

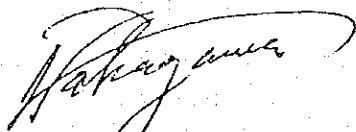
MINUTES OF JOINT COMMITTEE (2nd TIME)
ON THE REMOTE SENSING ENGINEERING PROJECT
FOR THE DEVELOPMENT OF AGRICULTURAL INFRASTRUCTURE

According to the record of discussion on remote sensing project the authorities concerned of the Republic of Indonesia and Japanese Experts held joint committee to formulate details of the Master Plan and the Annual Operational Work Plan of this project on March 2, 1983 getting attendance of Directorate Generals and representative of Planning Bureau in Ministry of Public Works, Organization Concerned, JICA, Japanese Embassy and Japanese Technical Guidance Team Organized by the JICA.

On the committee, the activity in past one year, facing subjects and the draft of implementation plan for hereinafter were reported, and many proposals or suggestions for the successful implementation of this remote sensing project were exchanged in serious discussion.

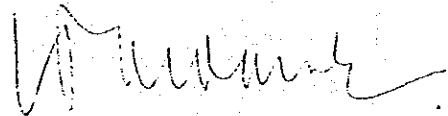
As a result of this committee, the matter referred to the document attached hereto was agreed. And it is expected that more smooth execution of this project will be promoted by this agreement.

Jakarta, March 2, 1983.-



Tokuo NAKAGAWA

Leader Japanese Experts
Japan International
Cooperation Agency



Tubagus Haedar Ali

Head of Center for Data
Processing and Statistics
Ministry of Public Works.

I. Member List

No.	N a m e	Occupation	Office
1.	Tubagus Haedar Ali	Head	Center for Data Processing and Statistics
2.	T.NAKAGAWA	Team Leader	JICA Expert
3.	Minoru MINE	Leader of Mission	JICA
4.	Y.MIYAMOTO	Member of Mission	JICA
5.	T.AKIYAMA	Member of Mission	JICA
6.	K.TSUJI	Member of Mission	JICA
7.	S.SAKAI	Expert	JICA
8.	M.FUJIYOSHI	1st Secretary	Embassy of Japan
9.	G.SAITO	Expert	JICA
10.	H.YAMAMOTO	Expert	JICA
11.	K.NAMIKI	Expert	JICA
12.	Soerastopo	Dean of Fakulty of Geography	Gajah Mada University
13.	K.MIMA	Expert	JICA
14.	SOELISTYO	Secretary of Directorate General	Directorate General of Cipta Karya
15.	Anton Sujadi	Staff	Directorate of Water Resources Development Plan
15.	R.GOTO	Deputy Representative	JICA

16.	Kardono D.	Head of Deputy II	Agency for National Coordination of Survey and Mapping
17.	Mahsun Irsyam	Head of Center for Satellite Utility	National Institute of Aeronatic and Space
19.	Muchtar Lutfie	Staff of Sub-Directorate of Regional Planning	Directorate of Urban and Regional Planning
20.	Suroso	Project Leader	Remote Sensing Project Dep. P.U.
21.	Darminto	Staff Foreign Affair Division	Bereau of Planning

II. REPORT ON ACTIVITY IN 1982 FISCAL YEAR.

The report on activity in past one year include following items was reported (see Annex - 1)

- * Introduction
- * Personeel
 - Japanese Experts
 - Indonesian Counterparts
- * Training Indonesian Personal
- * Machinery and equipment
- * Collection of Data
- * Method
 - Field Survey
 - Production of thematic map
 - Air-borne survey
 - Software development
- * Budget/Expense
 - Japanese side
 - Indonesian side
- * The opening Ceremony
- * Facing Subjects

III. SCHEDULE ON HEREINAFTER.

The draft of implementation schedules for hereinafter were proposed and were authorised.(see Annex - 2)

- * Introduction
- * Target
 - Working schedule 1983/1984
 - Annual implementation plan on remote sensing project
- * Personeel
 - Expert
 - Training acceptance
- * Equipment
- * Budget
- * Method
 - Data equisi
 - Field survey
 - Production of thematic map
 - Production of evaluation map
 - Strengthening of the method of Evaluation Map Software System

IV. FACING SUBJECTS

Following items were reported as facing subject.
And as a result of discussion, each countermeasures
written below were come to agreement.

(1) Countermeasure of Machine Trouble

For maintenance of equipments in this project except computer, it's necessary to establish more firm maintenance system such as to be concluded the maintenance contract between Ministry of Public Works and Representative of Machine Manufacturer.

(2) Strengthen Data Acquisition Activity

Successful achievement of this project depends on smooth image data (especially LANDSAT data) acquisition.

Therefore, it's necessary to get many data such as CCT and so on than now to obtain many information for the image analysis.

(3) Dispatch of Japanese Experts.

For effective technical transfer, it needs smooth dispatch of Japanese experts, especially short term experts, and more flexibility to meet to demands occurred in project site.

(4) Countermeasure of Hand Over of this Project

After the end of this project terms, all facilities and activities will be handed over to Indonesian side, therefore, technical transfer, management and machine maintenance system must be established in early time. Besides, enough number of counterparts and necessary local budget also should be shared by Indonesian side.

V. OTHERS

Following items are discussed and agreed on this committee.

- (1) This project will concentrate on survey of northern Sumatra area to produce thematic maps and evaluation map in next fiscal year.
- (2) Remote Sensing workshop for training staffs of every Remote Sensing organization in whole Indonesia is expected to be held in this project.
- (3) Probability and criterion for application of analyzed result of LANDSAT imagery should be cleared and informed to end users to avoid over expectation to Remote Sensing result.
- (4) Aerial photo image also should be used effectively on this Remote Sensing Project to improve Remote Sensing result.

PREFACE

The Remote Sensing Engineering Project was established in the Centre for Data Processing and Statistics, Ministry of Public Works, Republic of Indonesia, for the purpose of increasing capabilities of survey and planning for the development of agricultural infrastructure in Indonesia in April 1980.

This annual report is prepared to provide information on the main task and activities of the project for 1982 fiscal year and the tentative implementation plan in 1983 fiscal year.

We hope that this annual report will serve as useful reference.

Jakarta, March 1983.

Ir. Tubagus Haedar Ali.

Head of Centre for Data
Processing and Statistics,
Ministry of Public Works.

Drs. Suroso M. Djojosoekarto.
Project Leader.

Prof. Tokuo NAKAGAWA.
Leader, Japanese Experts.

PART I: ANNUAL REPORT IN 1982 FISCAL YEAR.

INTRODUCTION :

1. In December 20, 1982, the Remote Sensing Engineering Project was opened by the Minister of Public Works, its mean the operation period is already started for production of thematic maps of the training area and case study area.

In the opening ceremony, the Head of JICA Jakarta, presented the equipment for the Remote Sensing Engineering Project (ANNEX A).

2. The Remote Sensing Engineering Project , in the 1982 fiscal year, has developed various field of thematic maps, of the area :

- 2.1. North Banten :

The North Banten Project is the Water Resources Project under the Directorate General of Water Resources for Water Resources Development Program.

- 2.2. Sumbawa island :

The thematic maps were processed based on the cooperation between Remote Sensing Engineering Project and the Directorate of Regional and City Planning in the view point of generalization of technology of production of thematic maps.

1. Personeel.

1.1. Japanese Experts :

Japanese Experts dispatched by JICA in 1982 fiscal year are shown in Table 1.

The composition of Japanese Experts consist of :

- a. long term expert
- b. short term expert

1.2. Indonesian Counterparts :

Indonesian Counterparts, under supervision by Head of Data Processing and Statistics Center, are shown in Table 1.

Table 1. List of Counterparts and Japanese Experts.

Counterparts		Japanese Experts		
Project Leader	Drs.Suroso M Djojosoekarto	long term	Team Leader	Prof.T.NAKAGAWA
	Drs. Ibnu Katamsi	long term	Agr.Development	Mr.S.SAKAI
	Ir.Hariyatno Soemarman	long term	System planning	Mr.H.YAMAMOTO
	Ir.Naniek Siti Murdjiati	long term	Liaison Officer	Mr.K.MIMA
	Dra.Setyaningsih	short term	Software Dev.	Mr.N.TAGUCHI
	Dra.Adi Sasutji	short term	Regional plan.	Dr.M.NASU
	Ir.Paido H.Hutapea	short term	Data Processing	Mr.M.SAITO
	Ir.Anwar Soefi Ibrahim	short term	Hardware Dev.	Mr.M.SAWADA
	Drs.Sri Yumadiati N	short term	Aerophotogra- phy	Mr.K.NAMIKI
	Dra.Marcelina Renny	short term	Agronomy	Mr.M.ISHIKAWA

The above and seven others (clerks, servants, driver, etc.)

2. Training Indonesian personal

The training Indonesian personal in Japan was four persons in 1982 fiscal year as are shown in Table 3.

Beside training in Japan, the personeel of Remote Sensing Engineering Project has also trained by the expert in Indonesia.

Table 3. Training Indonesian personal in Japan in 1982 fiscal year.

Course	Name	Term	Object
Group	Ir.Hariyatno S.	Apr.10-Jan.12	Elementary technique of Remote Sensing Engineering in Remote Sensing Technology Center of Japan (RESTEC)
	Drs.B.Sembiring	Apr.10-Jan.12	
Individual	Drs.Ibnu Katamsi	Apr.15-Jul.20	digital image Analizing in IBM
	Dra. Setyaningsih	Apr.15-Jul.20	Tokyo Scientific Center

3. Machinery and Equipment.

Hardware System of the Project has already installed consist of :

* Digital equipment

* Analog equipment.

The equipments supplied by JICA in 1982 fiscal year are shown in Table 2.

Tabel 2. List of Technical Equipment was provided by JICA in 1982 fiscal year

No.		Quantity	Amount (YEN)
1.	Disk memory Expansion	2 set	
2.	Color display	4	
3.	Spare parts for color display	1	
4.	Tablet digitizer	1	
5.	XY-plotter	1	
6.	Photo typesetter	1	
7.	Spare parts for Analog Processing system	1	
8.	Light Table	1	
9.	Photo Densitometer	1	
10.	Article of consumption etc.		¥ 3,145,000
T o t a l			¥ 73,690,932

4. Collection of Data.

The collection of LANDSAT data and other existing data are shown in Table 4.

Table 4. Collection of Data.

Items	A r e a	scale	Draw up year	Remarks
LANDSAT (CCT)	Northern Sumatra Jawa			
Aerophotography	Eastern Jakarta	1:20,000	1981	IRcolor (350)
	Sumbawa	1:50,000	1981	
	Southern Palembang	1:20,000	1981	IRcolor
	Northern Sumatra	1:10,000	1974	
Topographical map	Indonesia	1:1,000,000	1968	
	Indonesia	1:500,000	1973	
	Jawa, Northern Sumatra	1:250,000	1943	
	West Jawa and South Sumatra	1:100,000		
	Jawa, Northern Sumatra	1:500,000	1943	
Geological map	Sumatra	1:1,000,000	1963	
	Jawa	1:500,000		
	Summary of Geological map			
Soil map	Sumatra	1:1,000,000	1964	
	Jawa	1:1,000,000	1960	
Rain map	Jawa		1931-1960	
	Indonesia		1911-1940	
Data of Land use	west Jawa		1975-1976	

5. Method.

5.1. Field survey.

The area of Field survey in 1982 fiscal year are shown in Table 5.

Table 5. Field survey.

A r e a	T e r m	
Sumbawa	Jun. 15-19	Condition of land cover
C J C	Jul 6- 8	Condition of land cover
Northern Banten	Jul. 12-14	Condition of land cover
Middle Jawa	Jan. 16-23	Geological survey

5. . Production of Thematic Map.

The production of thematic maps for agricultural infrastructure is a important work of Remote Sensing Project in 1982 fiscal year.

The result are shown in Table 6.

Table 6. Production of Thematic Map.

	C J C	Northern Banten	Sumbawa	Middle Jawa	North Sumatra
False color map (1:250,000)	0	0	0	0	0
Land cover map (1:250,000)	0	0	0		0
Biomass map (1:250,000)		0			0
Lineament map (1:250,000)		0		0	0
Drainage pattern(1:250,000) map		0			
Geological map (1:250,000)		0		0	
Soil map (1:250,000)		0			
Vegetativial map(1:250,000)		0			

5.3. Air-borne survey.

The color IR aerial photography was covered Asahan River Basin about 30,000 Ha. in the North Sumatra region.

The scale of photos are 1:20,000 and the purpose of the IR photos are used for interpretation and composed the comparative study between air-borne data and satellite imagery.

5.4. Software Development.

In the development program of analysis data was already developed Software so called Method of Evaluation Map.

6. Budget/Expense.

(A). Japanese on the job expense.

