

REPUBLIK INDONESIA  
DEPARTEMEN PEKERJAAN UMUM  
DIREKTORAT JENDERAL BINA MARGA

**FINAL REPORT  
ON  
THE LOCAL ROADS SUPPORT WORKS STUDY  
IN SEVEN PROVINCES**

**AUGUST, 1980**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
TOKYO, JAPAN**

FINAL REPORT ON THE LOCAL ROADS SUPPORT WORKS STUDY  
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## PREFACE

In response to the request of the Government of the Republic of Indonesia, the Japanese Government decided to conduct a survey on the Local Roads Support Works Program Project and entrusted the survey to the Japan International Cooperation Agency. The J.I.C.A. sent to Indonesia a survey team headed by Mr. Katsunori Miyahara from 13 February to 18 May, 1980.

The team exchanged views with the officials concerned of the Government had discussions of the Republic of Indonesia and conducted a field in seven provinces, namely Riau, Sumatra Selatan, Lampung, survey Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan and after the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

August, 1980



Keisuke Arita

President  
Japan International  
Cooperation  
Agency



## LOCAL ROADS SUPPORT WORKS STUDY

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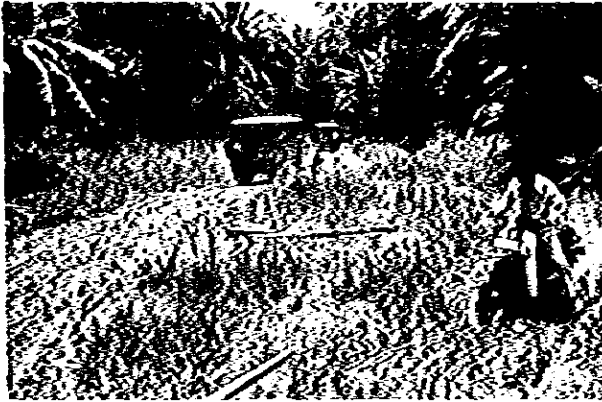
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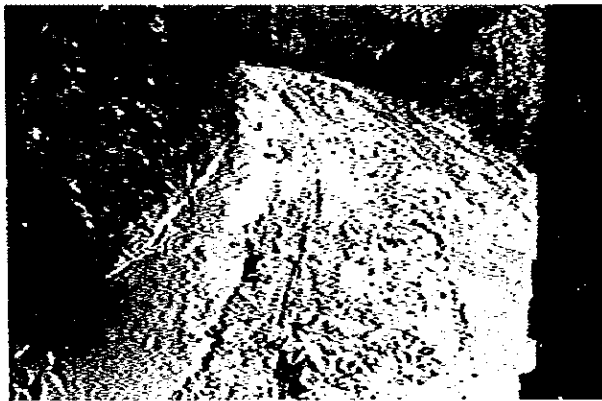
# I. ROAD CONDITION OF THE PROJECT



Some part of Kabupaten Road (SP. Padang-Pampanga), O.K.L., Sumatra Selatan



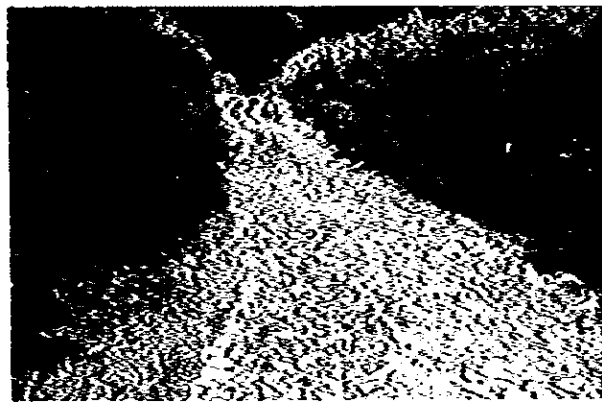
Earth Road in Bad Condition, Manggarai, N.T.T.



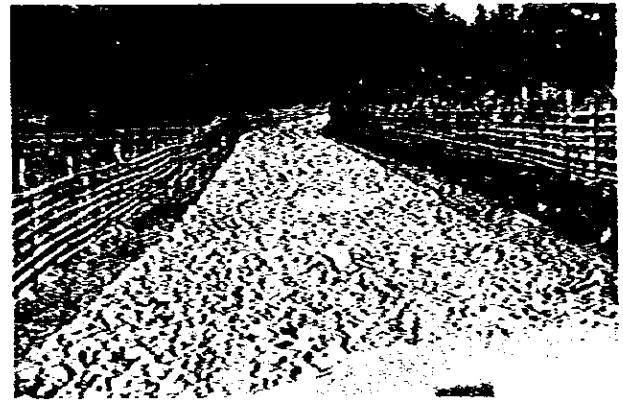
Kabupaten Road, Bolaang Mongondow, Sulawesi Utara



Good Condition of Earth Road, Kepulauan Riau, Riau



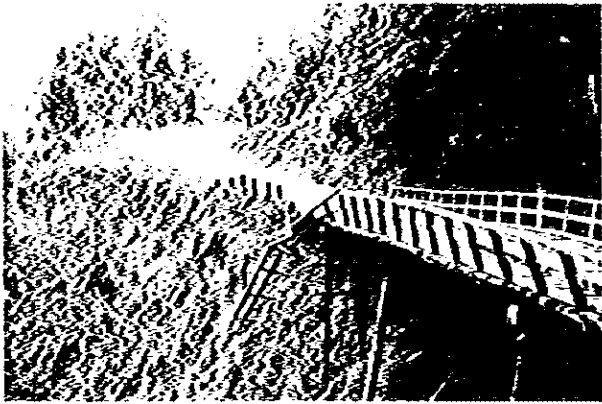
Stone Road in Poor Condition, manggarai, N.T.T.



Inpres Support Work Project Enrekang, Sulawesi Selatan



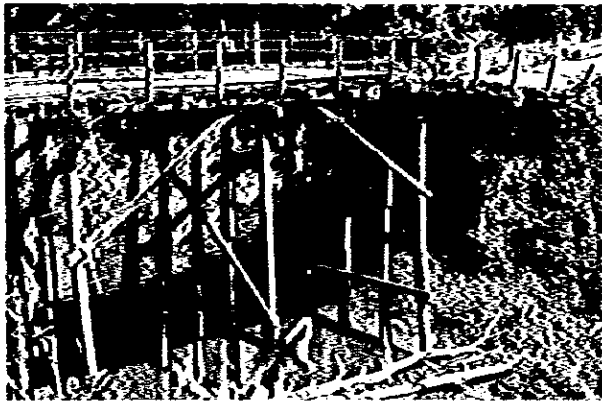
## II. BRIDGES RELATED TO THE PROJECT



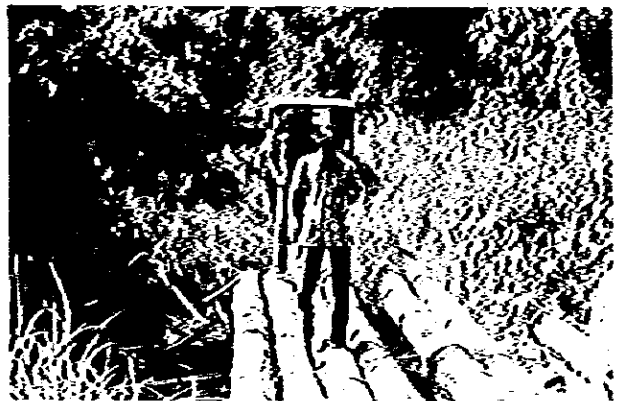
Timber Bridge in Kabupaten Road Kampar, Sumatra Selatan



One of the major bridges to be replaced (SP. Padang-Pampanga), O.K.I., Sumatra Selatan



One of bridges of Link No.29, Sidrap, Sulawesi Selatan



One Example of Log Stringer of Coconut Tree on Kabupaten Road, Kendari, Sulawesi Tenggara

## III. GRAVEL RESOURCES



Cobbles and Boulders in the River, Labat, Sumatra Selatan



Granular material in the River, Sidrap, Sulawesi Selatan



#### IV. TRAFFIC ON THE KABUPATEN ROADS



Medium Truck on Kabupaten Road, LIOT, Sumatra Selatan



Ox-cart on Kabupaten Road, Lampung Selatan, Lampung

#### V. AGRICULTURAL FIELD ALONG THE PROJECT ROADS



Mini Bus on Kabupaten Road, Manggarai, N.T.T.



Coffee Trees in Kab. LIOT, Sumatra Selatan



Rice Field in Kab. Manggarai, N.T.T.



Rice Field in Kab. Sidrap, Sulawesi Selatan









## SUMMARY AND RECOMMENDATIONS

### SUMMARY

This report presents a study of Local Roads Support Works in seven (7) Provinces, namely Riau, Sumatra Selatan, Lampung, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan and Sulawesi Tenggara in the Republic of Indonesia. The study was commissioned by the Government of Indonesia and sponsored by Japan International Cooperation Agency.

The study is to establish an Implementation Program of Local Roads Support Works in the seven (7) Provinces, as a part of the National and Regional Road Networks Development Program in the Third Five Year Plan (Pelita III).

This summary presents the major findings of the study and includes many of the recommendations.

### BACKGROUND AND NEEDS OF THE PROJECT

The 21 Kabupatens which were selected out of a total 257 Kabupatens in the whole country, have about 6 % of the total population in Indonesia.

Emphasis is given to agricultural production, as it represents more than half the regional product of every Province. The percentages of cultivated area in Riau, Sumatra Selatan, Lampung, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan and Sulawesi Tenggara were about 7, 9, 15, 16, 19, 21 and 5 respectively in 1977.

The Road network in Indonesia consists of 11,500 km National Roads, 27,500 km provincial Roads and 64,500 km Kabupaten Roads in 1979.

The total length of Kabupaten Roads in the 21 selected Kabupaten is 9,168 km in 1980, which is about 14% of the Kabupaten Roads in the whole country.

The main transportation method in the rural areas of those Kabupatens concerned is road transportation, with some exceptions of river transportation in the wet season in eastern parts of Sumatra Selatan and Lampung. However, the present traffic volume on the Kabupaten Roads concerned is

very light because of their low service level. 92% of Kabupaten Roads which will be supported, are carrying 0 - 50 vehicles per day.

It is one of the most important Policies of the Indonesian Government to expend the Support Works for Local Roads, as is stated in Chapter 1. The Direction and Main Target of Development in the Third Five Year Plan (Pelita III), is that the support works for a total length of 41,000 km of Kabupaten Roads should be carried out within Pelita III.

Although the word "Support Works of Local Roads" has been using officially since 1979, similar works for the improvement of Kabupaten Roads has been undertaken since 1969 by Inpres (Instruction President).

The Project, the support works for 21 selected Kabupatens by mechanized construction methods will cover an essential part of support work of local roads in Pelita III.

The investment plans of irrigation, transmigration and other social and economic activities were studied and the results taken into the consideration for the selection of Kabupatens.

#### PURPOSE OF THE PROJECT

The Local Road Support Works are based on the "1978 Principle Development Guidelines" which emphasizes:

1. To secure equity on development and their product in the whole country
2. To achieve sufficient economic growth, and
3. To get National stability.

The Local Roads Support Works are to be implemented with the same targets formulated in the highway development plan in Pelita III, namely, deletion of problem roads, make the problem roads passable in the wet season, especially critical roads, by support works.

## SELECTION OF KABUPATEN

Based on the proposed criteria of selection of Kabupatens, which consider current social and economic activities, various engineering conditions including execution capabilities, needs of local and national level and so on, it is proposed to include the following 21 Kabupatens in the Project.

It should be understood, that the proposed criteria of selection of Kabupatens are those of national minimum in line with the Policy of the Indonesian Government.

<u>Province</u>	<u>Kabupaten</u>
Riau	Kampar
	Kepulauan Riau
Sumatra Selatan	Lahat
	O.K.I.
	O.K.U.
	L.I.O.T.
Lampung	Lampung Utara
	Lampung Selatan
Nusa Tenggara Timur	Manggarai
	Belu
Sulawesi Utara	Bolaang Mongondow
	Gorontalo
Sulawesi Selatan	Takalar
	Bone
	Sidrap
	Pinrang
	Poleas
	Enrekang
	Jeneponto
Sulawesi Tenggara	Kendari
	Buton

## THE PROJECT

It is proposed to carry out the support works in the first stage, for those Kabupaten Roads, the inventory survey of which was completed by March 1980.

The total length of Kabupaten road for the main support works and maintenance is 4,093 km and 7,060 km respectively.

The Project will consist of the following work items:

### 1. Work Items of the Project

#### Main Support Works

- a) Graveling, 10 cm thick in average
- b) Shouldering
- c) Side Ditching
- d) Provision of Box and Pipe Culverts
- e) Reinforcement of Existing Bridges

#### Maintenance

- a) Regraveling
- b) Patching of Potholes

### 2. Quantity of the Project

The quantities of support works are as follows:

a) Total area of graveling	15,720,000 m <sup>2</sup>
b) Volume of aggregate including granular material	1,774,000 m <sup>3</sup>
c) Volume of soil	717,000 m <sup>3</sup>
d) Total length of side ditch	8,180 km
e) Length of culverts	22,500 m <sup>2</sup>
f) Length of bridges to be reinforced	6,300 m

## SCHEDULE OF THE PROJECT

The main support work is to be basically completed in three years.

It is scheduled, however, to complete the main support work in 6 years in 7 Kabupatens, namely, O.K.I., Manggarai, Belu, Bolaang Mongondow, Gorontalo, Kendari and Buton. This is due to the long length of Kabupaten Roads, unfavourable conditions of quarries, severe topographic conditions and execution capacities.

The construction schedule of each Kabupaten Road section (link) is recommended, based on a priority rating system.

## PROCUREMENT OF EQUIPMENT

Based on the quantities of support works, period of work schedule and some engineering judgement, it is recommended that the following equipment be procured under the loan.

