.1	25	6.6	6.7	35.7	0.84	-	<5
	25-90	VPC	13.8	42.4	43.8	SiC	26.6	16.2	11.8	32	5.7	6.2	51.4	<0.20	-	<5
	90-150	PC	14.8	39.4	45.8	C-	24.8	18.1	13.2	29	6.4	6.5	65.8	<0.20	-	<5

Analysis of Soil Samples (19)

Site No.	Depth cm	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention % Tension in bars			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
		Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
105D11	0-20	15.8	40.2	41.0	SiC-	26.2	15.6	9.9	26	7.1	8.0	42.9	0.72	-	<5
	20-60	15.0	44.8	40.2	SiC-	26.4	16.0	12.2	33	8.7	7.1	47.4	0.31	-	<5
	60-120	15.4	34.4	50.2	C	27.6	17.2	13.7	36	6.7	6.9	61.6	0.26	-	<5
	120-150	15.4	42.0	40.6	SiC	24.0	14.9	12.1	34	6.0	6.7	52.4	<0.20	-	<5
105D14	0-30	12.6	54.8	32.6	SiL	18.5	12.4	6.7	25	6.2	6.4	37.1	1.0	-	<5
	30-120	16.6	50.4	33.0	SiCL	23.8	14.0	10.2	66	6.0	6.5	49.0	0.60	-	<5
	120-150	18.6	42.8	38.6	SiCL+	23.2	16.1	12.0	176	8.1	9.2	48.7	0.90	-	<5
105D21	0-15	16.0	58.4	45.6	C-	18.9	15.2	12.4	26	7.7	8.4	44.6	0.71	-	<5
	15-90	17.4	30.4	52.2	C	31.4	19.3	16.3	30	7.9	8.7	50.4	0.45	-	<5
	90-150	16.8	34.6	48.6	C	31.0	17.4	15.9	31	7.9	8.7	53.2	0.32	-	<5
105D24	0-20	17.0	34.4	48.6	C	25.2	15.4	12.8	25	7.3	8.0	46.2	0.97	-	<5
	20-80	15.0	28.4	56.6	C	27.1	19.4	16.8	40	5.0	5.3	61.3	0.23	-	<5
	80-150	12.0	29.8	58.2	C	30.0	19.8	17.1	67	5.5	6.2	79.5	0.30	-	<5
105D28	0-30	15.8	26.4	57.8	C	23.2	17.9	14.5	33	7.4	7.8	60.6	0.47	-	<5
	30-90	11.2	27.4	61.4	C	25.0	18.2	14.5	39	7.6	8.3	67.3	0.29	-	<5
	90-150	21.8	22.8	55.4	C	20.3	15.5	12.9	50	7.8	8.5	55.7	0.30	-	<5
105D38	0-30	27.0	29.6	43.4	C-	18.6	15.6	10.9	24	5.9	6.7	41.4	0.80	-	<5
	30-90	21.4	21.6	57.0	C	30.0	20.3	16.1	90	6.8	7.3	102.0	<0.20	-	<5
	90-150	21.0	21.6	57.4	C	28.1	19.6	15.6	67	7.2	7.9	93.6	<0.20	-	<5
105D42	0-25	15.0	27.2	57.8	C	28.5	18.8	15.0	32	6.7	7.0	54.8	0.94	-	<5
	25-60	20.8	21.4	57.8	C	28.6	20.6	15.7	38	7.3	7.8	67.8	0.34	-	<5
	60-150	24.8	20.4	54.8	C	27.2	18.8	14.8	34	7.8	8.8	63.7	0.40	-	<5

Analysis of Soil Samples (20)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention %			Settling Volume ml	pH		Sat. % SP	Sat. Extract Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3	3	15		Paste	1:5				
105D46	0-15	CL	22.8	21.4	55.8	C	29.7	20.3	19.0	25	6.8	6.9	56.7	0.69	-	<5
	15-55	PC	20.6	13.2	66.2	C+	37.9	25.9	24.0	30	6.6	6.4	82.9	0.53	-	<5
	55-120	PC+	22.8	10.8	66.4	C+	38.0	26.0	23.6	85	5.3	6.2	96.5	<0.20	-	<5
	120-150	PC	16.6	17.6	65.8	C+	37.8	25.0	23.2	122	5.3	6.4	91.5	<0.20	-	<5
106A4P	0-20	L	33	45	22	L	23.9	9.1	5.4	18	4.6	5.2	27.3	0.38	18.5	14.8
	20-50	CL	24	37	39	CL+	23.2	15.4	13.2	350	6.9	8.0	64.4	0.40	10.0	7.8
	50-120	PC	11	35	54	C	27.9	21.9	19.2	209	5.2	6.2	64.5	0.45	8.7	6.0
	120-150	CL	26	39	35	CL	-	13.3	9.6	168	5.1	6.1	36.9	0.50	-	-
106A4	0-20	VPC	20	40	40	C, CL	34.9	21.4	19.1	27	7.6	8.5	56.8	0.60	-	44
	20-60	VPC	17	40	43	C	35.5	21.1	19.9	28	7.5	8.4	58.4	0.38	-	41
	60-150	SiCL	22	53	25	SiL+	15.0	9.9	7.4	21	7.7	8.7	35.7	0.30	-	36
106A38	0-30	SiC	21.2	8.0	70.8	C+	58.2	45.8	39.3	64	7.4	8.1	104.9	0.31	-	<5
	30-90	SPC	20.0	6.8	73.2	C+	60.9	49.4	41.7	45	7.2	7.6	114.9	0.25	-	<5
	90-150	SiCL+	31.0	51.6	17.4	SiL-	21.7	14.6	6.3	20	7.7	8.6	32.0	0.26	-	<5
106A40	0-90	SPC	18.8	14.4	66.8	C+	55.2	28.5	22.4	70	7.4	8.1	93.4	0.70	-	<5
	90-150	VPC	27.8	30.1	41.4	C-	27.3	16.6	13.4	27	7.5	8.3	49.7	1.8	-	<5
106A42	0-20	PC	17.0	33.4	49.6	C	46.2	32.4	20.7	35	7.5	8.1	72.8	0.34	-	<5
	20-70	VPC	21.0	35.2	43.8	C-	37.4	26.4	20.9	30	7.5	8.4	65.7	0.34	-	<5
	70-120	SiCL	21.2	51.0	27.8	CL-	24.9	11.8	8.5	21	7.7	8.5	38.3	0.27	-	<5
106B2	0-30	PC	19	20	61	C	57.8	45.4	39.7	40	7.4	8.0	97.1	0.72	-	<5
	30-60	PC	19	9	72	C+	62.2	47.4	43.1	50	7.1	7.8	108.2	0.35	-	<5
	60-150	SiCL	27	52	21	SiL	17.7	11.4	8.3	22	7.7	8.8	41.6	0.27	-	46