On the Japanese on the job expense at 1982 fiscal year is shown in Table 7.

Table 7. Japanese on the job expense in 1982 fiscal year.

(1) In coming : ¥ 5,010,000

(2) On going : ¥

(from April 1982 until February

I t e m s	Amount (Rp.)	(1983).
Survey and research		
Material		
Consumption		
Travel Allowance		
Correspondence		
Copy and print		
Rental charge		
Employment		
Conference		
T o t a l		

(B). Indonesian side.

Since 1980/1981 fiscal year up to 1982/1983 fiscal year the budget composition of counterparts budget are shown in Table 8.

Table 8. Budget allocation of Indonesian side.

BUDGET ITEM	FISCAL YEAR 1980/81(Rp)	FISCAL YEAR 1981/82(Rp)	FISCAL YEAR 1982/83	TOTAL (Rp)
1. Building	239.079 000	-	-	293.079.000
2. Material, consumption	8.750.000	15.500.000	24.450.000	
3. Operation	322.805.000	212.264.000	234.503.000	48.700.000
4. Commission	-	88.000.000	123.000.000	211.000.000
5. Salary	PM	PM	PM	PM

ANNEX A.

THE OPENING CEREMONY - PROGRAM.

1. Speech by Minister of Public Works.
2. Speech by Japanese Ambassador.
3. Speech and Presentation of Equipment for Remote Sensing Engineering Project for Development of Agricultural infrastructure (RTA-58) by Resident Representative Japan International Cooperation Agency (JICA).
4. Speech by the Head of Data Processing and Statistics Centre.

Facing Subjects.

Let us pick up some point on applying which are facing subjects.

(1) Establishment of Control system of Facilities.

The main machine and equipment to be provided by JICA is almost finished in these 2 years from 1881 to 1982.

And so, it is necessary to establish the good maintenance condition for facilities and equipments.

(2) Dificiency of Data.

It necessary to supply many data such as CCT and so on than now to obtain many information for the image analysis.

(3) Dispatch of Japanese Experts.

It is necessary to take suitable steps for the dispatch of Japanese Experts.

It should be dispatch smoothly the short term experts based on the working plan.

(4) Taking over of Project.

Our working are carrying foward the scheme based on the Record and Discussion.

But, the countermeasure to taking over of the project should be considered from now.

(5) Arrangement of couterparts.

It will be required to complete arrangement of counterparts for promotion of efficiency of project activity.

PART II : SCHEDULE OF THE 1983/1984

FISCAL YEAR.

PART II : SCHEDULE OF THE 1983/1984 FISCAL
YEAR.

INTRODUCTION

The project will be implemented in accordance with the record of discussion. However, some modification on the schedule is necessary to cope with the change of project's surroundings.

The modification will be;

1. As stated in schedule of the five years plan, the colour IR aerial photo will be implemented in the third and fourth year plan.

Because of technical reason, the color IR aerial photo will be implemented at the end of third year plan. It means that the color IR aerial photo schedule on the fourth year plan will be delayed to the fifth year plan.

2. It is requested the implementation of the software system application and strengthening of the software system application for analysis agriculture infrastructure engineering will be completed in the fourth year plan.

TARGET.

The activities of the project in 1983/1984 fiscal year are the following items:

1. Collection of LANDSAT data and other satellite data, and collection of existing data for ground truth.
2. Application of the basic technique for digital image analysis so call method of evaluation maps.
3. Strengthening of the software system application (method of evaluation map) for analysis agriculture infrastructure engineering.

4. Production of thematic map (scale 1:250,000) of the area : C.J.C., North Banten, North Sumatera, and other's.
5. Overlay of thematic maps, statistical data for the selection of suitable area for agricultural infrastructure development.
6. Field Survey (C.J.C., North Banten, North Sumatera, and other's area).
7. Training of the counterpart.
8. Installation of additional equipments, machinery, instruments and tools for data processing execution.

Working schedule 1983/1984

	4	5	6	7	8	9	10	11	12	1	2	3
Long term			→									→
Japanese experts			→									→
Team Leader												→
Agr. Development												→
System Planning			→									→
Liaison Officer												→
Short term												
Expert												
Hardware						→						
Software					→							
Regional planning						→						
Data Processing							→					
Aerial photo.												
Agrarian												
Equipment installation												
Field survey							← Sumatra (II) →					
Data Processing												
Thematic Map							← North Sumatra (I) →					
Evaluation Map								← Stage I →				
Multi stag Method									← Stage II →			
Training												
Joint Committee Meeting												◎
Japanese Technical Guidance Team										←		

Annual implementation plan on remote sensing project.

OR () : plan amended in last
Joint Committee
(March 23, 1982)

1. JAPANESE ASSISTANCE

: result

I T E M	1st Year 1980.4-1981.3	2nd Year '81.4-'82.3	3rd Year '82.4-'83.3	4th Year '83.4-'84.3	5th Year '84.4-'85.3	Total
I. EXPERTS (Long-Term assignment)						
1. Team Leader						
2. Agricultural Development						
3. System Planning						
4. Liaison Officer						
II. EXPERTS (Short-Term Assignment)						
1. Software Development						
2. Agronomy						
3. Aerial Photography						
4. Data Processing and Programming						
5. Hardware Development		(8) man-months 7	(10) man-months 10.5	8 man-months	7 man-months	32 man-months
6. Regional Planning						

Fig. (1) Annual cooperation plan on whole term.

I t e m	1st Year 1980.4-1981.3	2nd Year '81.4-'82.3	3rd Year '82.4-'83.3	4th Year '83.4-'84.3	5th Year '84.4-'85.3	Total
III. HARDWARE 1. Digital Image Processing System.		Computer. Magnetic Tape Units X 3 Disk Memory X 2 Consol Display & Printer Display terminal & printer X 2 Line printer Diskete I/O Unit.	(") Tablet Digitizer (") X - Y PLOTTER Display (5) Terminal X 4 (") Disk memory (") X 2 Spare parts	System Expansion Spare Parts	System Expansion Spare Parts	

Fig. (2) Annual cooperation plan on whole term.

I t e m	1st Year 1980.4-1981.3	2nd Year 1981.4-1982.3	3rd Year 1982.4-1983.3	4th Year 1983.4-1984.3	5th Year 1984.4-1985.3	Total
2. Analogue Image Processing Equipment		Programmable Data Station Drum Scanner Drum Printer Color Display Spare Parts Additive Color Viewer Zoom Transfer Scope Camera	(") Photo densito- meter			

Fig. (3) Annual cooperation plan on whole term.

I t e m	1st. Year 1980.4-1981.3	2nd Year '81.4-'82.3	3rd Year '82.4-'83.3	4th Year '83.4-'84.3	5th Year '84.4-'85.3	Total
		Photo Densito meter				
		Photo meter				
		Photo Color Processor				
		Enlarger				
3. Vehicle		Vehicles (2)				
4. Others		Test Equipment				
		Voltage Regula- tor with Switch Board	Miscellaneous	Miscellaneous	Miscellaneous	
		Air Conditioner				

Fig. (4) Annual cooperation plan on whole term.

I t e m	1st Year 1980.4-1981.3	2nd Year '81.4-'82.3	3rd Year '82.4-'83.3	4th Year '83.4-'84.3	5th Year '84.4-'85.3	Total
4. Others (continued)		MT Rack Refrigerator Miscellaneous	(") Light table			
IV. TRAINING ACCEPTANCE	2 persons (2 months)	2 persons (3 months) 2 persons (2 months)	1 person (3 months) 1 person (2 months)	1 person (3 months) 1 person (3 months)	2 persons (3 months)	10 persons

Fig. (5) Annual cooperation plan on whole term.

II. INDONESIAN RESPONSIBILITIES.

I t e m	1st Year 1980.4-1981.3	2nd Year 1981.4-1982.3	3rd Year 1982.4-1983.3	4th Year 1983.4-1984.3	5th Year 1984.4-1985.3	Total
VI. DATA ACQUISITION		LANDSAT EXISTING DATA	Color IR		Color IR	
VII. GROUND SURVEY		CJC area Northern Suma- tera	North Banten CJC area Outer territory			
VIII. OFFICE ACCOMODATION	Construction	interia				
IX. COUNTERPARTS						
1. Project Leader						
2. Planning and Operation						
3. Agricultural development						
4. Social Economic						
5. Soil						

Fig. () Annual cooperation plan on whole term.

I t e m	1st Year 1980.4-1981.3	2nd Year '81.4-'82.3	3rd Year '82.4-'83.3	4th Year '83.4-'84.3	5th Year '84.4-'85.3	Total
IX. COUNTERPARTS (continued)						
6. Data process						2 persons
7. Photo processing						2 persons
8. Geography						3 persons
X. OFFICE EMPLOYEE						
1. Office Clerks		5 persons	(5) 6 persons			
2. Drivers		1 person	(2) 1 person			

Fig. (.) Annual cooperation plan on whole term.

3. Personnel :

3.1. Expert :

The project has a plan about Japanese Expert, as follows :

3.1.1. Long term Experts Assignment.

table 1.

Speciality	Number
Leader	1
Agricultural development	1
System planning	1
Liaison officer	1

3.1.2. Short term Experts Assignment.

table 2.

No.	Speciality	Number	Period	Remarks
1.	Hardware development Maintenance and Repairment of equipment.	1	1	Installation of additional equipment and instruction of maintenance/repairment of equipment.
2.	Software development.	1	2	Instruction of digital image processing.

No.	Speciality	Number	Period	Remarks
3.	Data processing.	1	2	Instruction of data processing for thematic map production and establish multi stage method.
4.	Aerial photo	1	2	Instruction of standardize of operation of photo processing.
5.	Regional - planning.	1	2	Instruction of making Evaluation map.
6.	Agricultural development.	1	2	Instruction of data processing method for agricultural village planning.

3.2. Training acceptance :

There are two potential frame works for training in fiscal year 1983. The term and the organization accept two counterparts for training are shown in table 3.

table 3.

Class	Number	Term	Acceptable organization
(Group course ((Specialization *) (Pre-processing) (Natural resources digital processing).	2	April 4 - Juni 12. June 12 - August 12.	RESTEC (JICA Remote Sensing course). Purpose organization: Tokyo university. Chiba university. *) Continue course after Group - course.

4. Equipment :

The Remote Sensing Engineering Project required equipment and materials, as follows :

No.	I t e m s	Number
1.	Controller for photo printer.	1 set.
2.	Colour display unit.	1 unit.
3.	Computer CPU Memory.	1
4.	Transfer Devices or Wide Lense for Zoomtransfeer Scope.	1
5.	Diazo copy machine.	1
6.	Spare-parts	Digital & Analog parts.

5. Budget :

The Indonesian counter part budget in the 1983/
1984 Fiscal Year, is estimated as follow :

1. Building : -
 2. Material, : Rp. 24.380.000,-
consumption
 3. Operation : Rp.187.020.000,-
 4. Commission : Rp. 78.400.500,-
 5. Salary : P.M.
-

6. Method :

6.1. Data acquisition:

1. The project will acquire Landsat CCT data, aerial photo's and other satellite data as NOAA, Geo-satellite, etc., which covered either training area and case study area, nor the other area from the organization concerned process image data and some benefits are able to expected each other by the cooperation.
2. The project will collect existing data, maps, aerial photos and materials as ground truth data for remote sensing image processing.
3. The project will cooperate with LAPAN, BAKOSURTANAL and other institute, to get Landsat data and to promote new remote sensing techniques.
4. The project will cooperate with Directorate General of Water Resources to get ground information for Remote Sensing image processing of the North Sumatera area.
5. The project will cooperate with university, such as Pasca Sarjana, U-I, Gajah Mada University, to promote research and development of new Remote Sensing analysis techniques and to establish certain model, for example: Critical or hazard land model.

6.2. Field survey :

Field survey will be carried out in the training area and North Sumatera as case study area more than 2 times to acquire ground truth data.

6.3. Production thematic map :

The thematic map and the analysis map, will be processed from the training area and case study area, in the field of :

1. Land use.
2. Soil map.
3. Geomorphology map.
4. Geology map.
5. Biomass map.
6. River and drainage pattern map.
7. Other's.

6.4. Production evaluation map :

1. Critical land monitoring system.
2. Flooded area monitoring system.
3. Application of the Method of Evaluation map software will be processed the suitable land for Agricultural Development.

6.5. Strengthening of the Method of Evaluation Map Software System as a point of the required total system in the integrated Spatial Analysis and Evaluation System.