Bulldozers 11 t class	42 units
Motorgraders 3.1 m class	54 units
Tyre rollers 8.5 - 15 t class	43 units
Wheel loaders 1 m <sup>3</sup> class	43 units
Dump trucks 3.5 t class	370 units
Water tank trucks 3.5 m <sup>3</sup> class	21 units
Portable crushing plants 10 - 20 t/h	7 units
Ditto                      20 - 30 t/h	17 units
Portable concrete mixers 0.3 m <sup>3</sup>	21 units
Portable compressors 7.0 m <sup>3</sup> /min.	24 units
Leg drills Ø 38 bit	17 units
Hand hammers Ø 38 bit	55 units
Hydraulic excavators 0.4 m <sup>3</sup> w. breaker	6 units
Mobile workshops	21 units
Fuel tank trucks	25 units
Service cars	45 units

In order to minimize the equipment delivery period, it is proposed to specify the ports of entry in Indonesia as Ports Pakan Baru, Tanjung Pinang, Palembang, Surabaya, Bitung and Ujung Pandang.

### CONSULTING SERVICES

It is proposed to engage consulting services to provide assistance in coordination of the Project, to ensure maintenance of the scheduled progress, and also to provide training on 4 model job sites.

### COST OF THE PROJECT

The cost of the Project is summarized in the following table.

<u>COST ESTIMATES</u>				
Rp thousand (Yen thousand)				
Project Element	Local Currency	Foreign Currency	Total	Foreign Exchange Component
<b>A. Support Works</b>				(2)
1. Main Support Work <i>a/</i>	15,761,229	-	15,761,229	-
2. Maintenance <i>b/</i> (in the first year 81/82)	1,607,363	-	1,607,363	-
3. Contingencies				
a) Physical <i>c/</i>	1,736,859	-	1,736,859	-
b) Price Escalation <i>d/</i>	5,454,533	-	5,454,533	-
<b>Sub Total (A)</b>	<b>24,569,984</b>	-	<b>24,569,984</b>	-
<b>B. Equipment for Twenty-one Kabupaten</b>				
1. Equipment & Workshops <i>e/</i>	1,083,044	(Yen 4,350,000) 10,950,000	12,033,044	91.0
2. Contingencies		(Yen 300,000)		
a) Physical <i>f/</i>	121,502	750,000	871,502	86.1
b) Price Escalation <i>g/</i>	84,000	-	84,000	-
<b>Sub Total (B)</b>	<b>1,288,546</b>	<b>11,700,000</b>	<b>12,988,546</b>	<b>90.1</b>
<b>C. Consulting Services</b>		(Yen 183,764)		(2)
1. Consulting Services	974,081	471,910	1,445,991	32.6
2. Contingency	89,688	(Yen 31,236) 78,090	167,778	45.5
<b>Sub Total (C)</b>	<b>1,063,769</b>	<b>550,000</b>	<b>1,613,769</b>	<b>34.1</b>
<b>Total Cost (A+B+C)</b>	<b>26,922,299</b>	(Yen 4,900,000) <b>12,250,000</b>	<b>39,172,299</b>	<b>31.3</b>

*a/* 10% administrative cost is included

*b/* 10% administrative cost is included

*c/* 10% of A.1 and A.2

*d/* an annual rate of 10% for A.1 and A.2

*e/* Unloading and transportation costs for equipment and workshop cost (total currency)

*f/* 50% of unloading and transportation cost (local currency)

*g/* 10% of workshop cost (total currency)

**BUDGETARY SCHEDULE OF LOCAL PORTION OF THE PROJECT**

Unit; Million Rupiah

		Main Support Works	Maintenance	Others	Total
First Year	1981/82	3,409	1,607	2,108	7,124
Second Year	1982/83	4,229	1,768	1,096	7,093
Third Year	1983/84	4,652	1,945	910	7,507
Fourth Year	1984/85	1,991	2,366	435	4,792
Fifth Year	1985/86	2,319	2,602	492	5,413
Sixth Year	1986/87	2,551	2,863	540	5,954

These annual fund requirements are considered to be within a tolerable limit based on the past records of Inpres. budget.

**REPAYMENT PLAN OF FOREIGN PORTION OF THE PROJECT**

Disbursement of earliest possible date Jan. 1981:

Amortization term	20 years
Grace Period	10 years
Yearly rate of interest	2.5%
First Year of repayment	1992
Constant amount of yearly repayment	¥402,355,000.-
Last year of repayment	2011

## EXECUTION ORGANIZATION OF THE PROJECT

Since the execution organization has been already established for conventional local roads support works and it is functioning well, the support works of the Project will be carried out by the same organization.

Considering the large size of works, mechanized work method and execution by force account, however, it is proposed to provide a section under each DPUK (Public Works Kabupaten) exclusively engaged in the Project, together with a workshop.

Total numbers of operators and drivers needed for the project are estimated to be at least 260 and 480, respectively and it is therefore proposed to start a training program in advance of the arrival of equipment.

## EFFECT AND BENEFIT OF THE PROJECT

Benefit of the Project is analysed on the reduction of transportation cost and/or farmers production surplus for one representative Kabupaten in each of the 7 Provinces.

Total value of benefit in the Project life is estimated as follows:

Kepulauan Riau	1.4 billion Rp.
Lahat	6.8 billion Rp.
Lampung Selatan	23.5 billion Rp.
Manggarai	3.7 billion Rp.
Bolaang Mongondow	3.9 billion Rp.
Bone	2.7 billion Rp.
Buton	9.2 billion Rp.

Other effects and benefits of the Project, such as time saving cost, convenience of travel, establishment of social equity, elimination of isolated areas, improvement of access to medical and educational facilities and so on are considered.



## RECOMMENDATIONS

The Project, the Support Works for the 21 selected Kabupatens, is justifiable and feasible to implement, for the following reasons:

### 1. Technical Feasibility

- a. The Project is technically sound and its execution would help to resolve the shortage of adequate access roads and to motivate economic activity in the Project Area.
- b. Features of the programme such as support work period and the number of items of equipment to be distributed into each Kabupaten, were selected after careful consideration of both the present executing capacity of the local authority and also the local topography and material availability.
- c. The calculated cost of the Project is tolerable and is based on cost estimates of an adequate representative sample of similar work. Equipment cost and construction costs were based on latest international bidding and volumes of work derived from final designs. The duly analyzed unit prices are comparable with those of recent contracts for construction of similar work.
- d. The D.G.H. has the technical capacity required to assist the local authority by strengthening the local personnel, thus ensuring that the local authority will execute the Project within the proposed schedule.  
The D.G.H. is responsible for planning and technical management of support works of Kabupaten Roads.
- e. For the education and training of Kabupaten DPU's personnel the D.G.H. has carried out a training program involving over 2,000 personnels in the fiscal year of 1979/1980.

## **2. Financial Feasibility**

The Project is also considered to be feasible from a financial stand point since:

- a. For the fiscal year of 1979/1980, the first year of the local road support works program of the Republic of Indonesia, the Government prepared a budget of 13 billion Rps. for the support work of Kabupaten roads and the training of local personnel.  
The equivalent figure for the 1980/1981 fiscal year is 40 billion Rps.
- b. The budgetary schedule of local portion of the Project is within a bearable limit, as is already described.  
The budget required in fiscal year 1981/1982 is about 18% of the national budget prepared in 1980/1981.
- c. Similar road support work project by the World Bank (IBRD) aid, and the Asian Development Bank aid, will probably start almost simultaneously with the Project.  
The IBRD loan is for provincial Roads and the Directorate General of Highways has completed the support work study in 9 provinces and will complete the study in the remaining 10 Provinces by the end of 1980.  
  
In the case of the Asian Development Bank the D.G.H. is now selecting the consultant for the support works.
- d. The budget for the support works of Kabupaten Roads in the Project, comes from the National Government budget A.P.B.N.
- e. Attention is drawn to the fact that the Indonesian Government raised fuel oil prices by about 50% on May 1st 1980.

The reasons for the increase were given as:

1. The Government desire to increase their income and thus allow more projects to start.

11. The Government policy to reduce oil subsidies.

### 3. Economic Justification

Cost Benefit Analysis was carried for 7 representative Kabupatens in 7 Provinces. The internal rate of return based exclusively on the benefit of agricultural activities is estimated as 22% in the 10 years Project Life.

Although the internal rate of return for each representative Kabupaten varies widely, 72% for Lampung Selatan, 36% for Lahat, 18% for Buton, 7% for Bone, 6% for Manggarai, and uncountably low for Kepulauan Riau, the high figures of internal rate of return justifies the economic feasibility so long as the 21 Kabupatens are selected by the criteria of national minimum.

### 4. Social Evaluation

The Project is also considered to be feasible from a stand point of social effect on rural areas, since it provides:

- a. An opportunity for equalising the distribution of the Governments budget.
- b. An equalising of opportunity for food and cash crop producers.
- c. Encouragement of development in isolated areas.
- d. Easier access to education, medical and other facilities, which must be located in the capital towns.

A major premise of the Study was that bridge replacement and construction works are excluded from the Project.

However, it is strongly recommended that the existing, almost collapsed bridges are repaired or replaced, and that bridges are constructed where they are missing, in order to carry out the Support Works in the Project successfully. The urgent need for the simultaneous replacement and support works of bridges cannot be over-emphasized, in fact advanced construction would be preferable. The cost is roughly estimated to be Rp.13,000,000,000.-.







## **1. INTRODUCTION**

In response to a request by the Government of the Republic of Indonesia, the Government of Japan has decided to conduct a Local Roads Support Works Study for selected Kabupatens in seven (7) Provinces, namely, Riau, Sumatra Selatan, Lampung, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan and Sulawesi Tenggara.

The Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, carried out the study in close cooperation with the Directorate General of Highways of the Ministry of Public Works, Directorate General of Regional Planning, the Ministry of Home Affairs and the authorities concerned of the Government of the Republic of Indonesia.

The objectives of the study were to establish an Implementation Program of Local Roads Support Works for selected twenty-one (21) Kabupatens out of the said seven Provinces as Pilot Study areas, and as a part of the National and Regional Road Networks Development Program in the third Pelita.

### **History of the Project**

July 1979: A fact-Finding Mission of the Overseas Economic Cooperation Fund of Japan (OECF) mentioned the necessity of a study for local roads support works.

November 1980: A note, including a loan for the Local Roads Support Works for the selected Kabuptens in seven (7) Provinces, was exchanged between the Government of the Republic of Indonesia and Japan.

### **History of the Study of the Project**

August 1979: The Directorate General of Highways (BINA MARGA) started to carry out the study in seven provinces.

October 1979: BINA MARGA submitted a Progress Report of Local Roads Support Works to OECF Japan.

December 1979: BINA MARGA requested the Government of Japan to carry out the study of Local Roads Support Works by an Indonesia-Japanese Joint Study Team.

The Terms of Reference for the Local Roads Support Works Study is attached to this report as Appendix A.

13 February to 17 May 1980: The Study Team Consisting of nine (9) Japanese Expatriates and five (5) Indonesian Experts carried out the said study.

Throughout the study, the study team have received the fullest cooperation from the Director of Planning in BINA MARGA, Mr. Harun Al Rasyid, the ex. Director, Mr. Soenarno, and their staff as well as many Indonesian Officials in the Provinces and Kabupatens concerned.

The study team would like to express their deepest appreciation for the help they recieved.



## ORGANIZATION OF THE STUDY TEAM

The study team consists of the following members:

### (1). Expatriates:

1. Head of the Team	Katsunori MIYAHARA
2. Deputy Head of the Team	Shigeru IWAMA
3. Member (Highway Planning & Administration)	Akira KOMURO
4. Member (Construction Equipment)	Yasuyuki UCHIDA
5. Member (Highway Construction)	Torao TOKOZUMI
6. Member (Economy)	Yusuke KAJIMURA
7. Member (Study Adminis- tration)	Hiromi SETOH
8. Member (Adviser)	Toshiaki TACHIMORI
9. Member (Project Coordinator)	Kazuhisa MATSUOKA

### (2). Counterparts:

1. Highway Construction	Imanudin Lufthan
2. Highway Planning	Adinus Saleh
3. Mechanical Engineer	Waluyo
4. Mechanical Engineer	ASEORO
5. Economist	Pardan

**Officials Concerned with the Study in the Central Government**

**(1) Bina Marga, DPU**

<b>Suryatin Sastramidjojo,</b>	<b>Director General of Highways</b>
<b>Harun Al Rasyid,</b>	<b>Director of Planning</b>
<b>Soenarno,</b>	<b>Director of Rehabilitation</b>
<b>Djuned Djauhari,</b>	<b>Secretary of Director of Planning</b>
<b>Sony,</b>	<b>Sub Director of Local Road</b>
<b>Saugi</b>	<b>Sub Directorate of Local Road</b>
<b>Sudarmadi</b>	<b>- do -</b>
<b>Atang</b>	<b>- do -</b>
<b>Bonar</b>	<b>- do -</b>
<b>Edicaria</b>	<b>Head of Project Finance Office</b>
<b>Iean Djanhari</b>	<b>Project Finance Office</b>

**(2) Cipta Karya, DPU**

<b>Ruslan Diwiriyo,</b>	<b>Director for City &amp; Regional Planning</b>
<b>Isketh Abidin,</b>	<b>Directorate for City &amp; Regional Planning</b>