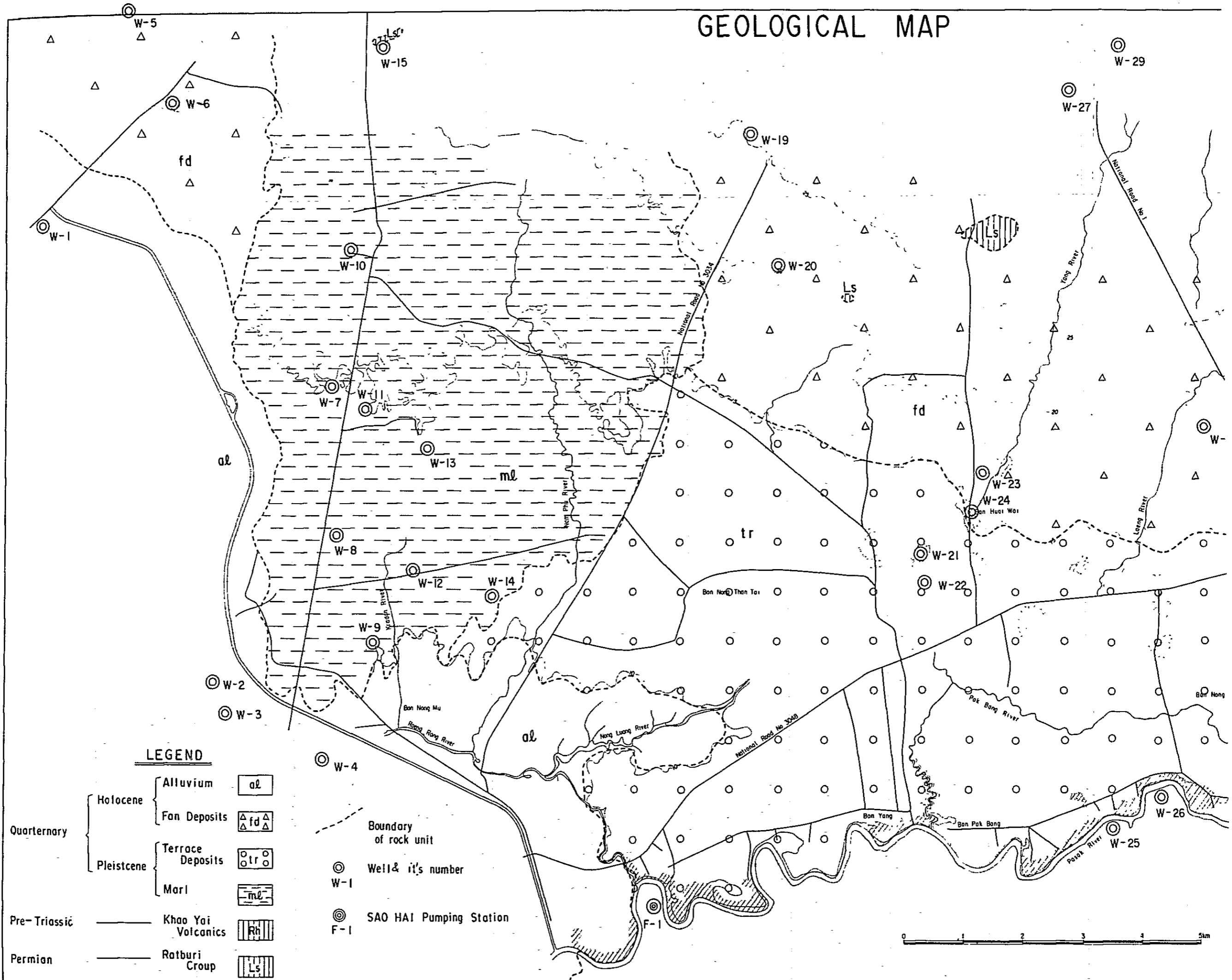
Analysis of Soil Samples (21)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class	Moisture Retention %			Settling Volume ml	pH		Sat. Elect. Cond. ECx10 ³	Ca(OH) ₂ meg/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3 Tension in bars	3 15	Paste		Sat. % SP				
106B6	0-20	SiPC	20	5	75	C+	58.8	42.2	36.0	64	7.5	8.0	1.1	-	<5
	20-120	PC	16	5	79	C+	62.9	45.5	38.1	55	7.2	7.6	0.61	-	<5
	120-150	PC	27	15	58	C	48.7	34.7	28.2	42	7.7	8.4	0.26	-	<5
106B8	0-20	VPC	17	28	55	C	48.4	37.2	32.1	45	7.7	8.3	0.50	-	<5
	20-70	VPC	18	30	52	C	42.8	32.3	27.7	34	7.5	8.3	0.36	-	<5
	70-150	SiCL	25	54	21	SiL	20.4	10.8	6.9	21	7.7	8.6	0.35	-	47
106B10	0-40	VPC	21	36	43	C-	39.6	29.5	25.7	27	7.5	8.2	0.60	-	<5
	40-90	CL	29	45	26	L+	22.8	12.4	8.8	21	7.6	8.6	0.34	-	48
	90-100	SiCL	27	51	22	SiL	21.8	10.6	7.0	22	7.6	8.8	0.32	-	48
106B16	0-30	VPC	17	41	42	SiC-	38.5	28.5	25.3	27	7.7	8.4	0.50	-	35
	30-90	CL	29	52	19	SiL-	19.2	11.6	8.2	20	7.7	8.6	0.25	-	44
	90-150	SiCL	34	53	13	SiL-	17.8	10.2	6.8	21	7.7	8.7	0.25	-	49
106B17	0-25	SPC	11	10	79	C+	58.0	42.5	33.1	97	6.8	7.3	0.79	-	<5
	25-120	SPC	19	4	77	C+	63.9	47.7	36.1	85	6.6	6.7	1.1	-	<5
	120-150	SPC	18	6	76	C+	63.7	47.2	35.5	108	6.8	7.1	0.75	-	<5
106B22	0-30	SPC	21	11	68	C+	49.3	35.8	30.3	37	7.3	8.0	0.71	-	<5
	30-90	PC	24	10	66	C+	49.5	36.0	29.7	45	7.3	7.8	0.51	-	<5
	90-150	PC	43	22	35	CL	25.3	17.7	14.0	29	7.7	8.3	0.58	-	56
106C6	0-50	SPC	19.4	18.6	62.0	C	43.9	32.0	27.2	48	7.5	8.2	0.78	-	<5
	50-150	SPC	18.4	16.4	65.2	C+	46.7	35.7	27.5	44	7.5	8.4	1.9	-	<5
106C10	0-20	SPC	17.0	42.6	40.4	SiC-	49.4	37.0	30.9	43	7.6	8.2	0.80	-	<5
	20-60	PC	25.0	12.4	62.6	C	40.4	30.8	26.0	47	7.5	8.2	0.50	-	<5
	60-150	SPC	21.6	7.2	71.2	C+	53.5	37.2	32.3	62	7.7	8.1	0.44	-	<5