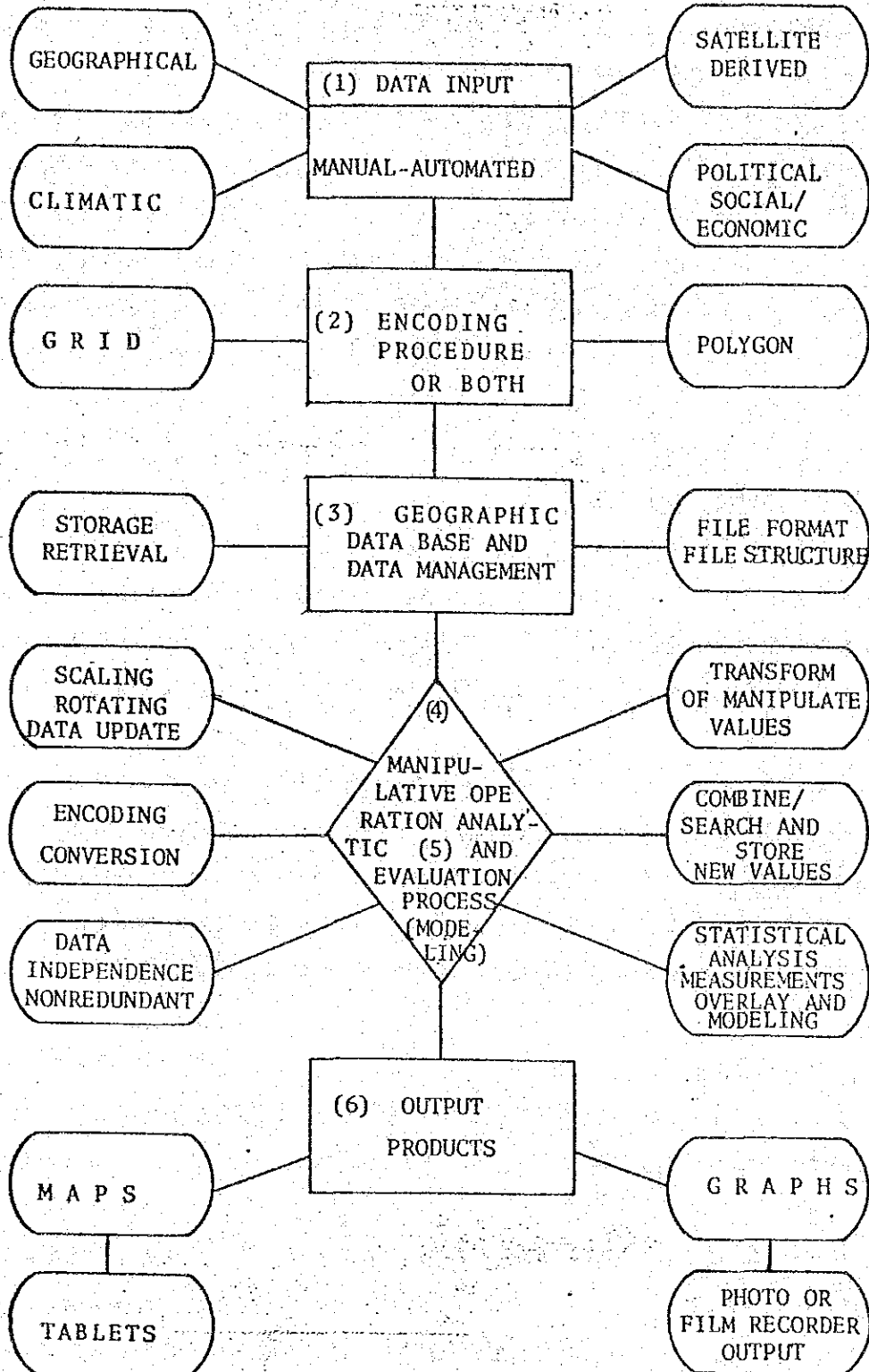
T E N T A T I V E I M P L E M E N T A T I O N

(meditted in March 1982)

		5th year (1984 - 1985)											
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Japanese experts	long term												
	short term	Soft regional data processing			hard			regional Agrarian					
Hardware installation		expansion											
Ground survey		test area				outer territory							
Data acquisition		CCT, existing area & maps IR color											
Study image data processing method		3rd stage (test area)				review application for another area							
Establishment of image data processing method													
Production of thematic and evaluation map		thematic 3rd, 3rd				overplay review							
Selection of suitable area for development												review	
Establishment of multistage survey technique												1st - 3rd stage overall	
Training acceptance		soft (1 person)											
Holding joint Committee meeting												final summarization	

INTEGRATED SPATIAL ANALYSIS AND
EVALUATION SYSTEM :

GIS DATA HANDLING APPROACH



3. リモートセンシングプロジェクト今後2か年の計画（プロジェクトからの提出資料）

1. 当初計画との比較

図-1はプロジェクト活動の当初計画であり、本プロジェクトの計画打合わせチーム（昭和55年11月7日～11月20日派遣）により提案されたものである。

図-2は現時点（昭和56年2月）までの活動実績及びプロジェクト終了までの向う2か年間（第4年次～第5年次）の活動予定を示すものである。

当初計画の骨子は図-3のように表され、4段階のマルチステージ調査法が考えられていた。それに対して変更計画の方は農業開発のための適地選定に必要と考えられる精度、インドネシアにおける現地調査実施の困難性、カウンターパートの技術レベル向上の目標等を検討し、図-4のように3段階となっている。また、実績及び変更計画においては、現地において機材の据付、消耗品の補充、必要データの入手、短期専門家派遣等が計画的に進めがたいこともあって、はつきりしたマルチステージ調査法とはならず、互いのステージがオーバーラップした形で活動が進んでいるといえる。

2. プロジェクトの対象範囲

本プロジェクトにおいて確立する調査手法の範囲としては、リモートセンシング手法により作成される主題図（ランドカバー、バイオマス、ソイル等）及び既存各種データ（地形、地質、降雨等）などを総合評価したところの農業開発適地選定図（評価図）作成までとし、評価図作成に必要な各主題図との相関等の分析を適地選定モデル作成の一環として進めることとする。

既に第3年次までにリモートセンシング手法により作成可能な主題図の作成技術はほとんど紹介されており、第4年次は主に適地選定モデルの構築に向う段階に来ている。

最終年の第5年次はそれまでに開発された技術、手法の有効性の吟味及び標準化、ルーチン化を進め、プロジェクトの円滑なインドネシア側への引継ぎを図る必要があることから、適地選定モデルは第4年次中に基本的なものが出来上っている必要がある。

3. プロジェクト引継構想

プロジェクト終了後インドネシア側に残すシステムとしては極力自動化を図り、複雑な思考過程を経ずとも単純な機器のオペレートにより一定の水準の成果が得られるものを指向する。

これはカウンターパートの資質を考慮しての対策であるが、もとより完全な自動システムはありえないのであって、処理過程における適切なパラメータの設定、異なる様式の入力データに対する対応法などは充分訓練し、引継後のプロジェクトのインドネシア国における定着を確かなものにしておくこととする。

なお、引継時におけるカウンターパートの所要能力として表-1が考えられる。カウンターパートがこの目標に到達出来るように訓練を行う。

項 目	現 在 (第3年次末)			引 継 時			
	オペレート	理 論	応 用	オペレート	理 論	応 用	
アナログ処理	カラーバランスの調整	△	×	—	○	△	—
	プリント縮尺の設定	△	×	—	○	△	—
	現像液の品質管理	×	×	—	○	△	—
デ イ ジ タ ル 処 理	フォーマット変換	△	×	×	○	○	○
	ノイズ除去	△	×	×	○	△	×
	幾可補正	△	×	×	○	△	×
	画像拡大	△	×	×	○	△	×
	画像強調	△	×	×	○	△	×
	画像編集	△	×	×	○	△	×
	クラスタリング	○	×	×	○	△	×
	最尤判別	○	×	×	○	△	×
	主成分画像	×	×	×	○	△	×
	CRT ディスプレイ	○	×	×	○	×	×
	フォトスキャン	○	×	×	○	×	×
X-Yプロット	×	×	×	○	×	×	
デジタイジング	×	×	×	○	×	×	
主 題 図 作 成	ランドカバー図	△	△	×	○	○	×
	バイオマス分級図	△	○	×	○	○	×
	土 壌 図	△	△	×	○	○	×
	地 質 図	△	×	×	○	○	×
	Geomorphology map	—	—	○	—	—	△
	水 系 図	—	—	△	—	—	△
	多時期データ応用解析	×	×	×	△	△	×
既存データの画像データ化	△	△	×	○	○	△	
評 価 図 作 成	適地選定モデル構築	×	△	×	×	△	×
	パラメータ設定	×	×	×	○	○	×
	適地選定図作成	×	×	×	○	○	×

注)

記 号	オペレート	理 論	応 用
○	習 熟	理 解	開発・改良
△	未・習熟 なるも可	概要のみ	技能的適用
×	不 可	不 理解	不 可

☒ - 1 Tentative Implementation Plan of Technical Cooperation for Remote Sensing in Republic Indonesia

	1st year (1980-1981)					2nd year (1981-1982)					3rd year (1982-1983)					4th year (1983-1984)					5th year (1984-1985)																				
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
Japanese experts	Team leader Agri. development System planning Liaison																																								
						hard data processing regional data processing hard data pro. agronomy					hard data processing regional aerial photo soft agronomy					hard aerial photo regional soft data P. regional agronomy					hard soft regional aerial photo regional agronomy agronomy																				
Hardware installation						analogue digital					expansion					expansion					expansion																				
Ground survey	Training area Case study area																																								
						LANDSAT film & CCT existing data & maps					IR color CCT existing data & maps					IR color CCT existing data & maps					CCT IR color map																				
						1st stage analogue LANDSAT film					2nd stage digital LANDSAT CCT					3rd stage analogue & digital Aerial photo					4th stage analogue & digital IR color					Review application for another area															
Establishment of image data processing method						1st stage					2nd stage					3rd stage					4th stage																				
Production of thematic and evaluation map						1st stage if necessary					2nd stage					3rd stage if necessary					4th stage					Review															
Selection of suitable area for development						1st stage					2nd stage					3rd stage					4th stage					Review															
Establishment of multistage survey technique						1st stage					2nd stage					3rd stage					4th stage					1st-4th stage overall															
Training acceptance	Hard 2 Person observation					Soft (long term) 1 person hard 2 persons observation					soft 1 soft (short term) 3					soft 1 soft 3					soft 1																				
Holding joint committee meeting						Institution					summarization of 2nd year					summarization of 3rd year					summarization of 4th year					final summarization															

☒ - 2 Amended Implementation Plan of Technical Cooperation for Remote Sensing Project

28, March 1983

	1st year (1980-1981)					2nd year (1981-1982)					3rd year (1982-1983)					4th year (1983-1984)					5th year (1984-1985)																										
	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
Japanese experts	Team leader Agri. development System Planning Liaison																																														
						hard hard regional					data processing regional soft hard aerial photo aerial photo agronomy					data processing regional soft hard aerial photo aerial photo agronomy					data processing regional soft hard aerial photo hard																										
Hardware installation	Construction of office accommodation					analogue - additive color view - photo enlarger - photo processor digital - computer - color display - photo scanner printer					system expansion - X-Y plotter - digitizer - photo typewriter																																				
Ground survey						CJC Sumatera Middle Jawa Banten					Sumbawa Banten CJC Banten Middle Jawa					Sumatera Sumatera																															
Data acquisition	LANDSAT existing data					order photo north sumatera soil geology					1:50,000 topo-map North Sumatera					IR color photo (taking) North Sumatera					IR taking IR taking review area																										
Study of image data processing method						analogue digital image processing for thematic maps					modeling for evaluation map					modification of model																															
Establishment of image data processing method						Analogue					digital (software for thematic maps)					digital (software for evaluation map)																															
Production of thematic and evaluation map						analogue digital color composit introduction					CJC, North.Banten, Sumbawa, Middle Jawa, North Sumatera					Sumatera					review area																										
Selection of suitable area for development																Banten Sumatera					review area																										
Establishment of multi-stage survey technique																					generalization																										
Training acceptance						Mr. Anwar Mr. Paiko					Mr. Hariyatno Mr. Sembiring Mr. Katansi Mrs. Setyaningsih					2 persons					2 persons																										
Joint Committee																																															
Liaison from Japan	Planning survey					Guidance					Guidance					evaluation					final evaluation																										

