

**REPUBLIC OF INDONESIA  
MINISTRY OF PUBLIC WORKS  
DIRECTORATE GENERAL OF HIGHWAYS**

**THE FEASIBILITY STUDY  
OF  
THE LOCAL ROAD DEVELOPMENT  
IN THE REPUBLIC OF INDONESIA**

**INCEPTION REPORT**

**OCTOBER 1984**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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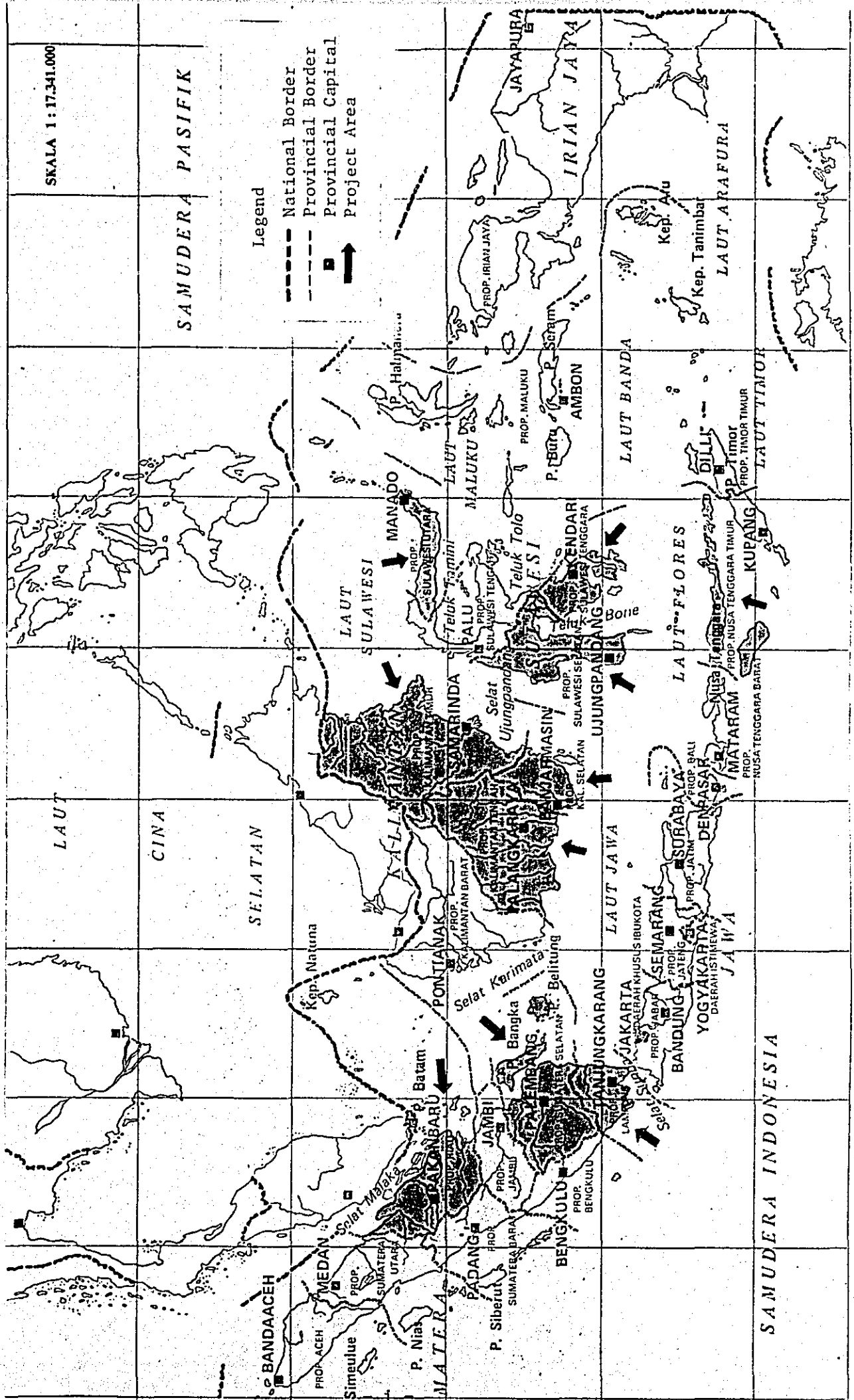
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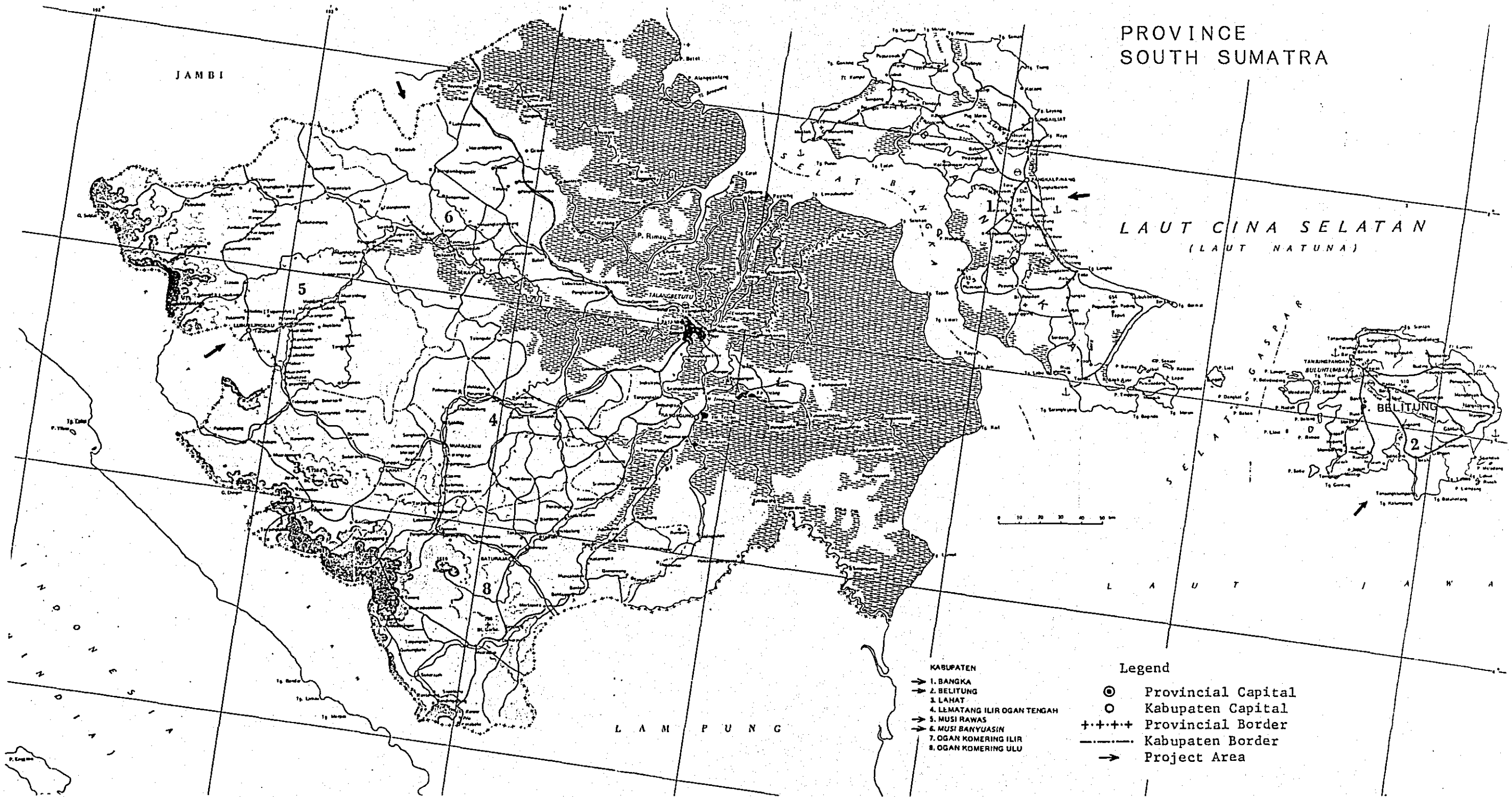
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PROJECT LOCATION MAP





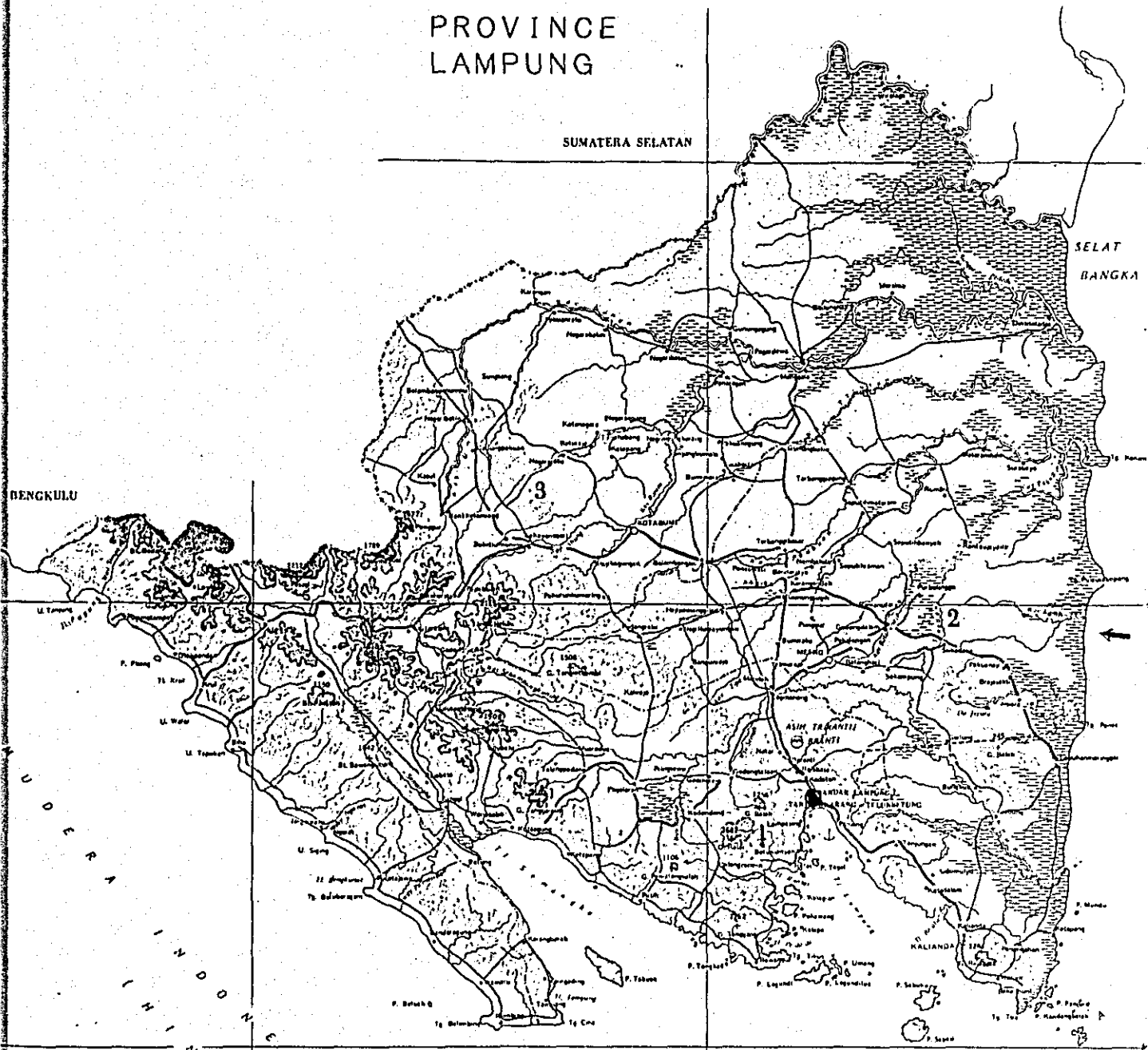
PROVINCE SOUTH SUMATRA



- KABUPATEN
- ➔ 1. BANGKA
  - ➔ 2. BELITUNG
  - ➔ 3. LAHAT
  - ➔ 4. LEMATANG ILIR OGAN TENGAH
  - ➔ 5. MUSI RAWAS
  - ➔ 6. MUSI BANYUASIN
  - ➔ 7. OGAN KOMERING ILIR
  - ➔ 8. OGAN KOMERING ULU

- Legend
- ⊙ Provincial Capital
  - Kabupaten Capital
  - + + + + Provincial Border
  - - - - Kabupaten Border
  - ➔ Project Area

# PROVINCE LAMPUNG



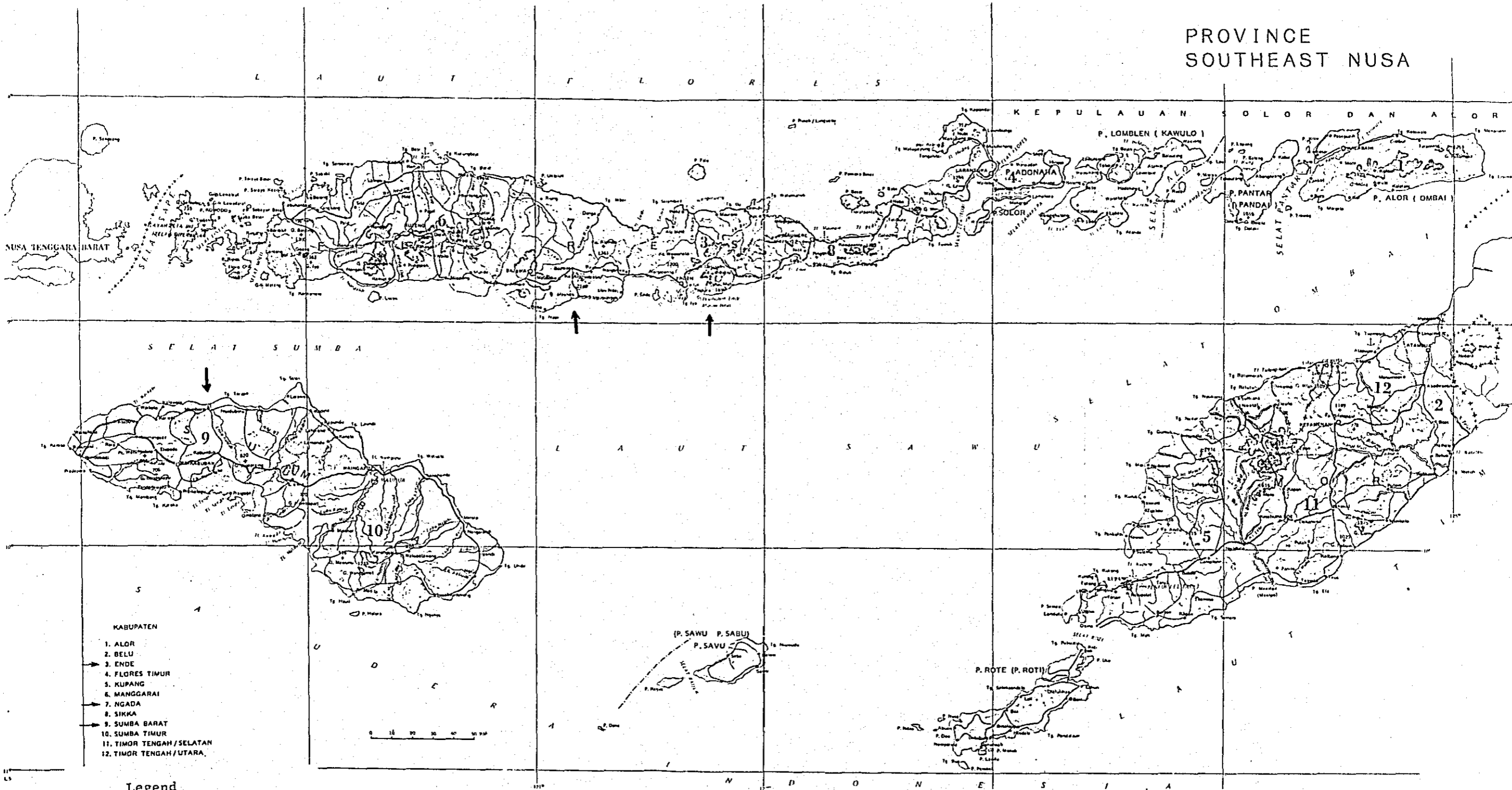
## Legend

- ⊙ Provincial Capital
- Kabupaten Capital
- ++++ Provincial Border
- - - - Kabupaten Border
- Project Area