Analysis of Soil Samples (22)

Site No.	Depth cm	Texture	Particle Size Hydrometer			Text. Class Lab. Hyd.	Moisture Retention %			pH		Sat. % SP	Sat. Extract. Elect. Cond. ECx10 ³	Ca(OH) ₂ meq/100g	Gravel >2mm %
			Sand %	Silt %	Clay %		1/3 Tension in bars	3 Tension in bars	15 Tension in bars	Settling Volume ml	Paste 1:5				
106C16	0-30	SPC	17.6	17.8	64.6	C	40.9	29.5	25.6	43	7.4	8.1	82.5	0.39	<5
	30-150	SPC	22.6	14.4	63.0	C	42.0	29.6	24.0	78	7.8	8.5	96.5	0.29	<5
106D4	0-40	SPC	16	12	72	C+	45.8	34.4	29.6	69	7.4	8.2	96.1	0.37	<5
	40-150	SPC	28	18	54	C	38.5	29.2	24.1	55	7.7	8.5	90.7	0.72	53
106D7	0-20	SiPC	20	9	71	C+	48.5	35.5	27.9	45	7.4	8.2	89.4	0.51	<5
	20-90	SiPC	20	7	73	C+	55.1	38.2	36.1	50	7.4	8.1	95.3	0.36	52
	90-150	SiPC	31	19	50	C	32.4	25.5	19.9	40	7.7	8.5	75.7	0.30	<5
106D15	0-60	SiPC	22	20	58	C	28.5	25.7	19.7	55	6.6	6.8	80.7	0.26	<5
	60-120	SiPC	20	16	64	C	36.0	29.6	22.6	82	7.4	8.2	123.1	0.35	<5
	120-150	SiPC	24	16	60	C	33.6	27.7	21.4	60	7.8	8.7	111.2	0.40	<5
106D18	0-90	SPC	23	8	69	C+	39.2	27.8	21.4	56	6.9	7.0	99.4	0.43	<5
	90-150	SPC	28	13	59	C	34.3	25.6	19.6	54	7.8	8.7	102.8	0.47	<5
106D23	0-40	SPC	12.8	23.6	63.6	C	32.6	22.6	20.9	46	6.5	7.1	77.5	0.23	<5
	40-150	SPC	20.0	12.8	67.2	C+	41.5	27.1	24.0	58	7.6	8.4	100.8	0.27	<5
106D25	0-40	SPC	12.4	20.0	67.6	C+	32.6	24.4	21.2	117	5.6	6.2	73.2	<0.20	<5
	40-150	SPC	12.4	12.0	75.6	C+	34.9	27.5	22.8	100	5.6	6.4	96.8	<0.20	<5
106D33	0-30	VPC	17.8	33.6	48.6	C	32.0	20.0	16.7	29	5.2	5.9	54.0	<0.20	<5
	30-90	PC	14.4	26.6	59.0	C	35.5	24.1	20.8	53	5.3	6.2	60.6	<0.20	<5
	90-150	PC	12.4	30.6	57.0	C	35.1	24.5	19.8	94	6.0	6.6	75.5	0.20	<5
106D54	0-30	PSCl	31.8	39.2	29.0	CL-	20.8	12.2	9.3	25	5.1	5.6	35.6	0.22	<5
	30-150	VPC	25.0	37.4	39.6	CL+	30.0	19.0	17.1	39	7.6	8.6	53.4	1.7	<5