図-3 当初計画骨子

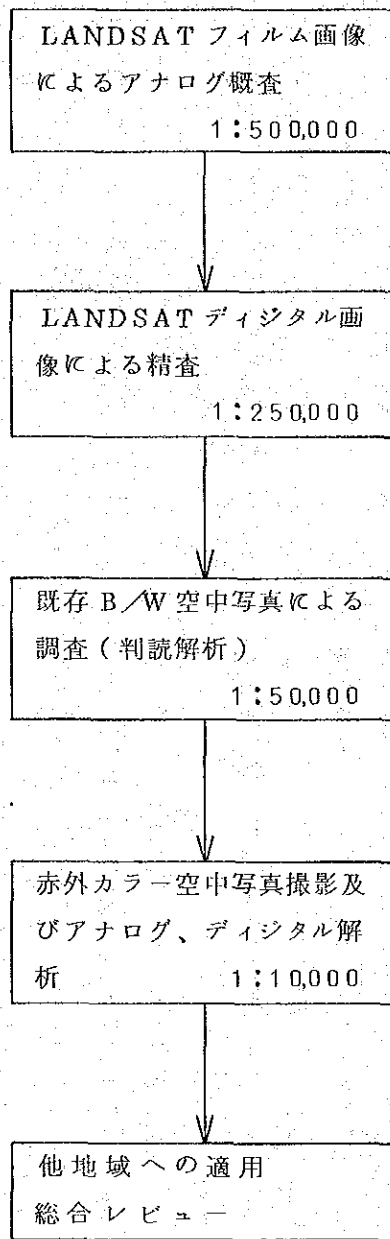
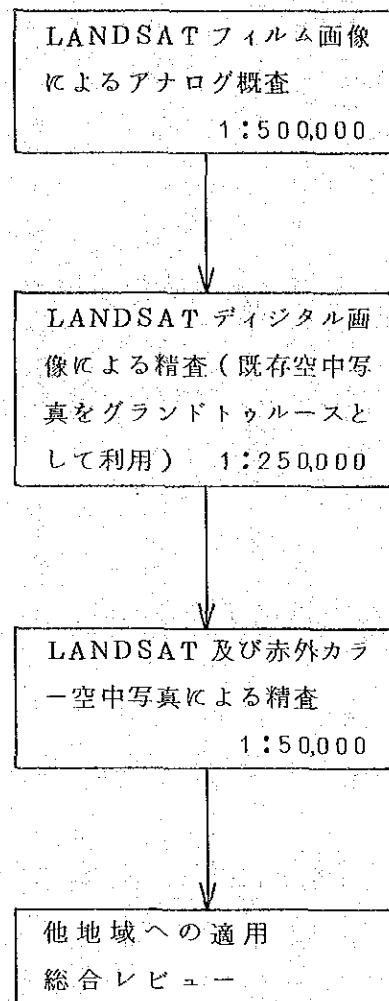


図-4 変更計画



4. プロジェクト関係資料（昭和58年3月上旬現在）

1. カウンターパート

担当	氏名	年齢	学歴	(専攻)
① プロジェクト・リーダー	Mr SUROSO M. DJOJOSOEKARTO	44才	ガジャマタ大学卒	(地理学)
② 計画・運営 (サブ・リーダー格)	Mr IBNU KATAMSI	39才	ガジャマタ大学卒	(地理学)
③ 農業基盤開発	Mr HARIYATONO SOEMARMAN	27才	"	(土壌学)
④ "	Mrs NANIEK SITI MURDJATI	28才	"	(農学)
⑤ 計算処理 (コンピューター処理)	Mrs SETYANINGSIH	29才	バンドン工科大学卒	(数学)
⑥ 計画・運営 (写真処理・メンテナンス)	Mr ANWAR SOEFI IBRAHIM	35才	インドネシア大学卒	(電子工学)
"	Miss SRI YUMADIATI NINOYOPAWOKO	26才	ガジャマタ大学卒	(地理)
※⑦ 計算処理 現在インドネシア大学院で2年間の研修中	Mrs ADI SASUTJI	28才	バンドン工科大学卒	(物理)
※⑧ "	Miss RENNI	26才		
現在インドネシア大学院で2年間の研修中				
※⑨ 計画・運営 現在東工大で6か月の研修中	Mr PAIDO HASURUNGAN HUTAPEA	33才	インドネシア大学卒	(電子工学)

この一年間の技術向上としては、主として主題図各種の作成処理の一連のプロセスが一応カウンターパートの手によって、可能になったと言え、処理プログラムの理解、アルゴリズムの理解およびアウトプットの精度の検定等の考え、フィードバックのやり方等、発展的な活動はまだ期待出来ない。しかし、一応リモート・センシングの概念はそなわって来たと思われる。

2. 主題図の作成

現在、当プロジェクトで作成される主題図（含LANDSAT イメージ）は次のとおりである。

- 1) カラーコンジットイメージ（いわゆる衛星写真） 小縮尺から1/12万5千程度まで
- 2) ランドカバーイメージ（土地利用図的なもの） ”
- 3) 土壌図（土壌の色あるいは含水率による分類で、土壌タイプの分類ではない）
- 4) バイオマス量推定図（地表の単位面積当たりの植物量の推定）
- 5) 地質判読図（LANDSAT イメージをマニュアル判読して作成する）
- 6) リバーパターン図（LANDSAT イメージからトレースする）
- 7) 地形、地質のエンハンスイメージ（特に主題図とはいえないが、演算処理したイメージ）
- 8) 植生の変遷図（植生の年間あるいは経年の変化を示す。所有データの数によるため現在は十分対応できない）
- 9) 洪水危険地予測図（既存の水文、地形データと各種のLANDSAT 主題図の重ね合わせによる一種の評価図）

以上が、一応、当プロジェクトの現在までの成果であるが、これらはいずれも日本人専門家により開発された手法であり、カウンターパートはそれの作成処理は可能であるが、アルゴリズムの理解はしていない。

以上の主題図は、LANDSAT データさえあればインドネシア全域の主題図提供が可能である。

主題図に関して言えば、一応の完了を見ているが、精度のアップ、他の手法の検討、等が今後の課題である。

3. 現地調査

1981年度	CJC地区	8月18日	} 地形、植生、土地利用調査および } 分光反射特性の調査
	北スマトラ地区	9月6日～12日	
1982年度	スンバワ島	6月15日～19日	土地利用調査
	CJC地区	7月6日～8日	土地利用調査（サンプリング）
		9月10日～11日	（評価検定）
	北バンテン	7月12日～14日	土地利用他
	中部ジャワ	1月16日～23日	地質調査

- 1) 北バンテン地区 水資源開発マスタープラン作成のための基礎資料提供として、82年のプロジェクト活動の中心として取り組み、この3月に当プロジェクトの現在、作成可能なすべての主題図の作成を行いレポートとしてまとめた。

- 2) スンパワ島 住宅総局からの依頼により同島の土地利用データ提供を試み、同じくこの3月に土地利用に関するレポートの作成を完了した。
- 3) C. J. C 地区 当初のスタディエリアであるが、今年は北バンテンを含めたLANDSAT 1シーン解析の形で進めた。そのレポートもランドカバー、バイオマスについてまとめられつつある。
- 4) 中部ジャワ 地形・地質のトレーニングフィールドとして、バラエティに富む。中部ジャワは、インドネシアでの代表的な地質構造を有しており、今後の地形・地質のリモートセンシング解析に非常に有効であると判断される（火山、石灰岩地帯等）。このため、地形・地質に限って中部ジャワの調査を実施し、数種のエンハンスイメージを作成し、地質判読図を作成した。この成果は北バンテンのレポートに集約されている。

4. 日本からの供与機材リスト

"Equipment List of Remote Sensing Project"

I. Digital Image Processing System			207,119,080 Yen
1) Central Processing Unit	IBM 4341-K01	1 Set	57,788,000 Yen
2) Magnetic Disk Storage	IBM 3370-A01/B01	2 Sets	14,717,800 Yen
3) Storage Control Unit	IBM 3880-001	1 Set	14,707,000 Yen
4) Magnetic Tape Drive	IBM 3420-004	3 Sets	18,374,100 Yen
5) Tape Control Unit	IBM 3803-002	1 Set	10,443,500 Yen
6) Color Grafic Display	Kimoto	1 Set	19,521,600 Yen
7) Drum Scanner Unit	Kimoto	1 Set	11,312,000 Yen
8) Photoprinter Unit	Kimoto	1 Set	9,760,000 Yen
9) High Speed Line Printer	IBM 3203-005	1 Set	9,694,000 Yen
10) Diskette I/O Unit	IBM 3540-B01	1 Set	7,292,000 Yen
11) Programabl Data System	IBM 5285-B01	1 Set	1,407,600 Yen
12) Color Display Unit	IBM 3278	3 Sets	2,988,800 Yen
13) Control Unit	IBM 3274-D01	1 Set	4,705,000 Yen
14) Printer	IBM 3287-001	2 Sets	2,934,480 Yen
15) Soft Programs	Kimoto	1 set	20,000,000 Yen
16) Others			1,473,200 Yen
II. Photo Processing System			36,780,400 Yen
1) Photo Enlarging System	Devere 108	1 Set	12,000,000 Yen
2) Color Paper Processor	Hope 146 RC52-14	1 Set	11,150,000 Yen
3) Rewind Film Processor	Carl Zeiss FE-120	1 Set	2,600,000 Yen
4) RC Paper Dryer	King Air Dryer 230	1 Set	
5) Thermo Controller	Niseikogyo	1 Set	1,100,000 Yen
6) Reflection Densito Meter	Kimoto	1 Set	432,000 Yen
7) Polardid 8 x 10 Processor		1 Set	304,000 Yen
8) Film Dryer	Karl Zeiss TG-24	1 Set	3,477,000 Yen
9) Others			5,717,400 Yen
III. Photo Interpretation Equipment			16,369,000 Yen
1) Additive Color Viewer	NAC AC-90	1 Set	11,550,000 Yen
2) Stered Zoom Transfer Scope	Bausch & Lomb Z.T.S.	1 Set	4,800,000 Yen
3) Pocket Stereo Scope Viewer	Sokkisha PS24	5 Sets	19,000 Yen

IV. Field Survey Equipment			6,955,800 Yen
1) Mobil	Nissan Patrol	2 CAR	3,702,800 Yen
2) Camera	Nikon	1 Set	187,000 Yen
	Pentaks	1 Set	262,000 Yen
3) Photo Meter	Kimoto PM-12A	1 Set	550,000 Yen
	Kimoto PM-2500	1 Set	2,000,000 Yen
4) Aneloid Altimeter		1 Set	25,000 Yen
5) Transreciver	Sony ICB-680	5 Sets	184,000 Yen
6) Soil Sampler	Kanto Rika 300-C	1 Set	45,000 Yen
V. Others			740,000 Yen
1) Overhead Projector	Sumitomo 3M	1 Set	280,000 Yen
2) Slide Projector	Cabin Super 3	1 Set	200,000 Yen
3) Refregirator	Sanyo SR-43F	1 Set	260,000 Yen
4) Air Conditioner	Daikin	1 Set	
5) Photo Copy	Fuji Xerox 4800	1 Set	7,500,000 RP
6) Typewriter	IBM 50	1 Set	1,900,000 RP

5. 主要機材の故障および保守状況

使用頻度	故障状況	メンテナンス状況
1) デジタル画像処理機材		
1. 主記憶装置 IBM 4341-K01	1台	◎
2. 磁気ディスク IBM 3370-A01/B01	4台	◎
3. 磁気ディスクコントローラ IBM 3860-001	1台	◎
4. 磁気テープユニット IBM 3420-004	3台	◎
5. 磁気テープコントローラ IBM 3803-002	1台	◎
6. ラインプリンター IBM 3203-005	1台	◎
7. ターミナル IBM 3278	7台	◎
8. ディスケット入出力装置 IBM 3540-B01	1台	△
9. ディスケットプログラムデモ装置 IBM 5285-B01	1台	△
10. コントローラ IBM 3274-D01	1台	◎
11. プリンター IBM 3267-001	1台	△
12. カラーグラフィックディスプレイ (きもと)		◎
13. フォト・プリンタ (きもと)		◎
14. ドラム・スキャナ (きもと)		○
15. X-Y プロッター		?
	(配備中)	
16. デイジタイザ		?
	(配備中)	
2) アナログ処理装置		
1. フォト・エンラジャー		◎
2. 自動顕像機		◎

インドネシア IBM とのメインテナンス契約により、保守管理されているため、メインテナンスに関しては問題ないが、この契約には年間 38,000,000Rp の予算がインドネシア側から出されている。

ただし、空調機の故障が多く、温度管理上問題が多い。(現在も 2 台の空調機のうち 1 台が故障しており室温は適切とはいえない。) また、ネズミによる害も多いようである。

根本的なメンテナンスは何もされていないため早急に体制を整える必要があり、公共事業省出入りのメンテナンス業者を日本のメーカーで研修させ、メンテナンスする話が進んでいる。

1 年間のメーカーによる定期メンテナンスが受けられるがその代理店がシンガポールにあるため問題も多い。1 年後からのメンテナンスにはインドネシア側の予算的な配慮が必要である。