**(3) Center of Education & Training, DPU**

**Siwoyo**

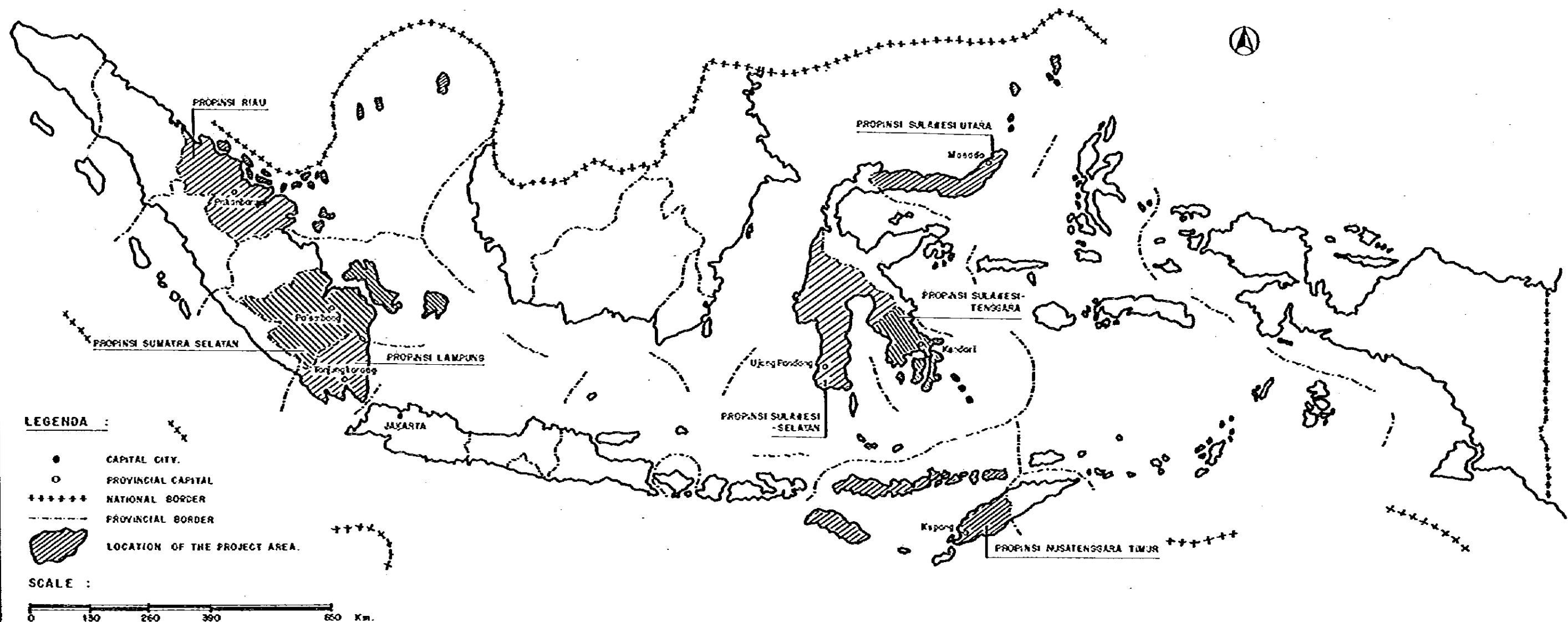
**Heri Krisnanda**

**(4) Department of Home Affairs**

<b>Atar Sibero,</b>	<b>Director for Regional Development</b>
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# LOCATION MAP OF THE SEVEN PROVINCES









## **2. BACKGROUND OF THE PROJECT**

### **2.1. Social and Economic Condition of the Project Area**

Indonesia consists of about 13,000 islands, among which Sumatra, Java, Kalimantan, Sulawesi and Irian Jaya are the five major islands.

About 140,000,000 people live in these islands, totalling about 1,900,000 km<sup>2</sup> in area.

The Project Area, covers 21 Kabupatens in 7 Provinces, namely, Kampar and Kepulauan Riau in Riau Province, Lahat, O.K.I., O.K.U. and L.I.O.T. in Sumatra Selatan Province, Lampung Utara and Lampung Selatan in Lampung Province, Manggarai and Belu in Nusa Tenggara Timur Province, Bolaang Mongondow and Gorontalo in Sulawesi Utara Province, Takalar, Bone, Sidrap, Pinrang, Poleas, Enrekang and Jeneponto in Sulawesi Selatan Province, Kendari and Buton in Sulawesi Tenggara Province are located in the islands of Sumatra, including the Riau islands, Flores, Timor and Sulawesi, including the Buton islands.

The data on each Kabupaten was collected from the Kabupatens and Provinces concerned to figure out the regional economic and social activities.

Each Kabupaten has Kecamatan as its lower administrative unit, but the data of Kecamatan was not collected in detail, except population and total area.

Emphasis was given to agricultural production, as it represents more than half the regional product of every Province and one of the major objectives of the Project is the development of agriculture.

It should be stressed that this assessment does not represent a detailed social and economic study of the Project Area. The analysis was limited to studying those activities which generate the transport demand either directly or indirectly in the Project Area.



#### **2.1.1. Population**

Table 2.1.1. indicates the population size in the Project Area. There are a number of features of population density and its growth rate. The high growth rate in the southern part of Sumatra island is due to the transmigration from Jawa island, and this tendency still continues due to the official and private transmigration programs

Except for a few of the Kabupatens, the population density appears to be rather low in the Project Area.

The rate of population growth in Indonesia is estimated at about 2.0% per. annum for the next ten years. Compared to this rate, it is estimated that the natural increase of population is lower and the social decrease of population is higher than the average in the major part of the Project Area.

#### **2.1.2. Land Use**

Table 2.1.2. shows land-use in each Province.

Many Provinces have a wide area to be cultivated in the future, except Lampung Province, where the space for future agricultural development is small.

The area of wet fields for rice production in Sulawesi Selatan Province, is large enough to produce so much rice that its surplus can be exported to the western part of Indonesia.

Table 2.1.1 Population Size

Province	Kabupaten	Mid Year		Annual Growth Rate %	Population Density person /Km <sup>2</sup>
		1971	1978		
Riau		1,858,790	1,898,993 ('77)	0.36	20.1
	Kampar	-	317,494 ('77)	-	11.2
	Kep. Riau	333,465	365,566 ('77)	1.54	45.1
Sumatera Selatan		3,479,216	4,135,088 ('77)	2.92	37.8
	Lahat	433,687 ('76)	458,697	2.84	45.7
	O.K.I	520,118 ('76)	551,015	2.93	25.4
	O.K.U	494,179 ('68)	635,198 ('77)	2.83	48.1
	LIOT	363,769	403,553 ('77)	1.74	42.1
Lampung		2,848,276 ('72)	3,707,324 ('77)	5.41	111.1
	Lamp.Utara	468,920	713,519 ('77)	6.18	41.1
	Lamp.Selatan	1,114,174	1,437,916 ('77)	3.71	212.5
N.T.T.		2,295,279	2,594,943	1.77	52.0
	Hanggarai	-	366,031 ('78)	-	51.5
	Belu	173,925 ('78)	178,072 ('79)	2.38	81.9
Sulawesi Utara		1,826,404 ('74)	1,975,367	1.98	76.6
	Bolaang Mo- ngondow	233,066 ('74)	273,606	4.09	36.0
	Gorontalo	425,703 ('74)	473,950	2.72	43.0
Sulawesi Selatan		5,189,227	5,722,501	1.41	67.2
	Takalar	152,553	163,499	1.00	335.8
	Bone	596,800	610,221	0.32	134.0
	Sidrap	181,588	197,913	1.24	84.6
	Pinrang	258,214	255,456	-	101.9
	Polmas	313,559	356,442	1.85	35.4
	Enrekang	121,140	129,347	0.94	66.6
	Jeneponto	200,605	225,926	2.00	286.0
Sulawesi Tenggara		714,120	844,498	2.43	22.1
	Kendari	189,968	255,888	4.35	15.5
	Buton	300,434	305,028	0.22	47.2
Whole Country		119,139,000	136,630,700	2.00	71.2

Source: Census and Statistics Office of  
each province and Kabupaten.

Table 2.1.2 Land Use of Project Area (1977)

Province	Wet field (rice)	Dry land	Village	Forest	Others	Total
	Ha					
Riau	109,971 1.2 %	555,841 5.9	- -	6,600,000 69.8	2,190,348 23.1	9,456,160 100
Sumatera Selatan	262,522 2.4	719,802 6.6	38,041 0.4	5,475,941 50.1	4,429,094 40.5	10,925,400 100
Lampung	135,554 4.0	352,206 10.6	- -	2,552,849 76.5	297,041 8.9	3,337,650 100
N.T.T.	142,108 2.8	653,926 13.1	35,913 0.7	2,440,627 48.9	1,715,424 34.4	4,987,998 100
Sulawesi Utara	78,638 3.1	421,068 16.3	21,600 0.8	1,475,622 57.2	581,672 22.6	2,578,600 100
Sulawesi Selatan	597,752 7.1	1,167,000 13.7	- -	3,220,000 37.8	3,524,120 41.4	8,508,872 100
Sulawesi Tenggara	14,471 0.4	162,720 4.3	- -	2,166,000 56.8	1,485,280 38.5	3,814,000 100

Source: Census and Statistics Office  
of each province

### 2.1.3. Regional Income

Table 2.1.3. shows the Gross Regional Domestic Product (GDP) both in current and constant prices. The period of calculation is not same in each Province and so the comparison among Provinces is only possible by GDP at current prices.

The growth rates of DGP in the Provinces of Sulawesi Island are much higher than those of other Provinces.

The share of the agricultural sector is gradually decreasing in all Provinces, but it still plays the major role in regional economic activity. The exceptions are Riau and Sumatra Selatan Provinces where oil production has a major role in the regional economic activity.

The GDP per capita in 1977 for the Provinces of Riau and Sumatra Selatan was at a higher level compared to the other Provinces, because of oil production.

### 2.1.4. Agricultural Production

Major crops in the agricultural production are as follows:-

<u>Food crops:</u>	Wet paddy
	Dry paddy
	Cassava
	Sweet potato
	Maize
	Peanut
	Soya bean
	Small green pea
<u>Cash crops</u>	Coconut
	Coffee
	Pepper
	Clove
	Rubber

Table 2.1.3 Gross Regional Domestic Product

10 <sup>9</sup> Rps							
Province	G.D.P at Current Prices		G.D.P at Constant Prices		Growth rate (%)	Per Ca- pita GDP ('77)	Share of Agricul- ture Sec- tor (%)
Riau	1972	183,651	1972	63,522	7.7	0.988 ( '76)	31.9
	1976	1,870,377	'76	85,310 at 69 prices			26.6
Sumatera Selatan	1975	724,064	1975	724,064	4.1	0.263	18.9
	1976	1,088,454	'77	784,832 at '75 prices			17.9
Lampung	1971	74,011	1971	74,011	8.4	0.080 ( '76)	55.7
	1976	278,969	'76	110,975 at '71 prices			51.8
N.T.T.	1975	93,324	1975	93,324	6.5	0.055	47.7
	1977	141,923	'77	105,893 at '75 prices			43.8
Sulawesi Utara	1974	142,942	1974	142,942	13.0	0.150	44.3
	1977	290,525	'77	206,520 at '74 prices			43.6
Sulawesi Selatan	1969	88,308	1969	88,308	14.0	0.085	60.4
	1977	480,046	'77	193,482 at '69 prices			37.4
Sulawesi Tenggara	1969	9,238	1969	9,238	10.4	-	69.4
	1973	28,586	'73	13,708 at '69 prices			47.2

Table 2.1.4 Agricultural Production (1977)

Province	Food Crops							
	Wet Paddy		Dry Paddy		Cassava		Maize	
	Ha	Ton	Ha	Ton	Ha	Ton	Ha	Ton
Riau	109,971	243,709	56,684	75,473	7,151	71,763	12,686	11,717
Sumatera Selatan	262,522	739,514	135,982	181,866	23,297	175,519	6,390	4,955
Lampung	135,554	406,992	117,283	236,966	71,873	868,142	41,060	61,658
N.T.T		142,108 Ha.		213,788 Ton	77,344	318,037	200,230	157,149
Sulawesi Utara	78,638	297,993	23,924	34,908	12,862	105,456	127,163	155,923
Sulawesi Selatan	597,752	2,314,060	32,107	48,191	39,407	283,619	295,626	228,793
Sulawesi Tenggara	14,471	30,647	24,759	29,650	24,591	145,521	54,540	45,724

Province	Cash Crops							
	Coconut		Coffee		Clove		Rubber	
	Ha	Ton	Ha	Ton	Ha	Ton	Ha	Ton
Riau	179,182	95,433	2,249	303	4,643	400	262,125	63,610
Sumatera Selatan	33,229	11,537	82,005	44,829	9,501	74	475,510	150,438
Lampung	85,663	37,775	87,382	52,734	35,750	6,230	18,500	6,790
N.T.T	80,276	31,180	15,812	3,371	956	4	-	-
Sulawesi Utara	237,907	214,926	3,104	1,226	28,432	2,400	-	-
Sulawesi Selatan	106,000	72,258	26,200	6,000	11,750	75	-	-
Sulawesi Tenggara	33,624	16,212	4,238	733	1,251	6	-	-

Source: Census and statistics Office of  
each province.

Beside these crops, many vegetables and fruits are also produced. The table 2.1.4. presents the production of some crops in the Project Area in 1977 or 1978.

More detailed data for the agricultural production is summarized in Appendix B.

The production, harvested area and yield rate of wet paddy in the Project Area are increasing by the introduction of the BHAS/INMAS programme, together with irrigation development plans. The harvest time of paddy in the rainfed area is only once a year, while in the irrigated area it is 2 to 2.5 times a year.

Table 2.1.5. indicates the plan of the wet paddy area development in Pelita III for the Project Area.

- The plan shows about a 10% increase of wet paddy field in this third /Five Year Plan (Pelita III).

As for the cash crop production by small holders, coconut is commonly produced throughout the Project Area. But generally speaking, the production of other cash crops is limited to Sumatra Selatan and Lampung among the 7 provinces. In the said two Provinces, the production of cash crops is significantly high.

The production of rubber is not increasing, because of the low market price compared to the production cost.

The production of other cash crops such as coffee, clove or pepper is increasing at a high rate being encouraged by high market prices. So, the planned production of such cash crops is being developed in other parts of Project Area, such as Nusa Tenggara Timur, Sulawesi island etc.

**Table 2.1.5 Developing Plan of Wet Paddy Field in Pelita III**

Province						ha
	'79/80	'80/81	'81/82	'82/83	'83/84	Total
Riau	2,022	4,000	4,000	2,978	3,000	16,000
Sumatera Selatan	1,603	2,200	6,000	4,697	3,500	18,000
Lampung	2,353	4,500	7,500	2,647	2,500	19,000
N.T.T	1,110	2,000	3,000	2,000	1,890	10,000
Sulawesi Utara	2,084	4,000	5,000	4,916	4,000	20,000
Sulawesi Selatan	2,013	4,000	5,100	2,987	2,000	17,000
Sulawesi Tenggara	945	1,470	8,000	9,363	8,220	28,000

Source: M. of agriculture, statistics section.

#### **2.1.5. Forestry**

About 40% to 70% of Indonesia's land is nominally covered by forest.

Table 2.1.6. presents the production of forestry in 1975.

Forestry production is not considered a very important activity in the Project Area, but forestry is the source for firewood (cooking etc.), charcoal, bamboo and other domestic uses.