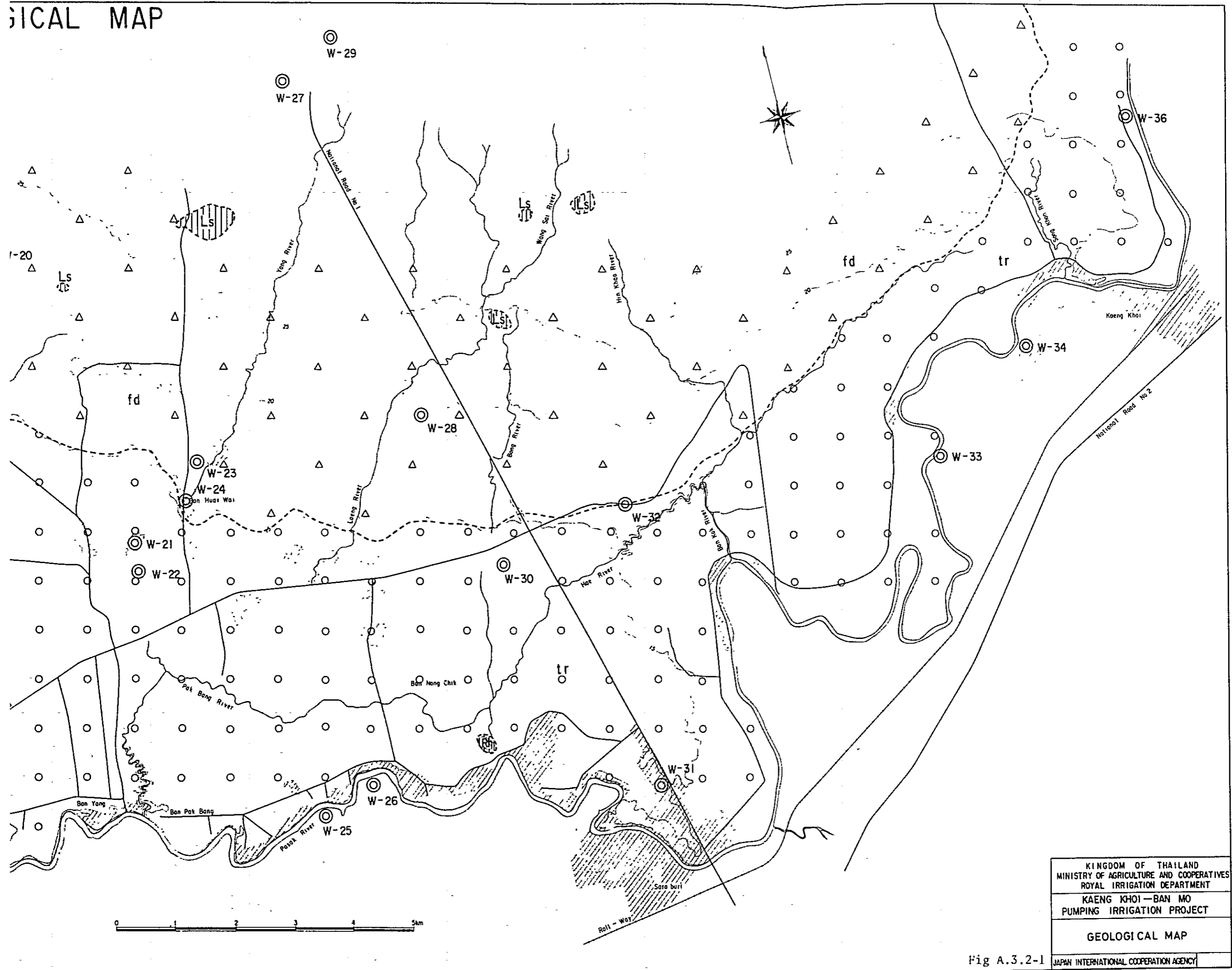
GEOLOGICAL MAP



LEGEND

Quaternary	Holocene	Alluvium	al	Boundary of rock unit	Well & it's number
		Fan Deposits	△ fd △		
Quaternary	Pleistocene	Terrace Deposits	○ tr ○	Well & it's number	SAO HAI Pumping Station
		Marl	ml		
		Pre-Triassic	Khao Yai Volcanics		
Permian		Ratburi Group	Ls		

GEOLOGICAL MAP



KINGDOM OF THAILAND MINISTRY OF AGRICULTURE AND COOPERATIVES ROYAL IRRIGATION DEPARTMENT
KAENG KHOI-BAN MO PUMPING IRRIGATION PROJECT
GEOLOGICAL MAP
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig A.3.2-1

Handwritten text, likely bleed-through from the reverse side of the page. The text is extremely faint and illegible due to the quality of the scan. It appears to be a list or series of entries, possibly names and dates, but cannot be transcribed accurately.