磁気テープユニットおよびコントローラの故障が時々おこるが、1 両日中に IBM により修理されている。特にテープユニットは 3 台のうち 1 台の調子が悪いようであるが、残る 2 台で一応カバーは出来る状態である。

画像に縞子状のノイズが現れる故障が発生したがプレート基板を日本に返送し、修理した。ライン欠損のノイズが発生する。修理はせずに使用中。

小さな故障は発生するが、現在のところスベアパーツにて修理されている。循環ポンプの異常があり、正常機能ではないが作動中。

3. サーモ・コントローラー	◎	パッチャーに故障が生じたが、日本に返送し、修理した。	上記メンテナンス業者が管理させたい。
4. リワイント・フィルム・プロセッサ	△	特になし	
5. デンシトメーター	◎	特になし	
6. アディティブ・カラー・ビューワー	△	特になし	特にメンテナンスの必要がないように思われるが、
7. ステレオ・トランスプリアースコープ	△	”	上記メンテナンス業者に管理させたい。
8. フォト・タイポジッター	?	”	
9. フォト・メーター PM-2500	(配備中) △	正常に機能しないため、日本に2度送り返し修理した。	上記メンテナンス業者に管理させたい。
10. ” PM-12A	△	特になし	
3) その他			
1. ニッサン・パトロール	◎	大きなトラブルはないが消耗品の補給が必要である。	インドネシアにニッサンの代理店もないため、問題ではあるが一応定期点検はうけている。
2. フォト・コピー	◎	インドネシア側がメンテナンス契約を結んでいないため現在使用出来ない。	新年度からの予算確保が可能であれば、使用出来るが、毎月500,000Rp~600,000Rpのメンテナンス費用が必要となる。
3. 空調機	◎	故障がよく発生するが、修理体制は十分でない。現在コンピュータ室の1台が故障中で室温管理が出来ていない。	故障に対する修理体制が充分でない。
4. 排水メーター	◎	故障がよく発生するが、修理はされていない。写真処理排水に必須のものであるが放置されている。日本チームの買った小型メーター。	”
5. タイプライター	◎		

注) ◎ 非常に頻繁に使用

○ よく使用

△ 時々(必要なたび)使用

? 配備中であり本格的に使用されていない

6. 既存及び収集資料リスト

Data and Material List

- I. Peta Tanah Eksplorasi (Soil Map) 土壤図
North Sumatra & South Sumatra
Scale 1: 1,000,000
1964
- II. Peta Ikhtisar Geologi (Geological Map) 地質図
North Sumatra & South Sumatra
Scale 1: 1,000,000
- III. Geological Map of Jawa and Madura 地質図
Volum I, II, III
Scale 1: 500,000
1963
Compiled Geological Survey of Indonesia, Direktorat Geologi
- IV. Peta Tanah Eksplorasi (Soil Map) 土壤図
Jawa and Madura
Scale 1: 1,000,000
1960
- V. Meteorological Note 降雨地図
-Rainfall Atlas of Indonesia-
Vol. I Jawa and Madura (1931-1960)
Vol. II Sumatra, Kalimantan, Sulawesi, (1911-1940)
Nusatenggara, Maluku, Irian Jaya
- VI. Rencana Tata Guna Tanah (Thematic Mesh Maps for Landuse) 土地利用メッシュ・マップ
Wilayah Pembangunah Cirebon & Banten (Cirebon & Banten Area)
Projek A.P.B.D, Propinsi Jawa Barat 1975/1976
Direktorat Agraria Propinsi Jawa Barat
- VII. Present Landuse, Soils and Land Capability Maps スンバワ島土地利用土壤マップ
(Sumbawa Water Resources Development Planning Study)
By D.P.U. Directorate General of Water Resources & Fenco
- VIII. Vegetation and Landuse Map in Lombok Island 植生, 土地利用マップ (ロンボタ)
Scale 1: 250,000
By National Coordination Agency For Surveys and Mapping (Bakosurtanal)
- IX. The Geology of Indonesia インドネシア地質解説書
General Geology
Vol. I, II
By R.W. VAN Bemmelen

7. 収集データリスト

図種	地域	縮尺	作製年	備考
航空写真	①ジャカルタ東方地域 (チレボンまで)	1/30,000	1981年8月	赤外カラー写真 (350枚)
	②スンパツ島全域	1/50,000	1981年	白黒写真 (402枚)
	③南スマトラ・パレンバン付近	1/20,000	1981年5月	赤外カラー写真 (169枚)
	④北スマトラ全域	1/100,000	1974年1月	白黒写真
地形図	①インドネシア全域	1/1,000,000	1968年	
	② "	1/500,000	1973年	
	③ジャワ島、北スマトラおよびイリヤン一部	1/250,000	1943年	
	④ジャワ島、西スマトラ、南スマトラ およびイリヤン・ジャヤ一部	1/100,000		
	⑤ジャワ島、北スマトラ、南スマトラ、 カリマンタンの一部、セレベス島一部 およびイリヤン・ジャヤその他一部	1/50,000	1943年	
地質図	①スマトラ全島	1/1,000,000		
	②ジャワ全島	1/500,000	1963年	
	③インドネシア全域の地質概要書			
土壌図	①スマトラ全島	1/1,000,000	1964年	
	②ジャワ全島	1/1,000,000	1960年	
降雨図	ジャワ島および全インドネシア (1931~60) (1911~1940)			
土地利用関係資料	西ジャワの一部		1975/76	
LANDSAT CCT データ	北スマトラ・ジャワ島を中心に34 ゾーン			

8. 書籍リスト

Reference Book List

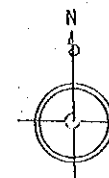
- 1) Remote Sensing in Geology - Wiley
By Barry S. Siegal
Alan R. Gillespie
- 2) Forest Environmentalism in Tropical Life Zones - Pergamon
- A Pilot Study -
By L.R. Holdridge
W.C. Grenke
Etc.
- 3) Digital Image Processing and Analysis - Nordhoff
Nato Advanced Study Institutes Series
By J.C. Simon
A. Rosenfeld
- 4) Remote Sensing and Image Interpretation - Wiley
By Lillesand/Kiefer
- 5) Computer Image Processing and Recognition - Academic Press
- Computer Science and Applied Mathematics -
By Ernest L. Hall
- 6) Remote Sensing in Geomorphology - Elsevier
By H.TH. Verstappen
- 7) Manual of Remote Sensing - The American Society of Photogrammetry
Vol. I & II
- 8) Cosmic Software Documentation
Larsys Test Procedures Manual
Vol. I, II & III
- 9) Remote Sensing Series - Toshi - Asakura Shoten
By Toshio Oshima
- 10) Remote Sensing Series - Kishoo - Asakura Shoten
By Nobuhiko Kodaira
- 11) Uchuu Kara No Me - Remote Sensing Data Kaiseki - Asakura Shoten
- 12) Jinko Eisei Shasin - Remote Sensing - Asakura Shoten
By Kiyoo Wadachi
- 13) Remote Sensing Note - Genri To Ooyo - Gihodo Shupan
Remote Sensing Kenkyu Kai
- 14) Sekai - Jinko Eisei Shasin Shu - Asakura Shoten
(Mission to Earth: Landsat Views the World)
By Hitoshi Takeuchi

- 15) Jinko Eisei Shasin - Asakura Shoten
 - Remote Sensing; Chikyu Shigen Tansa No Kaiseki to Ooyo -
- 16) Sora Kara No Chosa - Kashima Shupan
 Kuchu Shasin No Handoku to Riyoo
- 17) Remote Sensing - Canon Image Henshusitsu
- 18) Tahenryo Kaiseki Ho - Nikka Giren
 By Tadaichi Okuno
- 19) Zoku Tahenryo Kaiseki Ho - Nikka Giren
 By Tadaichi Okuno
- 20) Denshi Keisanki No Tame No Suuchi Keisanho - Baifukan
 By Jiro Yamauchi
- 21) Tokeyteki Tafenryo Data Kaiseki - Niyana Desikan- - Nikka Giren
 By Masaya Hamamoto
- 22) Netai Sakumotsu - Azumi Shobo
 By Shikuro Miura
- 23) TonanAsia No Kaju - Norin Sho, Netai Nogyo Kenkyu Center
- 24) Netai No Yuyo Sakumotsu - Norin Sho, Netai Nogyo Kenkyu Center
- 25) Netai Taurin - Seitai Gakuteki Kenkyu - - Kyoritsu Shupan
 By P.W. Richard
- 26) Nogaku Daijiten - Yokendo
 By Yakichi Noguchi