Table 2.1.6 Production of Forestry

10<sup>3</sup> m<sup>3</sup>

Province	Round Wood	Swan Wood	Total
Riau	784	20	804
Sumatera Selatan	327	237	664
Lampung	132	62	184
N.T.T	-	-	-
Sulawesi Utara	39	3	42
Sulawesi Selatan	100	-	100
Sulawesi Tenggara	38	3	41

2.1.6. Livestock and Fish

Table 2.1.7. presents the livestock population in the Project Area in 1976.

Cattle and water buffalo are used predominantly as work animals in the Project Area, but in the Provinces of Nusa Tenggara Timur and Sulawesi Selatan, they are raised for food consumption. Goats, sheep, pigs and chicken or ducks are reared largely for local consumption.

Table 2.1.7 Population of Livestocks

in 10<sup>3</sup> heads

Province	Cattle/ Buffalo	Sheep/Goat	Pig	Chicken/Duck
Riau	282	741	246	18,769
Sumatera Selatan	1,171	944	359	26,546
Lampung	1,019	1,735	125	28,292
N.T.T	4,510	3,167	6,689	22,743
Sulawesi Utara	1,471	388	1,530	12,536
Sulawesi Selatan	8,326	1,782	1,237	64,434
Sulawesi Tenggara	226	478	—	7,182

Table 2.1.8. shows the fish caught in the Project Area, divided into sea fish and fresh water fish.

Fish caught are, in the main, sea fish, and so the effect of road improvement will have little affect on the fishery industry.

**Table 2.1.8 Fish Product at 1976**

Province	Sea fish	Sweet water fish	ton
			Total
Riau	126,536	7,526	134,061
Sumatera Selatan	32,358	33,781	66,139
Lampung	30,729	4,292	35,021
N.T.T	24,482	247	24,729
Sulawesi Utara	37,844	8,910	46,754
Sulawesi Selatan	114,220	34,827	149,047
Sulawesi Tenggara	18,628	772	19,400

#### **2.1.7. Other Aspects of the Regional Economy**

The economic activity of minerals or mining in the Project Area is as follows:-

Crude oil	L.I.O.T. in Sumatra Selatan
Bauxite	Kepulauan Riau in Riau
Rock asphalt	Buton in Sulawesi Tenggara

These natural resources occupy an important part in the regional economic activity in the areas of the Project Area mentioned above.

However, they have their own freight transportation system, such as pipe lines, private roads etc., so that the improvement of Kabupaten roads concerned, may only affect the activities of such industries indirectly.

It will also be noticed, that these industries have been contributing to the regional economy only to a minor degree, although their contribution to increase the GDP has been remarkable in recent years.

#### **2.1.8. Social Aspects in Project Area**

Local roads have an important role for the convenient use of community facilities, especially those of health and education.

In recent years, almost all villages in the Project Area have been provided by Inpres Program with elementary or primary schools.

The public transportation system, for passengers is still poor or non-existent on Kabupaten Roads, so there are a certain number of children who cannot attend school.

As for the medical care, almost all villages have a health center and/or public polyclinic, but hospitals are only located in large cities, such as the Kabupaten's capital.

#### 2.1.9. Transportation system of Agricultural Products

The transportation for agricultural products from farmgate to central market, is carried out by many types of transport.

The first step in transportation is from the farmgate to the village market, the second is from the village market to the local market such as the market in Kabupaten capitals, and the last step is from the local market to the central market in the provincial capital.

There are many variations in this transportation system. The middlemen in the system, crowd at each step and the transportation margin is almost 1 - 2 times that of the farmgate prices.

Such a large margin is expected to decrease through the improvement of the communication and transportation systems.

## 2.2. Present Status of Road Networks in Indonesia and in the Project Area

### 2.2.1. Road Networks in Indonesia

Public Roads in Indonesia consist of National Roads, Provincial Roads and Kabupaten Roads. Their lengths in 1979 were:

National Roads	11,500 km
Provincial Roads	27,500 km
Kabupaten Roads	64,500 km
<hr/>	
Total Public Roads	103,500 km

Besides the above mentioned public roads, there are village roads, the total length of which is estimated at more than 200,000 km and agricultural roads, the length of which cannot be estimated.

The public roads are classified in accordance with their functions as shown in Table 2.2.1.

The target of handling that is already becoming a burden to APBN (National Budget), is for Arterial and Collector Roads in a primary system that covers 36,500 km.

The target of handling that is already becoming a burden to APBD I and APBD II is for collector roads, and local roads respectively.

Table 2.2.1. Classification of Public Roads by Administration and Function

<div>Classification Function</div> <div>Status</div>	Arterial	Collector	Local	Total
National Road	11,500	-	-	11,500
Province Road	3,700	21,300	2,500	27,500
Kabupaten Kodya Road	-	-	64,500	64,500
Total	15,200	21,300	67,000	103,500
		36,500		

It will be noticed that the approval and declaration procedure of a Kabupaten Road is not strictly determined. A Kabupaten road is proposed by the Bupati concerned and approved by the Public Works Section in the Kabupaten concerned. The declaration procedure for an approved Kabupaten road is not yet legally fixed and so, the total length of Kabupaten Roads in each Kabupaten is increasing almost continuously.

#### 2.2.2. Present Status of Road Networks in the Project Area

The length of national, provincial and Kabupaten roads in the selected 7 Provinces out of the 27 Provinces in the whole country are shown in Table 2.2.2.

Table 2.2.2. Lengths of Public Roads in the Selected 7 Provinces (1979)

Province	National Road (km)	Provincial Road (km)	Kabupaten Road (km)	Total Public Road (km)
Riau	100	1,005	1,140	2,245
Sumatra Selatan	662	2,635	2,864	6,161
Lampung	245	667	1,284	2,196
Nusa Tenggara Timur	1,117	1,753	2,101	4,971
Sulawesi Utara	672	289	2,206	3,167
Sulawesi Selatan	583	1,801	4,285	6,669
Sulawesi Tenggara	197	239	1,620	2,056
(1) Subtotal	3,576	8,389	15,500	27,465
(2) Whole Country	11,330	27,569	64,595	103,494
(1)/(2) x 100 %	32%	30%	24%	27%

The Surface types of Kabupaten roads in 1978 is shown in Table 2.2.3.

Table 2.2.3. Surface Types of Kabupaten Roads in 7 Selected Provinces

Province	Asphalt Penetration Macadam and Surface Treatment (km)	Gravel and Crushed Stone (km)	Earth (km)	Total (km)
Riau	112.0	182.0	1,661.0	1,955.0
Sumatra Selatan	349.68	795.53	1,818.34	2,963.55
Lampung	576.9	33.0	86.4	696.3
Nusa Tenggara Timur	9.00	0	2,568.76	2,577.76
Sulawesi Utara	569.51	329.67	1,658.46	2,557.64
Sulawesi Selatan	384.34	1,580.05	2,955.72	4,920.11
Sulawesi Tenggara	1,260.00	0	0	1,260.00
(1) Subtotal	3,261.43	2,920.25	10,748.68	16,930.36
(2) Whole country	27,436.52	15,010.58	31,570.58	74,017.68
(1)/(2) x 100 %	11.9	19.5	34.0	22.9

Note: The lengths of Kabupaten roads in 1978 have increased during 1979.

Table 2.2.4 shows the total lengths of Kabupaten Roads in the 21 Kabupaten selected for the Project, lengths of Kabupaten Roads, an inventory survey of which has been completed to March 1980 as well as their types of surfaces.

The total length of Kabupaten Roads in the 21 selected Kabupatens is 9,168 km in 1980.

The lengths of Kabupaten Roads of asphalt treated, crushed stone, gravel and of earth are 652 km (9.2%), 1,063 km (15.1%), 1,377 km (19.5%) and 3,968 km (56.2%) respectively. The fact that the majority of roads are earth surfaced is one of the most essential reasons for the necessity of support works.



Table 2.2.4. Lengths and Condition of Kabupaten Roads in the 21 Selected Kabupaten

Province	Kabupaten	Inventory survey is completed until March 1980											
		Total length of Kabupaten roads (km)		Total length (km)		Asphalt treated		Gravel stone		Gravel		Earth	
		(1) 1978	(2) 1980	(3) 1980	(4) 100 %	Length (km)	% in (3)	Length (km)	% in (3)	Length (km)	% in (3)	Length (km)	% in (3)
Kiau	Kampar	813	813	502	62	0	0	20	4.0	21	4.2	461	91.8
	Kepulauan Riau	516	473	411	87	30	7.3	0	0	0	0	381	92.7
Sumatera Selatan	Lehat	259.4	323	233	78	39	15.3	108	42.2	67	26.3	41	16.1
	O.K.I	372.7	393	317	80	0	0	0	0	20	63	297	93.7
	O.K.U	387.3	461	237	36	72	23.0	44	17.1	101	39.3	40	15.6
	L102	393.3	466	260	69	0	0	99	35.4	127	43.4	54	19.2
Lampung	Lampung Utara	187.0	389	261	44	60	15.3	0	0	167	64.0	54	20.7
	Lampung Selatan	214.9	348	223	63	74	25.8	131	67.1	0	0	0	0
Nusa Tenggara Timur	Manggarai	307.0	408	332	81	4	1.2	112	33.7	0	0	216	65.1
	Nelu	287.0	287	282	98	0	0	26	9.2	4	1.4	232	89.4
Sulawesi Utara	Malinau	559.8	591	474	80	34	11.4	72	15.2	75	15.8	273	57.6
	Corontalo	946.7	947	947	100	124	13.1	68	7.2	81	8.6	674	71.1
	Total	153.3	192	192	100	20	10.4	22	11.5	18	9.4	132	68.7
Sulawesi Selatan	Done	278.8	312	293	93	17	5.8	37	21.5	170	57.6	71	74.1
	Sidrap	276.3	314	238	76	3	1.3	52	21.8	26	10.9	137	66.0
	Pontang	423.0	344	268	78	25	9.3	72	26.9	73	28.0	96	35.8
	Palmas	153.0	174	152	87	3	2.0	81	53.3	3	3.3	63	41.4
	Zerokang	237.0	237	140	59	15	10.7	16	11.4	24	17.2	85	60.7
	Jeneponto	343.2	362	277	77	38	13.7	0	0	68	24.6	171	61.7
Sulawesi Tenggara	Kendari	482.0	550	350	100	52	9.4	31	9.3	161	29.3	286	52.0
	Bucon	244.4	380	403	70	42	10.4	32	7.9	167	41.2	164	40.3
Total		7,839.7	9,168	7,060	77	632	9.2	1,063	15.1	7,377	19.5	3,968	56.2

## **2.3. Transport System: Past and Present Traffic Conditions in Indonesia and in the Project Area**

### **2.3.1. Present Situation of Transportation**

The various modes of transportation for passengers and freight in the 7 provinces, are railway, road, river, aviation and coastal shipping.

However, from field observation, the main transportation method in the rural areas of those Kabupatens is considered to be road transportation, with some exceptions of river transportation in the rainy season in east parts of Sumatra Selatan, and Riau as well as railway transportation in Sumatra Selatan and Lampung.

#### **(1) Highway Transport**

Whilst recent information is not available on the allocation of traffic among the various transportation modes, road transport undoubtedly accounts for the majority of all passenger and freight (except oil) movement.

In 1978, the registered four-wheel vehicle fleet numbered about 925,000 units, of which 60 percent were cars and 40 percent were trucks and buses (Table 2.3.1.)

The level of motorization is still low, 6.6 four wheel vehicles per 1,000 inhabitants.

During 1969 - 1978, the average annual rate of increase in the number of four wheel vehicles was 11.5 %.

The number of trucks and buses increased at a rate of 12.3% compared with 10.2% for cars. The growth rate was particularly high in the 1976 - 1978 period, with an annual increase of 19% for trucks and buses and 12% for cars.

**Table 2.3.1. Registered Vehicles, 1966 - 1978**

(excluding military and diplomatic vehicles but including  
inoperative vehicles not yet deleted from the registration)

Year	Cars (incl. minibus)	Trucks	Buses	Sub-Total 4-wheel	Motor-cycles (incl. 3 wheels)	Total Motorized Vehicles
1966	179,494	92,891	19,584	(291,969)	281,779	573,748
1967	184,954	94,892	18,840	(298,686)	287,522	586,208
1968	201,743	93,417	19,612	(314,772)	308,404	623,176
1969	212,124	95,660	20,497	(318,281)	336,597	664,878
1970	238,924	102,975	23,541	(365,440)	440,005	805,445
1971	256,988	112,877	22,562	(392,427)	510,764	903,191
1972	277,210	131,175	26,488	(438,873)	615,220	1,050,093
1973	307,739	144,060	30,368	(482,167)	720,056	1,202,233
1974	337,789	166,457	31,439	(535,685)	944,734	1,480,419
1975	383,661	196,416	35,103	(614,550)	1,191,771	1,806,351
1976	420,488	222,310	39,840	(682,638)	1,417,223	2,099,866
1977	479,335	278,979	48,089	(806,403)	1,704,964	2,511,367
1978	534,160	333,027	58,158	(925,345)	1,973,578	2,899,823

Unfortunately, there is no data available for the vehicle-kilometer. It is certain, however, that the growth rate of vehicle-kilometer is greater than the above mentioned growth rate of the number of vehicles.

A geographical distribution of motor vehicle registration in 1978 is shown in Table 2.3.2.

**Table 2.3.2. Geographical Distribution of Motor Vehicle Registrations in 1978**

	Cars	Buses	Trucks	Motor-cycles	Total Motorized Vehicles
<u>Java and Madura</u>	<u>417,209</u>	<u>32,723</u>	<u>214,588</u>	<u>1,326,184</u>	<u>1,990,704</u>
<u>Jakarta</u>	190,566	17,132	58,449	369,428	635,575
West	98,166	6,525	60,998	251,105	416,794
Central	50,358	4,843	47,932	321,383	424,516
East	78,119	4,223	47,209	384,268	513,819
<u>Sumatera</u>	<u>76,415</u>	<u>16,768</u>	<u>74,861</u>	<u>382,459</u>	<u>550,503</u>
North	41,980	7,531	37,223	216,401	303,135
Central	10,055	2,832	12,365	57,085	82,337 (2.8%)
South	24,380	6,405	25,273	108,973	165,031 (5.7%)
<u>Kalimantan</u>	<u>13,765</u>	<u>2,268</u>	<u>9,361</u>	<u>82,027</u>	<u>107,421</u>
<u>Sulawesi</u>	<u>13,492</u>	<u>4,330</u>	<u>19,394</u>	<u>107,997</u>	<u>145,213 (5.0%)</u>
<u>Other Areas</u>	<u>14,671</u>	<u>2,494</u>	<u>15,782</u>	<u>84,655</u>	<u>117,602 (4.0%)</u>
<b>Total</b>	<u><u>535,552</u></u>	<u><u>58,583</u></u>	<u><u>333,986</u></u>	<u><u>1,983,322</u></u>	<u><u>2,911,443</u></u>

Less than 15% of all motorized vehicle in the whole country are registered in the Project Area.