Figure A.3.2-2 Location of Soil Investigation Sites

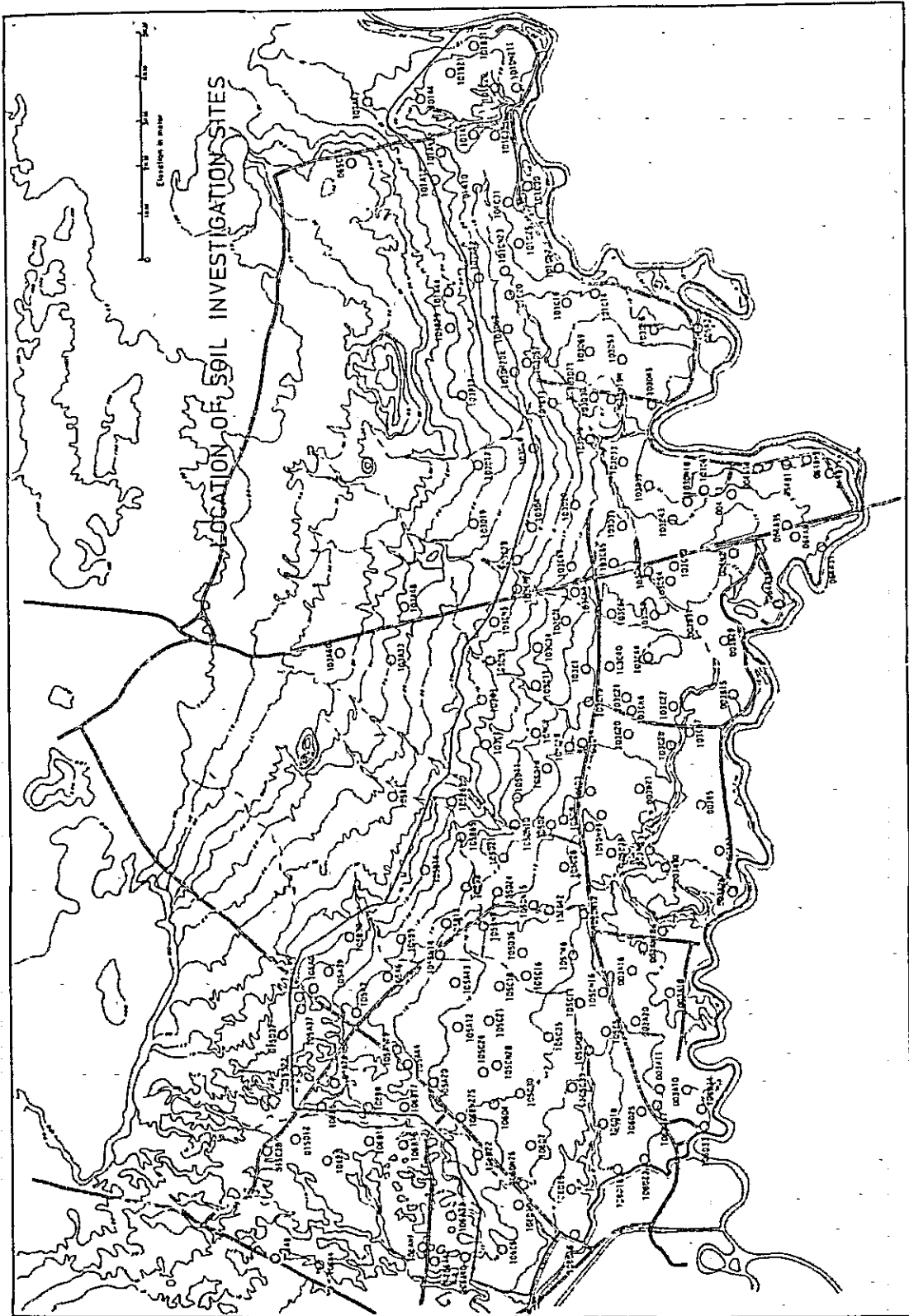


Figure A.3.2-5 Oxidation-Reduction Behavior of Surface Soils (1)