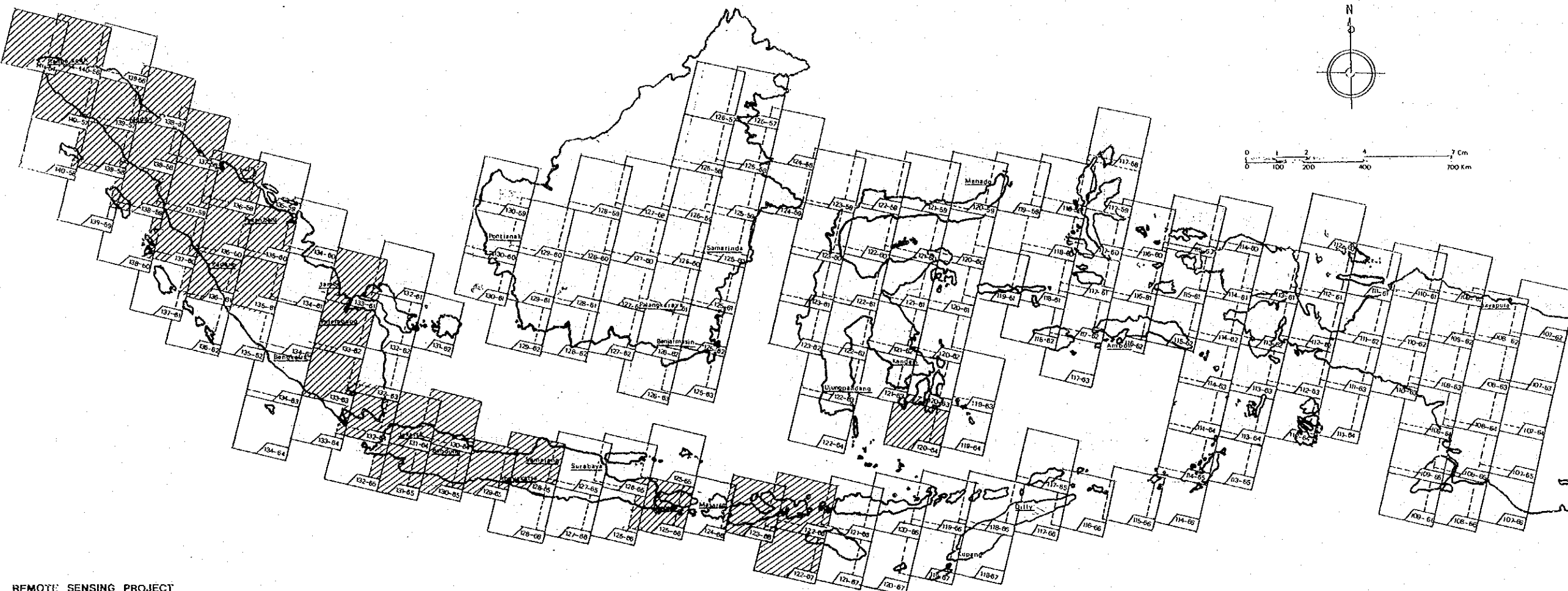
9. Landsat CCT 所有一覽表

Land Mss	Path	Row	Data	Sat	IM Qual	Cloud	Scene Ident	Area Name
1	141	56	04/10/73	2	5855	20	82117402490x0	Banda Aceh-North Sumatra
2	140	56	04/09/78	2	5858	30	82117302431x0	Banda Aceh-North Sumatra
3	140	57	01/21/74	1	2222	30	8154703171500	Banda Aceh-North Sumatra
4	139	57	11/14/72	1	8888	20	8111403153500	Medan-North Sumatra
5	139	58	01/07/73	1	8888	30	8116803154500	Medan-North Sumatra
6	138	57	10/03/73	1	2222	20	8143703075500	Medan-North Sumatra
7	138	58	10/03/73	1	2222	10	8143703081500	Lake Toba-North Sumatra
8	138	59	10/03/73	1	2222	40	8143703084500	Lake Toba-North Sumatra
9	137	58	04/29/77	2	5888	20	8282802342500	Asahan-North Sumatra
10	137	59	04/29/77	2	8888	40	8282802344500	Asahan-North Sumatra
11	137	60	10/25/72	1	8888	40	8109403050500	Asahan-North Sumatra
12	136	59	12/31/78	2	5528	20	82143902335x0	Pekan Baru-North Sumatra
13	136	60	06/15/73	3	8888	60	8132702592500	Pekan Baru-North Sumatra
14	136	61	09/18/72	1	8888	70	8105702591500	Padan-Middle Sumatra
15	135	60	06/14/73	1	8888	30	8132602534500	Pekan Baru-Middle Sumatra
16	135	61	06/14/73	1	8888	20	8132602540500	Bukit Tinggi-Middle Sumatra
17	133	61	06/22/78	3	5858	20	83010902304x0	Jambi & Bangka-South Sumatra
18	133	62	06/22/78	3	8828	20	83010902310x0	Palembang-South Sumatra
19	133	63	06/22/78	3	5858	30	83010902315x0	Lampung-Sumsel-South Sumatra
20	132	64	05/30/77	2	5888	20	8208590208500	Lampung-West Java
21	131	64	06/21/76	2	8588	10	8251602141500	Jakarta-West Java
22	131	64	08/21/73	1	8882	20	8139402313500	Jakarta-West Java
23	131	65	06/21/76	2	5888	10	8251602143500	Pelabuhan Ratu-West Java
24	131	65	07/17/78	2	8888	40	82127202001x0	Pelabuhan Ratu-West Java
25	130	64	08/12/78	3	8888	10	83016002152x0	Cirebon-West Java
26	130	65	06/20/76	2	8888	10	8251502085500	Bandung-West Java
27	129	65	09/29/72	1	8888	10	8106802204500	Cirebon-Middle Java
28	129	65	04/25/78	3	5858	10	83005102085x0	Cirebon-Middle Java
29	128	65	09/28/72	1	8888	0	8106702145500	Semarang-Yogyakarta-Middle Java
30	125	66	04/30/78	2	8588	10	82119401223x0	Bali-East Java
31	123	66	04/30/81	2	-	-	8222900133100	West Sumbawa
32	122	66	04/29/81	2	-	-	8222890127200	East Sumbawa
33	121	67	06/03/81	2	-	-	8223240121300	South Sumbawa
34	120	64	09/07/78	2	5558	30	83018601182x0	South Sulawesi

LANDSAT COVERAGE MAP
IN INDONESIA



0 1 2 4 7 Km
100 200 400 700 Km



REMOTE SENSING PROJECT
DEPARTEMEN PEKERJAAN UMUM
JL. PATTIMURA 20 JAKARTA

5. カウンターパートへのアンケート結果

1. Present Capability of Production of Landsat Color Composite Image by Indonesian Staff.

A) Digital Processing

- Noise Reduction
- Geometric Correction
- Image Enlargement
- Image Enhancement
- Photo Printing

B) Analogue Processing

- Adjustment of Color Balance
- Adjustment of Image Scale
- Control of Developer Condition

(Answer)

ITEM'S Name	A) Digital Processing					B) Analogue Processing			Capability of Thematic Map Production							
	Noise Reduction	Geometric Correction	Image Enlargement	Image Enhancement	Photo Printing	Adjustment of Color Balance	Adjustment of Image Scale	Control of Developer Condition	Land Cover Map	Biomass Estimation Map	Soil Classification Map	Geology Map	Geomorphology Map	River Pattern	Seasonal Vegetation Pattern Map	Others (Ground Reflectance Measurement)
1. Drs. Ibnu Katamsi	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
2. Ir. Haryatno S		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
3. Drs. P. Hutapea	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
4. Drs. Anwar SI.	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes
5. Dra. Setyaningsih	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes
6. Ir. Nanick SM.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes
7. Dra. Sri Yumadiati	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes

2. Thecnology Transfer from the Counterparts Who was Trained in Japan to

Another Counterparts.

- A) By Mr. Anwar
- B) By Mr. Hutapea
- C) By Mr. Katamshi
- D) By Mr. Hariatno
- E) By Mr. Sumbiring
- F) By Mrs Setyanigshi

(Answer)

Name	Name of Organization in Japan	Field of Study	Transfer to Technology
Ibnu Katamsi	TSC-IBM	Information extraction from landsat MSS data by color combination.	Presentation
Setaningsih	TSC-IBM	Changing detection.	Presentation
Anwar Soefi I.	KIMOTO & IBM	Application of photo processing and drum scanner maintenance.	Suhadi Nurwedha
P. Hutapea	KIMOTO & IBM	Application of photo processing and drum scanner maintenance.	Suhadi Nurwedha
Haryatno Sumarman	RESTEC	General application of Remote Sensing	Presentation
B. Sembiring	RESTEC	General application of Remote Sensing	Presentation

3. Maintenance Condition of Provided Equipments, Especially Analogue Equipment.

- A) Maintenance Regulation on Note
- B) Maintenance Formation
- C) Actual Maintenance Activity
- D) Maintenance Cost Equivalent to Maintenance Activity

(Answer)

Item's	Daily	Weekly	2/Weekly	Monthly
A) Maintenance Regulation	Every morning before start Work	Every Monday	-	Every Monday
B) Maintenance Formation	Start checking end-checking	Water roller checking/weeks		All the roller checking/month
C) Actual Maintenance Activity	Checking roller changing filters checking temp. Checking replenisher rate control strip			
D) Maintenance Cost Equivalent to Maintenance Activity	13,875	83,250	16,650	333,000

Maintenance cost equipment for:

Photographic processing

Photoprinter

Drum Scanner

Photo type setter

4,000,000 Rp for/Year

4. List of Reference Data & Maps Collected in This Project

- A) Topo. Map
- B) Thematic Map
- C) Aerial Photo
- D) Census Data
- F) Report or Material
- G) Reference Book
- H) Others

(Answer of 4.5.6.7) 参照

5. Condition of Application of Every Reference Data Mentioned in 4.

- A) Topo. Map
- B) Thematic Map
- C) Aerial Photo
- D) Census Data
- F) Report or Material
- G) Reference Book
- H) Others

(Answer of 4.5.6.7) 参照

6. Problems on Reference Data Collection Activity

- A) Topo. Map
- B) Thematic Map
- C) Aerial Photo
- D) Census Data
- E) Report or Material
- F) Reference Book
- G) Others

(Answer of 4.5.6.7) 参照

7. Reference Data Which Should Be Collected Hereinafter

- A) Topo. Map
- B) Thematic Map
- C) Aerial Photo
- D) Census Data
- E) Report or Material

F) Reference Book

G) Others

(Answer of 4.5.6.7)

No. Reference Data	4. List of Reference	5. Condition	6. Problems	7. Reference Data
A) Topo. Map	Annex 1	Edited in 1978, 1979 and 1940	-	New edition map
B) Thematic Map	Annex 2	Several of Editing Data	Difficult to get several kinds of thematic map	Geological maps, soil map
C) Aerial Photo	Northern Sumatra 1:500,000 (B & W) Jakarta-Citebon (Color IR) 1:30,000	1972 1981	-	North Sumatra (Asahan ±40,000 Ha) Color IR
D) Census Data	Population, rain fall, Transportation etc.	Good	-	1:30,000
E) Report of Material	Annex 3	Good	Difficult to get a good referent book for Remote Sensing in Indonesia	
F) Reference Book	Annex 4	Good	-ditto-	-
G) Others	-	-	-	-

8. Improvement of Counterpart's Capability During This One Year.

(What has become to be able to do?)

A) Mr Katamshi

- B) Mr Hariyatno
- C) Mr Anwar
- D) Mr Hutapea
- E) Mrs Setyaningshi
- F) Mrs Naniek
- G) Miss Yumadiati

(Answer of 8.9) 参照

9. Present Capability of Software Development

(Real Capability Without Any Help)

- A) Mr Katamshi
- B) Mr Hariyatno
- C) Mr Anwar
- D) Mr Hutapea
- E) Mrs Setyaningshi
- F) Mrs Naniek
- G) Miss Yumadiati

(Answer of 8.9)

Item's Name	8. Improvement of Counterpart's Capability	9. Present Capability of S/W Development
1. Drs. Ibnu Katamsi	Information extraction by color combination.	
2. Ir. Haryatno Sumarman	Image analysis for soil type analysis and land cover analysis.	
3. Drs. Anwar Soefi Ibrahim	- Application of reflection meter for ground observation. - Development for Photographic Analysis	
4. Dra. Setyaningsih	Image analysis for land cover analysis, geometric correction and changing detection, biomass estimation	Read & write manipulated of internal for file land grid image.
5. Ir. Naiek Siti Murdjiati	Image analysis for biomass estimation and land cover analysis.	
6. Dra. Sri Yumadiati	Image analysis for geological interpretation and land cover analysis.	
7. Drs. Paído Hutapea	Photo processing, land cover analysis.	

10. Present Capability of Thematic Map Production.

(Real Capability Without Any Help, from CCT to Photoprint)

- A) Land Cover Map
- B) Biomass Estimation Map
- C) Soil Classification Map
- D) Geology Map

- E) Geomorphology Map
- F) River Pattern
- G) Seasonal Vegetation Pattern Map
- H) Others

(Answer)

ITEM'S Name	Digital Processing					Analogue Processing			10.Capability of Thematic Map Production								
	Noise Reduction	Geometric Correction	Image Enlargement	Image Enhancement	Photo Printing	Adjustment of Color Balance	Adjustment of Image Scale	Controll of Developer Condition	Land Cover Map	Biomass Estimation Map	Soil Classification Map	Geology Map	Geomorphology Map	River Pattern	Seasonal Vegetation Pattern Map	Others Ground Reflectance Measurement	
1. Drs. Ibnu Katamsi	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
2. Ir. Haryatno S		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
3. Drs. P. Hutapea	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
4. Drs. Anwar SI.	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes
5. Dra. Setyaningsih	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
6. Ir. Naniek SM.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
7. Dra. Sri Yumadiati	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes

11. Indonesian Regulation on Selection of Agricultural Development Site.

(Answer)

Indonesian Parameter for Selection of Irrigation Development (Rice).

1. Suitable Land for Daddy/Rice.
2. Water Quantity and Quality is Suitable for Rice.
3. Manpower/Farmer Avialable.
4. Not Flooded Area.
5. Owner of Land is Clear.
6. Aviable Market for Agriculture Product.
7. Aces Road to the Project Location.
8. Other's.

12. Idea on Selection of Agricultural Development Site Using Remote Sensing Technique.

(Answer)

Factors on the Selection of Agricultural Development Site Using Remote Sensing.

1. Slope Category (0-5, 5-8, 8-12, 12-15, >15)
2. Elevation Category (0-200, 200-500, 500-700, 700-1000, >1000 m)

3. Soil Type Category
 4. Soil Condition Category
 5. Soil PH Category
 6. Hydrology
 7. Rain Fall/From GMS?/Temperature/NOAA?
 8. Drainage Pattern
 9. Land Use/Land Cover
 10. Settlement Pattern
 11. Transportation Network
 12. Flooded Area
 13. Critical Land
13. Whole Costs Spent for This Project from Beginning Until Now
- A) Material, Consumption
 - B) Personnel
 - C) Operatin
 - D) Commission

Budget Item	Fiscal Year 1980/81 (Rp)	Fiscal Year 1981/82 (Rp)	Fiscal Year 1982/83 (Rp)	Total (Rp)
1. Building	293,079,000	-	-	293,079,000
2. Material, consumption	8,750,000	15,500,000	24,450,000	48,700,000
3. Operation	322,805,000	212,264,000	234,503,000	769,572,000
4. Commission	-	88,000,000	123,000,000	211,000,000
5. Salary	PM	PM	PM	PM