Information on the road transport industry in Indonesia is limited. A survey carried out in 1975 in Java, indicated that the cargo/freight vehicle transportation industry consisted mainly of a large number of small firms and owner-operators, and that 600 registered enterprises operated about 2,750 trucks. About 60% of the firms owned less than three trucks. At the time of the survey, about half of the fleet was more than five years old.

The passenger transport industry operates on a similar scale. In 1975, 2,350 companies were licensed in the whole of Indonesia to operate 11,550 buses on short-haul and medium haul routes.

In addition, there were 550 companies licensed for long-haul inter-provincial routes with about 4,000 buses.

The age pattern of the buses was similar to that of trucks. Buses require licensing by routes, whereas trucks need licensing only in Java, and only for long-haul routes.

The surfaces of Kabupaten roads are almost all earth and stone, whose stone size is often more than 10 cm. Surface conditions are varied, from good to bad according to the construction year and after maintenance.

Maintenance works of Kabupaten roads are only occasionally done by Kabupaten's public work because of the limited budget available for them.

According to the topographical conditions, road surface conditions, and the needs of transported goods or passengers, many vehicles and portering methods are used in the project areas.

For the transportation of goods, the methods listed below were observed in our field survey.

- man power      overhead or bamboo shoulder
- animal power   ox-cart etc.
- bicycle        so called becaks are used in almost  
                         all urban areas
- light truck    capacity of less than 1 ton

Most bridges on Kabupaten roads do not have enough load capacity for medium or heavy trucks, and in some cases not even for light trucks.

On the roads capable of taking heavier vehicles, such as Provincial or National, even those whose surface conditions are not good, medium trucks of more than 4 ton capacity were observed because of the higher transport efficiency.

The transportation of agricultural produce is made by transporters, or collectors who gather these products along the Kabupaten roads.

These middlemen are divided into groups according to the methods of transporting the agricultural products.

For the transportation of passengers, there were also a variety of transport methods observed.

- by foot        short distance, but often taking-  
                         up to 2 hours
- by bicycle     in the flat area, rarely in  
                         rolling areas
- by motorcycle
- by light bus    maximum capacity, 12 persons

## (2) Railway Transport

Out of 21 Kabupateus selected for the Project, there are only 2 Kabupatens where railway services are available.

These are Sumatra Sulatan and Lampung. After reaching the peak volume in 1974, the total freight transport in ton-kilometer by railway of total 6,700 km length declined to a lowest level in 1976, and then keeps very slight increasing tendency.

Similarly, the total passenger traffic in passenger-kilometer maintaining almost same level in the past several years. Accordingly, the share of transport by railways is decreasing continuously in the latest years.

In the third Pelita, 777 km of railway track, 141 tons of steel bridges, 145 units of locomotives, 186 units of freight waggon, and 5,150 units of passenger wagons will be improved or implemented, what is much less than the targets of Pelita II except passenger wagons.

The targets of railway transport in Pelita III are shown in Table 2.3.3.

Table 2.3.3. Targets of Railway Transport

Item	1979	1983
Passenger ( 1,000 person )	27,426	36,031
Transport Milage ( $10^6$ km )	4,230	5,235
Freight ( $10^6$ ton )	5,295	7,855
Freight transport Milage ( $10^6$ km )	945	1,371

### **(3) Sea Transport**

Contrary to the railway transport, the sea transport has been increasing significantly, with annual increasing rates of to 16% depending on the kinds of freight.

According to a study report on the growth of Indonesia domestic maritime trade, the averaged increase of dry cargo tonnage from 1976 to 1989 is estimated roughly as 6% per year.

Out of around 300 registered port in the whole country, there are some international ports with custom offices as well as loading and unloading facilities in the Project Area, which will be described in chapter 6, section 2.

Targets of sea transport in Pelita III is shown Table 2.3.4. from a) to c).

**Table 2.3.4. a) Targets of Sea Transport in Pelita III**

<b>Classification of Ship</b>	<b>New and Renew (Dead Weight Tons)</b>
<b>I. Domestic</b>	
1. Connecting Solitary Islands	116,300
2. Coastal	62,500
3. Folk	36,000
<b>II. International</b>	
1. Common	275,290
2. Wooden	104,000



**Table 2.3.4. b) Targets of Port Facilities in Pelita III**

Facility	Increase
Piers (m)	6,669
Warehouse (m2)	83,160
Yards of Loading and Unloading (m2)	60,304

**Table 2.3.4. c) Targets of Dredging in Pelita III**

Item	Target
General Dredging (1,000m3)	94,450
Large Scale Dredging (1,000m3)	33,500
Dredger and Accessories	18

#### **(4) Air Transport**

Records of air transport in 1974 and 1978 are shown in Table 2.3.5.

**Table 2.3.5. Records of Air Transport in 1974 and 1978**

	1974	1978
<u>Domestic</u>		
1. Flight distance (1,000km)	42,448	62,560
2. Passengers	2,126,053	3,509,136
3. Freight (t)	19,252	32,908
4. Passenger - kilometer	1,593,990	2,603,716
5. Occupancy of passenger	57	61
6. Occupancy of freight	55	62
<u>International</u>		
1. Flight distance (1,000km)	11,250	17,676
2. Passengers	341,278	659,356
3. Freight (t)	6,860	8,880
4. Passenger-kilometer	782,146	1,497,216

### 2.3.2. Past and Present Traffic Conditions in the Project Area

The present traffic volume on the Kabupaten Roads in the selected 21 Kabupatens is summarized in Table 2.3.1.

**Table 2.3.1. Daily Traffic Volume reported in the Inventory Survey on March 1980**

Province	Kabupaten	Total Number of Road Links	Number of Road Link in accordance with Daily Traffic Volume					
			0	1 - 10	11 - 30	31 - 50	51-100	101-500
Riau	Kanpar	36	0 (0%)	19 (53%)	13 (36%)	2 (6%)	2 (6%)	0 (0%)
	Kepulauan Riau	37	1 (3)	18 (44)	4 (11)	6 (16)	4 (11)	4 (11)
Sumatra Selatan	Lahat	20	6 (30)	3 (15)	7 (35)	3 (15)	0 (0)	1 (5)
	O.K.I.	29	12 (41)	9 (31)	8 (28)	0	0	0
	O.K.U.	19	5 (26)	10 (53)	2 (11)	1 (5)	0	1
	L.I.O.T.	36	2 (6)	13 (36)	11 (31)	4 (11)	6 (17)	0
Lampung	Lampung Utara	20	0	3 (15)	5 (25)	9 (45)	1 (5)	2 (10)
	Lampung Selatan	34	1 (3)	13 (38)	10 (29)	5 (15)	5 (15)	0
Nusa Tenggara Timur	Manggarai	8	0	7 (88)	1 (12)	0	0	0
	Belu	21	3 (14)	18 (86)	0	0	0	0
Sulawesi Utara	Bolaang Mongondow	35	4 (11)	19 (54)	5 (14)	5 (14)	2 (6)	0
	Gorontalo	171	105 (61)	24 (14)	27 (16)	5 (3)	4 (2)	6 (4)
Sulawesi Selatan	Takalar	43	1 (2)	31 (72)	11 (26)	0	0	0
	Bone	30	0	9 (30)	8 (27)	8 (27)	4 (13)	1 (3)
	Sidrap	38	3 (8)	16 (42)	19 (50)	0	0	0
	Pinrang	36	2 (6)	24 (67)	10 (28)	0	0	0
	Polmas	24	0	0	2 (8)	6 (25)	16 (67)	0
	Enrekang	16	5 (31)	7 (44)	3 (19)	1 (6)	0	0
	Jeneponto	43	1 (2)	8 (19)	23 (53)	11 (26)	0	0
Sulawesi Tenggara	Kendari	32	0	1 (3)	16 (50)	12 (38)	3 (9)	0
	Buton	14	3 (21)	8 (57)	1 (7)	2 (14)	0	0
Total		742	154 (21)	260 (35)	186 (25)	80 (11)	47 (6)	15 (2)

**Note:** A road link, is a road section connecting major intersections and/or road ends.

The Kabupaten Roads in the selected 21 Kabupaten are carrying, in the main, light traffic, i.e. less than 500 vehicles per day. 92% of Kabupaten Roads are carrying 0-50 vehicles per day.

Types of vehicles are not reported in the Inventory Survey. However, field reconnaissance trips indicate that the vehicles on Kabupaten Roads are mostly mini-buses and light trucks.

Since the traffic count shown in Table 2.3.1. is the first observation on the Kabupaten Roads, the expansion rates of traffic on Kabupaten Roads cannot be estimated. It is however well known, that an improvement of any Kabupaten Roads by INPRES creates so-called generated traffic.

#### Vehicle operating speed at present

Actual vehicle operating speed is observed as follows.

Earth road	Dry Season	Wet Season
good (bauxite, good laterite)	30 km/h	passable
fair	30 km/h	often unpassable
poor	15 km/h	mostly unpassable
Cobble road		
good	20 km/h	15 km/h
fair	10 km/h	10 km/h
poor	5 km/h	5 km/h
Macadam		
good	40 km/h	40 km/h
fair	30 km/h	30 km/h
poor	20 km/h	20 km/h

Note: A cobble road, is made of cobbles and eventually of boulders.

The original construction of cobble roads are supposed to be of the Telford type. This type of surface allows the traffic in the wet season to the well, but has a very low serviceability in the dry season.

### **2.3.3. Transport Planning and Coordination**

The responsibilities of planning and implementation in the transport sector are shared among a number of Governmental Agencies. At the national level, the Ministry of Public Works is responsible mainly for the overall planning of roads.

As far as concerning to the local roads support works, their implementation will be cooperatively carried out, by Ministry of Home Affairs, Ministry of Finance, Ministry of Public Works and Ministry of Economy, Finance and Industry, as it will be described in this chapter 2, section 5.

Besides, Ministry of Transport, Communications and Tourism is responsible for the overall planning and policy formulation of other modes of transport.

After the planning work, investment proposals are formulated and then submitted to the National Development Planning Agency (BAPPENAS) for their review and approval within the framework of national transport policy objectives.

## **2.4. Road Development Plan in the Third Five Years Plan**

### **2.4.1. The Road Development Plan in the Book of Pelita III**

The road development plan, as described in the main book of Pelita III (the Third Five Years Plan) is quoted from the book as follows:

#### **1) Chapter 1 - Direction and Main Target of Development**

It is stated in this Chapter, that the support works of Kabupaten roads to be carried out within the Pelita III, is for a total length of 41,000 km including the replacement of bridges. The lengths of Kabupaten roads to be supported in Java, Sumatra, Kalimantan, Bali, Nusa Tenggara, Sulawesi and Maluku/Irian Jaya are 15,500 km, 10,500 km, 2,500 km, 1,200 km, 2,500 km, 7,500 km and 1,200 km respectively. The National Roads and Provincial Roads are to be improved simultaneously. In addition, 40,000 km of new roads are to be constructed in relation with the transmigration program.

Such a statement indicates clearly that the local road support work will play the main role in the roads development plan in Pelita III.

#### **2) Chapter 2 - Framework and Budget of Development**

The road development budget stated in this chapter can be summarized in Table 2.4.1.

Table 2.4.1. Budget for Roads in Pelita III

	1979/80 Fiscal Year	Pelita III
Budget for Roads (Rp)	227,8 x 10 <sup>9</sup>	1,665.5 x 10 <sup>9</sup>
Share of Roads Budget in the Budget of Transportation and Tourism (%)	53.3	49.2
Share of Roads Budget in the Whole Budget (%)	7.8	7.6

The annual rate of increase of the road budget proposed in Pelita III is calculated as 19.1%.

3) Chapter 3 - National Finance and Monetary Policy

The source of national revenue and that for the development plan of Pelita III, are summarized in Table 2.4.2. and 2.4.3. respectively.

Table 2.4.2 Source of National Revenue in Pelita III

Unit : Rp10<sup>9</sup>

	1979/80	1980/81	1981/82	1982/83	1983/84	Pelita III
1. Direct Tax	4,113.1	4,508.1	5,014.8	5,551.2	6,189.1	25,376.3
( Oli Tax )	3,344.8	3,578.9	3,897.4	4,244.3	4,702.7	19,768.1
2. Indirect Tax	1,160.1	1,396.9	1,582.5	1,757.3	1,987.1	7,883.9
3. Non Tax Receipts	0,167.3	0,184.9	0,206.9	0,217.7	0,236.1	1,012.9
Total	5,440.5	6,089.9	6,804.2	7,526.2	8,412.3	34,273.1

**Table 2.4.3. Budget for Development Plan of Pelita III**

Unit : Rp10<sup>9</sup>

	1979/80	1980/81	1981/82	1982/83	1983/84	Pelita III
1. Surplus from Nat. Gov.	1,994.6	2,244.5	2,510.0	2,758.7	3,104.1	12,611.9
2. Foreign Assistance	1,493.5	1,647.4	1,840.3	2,019.5	2,236.8	9,237.5
Total ;Budget for Deve lopment	3,488.1	3,891.9	4,350.3	4,778.2	5,340.9	21,849.4

Note: Nat. Gov. = National Government

#### 4) Chapter 4 - Balance of Payment

In this chapter an estimated balance of payment is shown in Table 2.4.4.