KABUPATEN  
 1. LAMPUNG SELATAN  
 2. LAMPUNG TENGAH  
 3. LAMPUNG UTARA



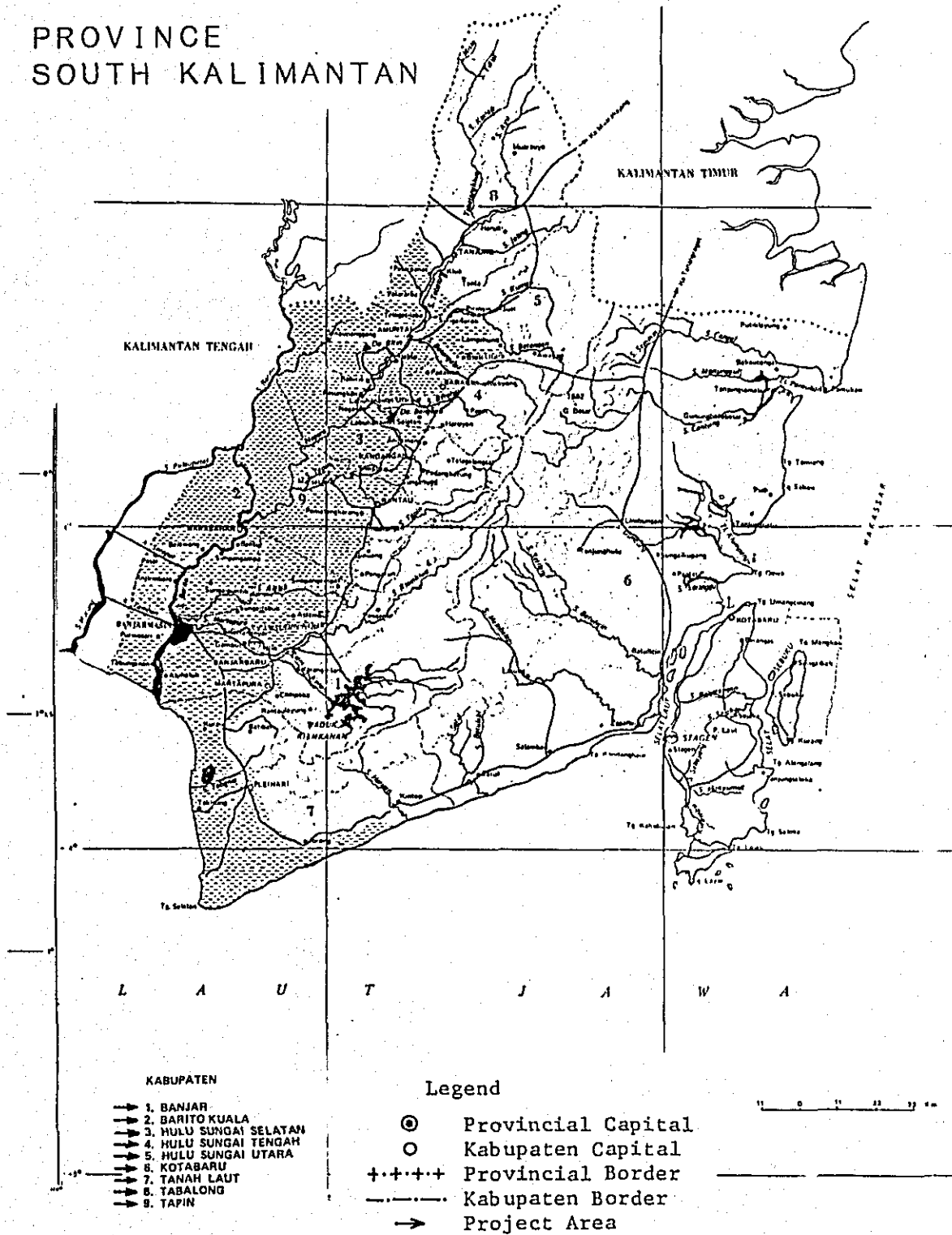
# PROVINCE SOUTHEAST NUSA



- KABUPATEN
1. ALOR
  2. BELU
  3. ENDE
  4. FLORES TIMUR
  5. KUPANG
  6. MANGGARAI
  7. NGADA
  8. SIKKA
  9. SUMBA BARAT
  10. SUMBA TIMUR
  11. TIMOR TENGAH/SELATAN
  12. TIMOR TENGAH/UTARA

- Legend
- ⊙ Provincial Capital
  - Kabupaten Capital
  - + + + + Provincial Border
  - - - - Kabupaten Border
  - Project Area

# PROVINCE SOUTH KALIMANTAN



**KABUPATEN**

- 1. BANJAR
- 2. BARITO KUALA
- 3. HULU SUNGAI SELATAN
- 4. HULU SUNGAI TENGAH
- 5. HULU SUNGAI UTARA
- 6. KOTABARU
- 7. TANAH LAUT
- 8. TABALONG
- 9. TAPIN

**Legend**

- ⊙ Provincial Capital
- Kabupaten Capital
- + + + + Provincial Border
- ..... Kabupaten Border
- Project Area

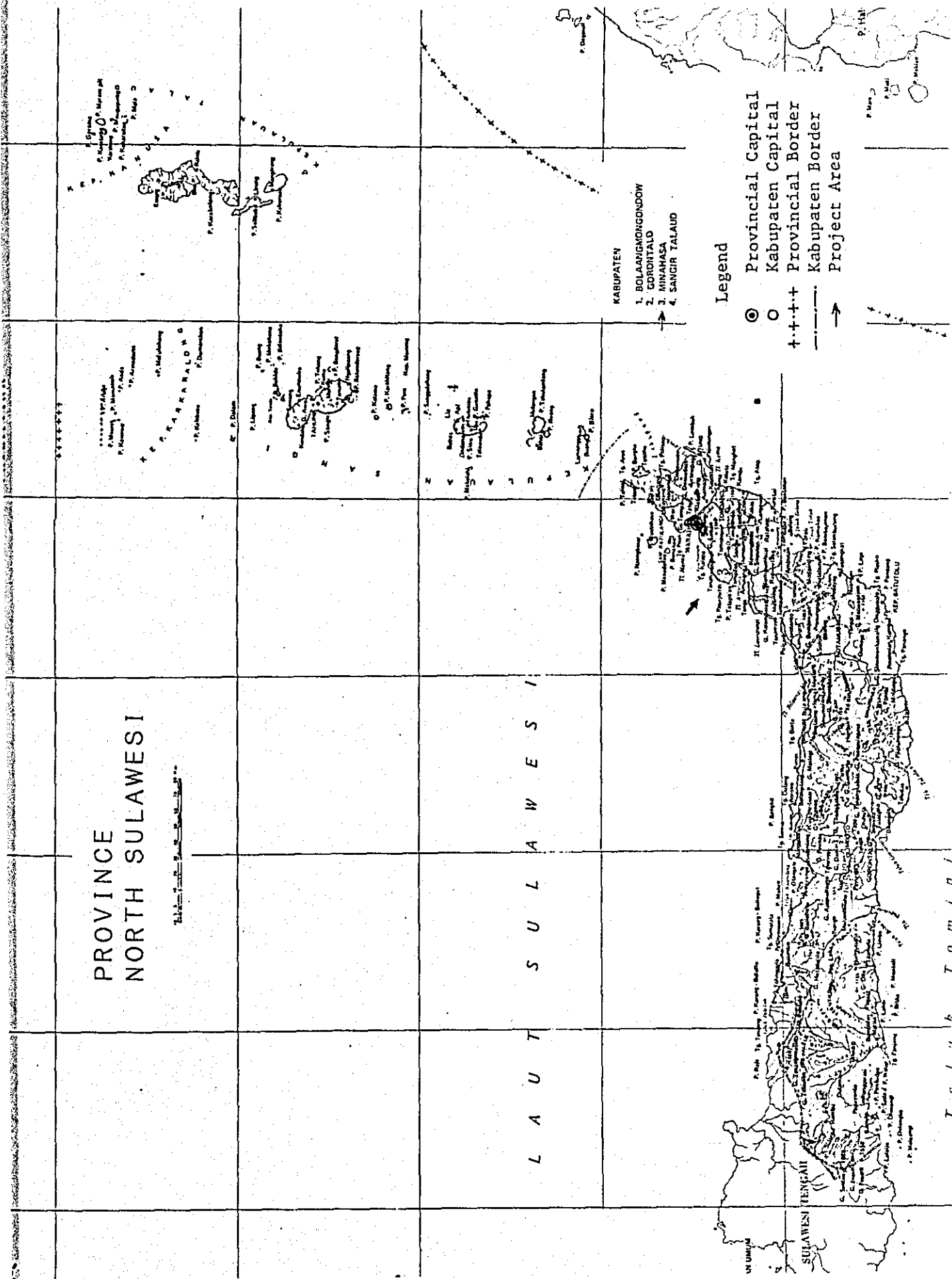
0 10 20 30 km

# PROVINCE NORTH SULAWESI

1:100,000

# L A U T S U L A W E S I

T o t i n i k T o m i n i

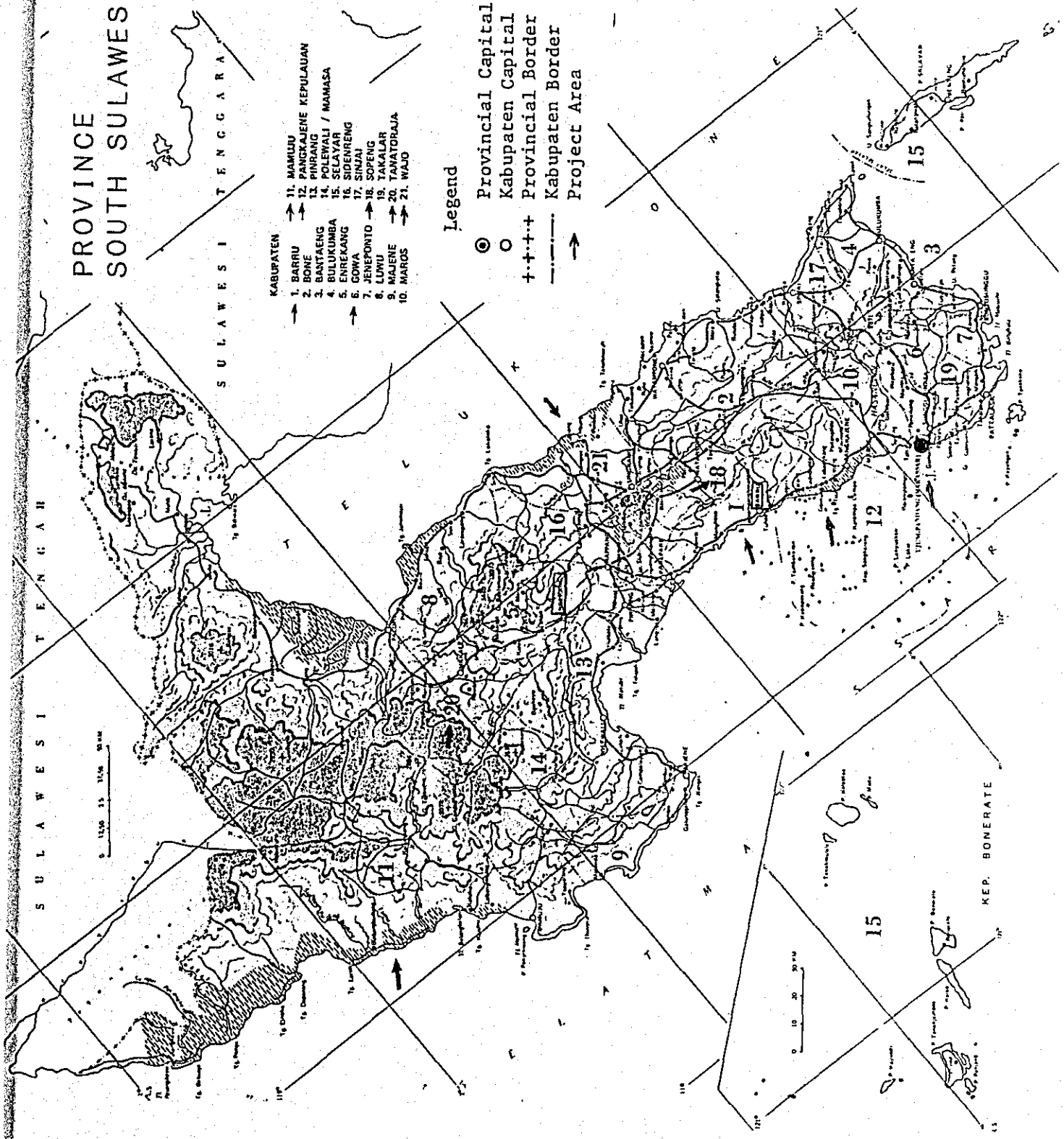


KABUPATEN  
1. BOLAANGMONGGONDOW  
2. GORONTALO  
3. MINAHASA  
4. SANGIR TALAUD

### Legend

- ⊙ Provincial Capital
- Kabupaten Capital
- + + + + Provincial Border
- - - - Kabupaten Border
- Project Area