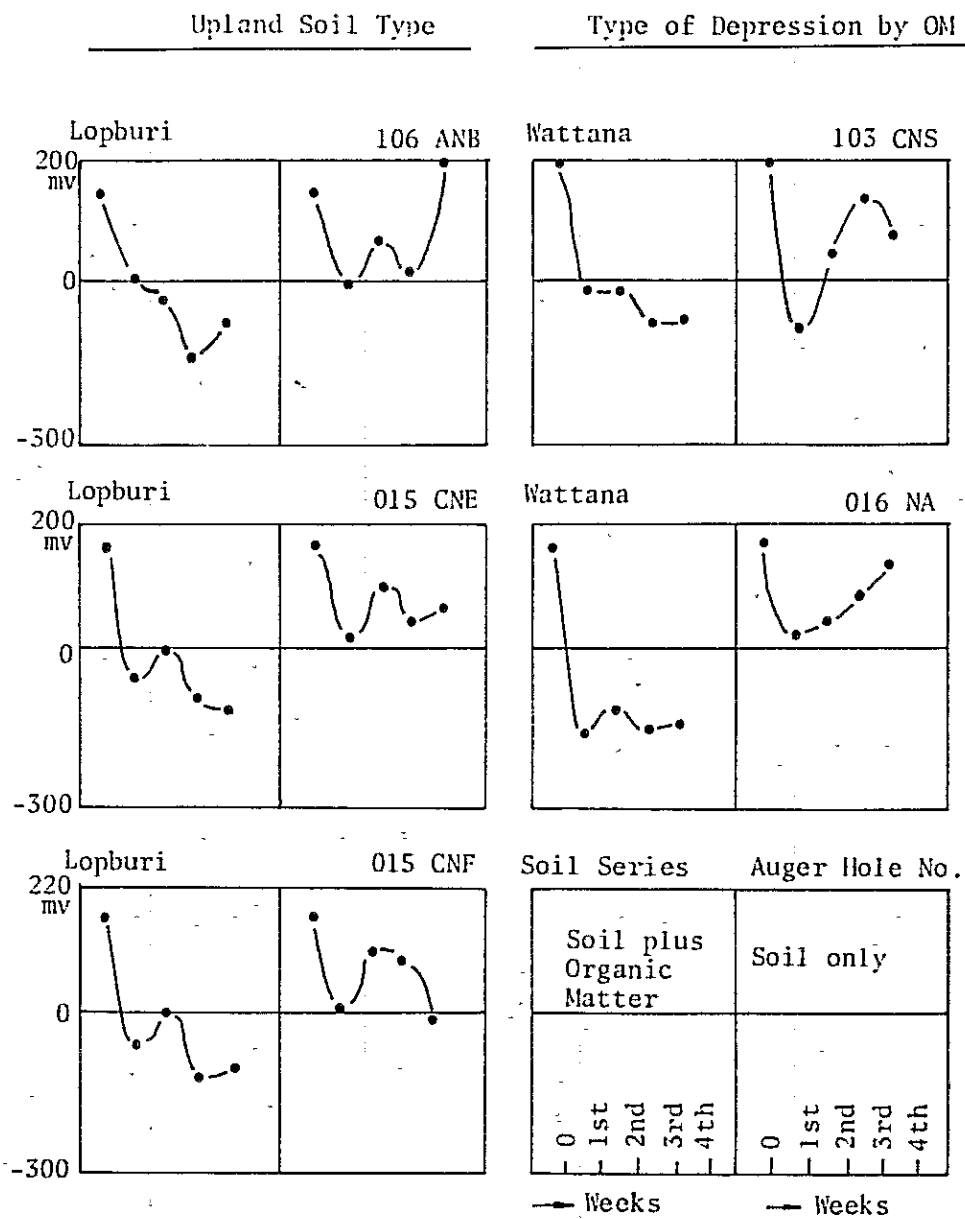
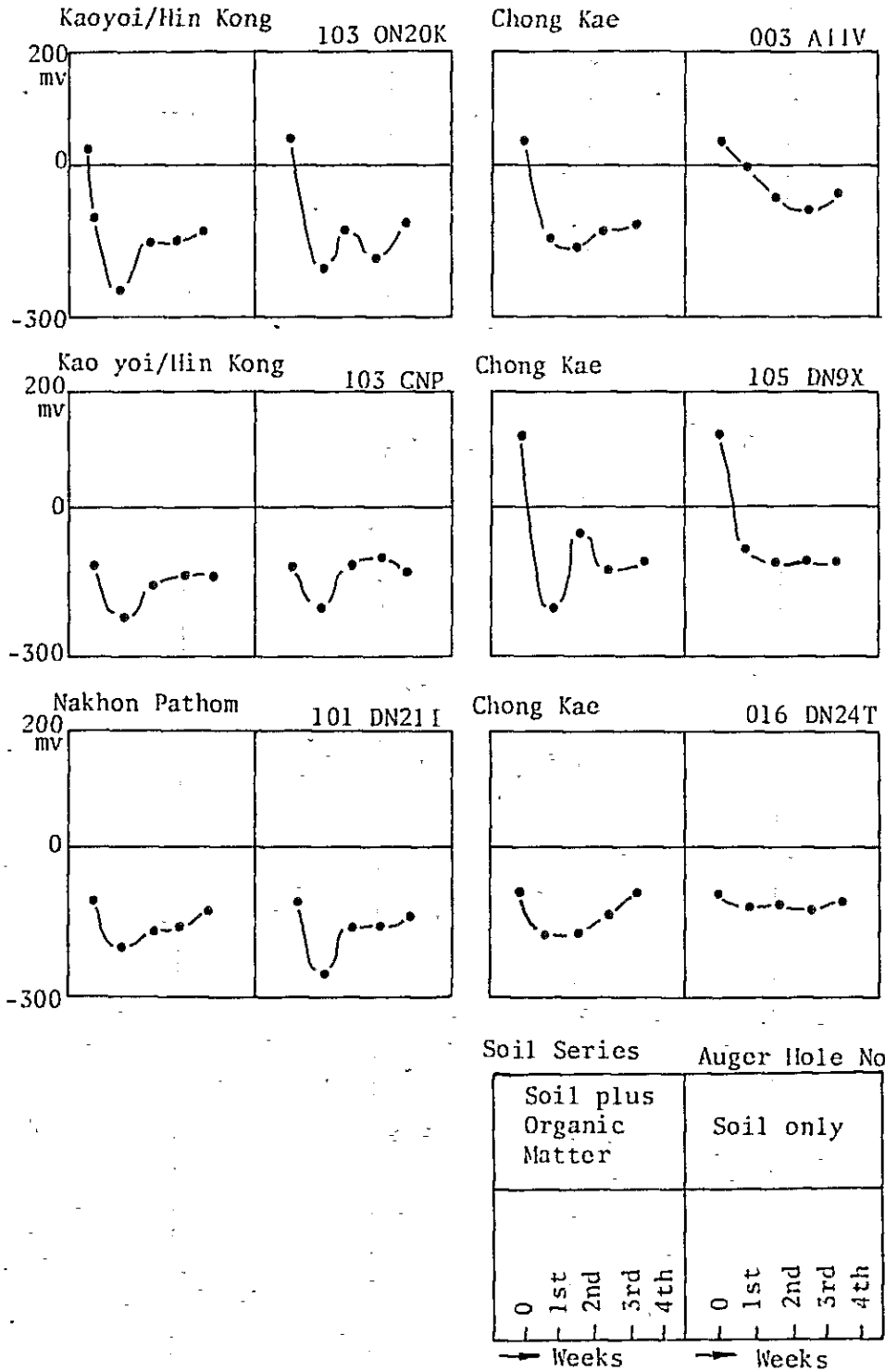
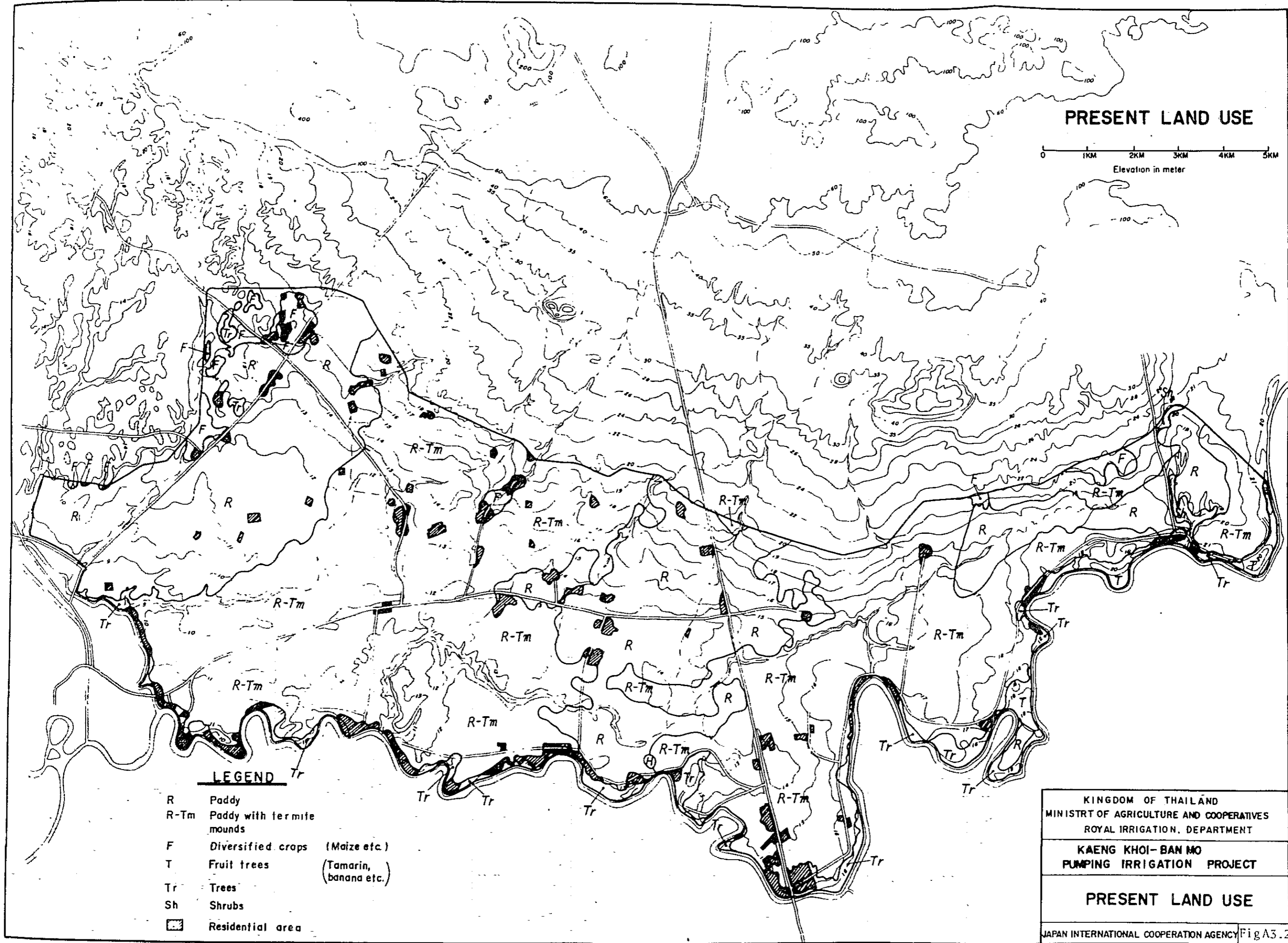