6. カウンターパート セミナー資料

Land Evaluation for Agricultural Development

- Total Evaluating technique considered from natural site condition -

Mar. 3., 1983 by Tsuyoshi AKIYAMA

Ecology Division

National Grassland Research Institute

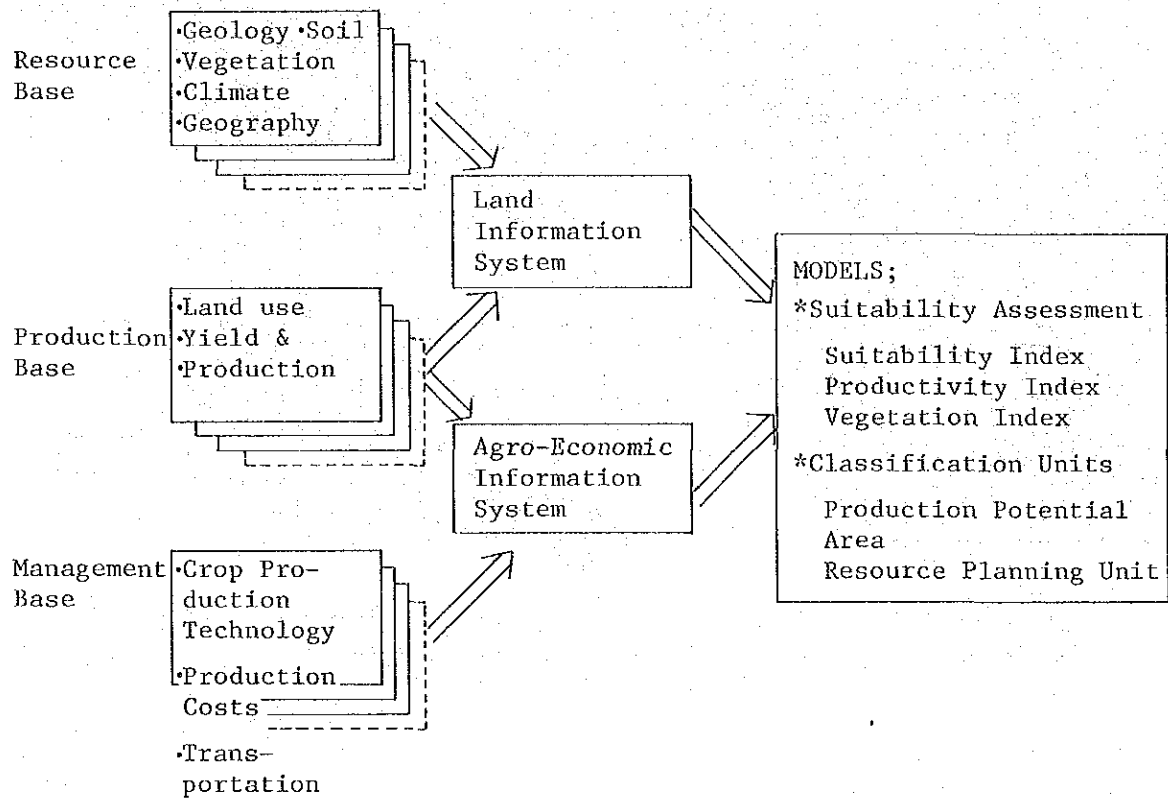
Ministry of Agriculture, Forestry and Fisheries,

JAPAN

Land Resource
Inventory Items

Agricultural
Infrastructure
Information System
(Spatial data base)

Assessment system



(Grid Cell Data File)

Fig.1 AGRICULTURAL INFRASTRUCTURE EVALUATION SYSTEM AND THE MAJOR FACTORS

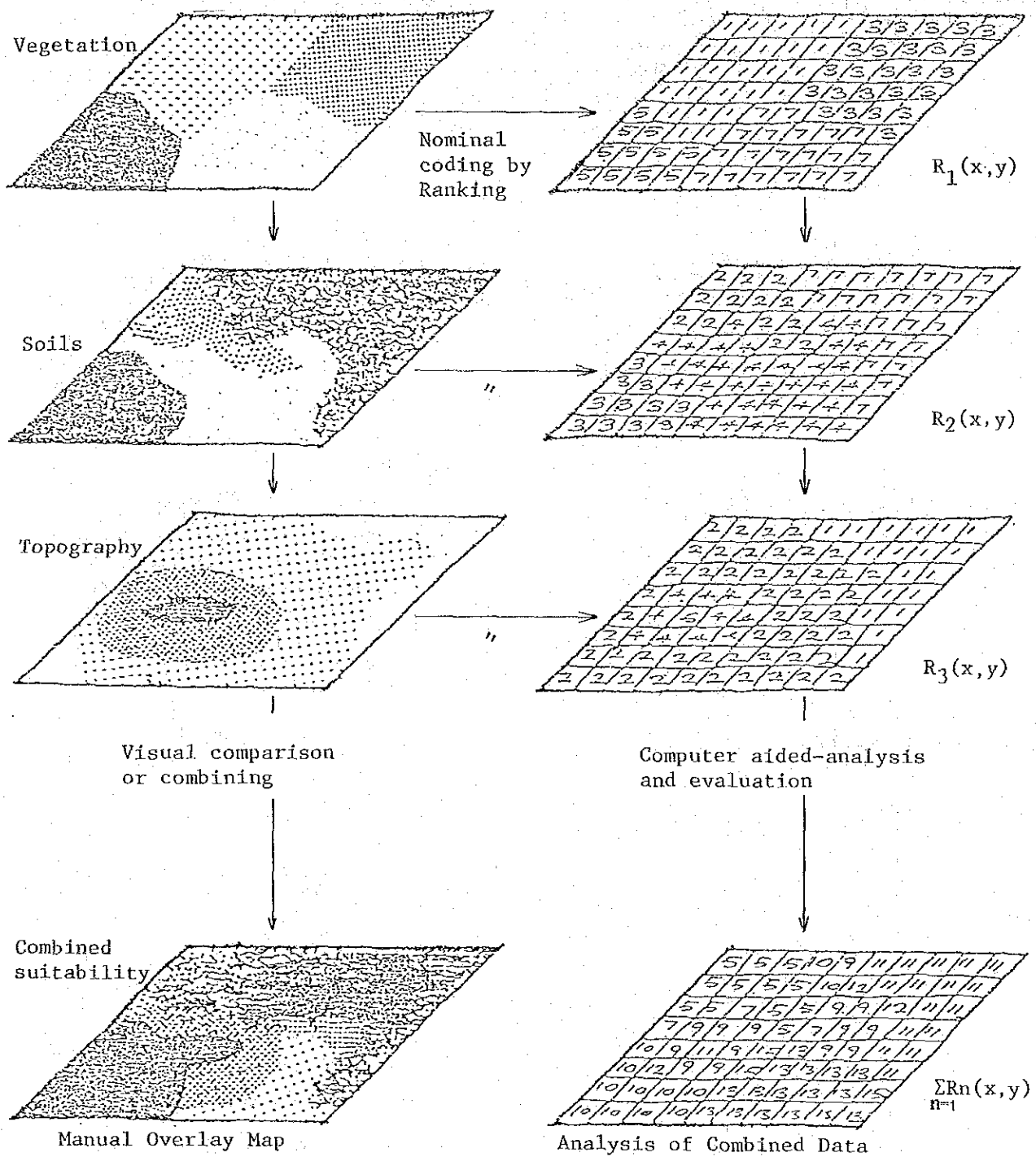


Fig.2 A simple example of Integrated Analysis of Spatial Data (Concept).

Table 1. Classification table of condition in rhizosphere.

Rank (Score)	Standard factors		
	Depth of soil	Soil moisture	Gravel content
5	More than 100 cm	Moist	-
4	75 ~ 100 cm	Moderately dry or wet	5 ~ 10%
3	50 ~ 75 cm	Dry or wet	10 ~ 20%
2	30 ~ 50 cm	Very wet	More than 20%
1	15 ~ 30 cm		-
0	Less than 15 cm		-

Correct factor	Correct method
Depth of top soil	If the data of standard factor is part of boundary and the depth of top soil is more than 30 cm, the rank should be promoted to a higher rank. In this case, if the depth of top soil is less than 30 cm, the rank should be degraded.

Table 2. Evaluation of dry field by natural factors.

Factors	Number of class	Score	Weight
Frostless period	(7 (by frostless period) 6 (by snow period)	0 ~ 25	25
Precipitation	4 (by annual precipitation)	0 ~ 3	3
Typhoon	3 (by number of times in the late 25 years)	0 ~ 3	3
Slope of dry field	4	0 ~ 5	5
Direction of field	8	0 ~ 5	5
Natural slope	4	0 ~ 4	4
Sunshine	(6 (by shadow) 4 (by number of days of fog)	0 ~ 8	8
Peat in plow layer	2 (by exist or not)	0 ~ 5	5
Soil texture	8	0 ~ 6	6
Gravel content	4 (by volume ratio)	0 ~ 5	5
Wind erosion	3 (by its extent)	0 ~ 2	2
Drainage	5	0 ~ 8	8
Color of plow layer	4	1 ~ 5	5
Depth of soil	4	0 ~ 8	8
Poor soil in 1 meter layer from surface	7 (by exist or not and extent)	1 ~ 8	8
Total		2 100	100

Table 3 Classification table of growth condition

Rank (Score)		Condition in rhizosphere					
		5	4	3	2	1	0
Assimilation	5	10	8	5	3	2	0
	4	9	7	4	2	1	0
	3	7	6	3	1	1	0
	2	5	4	2	1	0	0
	1	3	2	1	0	0	0
	0	0	0	0	0	0	0

Table 4 Classification table of suitability for farm land

Rank (Score)		Workability										
		10	9	8	7	6	5	4	3	2	1	0
Growth Condition	10	10	10	9	8	8	8	7	6	5	5	0
	9	9	8	8	7	7	6	6	5	4	4	0
	8	8	8	7	7	6	5	4	4	3	3	0
	7	7	6	6	5	5	4	3	3	2	2	0
	6	6	6	5	5	4	3	3	2	2	2	0
	5	5	4	4	3	3	2	2	2	1	1	0
	4	4	4	3	3	2	2	2	1	1	1	0
	3	3	2	2	2	1	1	1	1	0	0	0
	2	2	2	2	1	1	1	1	0	0	0	0
	1	1	1	1	1	1	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0

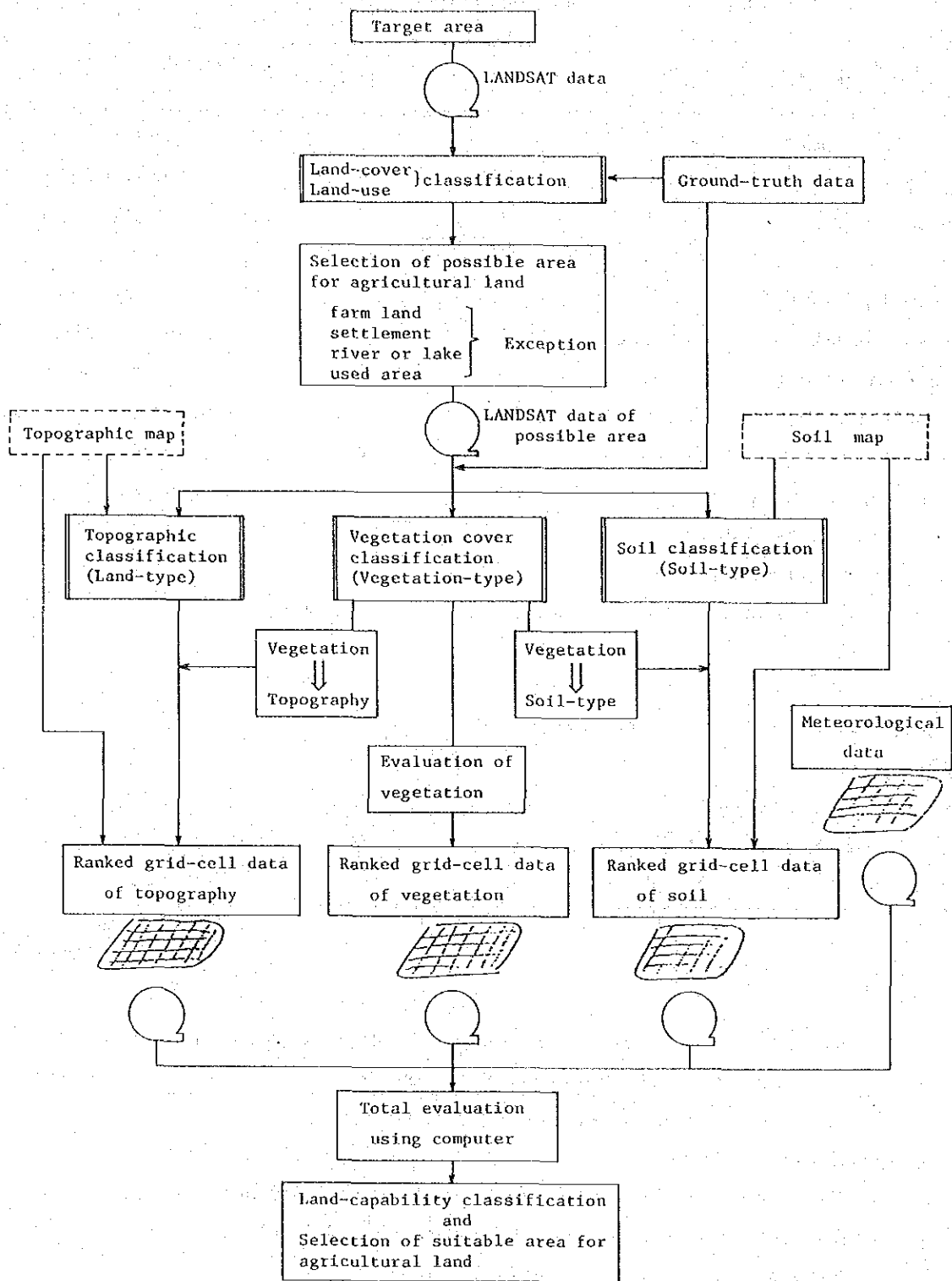


Fig. 3 Flowchart of land evaluation in "Regional assessment", mainly using LANDSAT MSS data