# PROVINCE SOUTH SULAWESI



- KABUPATEN**
- 1. BARRU
  - 2. BONE
  - 3. BANTAEANG
  - 4. BULUKUMBA
  - 5. ENREKANG
  - 6. GOWA
  - 7. JENEPONTO
  - 8. LUWU
  - 9. MAJENE
  - 10. MARGAS
  - 11. MAMUJU
  - 12. PANGKAJENE KEPULAUAN
  - 13. PINRANG
  - 14. POLEWALI / MAMASA
  - 15. SELAYAR
  - 16. SIDENRENG
  - 17. SINJAI
  - 18. SOPENG
  - 19. TAKALAR
  - 20. TAMATORAJA
  - 21. WAJO

**Legend**

- ⊙ Provincial Capital
- Kabupaten Capital
- + + + + Provincial Border
- - - - Kabupaten Border
- Project Area

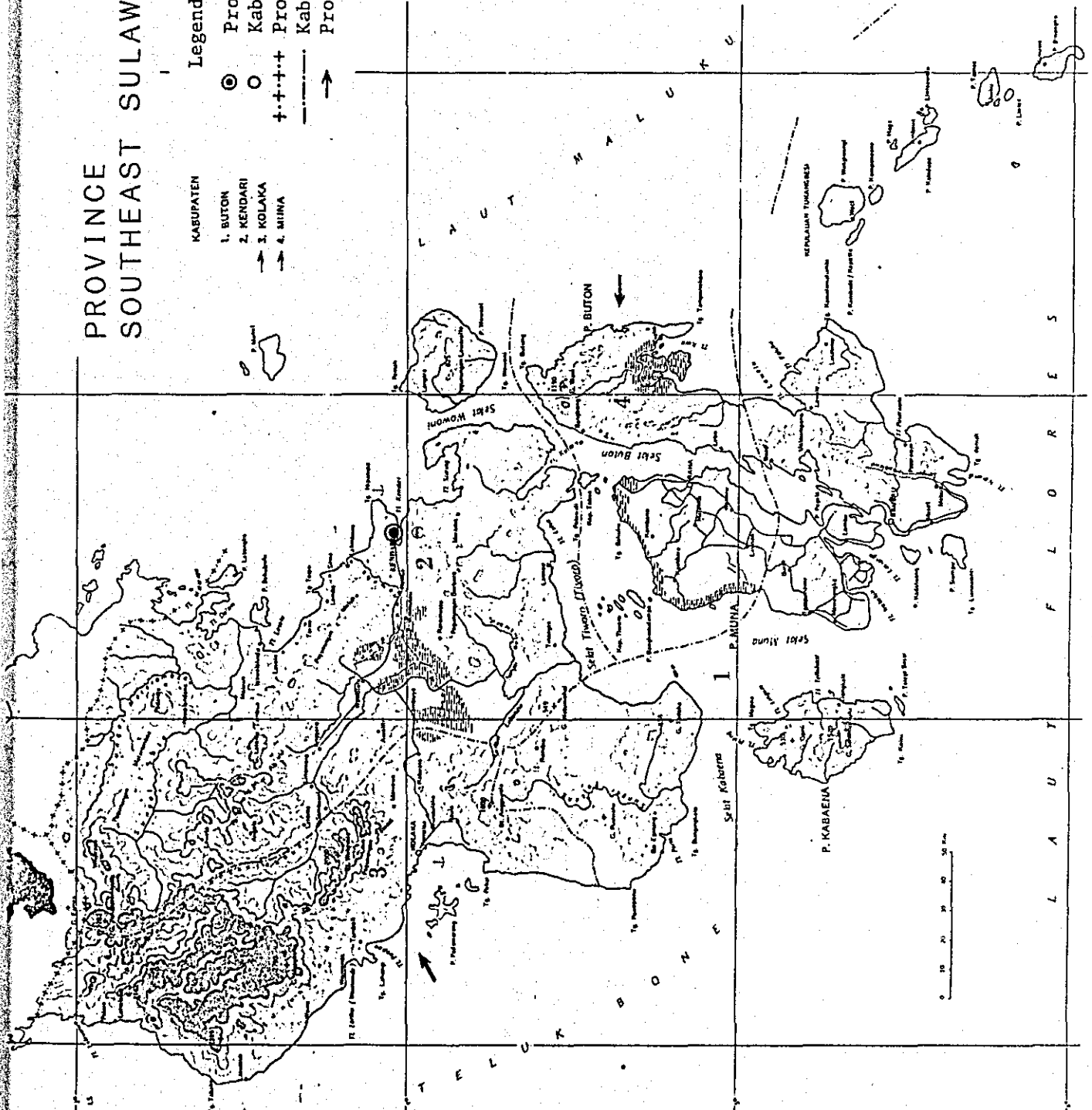
# PROVINCE SOUTHEAST SULAWESI

## KABUPATEN

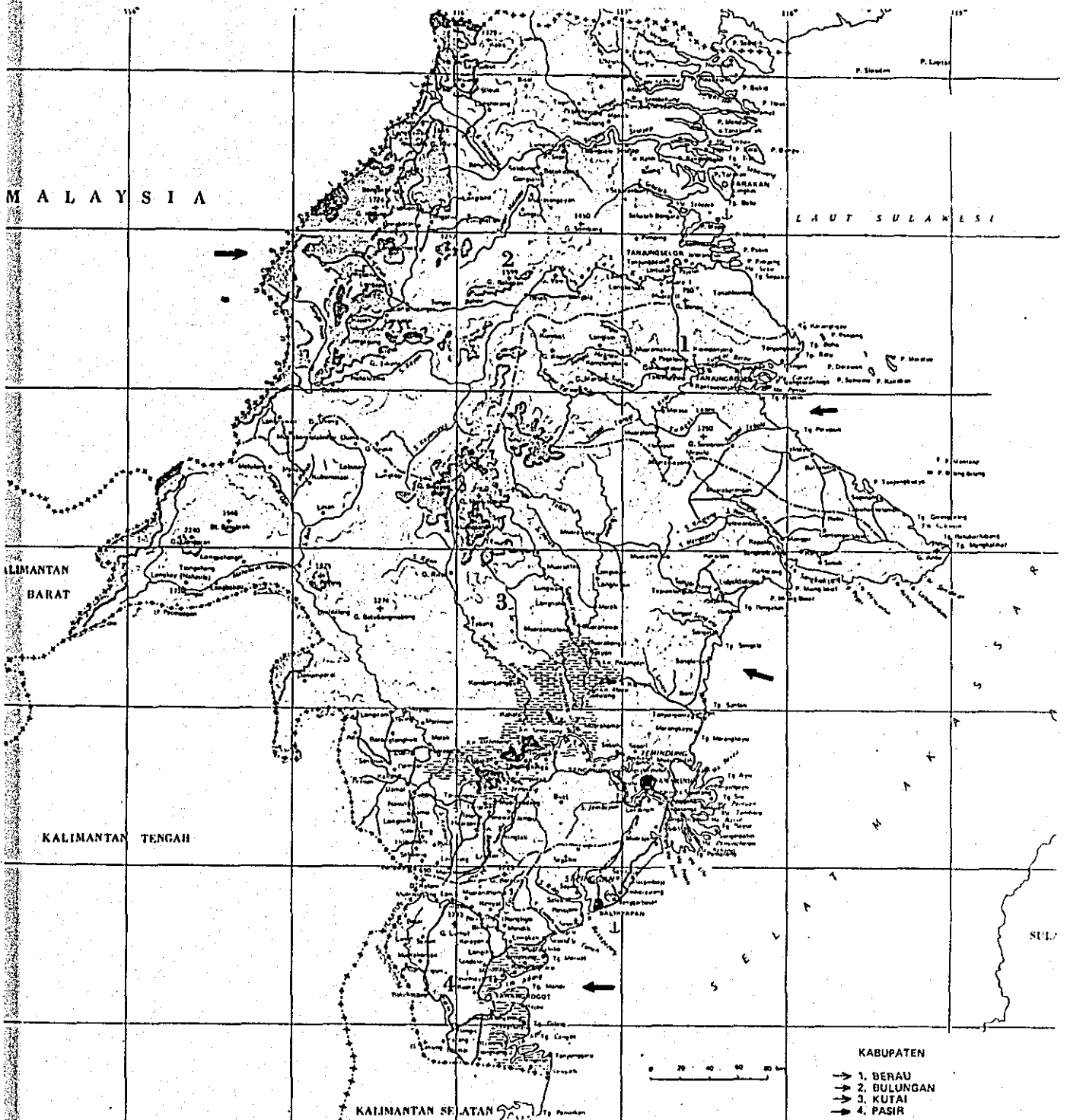
1. BUTON
2. KENDARI
3. KOLAKA
4. MINA

## Legend

- ⊙ Provincial Capital
- Kabupaten Capital
- + + + + Provincial Border
- - - - Kabupaten Border
- Project Area

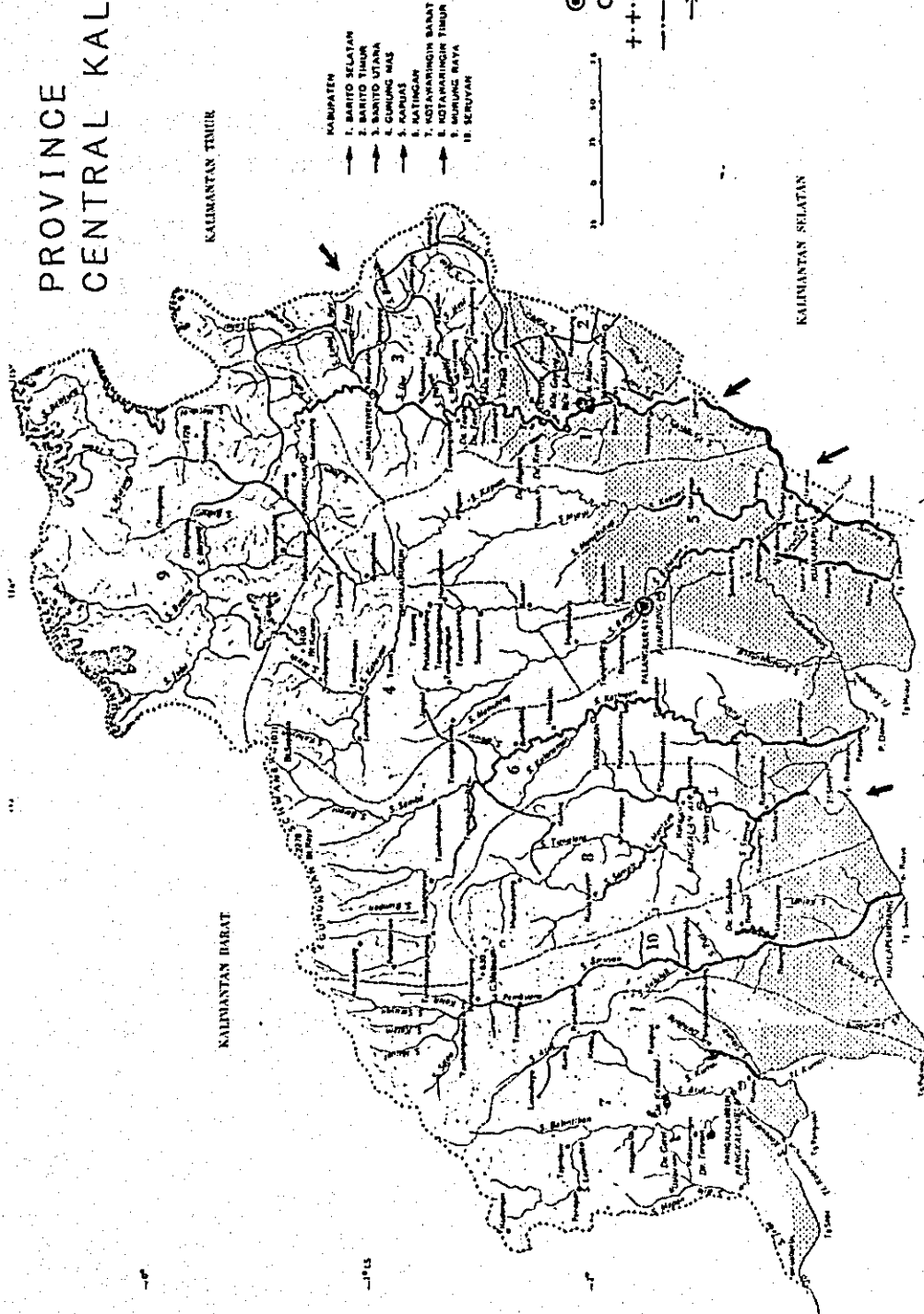


# PROVINCE EAST KALIMANTAN



- Legend**
- ⊙ Provincial Capital
  - Kabupaten Capital
  - + + + + Provincial Border
  - - - - Kabupaten Border
  - Project Area

# PROVINCE CENTRAL KALIMANTAN



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## SECTION 1: INTRODUCTION

### 1.1 BACKGROUND OF THE STUDY

The Government of Indonesia (hereinafter referred to as "the Government") is desirous to implement local road (Kabupaten Road) improvement expeditiously in consideration of a balanced development of rural area in Indonesia. From this point of view, a local road development programme was introduced in the Third Five-Year Plan, 1979-1983 (PELITA III), as one of the important policies of the Government.

Several international lending agencies have assisted the Government in financing the programme, viz., the Overseas Economic Cooperation Fund of Japan (hereinafter called as OECF) to 21 Kabupatens, the International Bank of Reconstruction and Development (hereinafter called as IBRD) to 25 Kabupatens and the Asian Development Bank (hereinafter called as ADB) to 14 Kabupatens.

In the Fourth Five-Year Plan, 1984-1988 (PELITA IV), the Government expects that the said three international lending agencies would continue to assist the Government in financing the program, that is 38 Kabupatens by OECF, 43 Kabupatens by IBRD and 30 Kabupatens by ADB respectively.