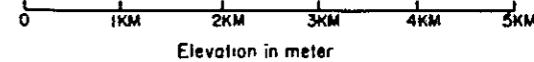
Figure A.3.2-3 Oxidation-Reduction Behavior of Surface Soils (2)

Deep Reduction Type





PRESENT LAND USE



LEGEND

- R Paddy
- R-Tm Paddy with termite mounds
- F Diversified crops (Maize etc.)
- T Fruit trees (Tamarin, banana etc.)
- Tr Trees
- Sh Shrubs
- Residential area

KINGDOM OF THAILAND MINISTRY OF AGRICULTURE AND COOPERATIVES ROYAL IRRIGATION DEPARTMENT
KAENG KHOI-BAN MO PUMPING IRRIGATION PROJECT
PRESENT LAND USE
JAPAN INTERNATIONAL COOPERATION AGENCY Fig A3.2-4

3.3. Irrigation

3.3 Irrigation

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Table A.3.3-2	List of NEA Pumping Project	3.3-2

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author outlines the various methods used to collect and analyze the data. This includes both primary and secondary data collection techniques. The analysis focuses on identifying trends and patterns over time, which is crucial for making informed decisions.

The third section provides a detailed breakdown of the results. It shows that there has been a significant increase in sales volume, particularly in the online channel. This is attributed to the implementation of the new marketing strategy and the improved user experience on the website.

Finally, the document concludes with a set of recommendations for future actions. It suggests continuing to invest in digital marketing and exploring new product lines to further drive growth. Regular monitoring and reporting will be essential to track the success of these initiatives.