Table 5 Weed-plant ecological groups observed in the Hakkohda Mountain system in Japan (Tachibana, 1968)

Species	PH-value	Organic matter content	Climate
<i>Plantago asiatica</i>	1	1	1
<i>Poa annua</i> L.	1	1	1
<i>Trifolium repens</i> L.	1	2	2
<i>Poa pratensis</i> L.	1	2	2
<i>Carex albata</i> Boott	1	1	2
<i>Petasites japonicus</i> var. <i>giganteus</i>	1	1	2
<i>Equisetum arvense</i> L.	1	3	2
<i>Lactuca dentata</i> Makino	2	2	3
<i>Hydrocotyle sibthorpioides</i> Lamk	2	2	3
<i>Zoysia japonica</i> Steud	2	2	3
<i>Pteridium aquilinum</i> Kuhn	2	2	3
<i>Miscanthus sinensis</i> Anderss.	2	2	3
<i>Halorrhagis micrantha</i> R. Br.	2	2	3
<i>Rumex acetosella</i> L.	2	3	2
<i>Rumex obtusifolius</i>	3	3	2
<i>Chenopodium album</i> L. var. <i>centrorubrum</i> Makino	3	3	2
<i>Stellaria media</i> Cyr	3	3	2
<i>Viola grypoceras</i> A. Gray	3	3	2
<i>Polygonum Blumei</i> Meisn.	3	3	3
<i>Polygonum Thunbergii</i> Sieb. et Zucc.	3	3	3

Note: Classification criteria

PH-value

- 1 Species grow in wide soil acidity range between PH 3.9 to 7.0.
- 2 Species grow only between PH 5.4 to 6.3.
- 3 Species grow only between PH 3.9 to 5.4.

Organic matter content

- 1 Species grow in wide range from rich to poor soil.
- 2 Species can grow on poor to intermediate soil.
- 3 Species can grow only on rich soil.

Climate

- 1 Species adapt broad zone among hilly, sub-alpine and alpine zones.
- 2 Species grow only on hilly or sub-alpine zones.
- 3 Species grow only on hilly zones.

Table 6: Indicator plants in Mid-Europe grassland ecological groups
(Extracted from Ellenberg, 1952)

Species	Light	Temperature	Soil		
			Moisture	Acidity	Nitrogen
<i>Calamagrostis Epigeios</i> Roth	3	2	2 ^w	0	2
<i>Dactylis glomerata</i> L.	4	0	3	4	4
<i>Deschampsia flexuosa</i> Trin.	4	0	2	1	2
<i>Festuca ovina</i> L.	4	0	2	<u>0</u>	1
<i>Holcus lanatus</i> L.	<u>3</u>	3	3	0	<u>4</u>
<i>Lolium multiflorum</i> Lam.	5	4	3	4	4
<i>Lolium perenne</i>	<u>5</u>	3	3	0	4
<i>Phalaris arundinacea</i> L.	4	2	5 ^u	4	5
<i>Phleum pratense</i> L.	4	0	3	0	4
<i>Poa annua</i> L.	3	0	5 ^u	0	5
<i>Juncus effusus</i> L. var. <i>decipiens</i> Buchen	4	3	3	<u>2</u>	3
<i>Luzula multiflora</i> Lej.	3	0	4 ^w	<u>3</u>	2
<i>Inula salicina</i> L.	4	4	4 ^w	5	2
<i>Picris hieracioides</i> L. var. <i>japonica</i> Regel	5	3	2 ^w	4	3
<i>Hemistepta carthamoides</i> O. Kuntze.	3	4	2	4	<u>1</u>
<i>Parnassia palustris</i> L.	4	0	3 ^w	4	2
<i>Sanguisorba officinalis</i> L.	4	3	4 ^w	0	2
<i>Trifolium pratensis</i> L.	<u>4</u>	0	4	0	2
<i>Medicago lupulina</i> L.	3	3	0	4	2
<i>Lotus corniculatus</i> L. var. <i>japonicus</i> Regel	4	0	2	0	2
<i>Dianthus superbus</i> L.	4	1	0	<u>5</u>	1
<i>Rumex obtusifolius</i>	4	3	<u>4</u>	0	5

Note: Numbers in the Table indicate the grade of tolerance to environmental factors, from 1 (shade tolerance, frost hardiness, drought resistance, acid tolerance and poor nitrogen tolerance) to 5 (not tolerable to each factor). Number 0 indicates any relationships were observed to the factor. Underlined numbers are not certain because of few observation. Species with letter w shows strong tolerance under temporally high moisture condition, and letter u shows hydrophilous plants.

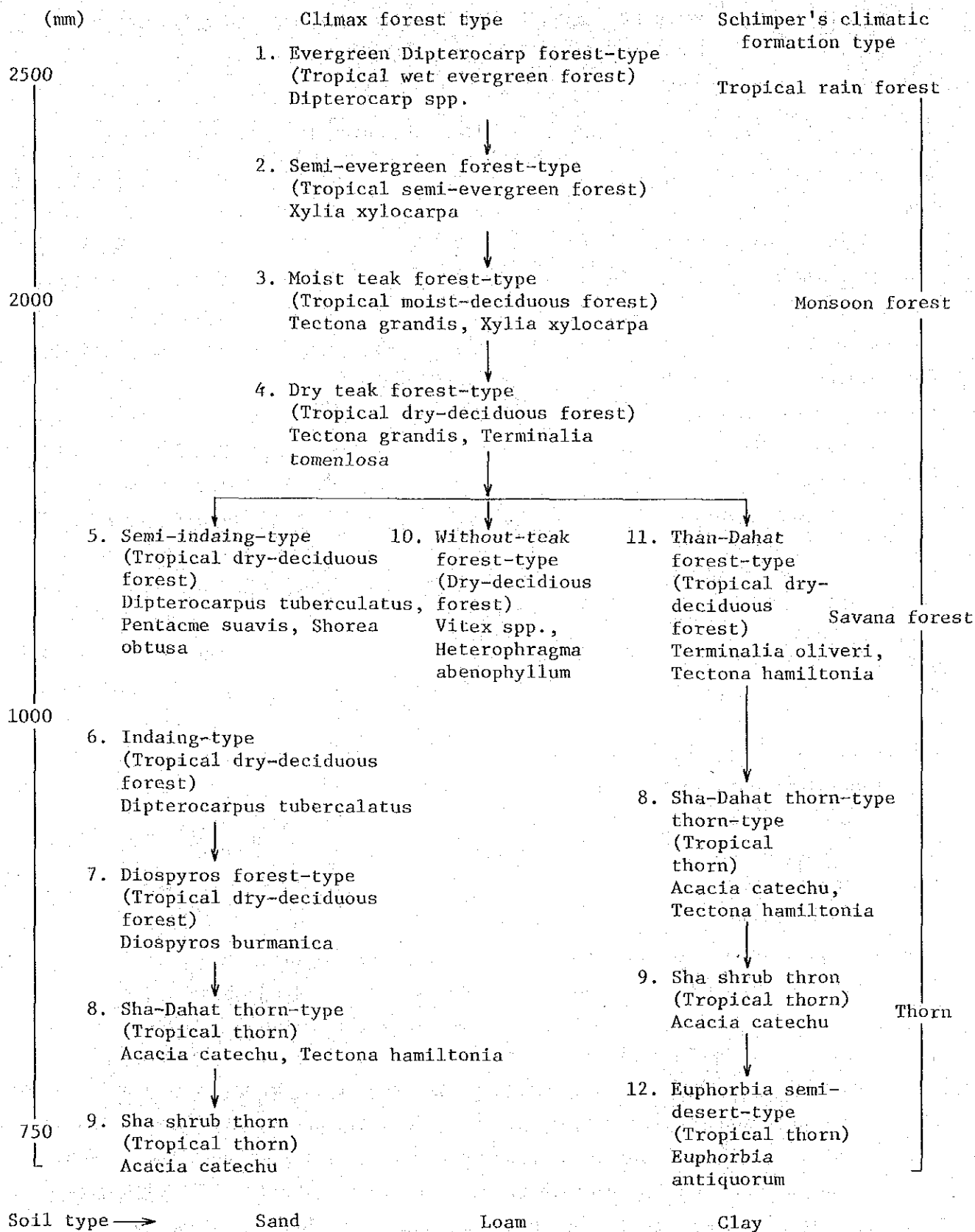
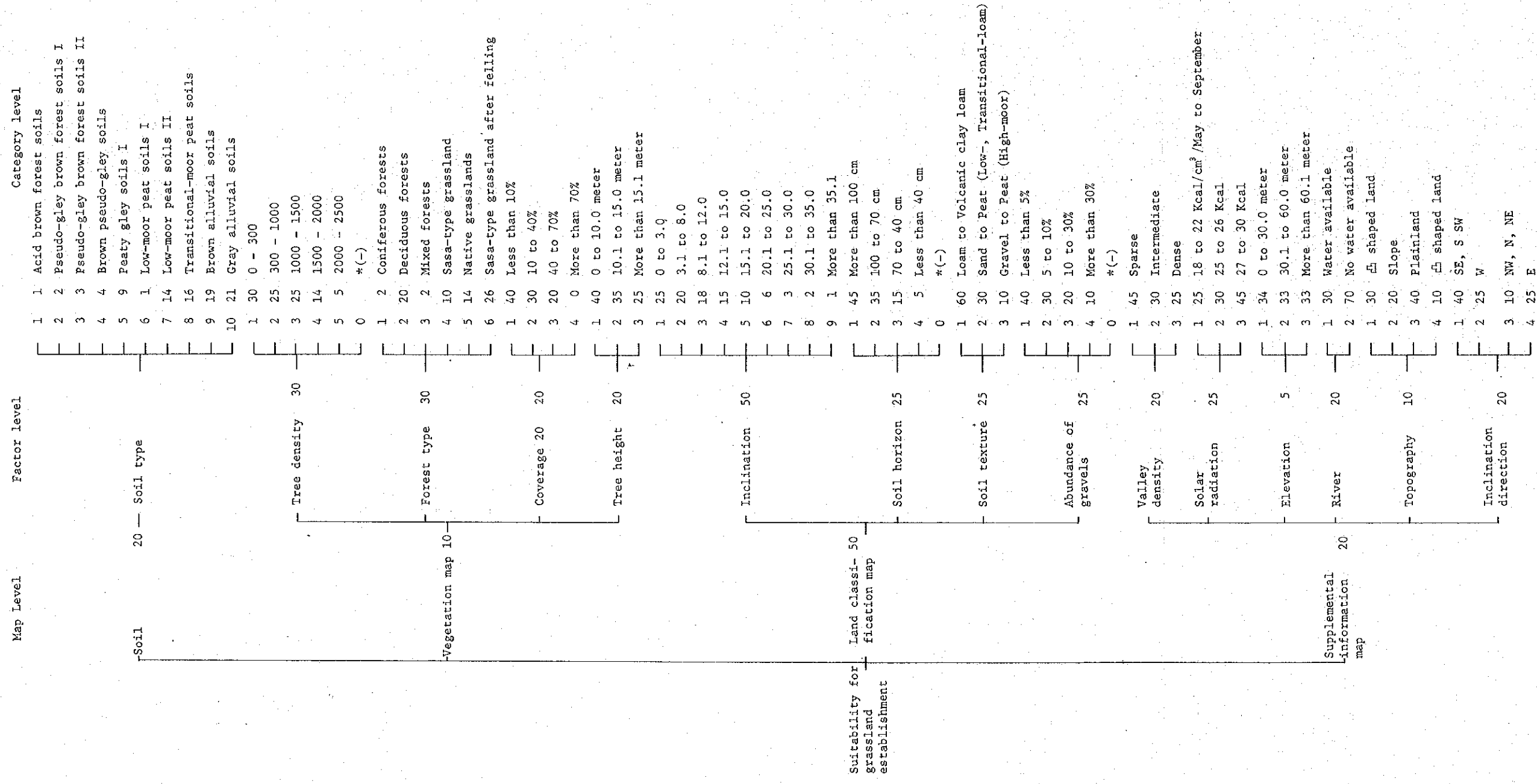


Fig. 4 Lowland climax forest types in Burma in relation to precipitation and soil type (Okutomi, 1977)



Note: Numbers in the Table indicate relative weight for the previous item.

Fig. 5 Relevance tree of suitability for grassland establishment in Japan by PATTERN method (Takahata et al. 1976)

(セミナー参加者名簿)

Remote Rensing Seminar at Remote Sensing Project

March 3, 1983

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