Under such circumstances, the Government requested the Japanese Government to conduct a feasibility study of the Local Road Development in the Republic of Indonesia. In response to the request, the Government of Japan has decided to conduct a feasibility study of the Local Road Development in the Republic of Indonesia, in accordance with the laws and regulation of Japan.

The Government of Japan appointed the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official executive agency responsible for the implementation of the technical cooperation programmes of the Government of Japan to conduct the Study, and JICA has organized a Study Team and a supervisory committee for this purpose.

## 1.2 OBJECTIVE OF THE STUDY

The objective of the Study is to carry out a feasibility study of the Local Road Development in the Republic of Indonesia (38 Kabupatens in 10 provinces) including the following study items.

- To carry out feasibility studies by using a simple economic feasibility evaluation methodology;
- To establish a simple implementation programming methodology and to prepare an implementation programming; and
- To perform technology transfer to Indonesian Government personnel in the course of the Study.

### (1) Simple Economic Feasibility Evaluation

In establishing the simplified economic feasibility evaluation methodology, the following study will be covered;

- a) Selection of 7 Kabupatens, for case study (hereinafter referred to as Model 7 Kabupatens) - See Table 1-1;
- b) Establishment of an economic feasibility evaluation method and execution of an economic feasibility for 7 Kabupatens mentioned above;
- c) Simplification of the economic feasibility evaluation method without any significant change of results obtained from the previous economic feasibility evaluation; and
- d) Evaluation of other 31 Kabupatens (see Table 1-1) using above-mentioned evaluation method for 7 Kabupatens.

(2) Implementation Programming

In establishing the implementation programming methodology, the following study will be covered;

- a) Selection of 7 Kabupatens for case study;
- b) Programming of implementation for these 7 Kabupatens;
- c) Simplification of implementation programming procedure; and
- d) Programming of implementation for other 31 Kabupatens by using above-mentioned programming procedure.

(3) Training (Technology Transfer)

After the simplified economic feasibility evaluation methodology and the implementation programming procedure have been established, on-the-job training to the Indonesian Government Officials concerned will be conducted.

The following on-the-job training will be covered.

- a) Explanation of logics of the simplified economic feasibility evaluation methodology and the simplified implementation procedure.
- b) Application of utilization of these methodology and procedure.
- c) Evaluation of output results of these methodology and procedure.

Table 1-1 List of Kabupatens for This Project

<u>Name of Province</u>		<u>Name of Kabupaten</u>
1. RIAU (3 Kabupatens)	:	* i. Indragiri Hulu ii. Indragiri Hilir iii. Bengkalis
2. SOUTH SUMATRA (4 Kabupatens)	:	* i. Musi Rawas ii. Musi Banyuasin iii. Bangka iv. Balitung
3. LAMPUNG (1 Kabupaten)	:	i. Lampung Tengah
4. SOUTHEAST NUSA (3 Kabupatens)	:	i. Ende ii. Ngada iii. Sumba Barat
5. SOUTH KALIMANTAN (9 Kabupatens)	:	i. Tanah Laut ii. Kota Baru * iii. Banjar iv. Barito Kuala v. Tapin vi. Hulu Sei Selatan vii. Hulu Sei Tengah viii. Hulu Sei Utara ix. Tabalong
6. NORTH SULAWESI (1 Kabupaten)	:	i. Minahasa
7. SOUTH SULAWESI (7 Kabupatens)	:	i. Tanatoraja * ii. Barru iii. Soppeng iv. Pangkajene Kepulauan v. Gowa vi. Wajo vii. Mamuju
8. SOUTHEAST SULAWESI (2 Kabupatens):	:	i. Muna * ii. Kolaka
9. EAST KALIMANTAN (4 Kabupatens)	:	* i. Kutai ii. Berau iii. Bulongan iv. Pasir
10. CENTRAL KALIMANTAN (4 Kabupatens):	:	* i. Kapuas ii. Barito Utara iii. Barito Selatan iv. Kota Waringin Timur

Note: The name of the Kabupatens with asterisk shows model 7 Kabupatens.

### 1.3 BASIC APPROACH TO THE STUDY

The study will be divided into two (2) consecutive phases schedule as Phase I up to the end of March 1985 and Phase II ending in December 1985 on the presentation of a Draft Final Report.

Basic considerations for this study are described as follows;

#### (1) Level of Feasibility Study

Since project the locations are deployed over vast regions and are widely dispersed areas including Sumatra, Kalimantan, Sulawesi and Nusa, it is clear that usual feasibility study level will not be able to be adopted for this study.

Thus, the study is divided into two phases according to the following consideration, such as Phase I Study and Phase II Study respectively.

Simplified feasibility evaluation methodology and implementation programming methodology through the study of 7 Kabupatens in model case will be established in Phase I Study, and after that the simplified feasibility study by using methodology established in Phase I will be applied for other 31 Kabupatens in Phase II Study.

#### (2) Construction, Rehabilitation and Maintenance Systems for Local Road

In order to establish systems of construction, rehabilitation and maintenance for the local roads, the existing conditions such as organization of local road construction, arrangement of workshops and existing construction equipment owned by the local governments will be surveyed carefully for whole 38 Kabupatens.

And the implementation plan for these project roads will be recommended in consideration of loan from international financing agency at the next stage that may be made available for procurement of construction equipment and spare parts and engineering services.

(3) In cooperating with Other Consultants Proceeding Similar Project

From the national administration point of view, the Government needs the unified evaluation methodology based on the established road development policy.

In consideration of these points of view, the Study Team will carry out their studies in close cooperation with the Government and other Consultants proceeding similar project.

(4) Using Mini-Computer for Study

Mini-computer of type Fujitsu FM-New 7 will be used for analysis of traffic forecast, engineering study and economic analysis in Jakarta. The Study Team will conduct technical transfer of this mini-computer using method through on-the-job training to counterparts of the Government.

Main activities under Phase I Study are:

- 1) Preparatory work in Japan and review of the existing reports and data;
- 2) Consultation with relevant agencies;
- 3) Data collection and analysis;
- 4) Initial analysis for simplified feasibility evaluation methodology;
- 5) Socio-economic survey on Model 7 Kabupatens;
- 6) Traffic survey on Model 7 Kabupatens;
- 7) Road inventory survey on Model 7 Kabupatens;
- 8) Construction and rehabilitation systems survey on Model 7 Kabupatens;
- 9) Preliminary design of road construction and rehabilitation on Model 7 Kabupatens;
- 10) Traffic estimates on Model 7 Kabupatens;
- 11) Construction and maintenance costs estimate on Model 7 Kabupatens;
- 12) Establishment of a simplified feasibility evaluation methodology;
- 13) Economic analysis on Model 7 Kabupatens; and
- 14) Simplified implementation plan on Model 7 Kabupaten.

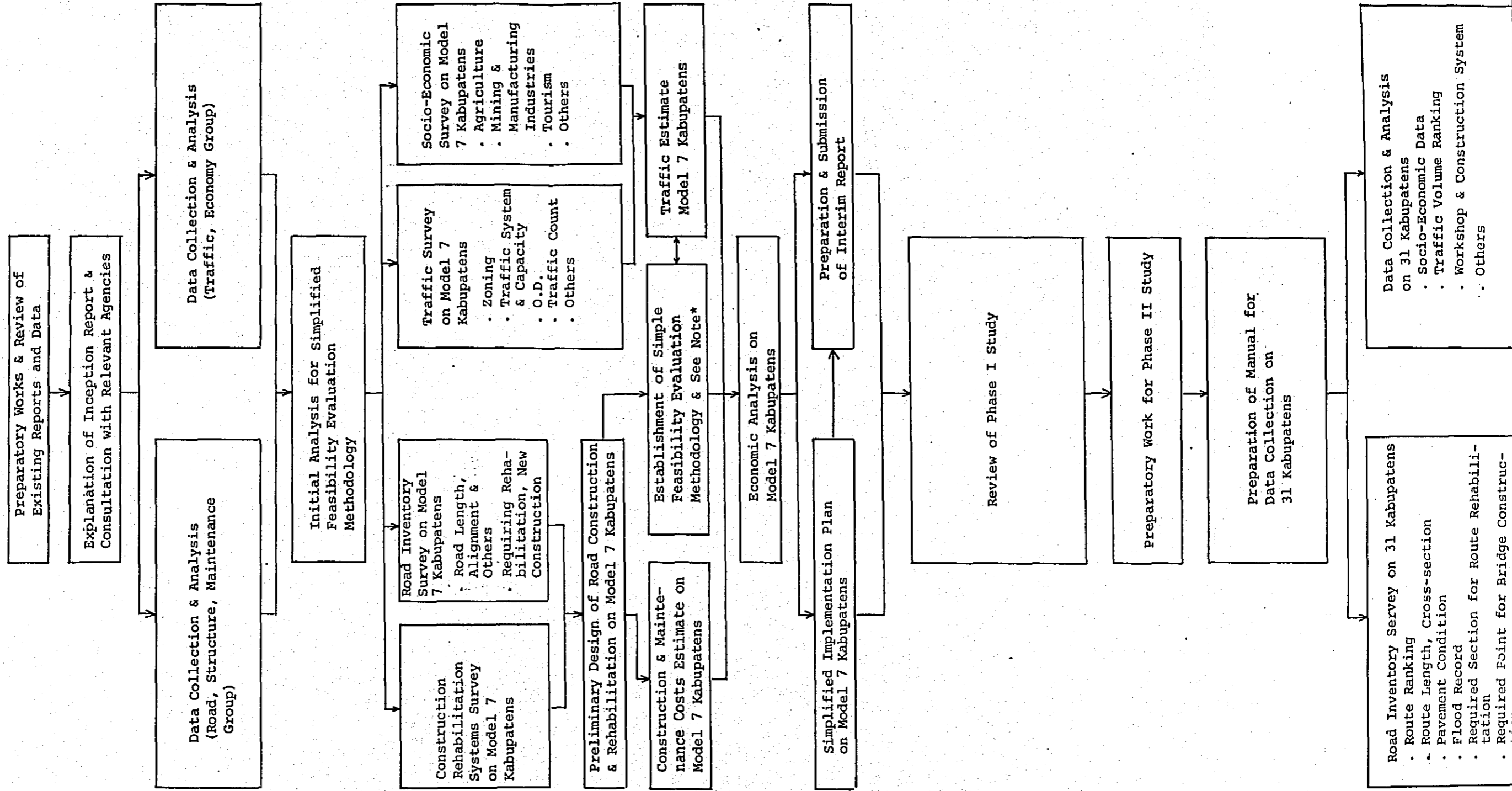
Main activities under Phase II Study are:

- 1) Preparatory work in Japan for Phase II Study;
- 2) Preparation of manual for data collection on 31 Kabupatens;
- 3) Data collection and analysis on 31 Kabupatens;
- 4) Road inventory survey on 31 Kabupatens;
- 5) Traffic forecast on 31 Kabupatens;
- 6) Preliminary design of road construction and rehabilitation on 31 Kabupatens;
- 7) Construction and maintenance costs estimate on 31 Kabupatens;
- 8) Economic evaluation on 31 Kabupatens;
- 9) Implementation plan for whole Kabupatens; and
- 10) Procurement plan of construction equipment and maintenance plan.

The work flows in Phase I and Phase II are shown in Fig. 1-1.

Fig. 1-1 WORK FLOW OF PHASE I & PHASE II

1	2	3	4	5	6	7	8	9	10	
OCTOBER 1984	NOVEMBER	DECEMBER	JANUARY 1985	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	A

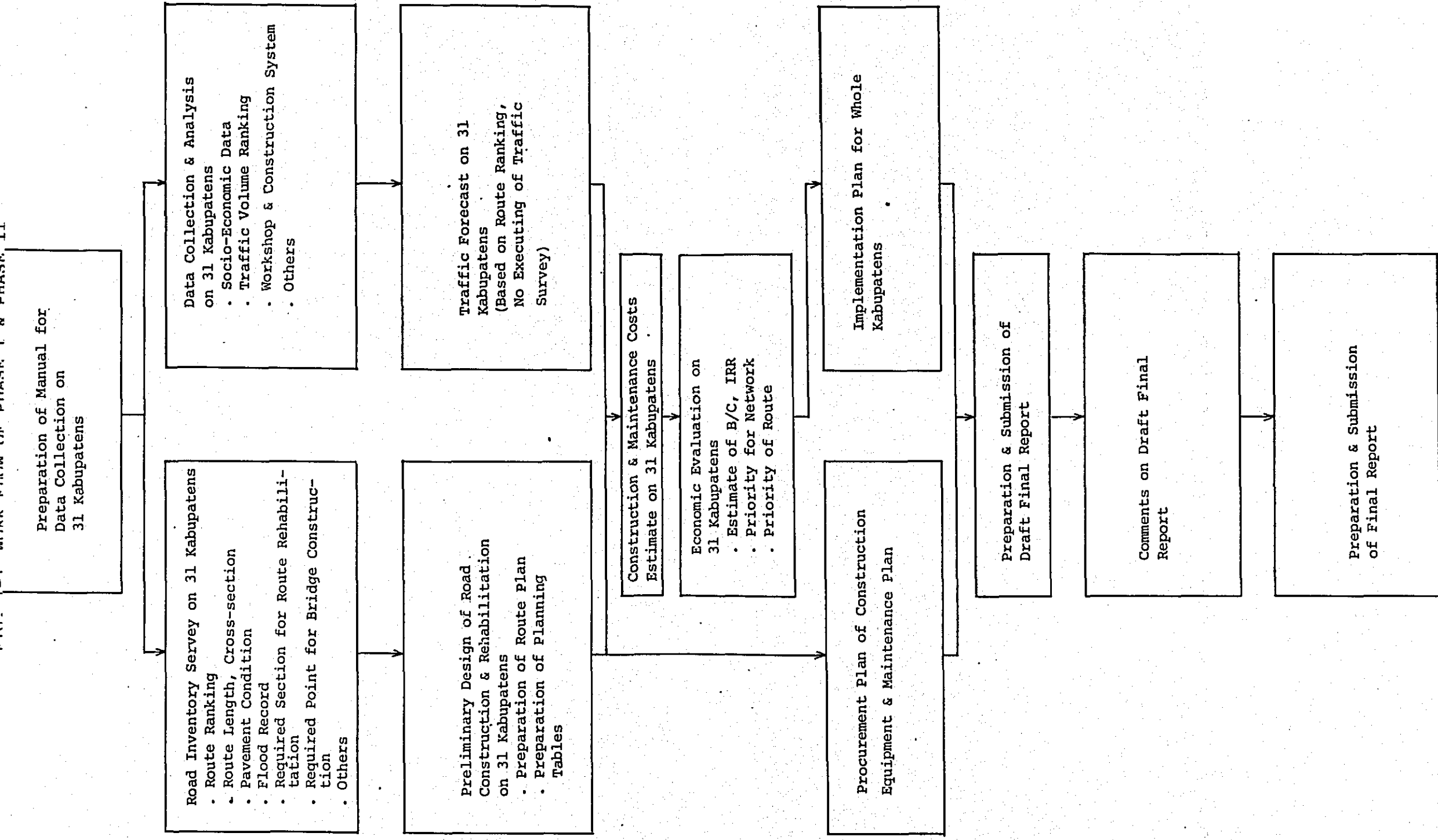


\*Note: Preparation of Draft Manual for Data Collection for Phase II



9	10	11	12	13	14	15	16	17	18	19
JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY 1986	FEBRUARY	MARCH	APRIL

Fig. -1 WORK FLOW OF PHASE I & PHASE II



n for Phase II

PHASE II STUDY

INDONESIA

JAPAN

## SECTION 2: OUTLINE OF THE STUDY

### 2.1 PHASE I STUDY

In Phase I Study, the Study Team will concentrate their efforts to the conduct of all necessary investigations and analysis for socio-economic, traffic, engineering and economic in order to enable implementation analysis for 7 Kabupatens as case study.