**Table 2.4.4. Balance of Payment (Pelita III)**

( in million of U.S \$ )

Fiscal Year	1979/80	1980/81	1981/82	1982/83	1983/84
<b>A. Goods and Services</b>					
1. Export	8,984	9,832	11,065	12,350	14,010
Others except Oil (FOB)	4,046	4,712	5,759	6,649	7,680
Oil Gas (NET)	4,938	5,120	5,306	5,701	6,330
2. Import (C&F)	-8,711	-9,765	-10,990	-12,335	-13,870
3. Services <sup>1)</sup> (NET)	-1,697	-1,873	- 2,079	- 2,292	- 2,499
4. Monetary Movements	-1,424	-1,806	-2,004	- 2,277	- 2,359
<b>B. Official transfers</b>	2,551	2,763	3,074	3,308	3,650
1. Program Aid	,220	,258	,288	,200	185
2. Project Aid <sup>2)</sup>	2,331	2,505	2,786	3,108	3,465
<b>C. Repayment of Loan <sup>3)</sup></b>	- 630	- 724	- 890	- 992	-1,255
<b>D. Investment from abroad (NET)</b>	- 147	67	200	411	414
<b>E. Balance of Payment</b>	- 350	- 300	- 380	- 450	- 450

**Note :** 1) excluding transportation cost

2) including export credit

3) excluding interest

5) Chapter 12 - Transportation and Tourism

The policy of the road development plan in Pelita III is as follows:

- a) After carrying out the rehabilitation of roads and bridges, the safe and economic movement of traffic should be ensured for 5 to 10 years.
- b) The support work of roads, aims to keep the roads in tolerable condition for about 3 years after the completion of support work.  
Accordingly, there are a lot of roads to be supported twice within Pelita III.
- c) The betterment of roads and bridges are to secure the safe and economic traffic movement for about 20 years after the completion of betterment.
- d) The target of road development plan in Pelita III is as follows:

Rehabilitation of Roads	29,140 km
Restoration of Road	1,570 km
Betterment of Roads	11,000 km
Replacement of Bridges	89,780 m
New construction of Bridges	995 m
Support Work of National Roads	7,700 km
Support Work of Provincial Roads	14,000 km
Support Work of Kabupaten Roads	41,000 km



2.4.2. The Detailed Road Development Plan in Pelita III, described in the "Consultation Meeting of Developing Roads Network" held in every Province from January 15 to 31, 1980.

1) Targets of Road Development

The main characteristics of the targets are:

- a) All critical road sections on all the National and Provincial Roads concerned should be eliminated.
- b) All Road must have its own function in the Net Work. such as Arterial, Collector and Local.
- c) Improving the service-ability of the existing Road Network by maintenance, while the opening of new roads is limited.

The efforts in reaching the target:

- a) Program of support works are expanded through the introduction of AWCAS for example. An explanation about AWCAS Roads (All Weather Compact Aggregated Subgrade) is available.
- b) Program of road improvement, using criteria of low improvement.
- c) Program of replacing bridge increased.
- d) Program Rehabilitation.
- e) The road is expected to be functioning while the work goes on.
- f) Introduction program of Toll Road.

g) Foreign Aid leads to help of financial Program.

2) More funds to support equalization

The comparison of funds available for road development in Pelita II & III are shown in percentages as follows:

	Program that directly support equalization	Program that support serving ability of the road
Pelita II	17.6 %	82.4 %
Pelita III	49.3 %	50.7 %

3) Breakdown of targets of road development.

Established targets have been the effort of program synchronization, unity of funds from APBN (national budget) as well as from APBD/Inpres level I & II and Inpres of Kabupaten roads. ( see Table 2.4.5. )

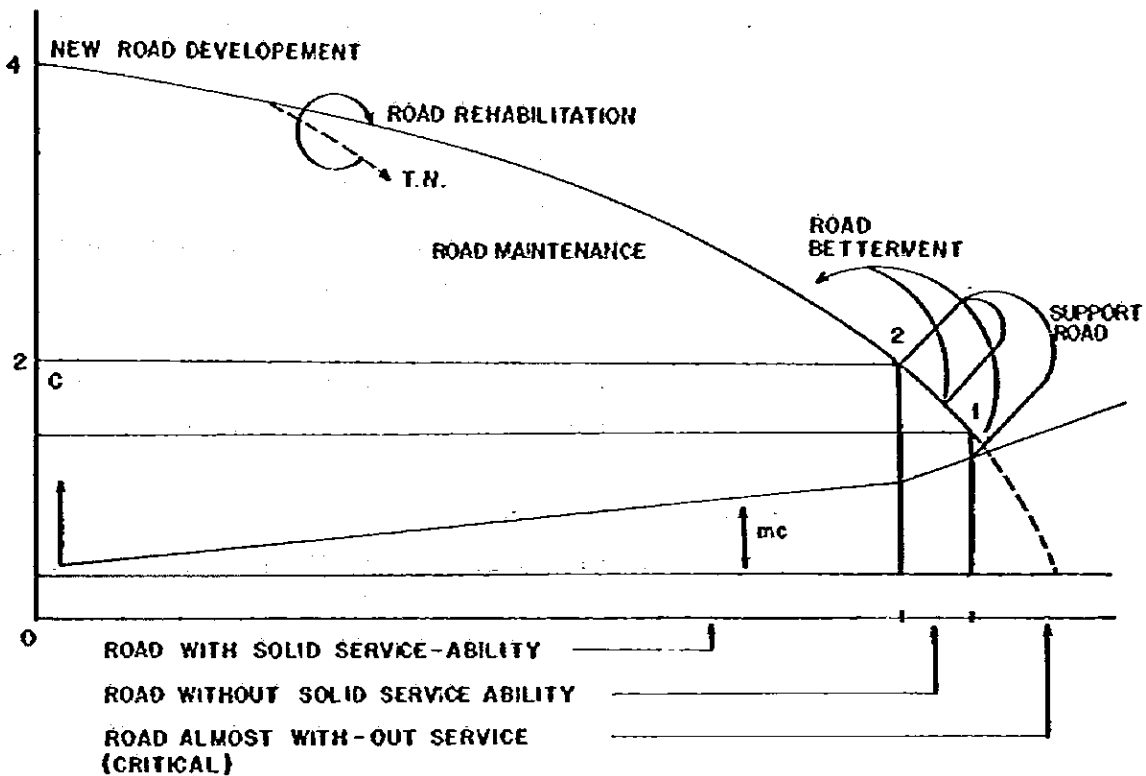
Table 2.4.5 Targets of Road Development

Source of Fund	Road Classification		Target cumulative per type of program					
			Rehabilitation	Maintenance	Support	Betterment	Replacement bridge	New Construction
			km	km	km	km	m	km
APBN	Arteri & Collector (prime)	Road Outside City	1,600	29,000	86,800	10,000	33,800	625
		City Road	-	-	-	1,000	6,000	350
		Road of Free barrier	-	-	-	-	-	63 (+96 non APBN)
APBD/ Inpres Level I	Collector & Local (prime)	Outside City Road	-	-	43,200	-	56,200	-
APBD/ Inpres Level II	Local (prime)	Outside & Inside City Road	-	-	41,000	-	47,500	-

#### 4) Concept of Road Development

The above mentioned program has used a new criteria/technic which is shown in detail in Fig. 2.4.1.

Fig. 2.4.1 Explanatory Scheme of Different Road Works



- Note:
- 1) The Maintenance program covers the maintenance and repair works of deteriorated parts of roads, in order to keep them in good condition and not the compaction works of road sections in good condition.
  - 2) The rehabilitation programme of roads, covers the handling of the deteriorated parts of roads in order to make them into good condition. The deteriorated portion of the roads is expected to be less than 5% of the whole road section.
  - 3) The support work program, means a short term program (3 years, more or less) of those road sections and bridges, which are not in good condition before the program is implemented, for the purpose of keeping the traffic moving on them, even if ability of maintenance work is not sufficient.

5) Sources of financing

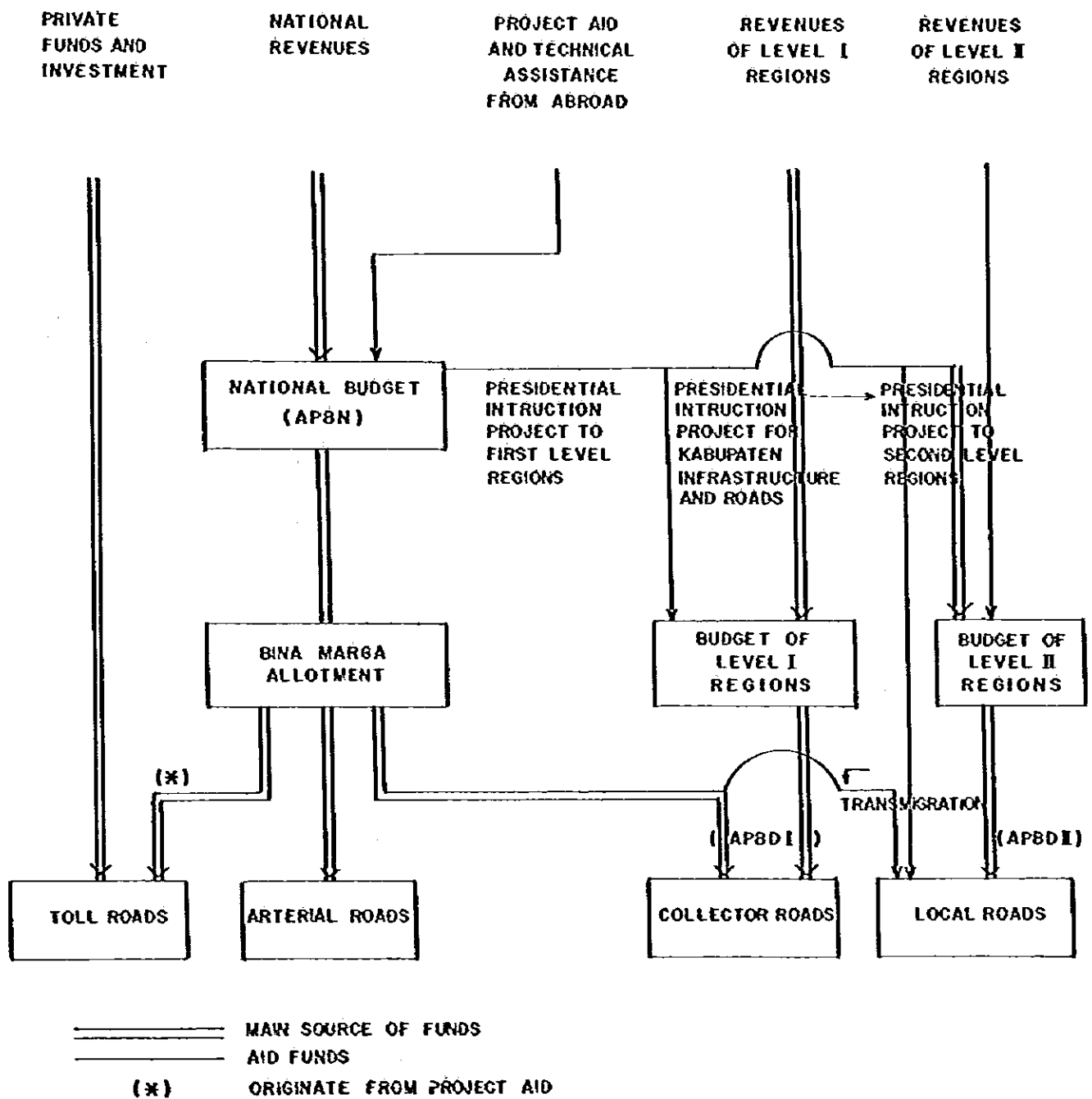
- Financing for the program on the development of the road network, originates from:

- National Revenues
- Program Aid and Technical Assistance (from abroad)
- Regional Revenues (Level I and Level II Regions)
- Private funds and Investment

The funds from the National Income, is the main source of finance for the road network development.

- On the basis of the currently effective budget system, the channeling budget is broadly regulated as follows:

**Fig. 2.4.2. Budgetary Flow Chart.**



# 6) Financial regulations

In Pelita III (the Third Five Year Development Plan), the following general guideline for the allocation of financing, according to the type of program, is used (Table 2.4.6.)

Table 2.4.6. Allocation of Budget for Public Roads

Classification Type of Program	Arterial Roads	Collector Roads	Local Roads	Toll Roads
New Construction	National Budget (APBN)	National Budget (APBN)	National Budget (APBN) for transmigration and Regional budget (APBD) of First and Second Level Regions	National Budget (APBN) + Private Funds (investment)
Road Improvement Upgrading	National Budget (APBN)	Regional Budget of First Level Regions + National Budget	Regional Budget of Second Level Regions	-
Replacement of Bridges	National	Same as	Same as	-
New Bridges	Budget (APBN)	Above	Above	-
Support	National Budget (APBN)	Same as above	Presidential Instruction Projects on Kabupaten Infrastructure and Roads & Regional Budget (APBD) of Second Level Regions	-
Rehabilitation/Maintenance	National Budget (APBN)	Regional Budget (APBD) of First Level Regions	Regional Budget (APBD) of Second Level Regions	Adminis- trators of Toll Roads

**7) Financing of the Road Development Program in Pelita III**

On the basis of indications on financing potentials, originating from the APBN (National Budget) as well as the APBD (Regional Budget) of First and Second Level Regions, the scheduled program for the overall road network development, has been compiled as shown in the following table.



Table 2.4.7. Program for the Overall Development of Road Network in Pelica III

Item Type of Program	Road Classification	Total Target	PHYSICAL PROGRAM AND FINANCING														
			Regional Budget of First Level Regions					Regional Budget of Second Level Regions									
			Art	Col	Lc2 (km/m)	Target	Bina Marga Foreign Component (Rp.10 <sup>6</sup> )	Rupiah Component (Rp.10 <sup>6</sup> )	Target	Foreign Component (Rp.10 <sup>6</sup> )	Rupiah Component (Rp.10 <sup>6</sup> )	Target	Foreign Component (Rp.10 <sup>6</sup> )	Rupiah Component (Rp.10 <sup>6</sup> )			
I Construction of New Roads																	
			x	x		625	625	123,500	65,500								
						350	350	88,700	58,600								
			x			975	975	212,200	124,100								
			Sub Total I														
II Road Improvements/Betterment																	
			x	x		10,000	10,000	257,900	198,500								
						1,000	1,000	-	66,000								
			x			11,000	11,000	257,900	264,500								
III Replacement of Bridges																	
			x	x		90,000	33,800	80,000	107,300	56,200	130,000	170,000	-	-	-	-	-
						6,000	6,000	-	25,400	-	-	-	-	-	-	-	-
						x	47,500	-	-	-	-	-	47,500	40,000	40,000	85,000	85,000
						x	143,500	39,800	160,000	132,200	56,200	130,000	170,000	47,500	40,000	85,000	85,000
IV Support																	
			x	x		130,000	86,200	25,000	132,400	43,200	20,000	71,300	-	-	-	-	-
						x	205,000	85,800	50,000	100,000	-	-	120,000	60,000	60,000	170,000	170,000
						x	335,000	172,000	75,000	232,400	43,200	20,000	71,300	120,000	60,000	170,000	170,000
V Rehabilitation and Maintenance																	
			x	x		1,600	800	-	6,800	800	2,200	6,600	-	-	-	-	-
						x	29,000	15,000	6,000	14,000	6,800	5,600	-	-	-	-	-
			x			-	-	-	12,800	-	9,000	12,200	-	-	-	-	-
			Sub Total V														
TOTAL								625,100	766,500		159,000	253,500	100,000			255,000	

#### 2.4.3. Summary

Local Roads Support Works, the total length of which to be implemented is 41,000 km, is one of the main targets of the road development plan in Pelita III.