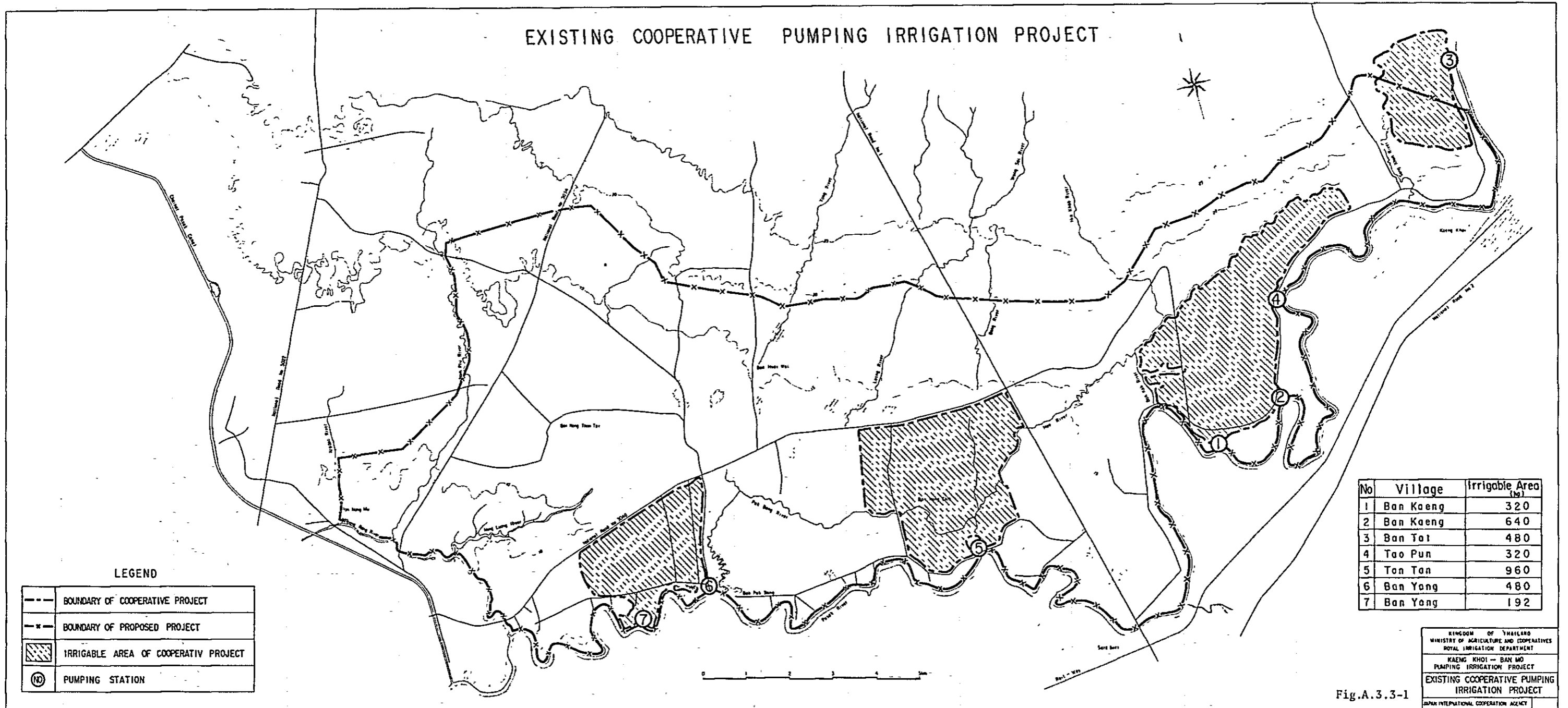
Table A.3.3-1 List of Existing Cooperatives Pumping Project

<u>No.</u>	<u>Village</u>	<u>District</u>	<u>Irrigable Area (ha)</u>	<u>Pump Diameter (mmxunit)</u>	<u>Type</u>	<u>Engine (HP)</u>	<u>Completed Year</u>
1	Tambon Ban Kaeng	Amphoe Muang	320	400x1	Flowting	Engine 180	1973
2	Ditto	Ditto	640	400x1	Flowting	Engine 180	1975
3	T. Ban Tat	Amphoe Kaeng Khoi	480	450x1	Vertical	Engine 180	1976
4	T. Tao Pun	Ditto	320	450x1	Vertical	Engine 180	1976
5	T. Ton Tan	Amphoe Sao Hai	960	600x2	Vertical	Motor 90 ^{kw} x2	1979
6	T. Ban Yang	Ditto	480	500x2	Vertical	Engine 110	1968
7	Ditto	Ditto	192	500x1	Flowting	Engine 180	1977

Table A.3.3-2 List of NEA Pumping Project

Name	Irrigable Area	Pump		Engine (HP)	Construction to be completed
		Type	Dia Unit		
Ban Tao Pun	672	Floating	300 2	Engine 150	Pumping plants End of Apr. 1981 Canal May. 1981
Ban Song Khon	560	Inclined	300 2	Motor 150	Ditto
Ban Ta Toom	1280	Floating	300 3	Engine 150	Ditto
Ban Nong Bua	720	Floating	300 2	Engine 150	Ditto

EXISTING COOPERATIVE PUMPING IRRIGATION PROJECT



No	Village	Irrigable Area (ha)
1	Ban Kaeng	320
2	Ban Kaeng	640
3	Ban Tai	480
4	Tao Pun	320
5	Ton Tan	960
6	Ban Yang	480
7	Ban Yang	192

LEGEND

	BOUNDARY OF COOPERATIVE PROJECT
	BOUNDARY OF PROPOSED PROJECT
	IRRIGABLE AREA OF COOPERATIV PROJECT
	PUMPING STATION

KINGDOM OF THAILAND
 MINISTRY OF AGRICULTURE AND COOPERATIVES
 ROYAL IRRIGATION DEPARTMENT
 KAENG KHOI - BAN MO
 PUMPING IRRIGATION PROJECT
 EXISTING COOPERATIVE PUMPING
 IRRIGATION PROJECT
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig.A.3.3-1