This study purpose in Phase I is to simplify the feasibility evaluation methodology in order to use these data as model case in Phase II Study for 31 Kabupatens.

The following is a summary of descriptions of each work under Phase I Study.

#### (1) Preparatory Works in Japan, Review of the Existing Reports and Data

The Study Team will collect available reports, data and information relating to equipment and hand-carry these documents to Indonesia. The Inception Report which presents the plan of the Study will be prepared before arriving in Indonesia.

The existing reports and available data as mentioned below will be reviewed.

- The Local Road Support Work Study in Seven Provinces, JICA August 1980;
- Rural Road Study Project, ENEX of New Zealand and BIEC International Inc., February 1982;
- Rural Road Study, Central and East Java, Hoff and Overgaard A/S; and
- Other existing reports and data necessary for the Study.

(2) Consultation with Relevant Agencies

The Study Team will have consultation with the government agencies and other bodies concerned on similar projects engaged by IBRD and ADB, after their arrival in Jakarta.

(3) Data Collection and Analysis

After consultation with the relevant agencies and having collected the data in Jakarta, the Study Team will visit the proposed project sites for familiarization, initial data collection and arrangement for conducting the next site survey.

Initial analysis will be carried out after the team has been familiarized with the site condition and the data have been collected, which are deemed necessary to attain the purposes as summarized in the following.

(4) An Initial Analysis for Simplified Feasibility Evaluation Methodology

The purpose of this work is to find a way as to how the feasibility evaluation methodology can be established simply in the light of plenty of roads involved in the study area as many as 38 Kabupatens in 10 Provinces. Therefore, before commencement of the site investigation, the initial analysis will be estimated on the basis of the data collected. The procedure of this work will be as follows:

- Traffic survey for analysis will be chosen by typical roads and their locations in order to apply the study area for Phase II;
- For inventory survey, the form of classification will be prepared in order to simplify the site investigation which will be carried out at the next stage; and
- To develop a methodology which will be different from a conventional feasibility evaluation method.

(5) Socio-Economic Survey on Model 7 Kabupatens

The following surveys and data collection will be carried out on Model 7 Kabupatens. These data will be used for traffic analysis, engineering study and economic analysis.

a) Basic Data

Basic data to be collected are as follows;

- Each Kabupaten's employment population;
- Area of Kabupaten;
- Agricultural area; and
- Road value.

b) Physical Conditions

- Topography, geology and soil characteristics;
- River, discharge, flood, rainfall and irrigation, etc.;
- Possibility and/or restriction of land use; and
- Distribution of forestry resources.

c) Social and Urban

- Population, distribution and employment; and
- Land use, accommodations and infrastructures.

d) Income, GRDP, etc.

e) Industrial Survey

i) Agricultural survey

ia) Present status of agricultural activities

- Production, distribution of some principal crops/products;
- Method, level of technic and system of production;
- Yield of each crop/product, income and expenditure;
- Marketing and commodity flow of each crop/product; and
- Others.

- iB) Present analysis of agriculture
  - Possibility of improvement for irrigation, etc.;
  - Assessment of the agricultural development potential areas; and
  - Others.
- ii) Other survey
  - iA) Industry, mining survey, etc.
    - Production, distribution of products and employment, etc.;
  - iB) Present status of tourism activities; and
  - iC) Marketing and service activities.

The above-mentioned information will be sorted out from the existing statistics data through making an adjustment with the field survey and consultation with the relevant agencies.

(6) Traffic Survey on Model 7 Kabupatens

The following traffic survey will be conducted for 7 Kabupatens as model case.

- a) Survey for Zoning
 

Zonings for each Kabupaten will be decided so as to correspond to appraisal of the road network and analysis of socio-economic and land use planning.
- b) Survey for Existing Traffic System
- c) Survey for Existing Transport Capacity
- d) Traffic Survey
  - OD survey;
  - Traffic counting survey; and
  - Vehicle running speed survey.

(7) Road Inventory Survey on Model 7 Kabupatens

The purpose of the road inventory survey in Phase I is to design and estimate of typical construction/rehabilitation methods, cost for the case study, field reconnaissance and survey.

The following items of existing road conditions will be surveyed.

- Length of the roads and existing cross-sections of the roads;
- Road surface condition including the type of sub-grade, base and surface;
- Horizontal and vertical alignments;
- Fill and cut height;
- Locations and magnitude of structures, bridges and culverts;
- Road length requiring rehabilitation and/or new construction;
- Name of villages located along the roads;
- Drainage and past flood records; and
- Others.

(8) Construction and Rehabilitation Systems Survey on Model 7 Kabupatens

The purpose of this survey is to isolate the actual condition for the construction and rehabilitation systems on each selected Kabupatens, and to estimate the equipment, workshop and other needs for construction and/or rehabilitation on each Kabupaten in future.

(9) Preliminary Design of Road Construction and Rehabilitation on Model 7 Kabupatens

The following design procedure will be applied.

a) Maps for Design Work

Topographic maps to a scale of 1/50,000 and 1/100,000 prepared by the Government will be used basically in addition to other collected maps, drawings and photographs for design work.

b) Topographic Survey

Basically, the design work will be executed by using the topographical maps mentioned earlier, however, in case of necessity to study in more detail, i.e., to identify the bridge location and the like, a simple survey will be conducted with tapes, pole, etc. and by visual observation as needed.

c) Soils and Materials Survey

Existing data collected will be used.

d) Hydrology/Drainage Survey

Hydrological survey will be carried out to estimate hydrological and hydraulic data required in designing, checking and estimating the height of embankments. Existing data will be collected and the site investigation, including information from inhabitants for past flood will also be collected.

e) Establishment of Design Criteria

The existing design standards of roads and structures set forth by the Directorate General of Highways will be reviewed to establish an appropriate design standards for the local road, based on the data obtained through the field investigation.

f) Preliminary Design

Preliminary design based on the design criteria mentioned above will be conducted as follows:

- Preliminary route selection will be made by using topographical maps having scale 1/50,000 and 1/100,000;
- Classification of route;
- Selection of stretches requiring improvement and/or rehabilitation;

- Location of structures;
- Pavement design; and
- Others.

(10) Traffic Estimate on Model 7 Kabupatens

Traffic estimates on Model 7 Kabupatens will be conducted based on the survey for zoning, existing traffic system, existing transport capacity and traffic survey using mini-computer.

Vehicles OD tables at present will be calculated by using the attached flow chart presented in Fig. 2-1, and vehicle OD table in future years and future traffic volumes on each road for Model 7 Kabupatens will be estimated by using the attached flow chart present in Fig. 2-2.

(11) Construction and Maintenance Costs Estimate on Model 7 Kabupatens

Based on the preliminary design of road, construction and maintenance costs will be estimated.

Necessary data to be collected in preparing the cost estimate are as follows:

- Materials and equipment which are available locally;
- Capability of local contractors;
- Method of transportation, obtaining and cost of some principal materials, such as cement, asphalt, reinforcing bar, timber, fuel and etc.;
- Necessary equipment for construction and maintenance, and actual operation, maintenance, depreciation etc.;
- Labor;
- Maintenance cost for existing roads prevailing at present;
- Land acquisition cost; and
- Government law and regulation applicable for construction and maintenance.



Fig.2-1 PRESENT OD TABLE

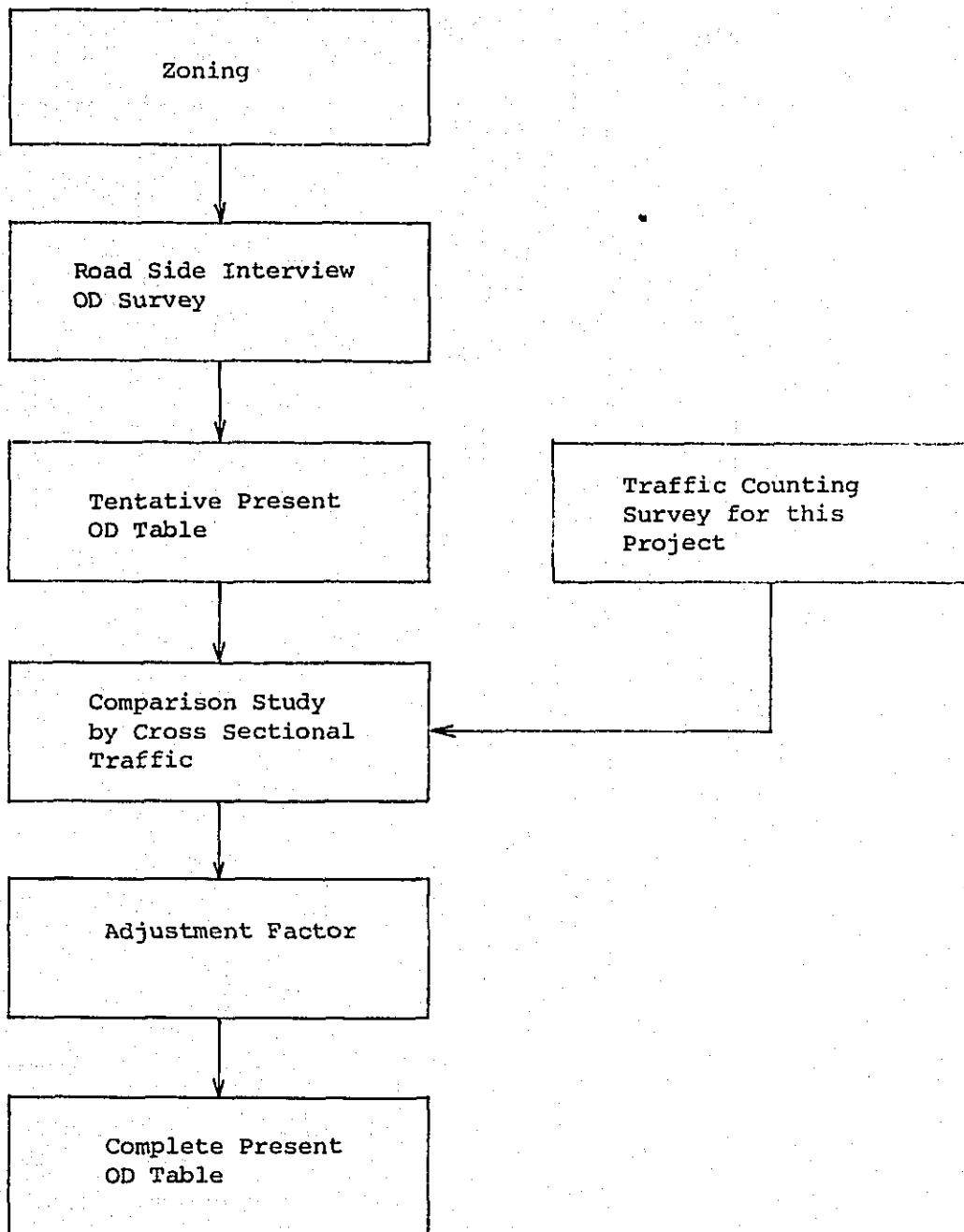
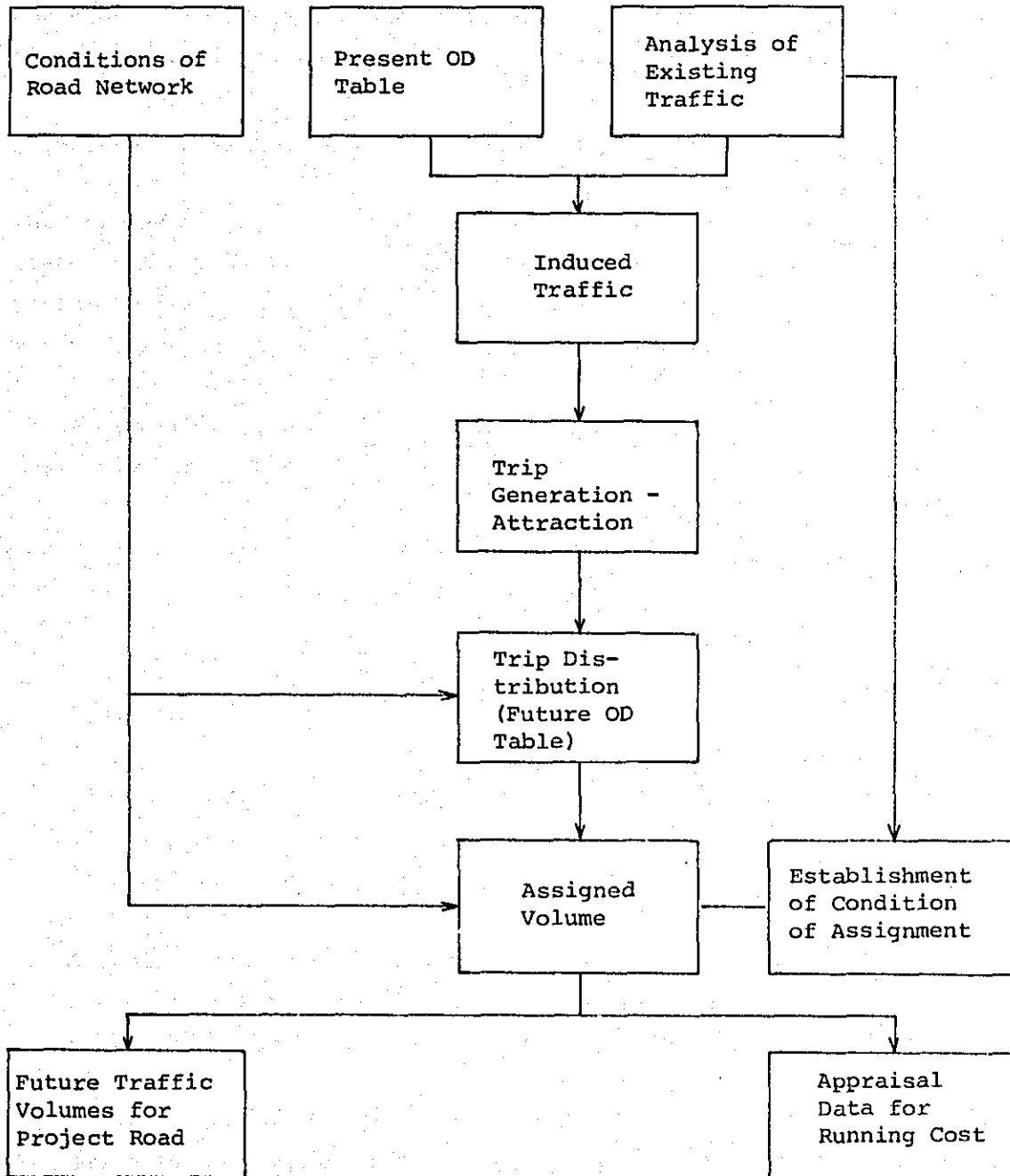


Fig.2-2 FORECAST OF FUTURE TRAFFIC VOLUMES



Based on the data listed above, basic cost elements such as labor, material, operation, depreciation, etc., will be estimated with the consideration of keeping a balance between foreign and local currency components. Furthermore, the cost information will be compared for reference with other similar projects currently being estimated. And this estimate will be prepared in order to carry out the economic analysis by taking into account stage construction.