In the first stage, it is proposed that the support works will support 7,060 km of Kabupaten Roads in the 21 Kabupaten selected for this project.

The Project ( support works in narrow sense ) will cover an essential part of support work in Pelita III. The Project is also considered to be a model work to accelerate the support work for remaining Kabupaten Roads.

## Overall Program of Local Roads Support Works

There are 257 Kabupatens in the 27 Provinces of Indonesia.

The Kabupaten Roads Support Works started in 1979, the first year of Pelita III.

As already described, in the foregoing paragraph 2.4., the total length of Kabupaten roads to be supported will reach 41,000 km in Pelita III (1979/80 - 1983-84). In the first year of Pelita III, that is in the Fiscal Year 1979/80, the total budget of the support works amounts to Rp.13,000,000,000.- the breakdown of which is as follows.

### (1) Physical support works

Rp.12,727,000,000.-

for 2,088 km roads support works

1,145.5 m bridges support works

4,243.5 m wooden bridges construction

7,180 m culverts replacement

51 Kabupatens in 17 Provinces.

### (2) Education and Training of Public Works Kabupaten Personnel

Rp.260,000,000.-

Public Works Chiefs Kabupaten	200	Rp.55,624,000.-
-------------------------------	-----	-----------------

Supervisors	500	Rp.62,150,000.-
-------------	-----	-----------------

Foremen	500	Rp.62,150,000.-
---------	-----	-----------------

Operators	500	Rp.62,150,000.-
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Assistant Supervisors	300	Rp.37,926,000.-
-----------------------	-----	-----------------

### (3) Bank's provision

Rp.13,000,000.-

It is indeed a fact that, not only the amount of the budget, but also its covering number of Kabupatens are quite low compared to the aimed targets in Pelita III. This is one of the reasons for the necessity of the Projects.

There are provisions for the guidance of support works aid of Kabupaten Roads, Local Government Level II, 1979/80, essential parts of which are quoted as follows.

- (1) Consideration of the Support Works in the "Instruction of the President of the Republic of Indonesia No. 18, 1979"
  - a) In order to equalize distribution, to motivate local economic activity, to increase traffic flow and distribution, and to support local projects, it is a must that support works of Kabupaten Roads be implemented.
  - b) To finance the Kabupaten Roads support works program, government aid is available in the form of the government budget for the year 1979/1980.
  - c) Due to items a) and b), it is necessary to have the "President's Instruction" covering the Support Works aid for Kabupaten Roads.
- (2) References for the Support Works in the "Instruction of the President of the Republic of Indonesia No. 18, 1979"
  - a) Section 4, sub-section (1) 1945 constitution.
  - b) Law No. 5, 1974 covering basics of local government (government statement, 1974 No. 38 addition of government statement No. 3037).
  - c) Law No. 2, 1979 covering government income & expenditure for the year 1979/1980 (government statement 1979/No. 6 addition of government statement No. B 131).
  - d) Presidential decree No. 15, 1974 covering the foreation of Local Development Plan Agency.

- e) Presidential decree No. 44, 1975 Covering Basic Organization of Departmental Relations has been changed many times, and previously by the Presidential decree No. 30, 1978.
- f) Presidential decree No. 45, 1974, covering the structure of Department Organization.
- g) Presidential decree No. 59/M/1978 covering the formation of the 3rd Development Cabinet.
- h) Presidential decree No. 7/1979 covering the third phase of Five Year Development Plan (PELITA III) for the year 1979/80 - 1983/84.
- i) Presidential decree No. 14/1979 covering the implementation of government expenditure and income.

**(3) Definition and Objectives of the Support Works Aid**

Kabupaten Roads Support Works aid, is aid which comes from the government expenditure and income budget for the year 1979/1980 for the Kabupaten (Local government level II) to be used for support works of Kabupaten Roads.

**Aid is used for:**

- a) Repairing road subgrade and paving of Kabupaten Roads in which the services are declining.
- b) Repairing and replacing of old Kabupaten Roads bridges.

**(4) Governmental Organizations to implement the Support Works**

- a) The Minister of Home Affairs is responsible for managing the execution of support works aid for Kabupaten Roads.

- b) The Minister of Finance is responsible for supplying the aid.
- c) The Minister of Public Works is responsible for planning and technical management of Kabupaten Roads support works aid.
- d) The Coordinator Minister of Economy, Finance and Industry/ Chairman of Bappenas is responsible for general managing of the plan of support works aid of Kabupaten Road under scheme of national development.

(5) Amount and type of Aid

Rp.13,000,000,000.- for 1979/1980

The amounts for each Provincial and Kabupaten aid are decided together, by the Ministers of Home Affairs, Finance, Public Works and the Coordinator Minister of Economy, Finance and Industry/Chairman of Bappenas.

The emphasis of disbursement of aid should be to support people in economic activities such as food production, peoples farms, peoples handicrafts, and trade, through the support works for roads that will open isolated areas and roads that are damaged by natural disasters.

(6) Disbursing Aid

Aid support will be disbursed through the office of the Government treasury service (KPN) and cleared through:

- a) Peoples Bank of Indonesia (BRI)
- b) Exports Import Bank of Indonesia for the province of Irian Jaya.

**(7) Responsibility of Local Government**

The Governor of the Province should be responsible for the management, supervision, reparation and administrative discipline, for Kabupaten Roads Support Works aid.

Bupati as the head of local government level II, is responsible for planning, managing, implementing, supervising, reporting and administrative discipline for Kabupaten Roads Support Works aid.

**(8) Project Manager and Treasurer**

The Minister of Public Works will select the Project Manager and treasurer for the education and training projects of the Kabupaten DPU personnel, on the central level, and the sub-project's manager and treasurer assistant in the provincial level.

a) The Governor will instruct the Bupati to act as the responsible person for the aid using a letter of decree.

b) The Bupati will order the head of Kabupaten DPU to act as the Project Manager of the support works of Kabupaten roads and personnel of DPU to act as the treasurer.

In case of absence of the head of DPU Kabupaten, the head of the Public Works Section will take place of the Project Manager.

**(9) Planning**

The formation of planning of the support works of Kabupaten roads should follow the technical standard that is decided by the Minister of Public Works.

a) The Project Manager of the support works project of Kabupaten roads should hand in the project's plan and its location to the Bupati, as the head of local government level II.

- b) The Bupati, assisted by the head of DPU section, should examine the project's plan under sub section (1) and then submit it to the Governor.
- c) The Governor, assisted by the chairman of the Local Development Planning Agency ( BAPPEDA), and the head of the province DPU, may reject the plan under sub section (2) of this section, with the guidance of Presidential instructions No. 18, 1979 and this joint agreement.
- d) Based on the acceptance of the examining procedure under sub section (3) of this section, the governor will formally legalize the project's plan.
- e) If the Governor rejects the project plan, it should be returned to the Bupati, with the cause for rejection, and ideas on how to solve the problem.
- f) The Governor will hand in the legalized project's plan to:
  - Bupati
  - Project Manager
  - Chairman of BAPPEDA
  - Head of Provincial DPU
  - Head of Regional office of the Directorate General of Budget
  - Head of the branch of Bank Rakyat Indonesia/Bank Ekspor Import Indonesia.

**(10) Implementation**

- a) The Project Manager should work according to the legalized project's plan.
- b) The Bupati, together with the Project Manager, should decide if the job:



- i) Will be done by contractor
  - ii) Will be done by force account
- c) In purchasing goods or materials, whether by the third party (contractor) or by force account (PU Kabupaton), the procedure should follow Presidential decree No. 14, 1979 covering the implementation of expenditures and income budget of the Government. A Ministry of Home Affairs (Penertiban Aparatur Negara) letter No. 02/SE/MENPAN/1979 dated 26 May 1979, covering the implementation of section 19 subsection (1) of the Presidential decree No. 14 of 1979 emphasizes that companies with a weak economic background and local companies should have first priority, and also emphasizes the purchase of National products and other provisions, is used at present.
- d) If the work is to be carried out by a contractor, then the Project Manager should send copies of the contract to the Bupati, the Office of BRI/Bank Eksim Branch, the Governor and the Head of the Regional Office of the Directorate General of the Budget.
- e) BRI/Bank Eksim Branch and the Project Treasurer are obligated to apply MPO tax & other tax to the third party (contractor) according to Presidential Decree No. 14-A, 1980.

**(11) Reporting and Supervising**

- a) The Head of support road project has to make a monthly report, by the 10th at the latest, to the Bupati concerning the development of the project.
- b) The Bupati then evaluates the report, according to subsection (1) of this section, and takes any steps necessary to improve the smooth running of the work/implementation.

- c) The Bupati have to report to the Governor, by the 15th at the latest, on the progress of the implementation of the Aid support work of the Kabupaten Roads. This report will also be sent to the Head of the Regional Office of the Directorate General for budgeting, and the chairman of BAPPEDA.
  - d) The Governor will evaluate the report based on sub-section
- (3) Of this section, and will take any steps necessary to improve the smooth running of the work/implementation.
- e) Each quarter, the Governor will report the progress of the implementation of the aid support work of Kabupaten Roads, to the Ministers of Home Affairs, Finance, Public Works and the Coordinator Minister of Economy, Finance and Industry/Chairman of BAPPENAS.
  - f) The Minister of Home Affairs reports the development of the Implementation of the aid Support Works of Kabupaten Roads to the President every Quarter of the year.
  - g) The Head of the project of Education and training PU in Kabupaten, also reports the development of the implementation on the 15th day, at the latest to the Ministers of Home Affairs, and Finance, of the Minister of Economy, Finance and Industry/Chairman of BAPPENAS.

#### Development of Kabupaten roads by INPRES

The major source of funds for the development program has been INPRES Kabupaten, which started in 1969.

INPRES is an abbreviation of "Instruction President" and is a central Government grant made to each Kabupaten throughout the country.

INPRES Kabupaten, is one of a number of INPRES programs including specific grants for school buildings and health services.

The general Kabupaten grant, can be used for construction and resurfacing of roads and bridges, minor irrigation works, improvement of bus stations, improvement of market and soil conservation and re-forestation programs.

Since 1979, INPRES roads and bridges are the same as the Support Works.

INPRES projects are subject to a number of regulations and requirements, issued by the central Government Ministry of Home Affairs, and are summarized below:

- \* Projects should be of a medium size with expenditure between Rp.5 million and Rp.75 million.
- \* The project should be technically feasible and the design, supervision and execution be undertaken by local staff.
- \* Projects must be completed in every respect, and must not be combined with the local budget as part of a larger project.
- \* Projects must be completed by the end of the fiscal year (April). On application an extension is possible until June.
- \* Project maintenance costs are first subtracted from the Ipeda income of the Kabupaten. If a minimum of 20% from this source is insufficient, then 5% of the Inpres fund may be allocated to maintenance. This is to cover all projects, not just roads and bridges.
- \* If a Kabupaten executes a project directly using their own staff, tenders must be called, if the supply of materials exceeds Rp.5 million in value.

The budget of INPRES roads and bridges for the past 5 years in the Project Area (in the selected 7 Provinces and 21 Kabupatens), are shown in Table 2.5.1

Table 2.5.1 Past Record of Impres Kabupaten Roads

Whole Country	1979/80		1978/79		1977/78		1976/77		1975/76	
	Length (km)	Budget (Rp10 <sup>3</sup> )	Length (km)	Budget (Rp10 <sup>3</sup> )	Length (km)	Budget (Rp10 <sup>3</sup> )	Length (km)	Budget (Rp10 <sup>3</sup> )	Length (km)	Budget (Rp10 <sup>3</sup> )
Riau										
Komper	15.435	80.151	11.005	100.232	38	100.598	18.853	65.212	10.088	36.244
Kepulauan Riau	19.067	150.947	28.655	94.695	20.858	141.581	12.226	121.181	21.084	63.182
Sumatera Selatan										
Lahat	10.50	131.698	-	-	136.105	119.022	93.75	136.639	0.791	2.914
O.K.I	67.686	80.926	87.297	167.763	62.394	158.427	19.685	75.600	-	3.695
O.K.U	93.47	316.874	39.821	214.360	45.50	106.481	99.291	208.063	-	-
LIT	44.25	171.900	54.876	189.384	44.09	176.337	33.25	67.700	-	-
Lampung										
Lampung Utara	-	-	56.56	275.848	43.65	228.682	31.00	225.170	30.549	140.597
Lampung Selatan	80.60	698.212	32.8	394.931	45.39	421.788	38.70	226.181	39.650	202.507
Nusa Tenggara Timur										
Manggarai	4.60	50.073	4.00	37.800	0	0	0	0	-	-
Belu	6.00	57.066	5.95	62.106	5.00	61.030	2	14.850	2.780	16.186
Sulawesi Utara										
Dolaang Mongondow	17.19	144.159	18.75	110.159	25.66	93.411	20.50	74.120	12.75	69.375
Corontale	20.826	266.527	28.076	182.829	38.822	186.108	42.72	114.236	37.516	122.363
Sulawesi Selatan										
Takalar	10.400	73.101	3.4	32.709	3	20.450	8.10	38.193	-	14.508
Zona	45.805	324.590	33.493	181.451	47.976	228.408	19.034	91.167	-	151.927
Sidrap	10.70	98.928	5.608	36.484	15.093	102.177	17.859	81.698	-	49.993
Pinrang	16.747	148.329	23.271	127.924	15.85	120.069	11.156	109.805	-	291.541
Pilmas	52.00	155.200	22.50	75.912	28.80	143.301	42.00	95.338	-	104.094
Enrekang	8.50	57.012	6.25	47.908	5.5	52.435	7.50	34.120	-	38.116
Jeneponto	25.25	110.383	3.00	27.598	0.93	8.024	14.40	51.495	-	46.652
Sulawesi Tenggara										
Kendat	40.55	135.954	12.134	76.795	19.72	78.604	12.85	78.532	14	50.729
Buton	18.900	140.815	53.612	81.743	16.2	131.202	10.4	61.548	15.078	121.371
Total	608.476	3,392.845	591.058	2,518.631	658.538	2,677.935	555.274	1,970.758	-	1,525.995







### 3. NEEDS AND PRIORITY OF THE PROJECT.

#### 3.1. Policy on the Improvement and Maintenance of Kabupaten Roads

##### (1) Local Roads Support Works.

With the development of the national and Provincial roads, the Local Roads Development Scheme has become one of the major items demanded by the local government as well as the local people all over Indonesia.