(12) Establishment of Simple Feasibility Evaluation Methodology

The purpose of this work in Phase I is to establish simplified economic feasibility evaluation methodology based on the study in paragraph (4) in this report through making an adjustment with actual survey data and analysis for Model 7 Kabupatens.

These simplified methodologies will be used for feasibility evaluation of 31 Kabupatens in Phase II.

Then, the following points will be considered in the simplified methodology.

- a) Simplify the survey and analysis for Phase II as much as possible.
- b) Assuming that the traffic survey will not be conducted in Phase II, making a model from the data relating to the traffic survey of Model 7 Kabupatens in Phase I will be considered.
- c) Assuming that socio-economic survey will not be conducted in Phase II, making a model from the data relating to the socio-economic survey of Model 7 Kabupatens in Phase I will be considered.
- d) Simplify the data relating to the road inventory in Phase I as far as possible.

- e) Social benefit will be considered in addition to other benefits as much as possible.
- f) Draft manual for data collection for Phase II will be prepared.

(13) Economic Analysis on Model 7 Kabupatens

The basic data for economic evaluation will be estimated according to the items mentioned in the following.

a) Vehicle Operation Cost

The operation cost of vehicle is one of the major factors in calculating benefits that can be derived from a project. The operation cost will be calculated based on the data of projects similar in nature that have been carried out in the past and be supplemented with this project.

b) Time Value of Passengers

The Study Team will evaluate the time value by the method normally used for this purpose, i.e. its calculation based on hourly income of the passengers, especially of cars.

c) Major Benefits

The major benefits of the project will consist of (i) the saving of vehicle operating costs, and (ii) the elimination of delays of vehicles, drivers, passengers and freights. Other benefits, such as social benefits will be considered as much as possible.

Economic evaluation will be conducted for road networks on each 7 Kabupatens. The savings in vehicle operating cost and other quantifiable benefits will be included in the benefit streams, while the costs of construction, maintenance, repairing and road operation will be in the cost streams. Benefit/Cost (B/C) ratios, Present Worth (PW) and Internal Rate of Return (IRR)

will be computed to determine the order of economic priority of networks. The above index value will be checked by the sensitivity analysis.

On the other hand, technical evaluation will be carried out based on the results of the preliminary design of the project roads including costs for construction and maintenance, construction method, aesthetics, etc. and together with the outcomes of the above economic evaluation, the most feasible plan will be determined.

(14) Simplified Implementation Plan on Model 7 Kabupatens

A simplified implementation plan will be prepared based on the following;

- a) Financial sources of actual condition and considering of manner of financing from the international financing agencies as well as self financing by the Government;
- b) Implementation plan for the roads in considering with timing of construction, betterment and rehabilitation, division, priority and stage construction of routes, will be provided;
- c) Proposal for construction system in considering with actual site condition of construction and workshop, etc.;
- d) Available number and type of construction equipment; and
- e) Quality and quantity of labor and materials that can be made available and others deemed appropriate and etc.

2.2 PHASE II STUDY

The simplified feasibility evaluation methodology will be established for Model 7 Kabupatens in Phase I. The Phase II Study works will be carried out according to this evaluation methodology for 31 Kabupatens.

Implementation plan for whole 38 Kabupatens including Model 7 Kabupatens will be prepared at this stage according to all analysis data of Phase I and Phase II, and finally a procurement plan of construction equipment and maintenance programme will be prepared in consideration of loan from international financing agency at the next stage that may be made available for the procurement and engineering services.

The following is summary of descriptions of each work under Phase II Study.

(1) Preparatory Works in Japan for Phase II

Prior to remobilization of the Study Team in Indonesia the following works will be undertaken in Japan.

- Review Interim Report;
- Preparation of detailed work schedule in Phase II; and
- Careful discussion with advisory committee with respect to problems in Phase I and work schedule in Phase II.

(2) Preparation of Manual for Data Collection on 31 Kabupatens

After arrival again in Indonesia, the Study Team will prepare the following manual and data sheets for data collection on 31 Kabupatens.

- for socio economic;
- for traffic volume ranking;
- for road ranking;
- for construction and rehabilitation systems;
- for cost estimate; and
- for others.

(3) Data Collection and Analysis on 31 Kabupatens

Data collection for each 31 Kabupaten will be carried out according to the manuals and data sheets mentioned in Paragraph 2.2 (2). Since the Study Team consists of a few members of staff and the study areas cover a fairly large regions in Phase II, the whole members including counterparts and local members will move effectively from one project location to other.

Therefore, the Study Team will be divided into several parties including an individual party consisting of the Indonesian staff only, and each party will exert their efforts to collect data and information available.

Main data for collection at this stage are as follows:

- a) Socio-economic data of 31 Kabupatens;
- b) Traffic volume ranking for each Kabupaten road (31 Kabupatens);  
and
- c) Workshop and road construction system on 31 Kabupatens.

(4) Road Inventory Survey on 31 Kabupatens

Road inventory survey work at this stage will be divided into two kinds of method, i.e., with and without data sheets.

The following survey items are considered as being the works by data sheets based on the manual.

- Ranking of road;
- Road length and cross-section;
- Conditions of pavement;
- Conditions of alignments;
- Height of cutting and filling;
- Record of flood;
- Location, magnitude and existing condition of culvert & bridges; and
- Others.

The following survey items are considered as being the works without data sheets based on the manual.

- Length, type and scale of new construction stretch;
- Length, type and scale of rehabilitation stretch;
- Type and scale of new bridge construction; and
- Others.

(5) Traffic Forecast on 31 Kabupatens

Traffic surveys will not be conducted in Phase II. Traffic forecast for each roads on 31 Kabupatens will be made by selection of similar road based on the road ranking estimated in Phase I for Model 7 Kabupatens.

(6) Preliminary Design of Road Construction and Rehabilitation on 31 Kabupatens

The data collected through road inventory survey (for 31 Kabupatens) will be plotted on topographic map and relevant tables which would be prepared in Phase I on Model 7 Kabupatens.

Topographic maps prepared to a scale of 1/50,000 or 1/100,000 for this work will be adopted. These maps are expected to be prepared by the Government.

(7) Construction and Maintenance Costs Estimate on 31 Kabupatens

The construction, land acquisition and maintenance costs for each kind of case and stretch of road would be estimated in Phase I as model case on 7 Kabupatens.

Quantities for stretch for 31 Kabupatens which are provided with ranking and are calculated according to estimated method of Model 7 Kabupatens, will be estimated on the basis of the data of preliminary designs.



Unit cost also will be used on the basis of the data of Model 7 Kabupatens.

(8) Economic Evaluation on 31 Kabupatens

The benefits for road network on 31 Kabupatens will be estimated according to the same method which would be adopted in Phase I. Data of costs calculated in Paragraph (7) will be used. B/C and IRR of networks for each Kabupaten will be computed according to the manual of model case of Phase I Study.

These economic evaluations will be adopted to determine the order of economic priority of the road network.

The order of priority of each road in network will be determined according to future traffic volume.

(9) Implementation Plan for Whole Kabupatens

The Study Team will prepare an appropriate schedule on the final recommended plan for whole Kabupatens (38 Kabupatens) which will be determined by preliminary design and the economic evaluation. These plans will be made according to model case study in Phase I.

The schedule will cover an annual disbursement plan of local funds and foreign currency component, covering the activities of equipment supplies, engineering services, land acquisition and compensation, construction works and maintenance of the proposed project roads.

The implementation programme proposed on major work items will be shown in a bar chart table for each Kabupaten.

(10) Procurement Plan of Construction Equipment and Maintenance Plan

Present maintenance system for the project roads will be investigated in order to study the future maintenance system.

In this investigation, a study of construction equipment to meet the site condition will be conducted carefully.

Based on these investigations, the Study Team will prepared a construction plan and an arrangement plan of workshops, procurement programme of these construction equipment, procurement cost, maintenance plan of these construction equipment, and recommendation of construction and maintenance systems in each Kabupaten.

## SECTION 3: EXECUTION OF THE STUDY

### 3.1 ORGANIZATION FOR THE LOCAL ROAD DEVELOPMENT STUDY

The study will be carried out by the JICA in close cooperation with the authorities of Indonesia (Directorate General of Highway). JICA has organized both the Advisory Committee and the JICA Study Team, and DGH has organized both the Coordinating Staff and the Counterpart Staff.

The organization for implementating the study is illustrated in Fig. 3-1.

The Advisory Committee comprises 3 members as follows:

#### Member of the Advisory Committee (JICA)

Dr. Hirohiko TADA (Chairman)	Director of Structure and Bridge Department, Public Works Research Institute, Ministry of Construction
Mr. Takashi SAKAI	Construction Specialist of Municipal Road Section, Local Road Division, Road Bureau, Ministry of Construction
Mr. Hiroo SATO	Deputy Director of the First Construction Management Section, the First Construction Department, Japan Highway Public Corporation

The JICA Study Team comprises 8 members as follows:

#### Member of JICA Study Team

Team Leader:	Mr. Nobutaka SATO
Team Member: (Highway Planning)	Mr. Takeshi OTANI
Team Member: (Traffic Planning & Economic Analysis)	Mr. Motoyoshi YAMADA
Team Member: (Agricultural Economic Analysis)	Mr. Ryosuke FUJIWARA

### Member of JICA Study Team

Team Member: (Regional Planning)	Mr. Yasuharu YAMADA
Team Member: (Structural Planning)	Mr. Toshiro SUZUKI
Team Member: (System Analysis)	Mr. Hideki MAGORI
Team Member: (Construction & Maintenance Planning)	Mr. Takashi CHUJO

### 3.2 WORK SCHEDULE

The work schedule of the Study is shown in the form of a flow chart for Phase I and Phase II in Fig. 1-1, and the staffing schedule is Fig. 3-2.

### 3.3 PREPARATION AND SUBMISSION OF REPORTS

The following reports will be prepared in English and submitted to the Government.

- (1) Inception Report (20 copies)  
Within one (1) month after the commencement of the Study.
- (2) Interim Report (50 copies)  
Within six (6) months after the commencement of the Study.
- (3) Draft Final Report (50 copies)  
Within fifteen (15) months after the commencement of the Study.
- (4) Final Report (main volume: 50 copies, Kabupatens report: 20 copies on each Kabupaten)  
Within two (2) months after receipt of comments on the Draft Final Report from the Government.

Fig.3-1 ORGANIZATION CHART

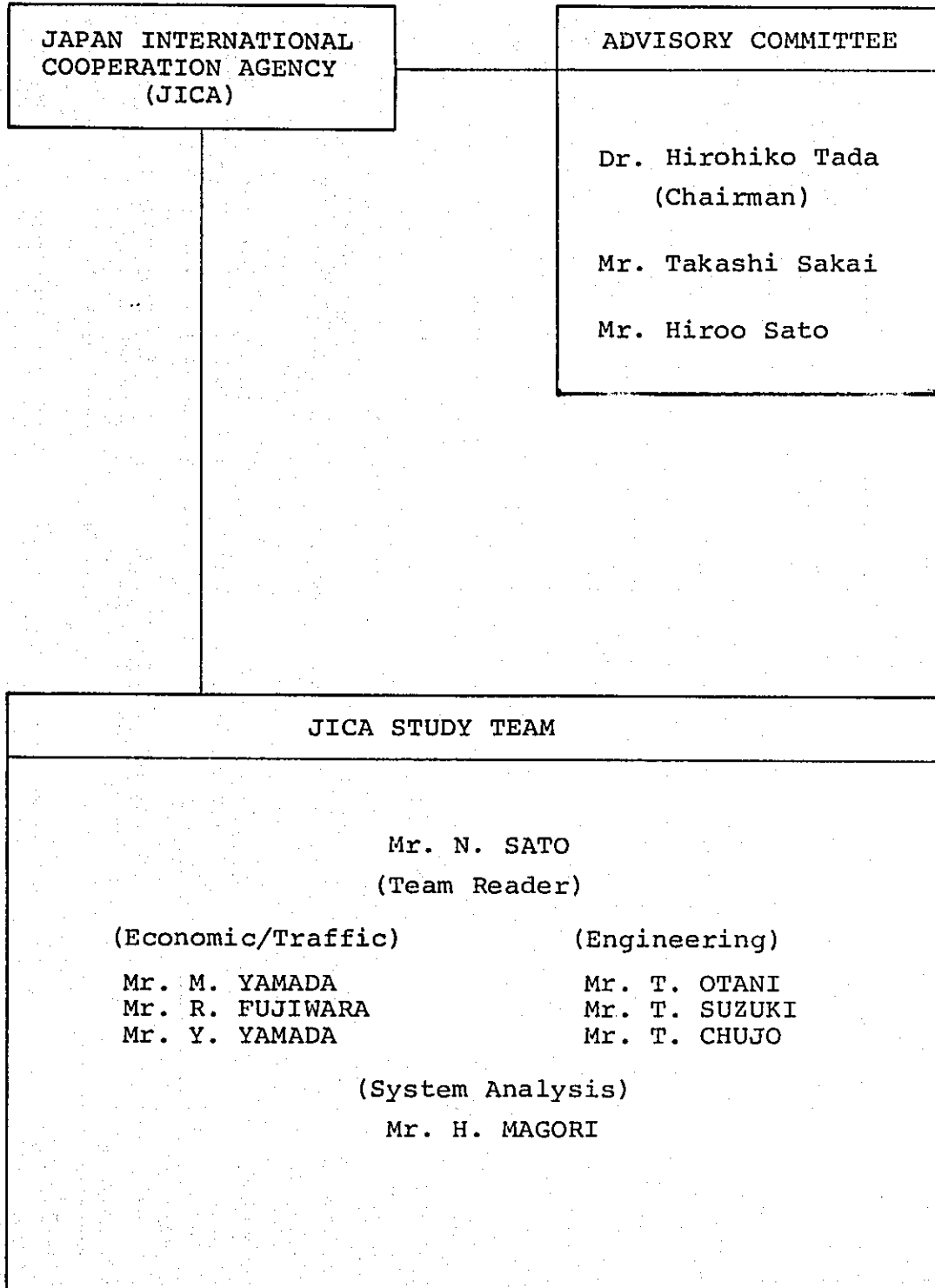
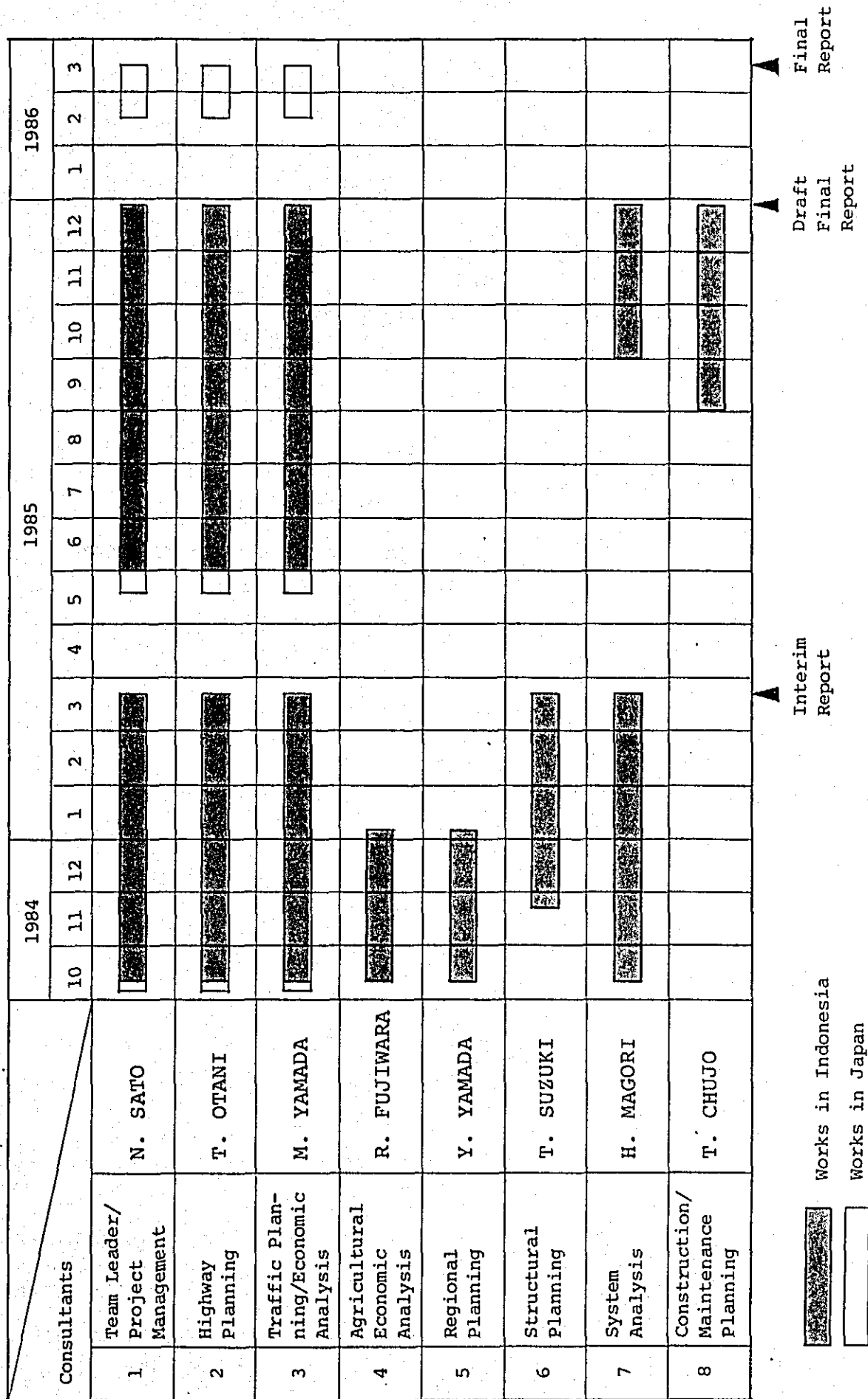


Fig. 3-2 STAFFING SCHEDULE



APPENDIX A

MINUTES OF DISCUSSIONS  
ON  
SCOPE OF WORK  
FOR

THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT  
IN THE REPUBLIC OF INDONESIA

JUNE 14 , 1984

*H. Tada*

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DR. HIROHIKO TADA  
LEADER OF THE PRELIMINARY STUDY TEAM  
THE JAPAN INTERNATIONAL  
COOPERATION AGENCY

*Harun*

*to*  

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Ir. HARUN AL RASYID  
DIRECTOR OF ROAD PLANNING  
DIRECTORATE GENERAL OF  
HIGHWAYS  
MINISTRY OF PUBLIC WORKS

*Pargio*

---

Mr. PARGIO BA  
CHIEF OF SUB DIRECTORATE  
OF REGIONAL DEVELOPMENT  
MINISTRY OF HOME AFFAIRS

1. The Japanese Preliminary Study Team (The Team) organized by the Japan International Cooperation Agency, headed by Dr. H.Tada visited the Republic of Indonesia from 6th to 15th June 1984, for the purpose of formulating a scope of work on the captioned feasibility study.
2. After a series of discussions, the Team and D.G.H and M.H.A agreed on the Scope of Work for the Study as mentioned bellow :
  - a) Kabupatens which will be selected in the Study are as shown in article I
  - b) Kabupatens which will be selected as case study sites are as shown in article II
  - c) The D.G.H and M.H.A requested the opportunity of the counterpart training in Japan for the Indonesia counterpart personnel assigned to the Study to realize an effective technology transfer. Upon the request, the Team promised to convey this matter to the Government of Japan.
  - d) In the course of the study, if the Study team could not procure the necessary data for implementation of the Project, the number of Kabupatens to be studied would be reduced under the consultation of both sides.

I. Kabupatens which will be selected in the Study

1. RIAU (3 Kabupatens) :
  - i. Indragiri Hulu
  - ii. Indragiri Hilir
  - iii. Bengkalis
2. SOUTH SUMATRA (4 Kabupatens) :
  - i. Musi Rawas
  - ii. Musi Banyuasin
  - iii. Bangka
  - iv. Balitung
3. LAMPUNG (1 Kabupaten) :
  - i. Lampung Tengah



4. SOUTHEAST NUSA (3 Kabupatens) :
  - i. Ende
  - ii. Ngada
  - iii. Sumba Barat
  
5. SOUTH KALIMANTAN (9 Kabupatens) :
  - i. Tanah Laut
  - ii. Kota Baru
  - iii. Banjar
  - iv. Barito Kuala
  - v. Tapin
  - vi. Hulu Sei Selatan
  - vii. Hulu Sei Tengah
  - viii. Hulu Sei Utara
  - ix. Tabalong
  
6. NORTH SULAWESI (1 Kabupaten) :
  - i. Minahasa
  
7. SOUTH SULAWESI (7 Kabupatens) :
  - i. Tanatoraja
  - ii. Barru
  - iii. Soppeng
  - iv. Pangkajene Kepulauan
  - v. Gowa
  - vi. Wajo
  - vii. Mamuju
  
8. SOUTHEAST SULAWESI (2 Kabupatens) :
  - i. Muna
  - ii. Kolaka
  
9. EAST KALIMANTAN (4 Kabupatens):
  - i. Kutai
  - ii. Berau
  - iii. Bulongan
  - iv. Pasir
  
10. CENTRAL KALIMANTAN (4 Kabupatens) :
  - i. Kapuas
  - ii. Barito Utara
  - iii. Barito Selatan
  - iv. Kota waringin Timur

## ATTENDANTS LIST

### 1. MINISTRY OF PUBLIC WORKS

- Ir. Harun Al Rasyid                      Director of Road Planning,  
Directorate General of Highways
- Mr. Djuned Djohari                      Secretary to Director of Road-  
Planning, Directorate General of  
Highways
- Ir. Sudarmadji Koesno                      Sub Director of Local Road/MPW
- Ir. Imanudin Lutfan                      Project Manager of Local Road/MPW
- Ir. Adinus Saleh                      Section Chief/MPW
- Ir. Istiarso Surjo                      Section Chief/MPW
- Ir. M. Irian                      Staff/Road Engineer of Directorate  
of Road Planning/MPW
- Ir. Permadi H                      Staff/Road Engineer of Directorate  
of Road Planning/MPW
- Ir. Djoko Sugijono                      Staff/Planner of Directorate of  
Road Planning/MPW

### 2. MINISTRY OF HOME AFFAIRS

- Mr. Pargio BA                      Chief of Sub Directorate of  
Regional Development

### 3. JAPANESE STUDY TEAM

- Dr. Hirohiko Tada                      Leader of the Preliminary Study -  
Team
- Mr. Takashi Sakai                      M e m b e r
- Mr. Hiroo Sato                      M e m b e r
- Mr. Toshio Hida                      M e m b e r

### 4. EXPERT

- Mr. Yoshimitsu Hiyama

II. Kabupatens which will be selected as case study sites

1. RIAU

- Kabupaten Indragiri Hulu

2. SOUTH SUMATRA

- Kabupaten Musi Rawas

3. CENTRAL KALIMANTAN

- Kabupaten Kapuas

4. SOUTH KALIMANTAN

- Kabupaten Banjar

5. EAST KALIMANTAN

- Kabupaten Kutai

6. SOUTH SULAWESI

- Kabupaten Barru

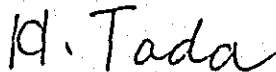
7. SOUTHEAST SULAWESI

- Kabupaten Kolaka

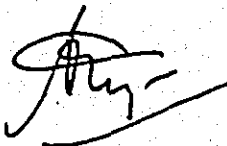
APPENDIX B  
SCOPE OF WORK  
FOR  
THE LOCAL ROAD DEVELOPMENT STUDY  
IN THE REPUBLIC OF INDONESIA

AGREED UPON BETWEEN  
DIRECTORATE GENERAL OF HIGHWAYS  
MINISTRY OF PUBLIC WORKS  
AND  
THE JAPAN INTERNATIONAL COOPERATION AGENCY

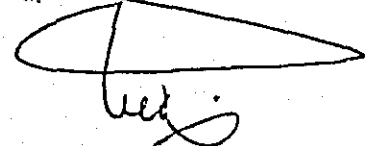
JUNE 14th, 1984  
JAKARTA, INDONESIA



DR. HIROHIKO TADA  
LEADER OF THE PRELIMINARY STUDY TEAM  
THE JAPAN INTERNATIONAL COOPERATION AGENCY



Ir. HARUN AL RASYID  
DIRECTOR OF ROAD PLANNING  
DIRECTORATE GENERAL OF  
HIGHWAYS  
MINISTRY OF PUBLIC WORKS



Mr. PARGIO BA  
CHIEF OF SUB DIRECTORATE  
OF REGIONAL DEVELOPMENT  
MINISTRY OF HOME AFFAIRS

## I. INTRODUCTION

In response to the request of the Government of Indonesia (hereinafter referred to as "Indonesia"), the Government of Japan decided to implement the Local Road Development Study (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities of Indonesia.

Directorate General of Highways (hereinafter referred to as "D.G.H") shall act as counterpart body to the Japanese study team and also as coordinating body to other relevant organizations for the smooth implementation of the Study.

The present document sets forth the Scope of Work for the Study.

## II. OBJECTIVE OF THE STUDY

The objectives of the Study are :

- (1) to carry out feasibility studies on the local road development by using a simple economic feasibility evaluation methodology at thirty eight (38) Kabupatens.
- (2) to perform technology transfer to Indonesia government personnel in the course of the Study.

## III. SCOPE OF THE STUDY

In order to achieve the objectives, The Study would divide into two (2) phases :

1. Main activities of the First phase under The Study are

1.1. Review of the existing reports and data

a. The Local Road Support Work Study in Seven Provinces

JICA August 1980

- b. Rural Road Study Project, ENEX of New Zealand and BIEC International Inc., February, 1982.
    - c. Rural Road Study, Central and East Java, Hoff and Overgaard A/S.
    - d. Other existing reports and data necessary for the Study.
  - 1.2. Selection of several Kabupatens as case study sites at following territories.
    - a. Kalimantan
    - b. Sulawesi
    - c. Sumatra
  - 1.3. Data collection and field survey
    - a. Collection of the necessary data and field survey at several Kabupatens selected as case study sites.
  - 1.4. Establishment of a methodology
    - a. a simple economic feasibility evaluation methodology
    - b. a simple implementation programming methodology
2. Main activities of the second phase under the Study are
  - 2.1. Collection of the necessary data to carry out feasibility study for local road development at thirty eight (38) Kabupatens.
  - 2.2. Analysis of the collected data.
  - 2.3. Estimation of construction cost.
  - 2.4. Calculation of benefit.
  - 2.5. Economic evaluation by using the establishment methodology developed at phase 1.
  - 2.6. Optimal phasing for implementation.

IV. STUDY SCHEDULE

The whole work will be conducted in accordance with the attached tentative study schedule.

V. REPORTS

JICA will prepare and submit the following Reports in English to the Government of Indonesia.

1. Inception Report  
20 copies  
Within one month after the commencement of the Study
2. Interim Report  
50 copies  
Within 6 months after the commencement of the Study
3. Draft Final Report  
50 copies  
Within 15 months after the commencement of the Study
4. Final Report  
Main volume; 50 copies, Kabupatens report; 20 copies in each Kabupatens within two months after receipt of Indonesia Government's comments on the Draft Final Report.

VI. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

1. To facilitate the smooth implementation of the Study, the Government of Indonesia shall make necessary arrangement.
  - (1) To secure the safety of the Study team
  - (2) To permit the members of Japanese study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees.

- (3) To exempt the members of Japanese study team from taxes, duties and other charges on equipment, machinery and other materials brought into Indonesia for the implementation of the Study.
  - (4) To exempt the members of the Japanese study team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study.
  - (5) To provide the necessary facilities to the Japanese study team for the remittances as well as utilities of fund introduced into Indonesia from Japan in connection with the implementation of the Study.
  - (6) To secure permission for entry into private properties and restricted area in connection with field survey, according to prevailing regulations of the Government of the Republic of Indonesia.
  - (7) To make arrangements for the study team to use the data, maps and materials for analysis in Japan subject to the approval of the Government of Indonesia.
2. D.G.H. (Directorate General of Highways) shall, at its own expense, provide the Japanese study team with the following, in cooperation with other relevant organizations ;
- (1) Available data and information related to the Study
  - (2) Counterpart personnel
  - (3) Credentials or identification cards
  - (4) Assistance for quick access to medical service.
3. The government of Indonesia shall bear claims, if any arises against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligences or wilful



misconduct on the part of the members of the Japanese study team.

VII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall, in accordance with the relevant laws and regulations in force in Japan, take the following measures ;

1. To dispatch, at its own expense, study teams to Indonesia,
2. To perform technology transfer to the Indonesia counterpart personnel in the course of the Study.

VIII. JICA and D.G.H. will consult with each other in respect of any matter that is not agreed upon in this document and may arise from or in connection with the Study.

TENTATIVE SCHEDULE

MONTH	1985												1986									
	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
WORK IN INDONESIA	████████████████████							████████████████████														
WORK IN JAPAN																		████████				
REPORT PRESENTATION	↑ Ic/R						↑ I/R											↑ D/F	↑ F/R			

APPENDIX C

TERMS OF REFERENCE

FOR

LOCAL ROAD DEVELOPMENT STUDY

MARCH, 1983

MINISTRY OF PUBLIC WORKS

DIRECTORATE GENERAL OF HIGHWAYS

## I. INTRODUCTION

- 1.1. As of 1980 the road network of Indonesia consisted of 11,700km of national roads, 32,700 km of provincial roads, 92,000 km of Kabupaten roads and 8,200 km of Kotamadya roads. Local roads are referred to as Kabupaten roads and comprise 63 % of the road network of Indonesia.
- 1.2. Local roads contribute foremost to rural area development, and secondly to the balanced distribution of income. From this point of view, a local road development program was introduced in the third five-year plan; 1979 - 1983 (PELTA III), as one of the important policies of the Government of Indonesia. Local roads covering 41,000 km are expected to be improved within PELTA III.
- 1.3. Several International lending agencies have assisted the Government of Indonesia in financing the program, viz., the Overseas Economic Cooperation Fund of Japan (hereinafter called OECF) to 21 Kabupatens, the International Bank of Reconstruction and Development (hereinafter called IBRD) to 25 Kabupatens, and the Asian Development Bank (hereinafter called ADB) to 14 Kabupatens.
- 1.4. In the fourth five-year plan, 1984 - 1988 (PELITA IV) the Government of Indonesia expects said three international lending agencies continue to assist the Government of Indonesia in financing the program, that is, OECF 38 Kabupatens, IBRD and ADB accepted the request of the Government of Indonesia, and IBRD have dispatched the Study team to Indonesia. With these assistance, around

seventy percent of Kabupatens will be enrolled in the local road development program.

- 1.5. JICA, IBRD and ADB study reports enlisted in section 1.3 present an evaluation methodology and a road development policy respectively. But these presented methodologies and policies show some differences each other. Standing on national administration point of view, the Government of Indonesia badly needs the unified evaluation methodology based on the established road development policy.

## II. OBJECTIVES

- 2.1. The purpose of this project are to :
  - (a) provide a simple economic feasibility evaluation methodology.
  - (b) provide a methodology to establish an implementation program, and
  - (c) train the concerned Indonesia Government Officials to be capable to execute feasibility study.
- 2.2. In establishing the simple economic feasibility evaluation methodology the study should cover :
  - 1) Selection of several kabupatens for case study,
  - 2) establishment of an economic feasibility evaluation method and execution of an economic feasibility for these selected kabupatens, and then
  - 3) simplification of the economic feasibility evaluation method without any significant change of results obtained from the previous

economic feasibility evaluation.

2.3. In establishing the implementation programming methodology the study should cover :

- 1) selection of several kabupatens for case study,
- 2) programming of implementation for these selected kabupatens, and then
- 3) simplification of implementation programming procedure.

2.4. After the simplified economic feasibility evaluation methodology and the simplified implementation programming procedure are established, on-the-job training for the concerned Indonesian Government Officials are requested.

On-the-Job training should cover

- 1) Explanation of logics of the simplified economic feasibility evaluation methodology and the simplified implementation procedure,
- 2) way of utilization of these methodology and procedure and then
- 3) evaluation of output results of these methodology and procedure.

### III. SCOPE OF WORK

3.1. The study team shall perform all technical and administrative studies, economic analysis, field investigation and related work hereinafter described, as required to achieve the objectives set forth in Section III above. In the execution of this work the study team shall cooperate fully with the Government of Indonesia and other public

authorities involved, which will provide the data studies, services and facilities outlined in Section VI hereof. The study team shall review the following these reports :

- (a) The Local Roads Support Works Study in Seven Provinces, JICA, August 1980.
- (b) Rural Road Study Project, ENEX of New Zealand and BIEC International Inc., February 1982, and
- (c) Rural Roads Study, Central and East Java, Hoff & Overgeard A/S.

### 3.2. Selection of objective Kabupatens

The study team shall select several Kabupatens as case study sites to achieve the objectives described in Section II.

### 3.3. Collection and Review of Existing Data

The study team shall review the existing data and collect data as needed by means of field survey. They must include :

- a) Topographical Maps
- b) Geology Maps
- c) Road Network Maps
- d) Land Use Maps
- e) Road Inventories
- f) Bridge Inventories
- g) Jurisdiction of Rural Roads
- h) Drainage Information
- i) Kabupaten Road and Bridge Construction Programme Records
- j) Kabupaten Records for Maintenance Programmes
- k) Kabupaten Records for Plant and equipment
- l) Kabupaten Records for Road Construction Materials

- m) Kabupaten Statistics for Staff and Labour Employed
- n) Population Data
- o) Market Information
- p) Traffic
  - Person Traffic
  - Agricultural Freight Traffic
  - Non-Agricultural Freight Traffic
- q) Desa Income Capability
- r) Major Development Plans
- s) Existing Kabupaten Development Plan

#### 3.4. Demand Forecast

The study team shall forecast population growth and the growth of the agricultural production for the coming 10 years. Based on these forecasts, the study team shall then determine the number of person movements and cargo movements without any significant improvements made to the local road network.

#### 3.5. Cost Estimate

The study team shall estimate the construction costs relating to the local roads. The study team shall also provide an estimated construction schedule showing the timing of expenditures. The cost estimates shall identify the foreign and local currency component for each item. The study team shall also determine the cost of maintaining the recommended local roads over project life.



### 3.6. Economic Evaluation

The study team shall determine whether the development of local roads is economically recommendable, taking into account (a) the impact of existing rural development plans and programs, (b) the impact of national immigration projects, and (c) projected population and industrial growth in each area.

The benefits to be considered shall include savings in vehicle running time, savings in road maintenance cost and producer surplus benefits.

The cost shall include expenditures relating to engineering, construction, equipment acquisition and maintenance. The costs shall be as calculated in paragraph 3.4.

The economic analysis shall include full supporting data, including tabulation of economic benefits and costs for each year of the project. It shall further include determination of the economic internal rate of return (EIRR), benefit-cost ratio (BCR) and the net present value (NPV).

### 3.7. Implementation Schedule

The study team shall prepare implementation schedules for the projects attached, with (a) equipment and material requirements, and (b) supervisory consulting services and training. The study team shall also assess (a) the management administration and operational system of the local road project and (b) the procedure for project execution including equipment procurement.

### 3.8. Simplification

The study team shall simplify the established economic feasibility evaluation method and implementation programming procedure to easy-use type.

The said easy-use type method procedure must include function of : (a) easy input preparation, (b) easy operation and (c) easily understandable output.

These requirements point out that the model and the procedure must be formulated as computerized models.

### 3.9. On-the-Job Training

The study team shall provide enough on-the-job training opportunity to The concerned Indonesia Government Officials. Items of training must include,

- a) methodology of the economic feasibility evaluation,
- b) procedure of the implementation program,
- c) justification of simplification methods,
- d) data collection and input preparation
- e) operation of model, and
- f) evaluation of computer output.

## IV. STUDY AREA AND STUDY SCHEDULE

### 4.1. Study Area

Case Study area shall be selected out of Jawa Island.

#### 4.2. Study Schedule

The study will be completed approximately 12 months after the start of the field survey. The entire work shall be conducted in accordance with the study schedule shown in the figure attached.

#### V. REPORT

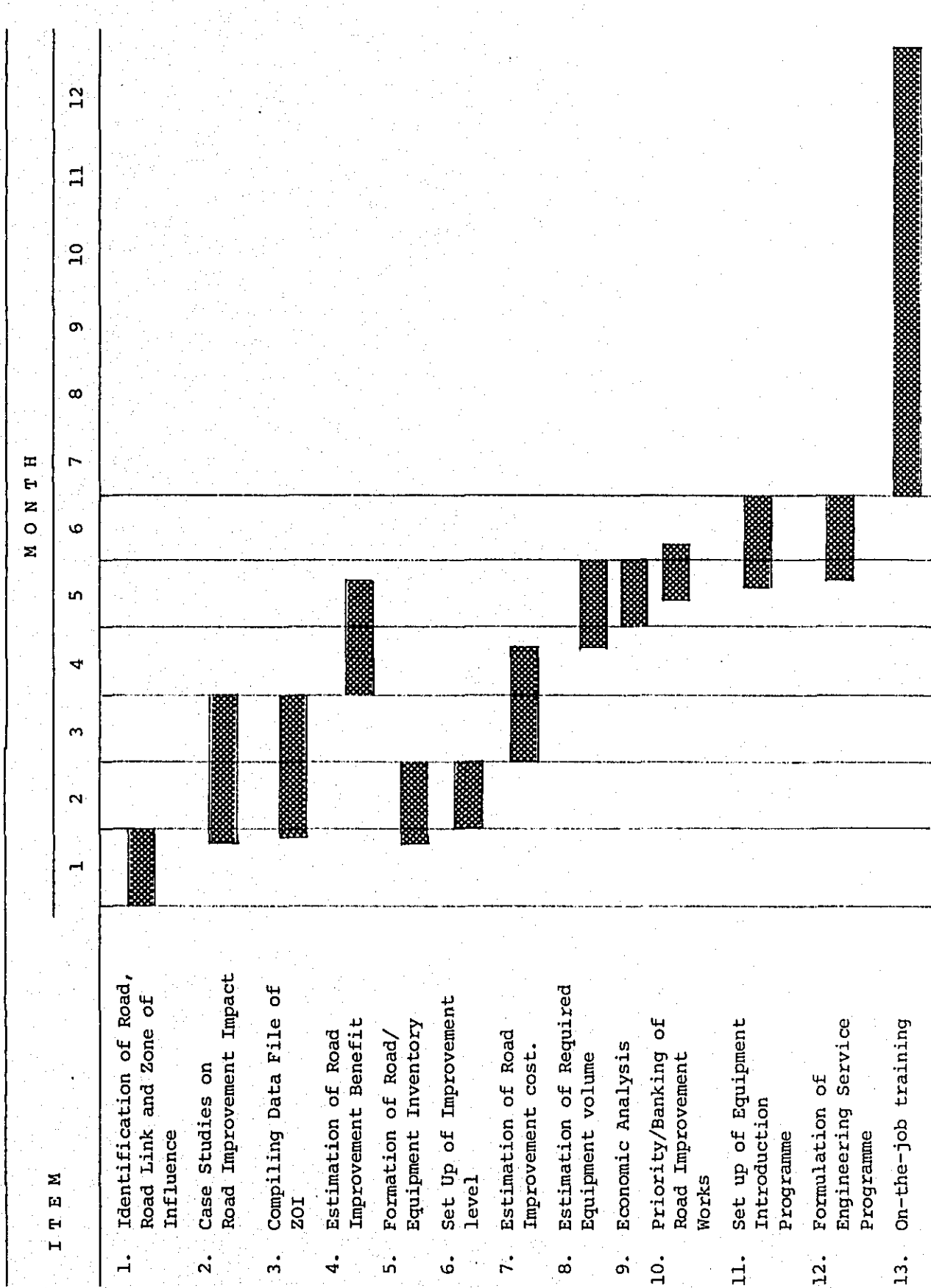
The study team shall prepare and submit the following reports in English within the time limits indicated below :

- a) An inception Report, within one month of the starting date, summarizing the initial findings of the study team and providing a list of additional field investigations which the study team has requested that the Government of Indonesia have carried out within three months. (10 copies).
- b) An Interim Report, within six months of the starting date, summarizing all work performed during the period from the starting date until the reporting date. (20 copies)
- c) A Draft Final Report, within twelve months of the starting date summarizing all work performed and the findings and recommendations of the study team. (20 copies)
- d) A Final Report, incorporating all revisions deemed appropriate by the study team, to be submitted within 60 days after receipt of comments on the Draft Final Report from the Government of Indonesia. (40 copies)

VI. CONTRIBUTION BY THE GOVERNMENT OF INDONESIA

- 6.1. The Government of Indonesia shall assign qualified counterparts responsible both for preparation of the study reports and liaison between the Directorate General of Highways and the team during the whole period of the study.
- 6.2. The Government of Indonesia shall provide the team with all available data and reports relevant to the study.
- 6.3. The Government of Indonesia shall provide the team with necessary land transportation.
- 6.4. The Government of Indonesia shall provide liaison for work which requires the cooperation of the Government, Local Government and/or other public agencies, and shall ensure that the team has access to all information required for the completion of the study.
- 6.5. The Government of Indonesia shall support the travel of the team for field investigation, including handling or reservations for accommodations as well as flight reservations.
- 6.6. The Directorate General of Highways shall be in charge of the above contributions on behalf of the Government of Indonesia.

WORK SCHEDULE





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