In order to secure equity and achieve the spread of development instructed in the National Development guideline, the Government of Indonesia weighed especially on the Local Roads Development Program in Pelita III. From 1979/1980 Fiscal Year the Central Government of Indonesia started the Support Works aid for Kabupaten Roads by Inpres under the cooperation of four Ministries, namely Ministry of Home Affairs, Ministry of Finance, Ministry of Public Works and BAPPENAS.

To implement and develop the Local Roads Support Works, the Instruction of the President No. 18, 1979 was publicized in August 22, 1979.

This instruction is quoted in Chapter 2, Section 5. Within the limit of funds and available skills, the government is required to eliminate those roads with critical condition and to provide as many as possible passable roads in Pelita III.

Since the soil in Indonesia is generally clayey, long lengths of the local roads become impassable and heavily damaged in the wet season.

During this season it is extremely difficult to maintain the roads as passable and thus many villages and people become isolated.



**(2) Maintenance Of Kabupaten Roads.**

**There is no policy established for the maintenance of Kabupaten Roads.**

**The Kabupaten Roads have been maintained by the voluntary work of inhabitants along the roads combined with the compacting work of road rollers operated by Public Works Kabupaten (DPUK).**

**Some of the roads have not been maintained at all.**

**However, the Government of Indonesia has decided to maintain the Kabupaten Roads in the Project Area with mechanized maintenance work.**

### **3.2. Selection of Kabupatens to be included in the Project**

#### **3.2.1. General**

The Government of Indonesia plans to eliminate all the critical roads and make them all-weather passable roads. As noted in the foregoing chapters, the Government puts considerable emphasis on the high priorities of Local Roads Support Works.

In this sense, to all the Kabupatens and Kabupaten roads the Roads Support Works should be applied more or less in the immediate future.

However, it is reasonable and practical to select a limited number of Kabupatens, out of the total 257 Kabupatens (for the Project) for a pilot project of accelerated (in other words, mechanized) support works. This will keep the annual fund requirement and increase of work capacity of local Governments within tolerable limits.

Accordingly, the Project, namely the support works for the roads of selected Kabupatens, is considered to be a part of the over-all support works program.

It is hoped that the success of the Project, will set a good example for expanding the support works to all Kabupatens and assist with the acceleration of the program.

The procedure for the selection of Kabupatens is summarized as below:

- (1) The Government of the Republic of Indonesia selected seven (7) Provinces, namely, Riau, Sumatra Selatan, Lampung, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Selatan and Sulawesi Tenggara.

The total number of Kabupatens and municipal cities in the said seven Provinces is 66.

- (2) The criteria for the selection of the Kabupatens is proposed, discussed and established.
- (3) Selected Kabupatens, based on the established criteria, are checked by the Figures in the paper "Rural Road in National Development" (August 1979) proposed by Mr. Ruslan Diwiryo, Directorate of City and Regional Planning.

### 3.2.2. Number of Kabupatens to be Selected in each Province

#### (1) Total number of Kabupatens to be Selected in Seven Provinces.

To conduct the Support Works of the Kabupatens Roads successfully, it should be noted that the executing system and capability are to be developed gradually (step by step). With the limited available funds for this Project, especially the foreign component, the total number of Kabupatens had to be limited.

However the limitation of number of Kabupatens is considered to be reasonable from a practical point of view, because the implementation of the Project by DPUK (Public Works Kabupaten) requires the assistance of DPUP (Public Works Province) to a certain degree.

In order to finalise the total number of Kabupatens which could be selected, consideration had to be given to the amount of support works required within individual Kabupatens. The total number of Kabupatens which could have been selected therefore varied for the various options. Following consideration of the above and in particular of the estimate for executing the Project, the total number of twenty one Kabupaten was felt to be the optimum, under the limit of budget, especially that of Foreign Currency.

**(2) Allocation of Kabupatens to each Province.**

To allocate the total number 21 amongst the Provinces, the following viewpoints were studied :

**(i) Population.**

The needs for Local Road Development can be considered closely related to the population of Provinces. Since a substantial amount of funds are to be distributed to the Seven Provinces in the Project, it is reasonable that the number of Kabupatens is approximately proportional to the population of each Province.

Although this method may not have 100% technical justification, it is still considered a viable way of distributing the work.

**(ii) Total number of Kabupatens in each Province.**

It is the intention that all the local roads will be supported at the same time in the coming years.

In order to achieve the goal of all Support Works in all the Provinces being undertaken at sometime in the future, the Kabupaten coverage should preferably be equal in each of the seven Provinces.

**(iii) Support capability of The Public Works in each Province.**

Since the executing ability of Kabupatens is not enough in operationally and mechanically, support from the Public Works in each Province is essential in the technical field.

Based on this consideration the share of Kabupatens to each Province has been adjusted. For example in some Provinces in Indonesia even the Provincial Workshops have some difficulty to get spare parts in a reasonable time because of the handicap of the transportation and communication system.

These matters have been taken into consideration in adjusting the number of Kabupatens and where necessary a reduction in the allocation has been made.

**(iv) Minimum Two Kabupatens in Each Province.**

In executing the support work, it is proposed that at least two Kabupatens are to be selected in each Province.

Execution of the support works in Kabupatens will serve as a good example and stimulate support works in other Kabupatens in the same Province.

It is hoped that competition between Kabupatens will result in a speedy improvement of workmanship.

**(v) The number of Kabupatens in 7 Provinces.**

Based on all the above-mentioned considerations, the number of Kabupatens to be allocated to each Province is proposed and shown in table 3.2.1.

Table 3.2.1. Number of Kabupatens to be allocated to each Province Concerned.

Province	Population	% (1)	Number of Kabupatens	% (2)	Average of 'Calculated' Number of the Shares $\frac{(1)+(2)}{2}$ (3)	Selected Number of Kabupatens (4) = (3) @ 21 Kabupatens	Remarks
(thousand)							
Riau	1,942	9.36	6	9.09	9.23	1.94	2
Sumatra Selatan	3,693	17.80	10	15.15	16.48	3.46	4
Lampung	3,323	16.02	4	6.06	11.04	2.32	2
Nusa Tenggara Timur	2,714	13.08	12	18.18	15.63	3.28	2 Limited Sup- porting Capa- bility of the Provincial Government
Sulawesi Utara	2,035	9.81	7	10.61	10.21	2.14	2
Sulawesi Selatan	6,167	29.78	23	34.85	32.31	6.79	7
Sulawesi Tengga- ra	862	4.15	4	6.06	5.11	1.07	2 Minimum two Kabupatens in Province
	20,736	100	66	100	100	21	21

### **1.2.3 Proposed criteria for the selection of Kabupatens**

In selecting the Kabupatens in each Province, it is reasonable and necessary to conform with the government's policy of the local road development and maintenance, studied in chapter 3.1.

As noted, the emphasis is to be given to supporting the peoples economic activities such as food production, farming, hadicraft and trade. Emphasis is also to be given to relieving isolated areas and rehabilitating roads damaged by natural disasters.

In addition it is of course necessary that checks are made on engineering matters, such as aggregate availability, the supporting capacity from the DPU Province and so on.

In selecting Kabupatens, criteria have been developed in three fields, namely economic field, engineering field and the local and national level needs.

#### **(1) Economic fields**

The priorities of selection have been given to those Kabupatens which have

- (i) more population and/or population density than others,
- (ii) more cultivated area and production of agriculture than others,

- (iii) more commercial activities than others, and/or
- (iv ) more investment plans for agricultural, industrial development, or infrastructure,

**(2) Engineering fields**

The priorities of selection have been given to those Kabupatens which have

- (i) the provincial roads in good condition or at least with the improvement program specified in Pelita III,
- (ii) suitable local roads for the Project,
- (iii) enough capability to execute the Project or enough supporting assistance from the DPU Province, and/or
- (iv) suitable surfacing materials, such as gravel, coral stone, stone/soil mixture or mountain rock for crushing at an acceptable distance from the Project Area.

**(3) Local and National Level Needs**

The priorities of selection have been given to those Kabupatens which have

- (i) road sections needed for national security,
- (ii) road sections giving access to isolated areas,
- (iii) road sections needed for national projects such as transmigration, etc., and/or.
- (iv) road sections damaged by natural disasters.



The selection of Kabupatens was finalized with reference firstly to the population of each Kabupaten and then consideration was given to factors such as agricultural Development, Engineering, and Local and National Level needs. The results are summarized in table 3.2.2.

In proceeding with the selection of Kabupatens, strong consideration was given to the opinions and suggestions from Bappedas in Provincial governments.

It was difficult to study all Kabupatens within the seven provinces in depth, during a short stay of one or two days in the Provincial capital together with a similar time in each Kabupaten capital.

There was also very limited Kabupaten level data available for inspection in Jakarta before the site trips.

Since the local government personnel are faced with the local level development problems from day to day, it is not unreasonable to take into consideration the opinions of local government staff.

Table 3.2.2. Selection of Kabupatens (Part 1)

Province \ Index	Population (thousand)	Priority from Population	Agricultural Development Remarks	Engineering Remarks	Local & National Level Remarks	Selection
<b>RIAU</b>						
Indragiri Ulu	233	5				
Indragiri Ilir	339	3		Study needed for Suitable Project	National Security Transmigration Scheme	0
Kepulauan Riau	392	2				0
Kaspar	306	4				
Bengalis	501	1		Study needed for Aggregate		
<b>Total</b>	<b>1,942</b>					
<b>SUMATRA SELATAN</b>						
Ogan Komering Ulu (O.K.U.)	676	2	Coffee Production		Isolated Part in Swampy Area Transmigration Scheme	0
Ogan Komering Ilir (O.K.I.)	290	7		Model Project in Swamp. Natural Rock Available for Aggregate		0
LIOT	490	4	Coffee Production			0
Lahat	301	6	Coffee, Agricultural Model Project			0
Musi Rawas	459	3				
Musi Banyu Asin	359	5				
Bangka	353	8				
Belitung	689	1	Negligible Agricultural Production	Study needed for Support from DPIP		
<b>Total</b>	<b>3,693</b>					
<b>LANGKAT</b>						
Langkat Selatan	1,318	1			Transmigration	0
Langkat Tengah	1,187	2				
Langkat Utara	582	3	Development Scheme of Province			0
<b>Total</b>	<b>3,323</b>					

Table 3.2.2. (Part II)

Province	Index	Population (thousand)	Priority from Population	Agricultural Development Remarks	Engineering Remarks	Local & National Level Remarks	Selection
N.T.T.							
Sumba Barat		222	6				
Sumba Timur		122	12				
Kupang		372	2				
Timor Tengah Selatan		285	3				
Timor Tengah Utara		139	10				
Belu		181	8	Big Scale Development Project			0
Alor		135	11				
Flores Timur		272	4				
Sikka		225	5				
Ende		212	7				
Ngada		170	9				
Manggarai		379	1				0
Total		2,714					
SULAWESI UTARA							
Corontalo		489	2			Transmigration, Isolated Area	0
Bolaang Mongondow		253	4			Transmigration, Isolated Area	0
Minahasa		730	1		Road consi- derably developed. Study needed for execution.		
Sangihe Talaud		271	3				
Total		2,035					

Table 3.2.2. (Part III)

Province	Index	Population (thousand)	Priority from Population	Agricultural Development Remarks	Engineering Remarks	Local & National Level Remarks	Selection
<b>SULAWESI SELATAN</b>							
Selaya		109	18				
Bulukumba		308	7				
Bantaeng		106	19				
Jeneponto		237	19	Orange Produ Production Model Project			0
Takalar		180	14			High Population Density	0
Cowa		358	6				
Sinjai		177	15				
Bone		706	1	Major Rice Resources			0
Maros		205	13				
Pangkajene		235	11				
Parru		157	16				
Soppeng		273	9				
Wajo		381	3				
Sidrap		215	12	Major Rice Resources			0
Pinrang		305	8	Major Rice Resources			0
Barekang		143	17	Regional Agri- cultural Deve- lopment Scheme			0
Luwu		415	2				
Tana Toraja		375	4			Many Isolated Area	
Polewali Manasa		371	5				
Majene		93	20				
Mazauja		82	21				
<b>Total</b>		<b>6,167</b>					
<b>SULAWESI TENGGARA</b>							
Buton		355	1			Isolated Area	0
Koma		182	3				
Kendari		238	2			Isolated Area	0
Kolaka		97	4				
<b>Total</b>		<b>862</b>					

The selected Kabupatens for the Project are 21 in total and their names are as follows:

<u>Province</u>	<u>Kabupaten</u>
Riau	Kampar
	Kepulauan Riau
Sumatra Selatan	Lahat
	O.K.I.
	O.K.U.
	L.I.O.T.
Lampung	Lampung Utara
	Lampung Selatan
Nusa Tenggara Timur	Manggarai
	Belu
Sulawesi Utara	Bolaang Mongondow
	Gorontalo
Sulawesi Selatan	Takalar
	Bone
	Sidrap
	Pinrang
	Polmas
	Enrekang
	Jeneponto
Sulawesi Tenggara	Kendari
	Buton

#### 3.2.4 Checking the selected Kabupatens by the Study Report of Cipta Karya

The selection of Kabupatens was checked by the Figures in the paper " Rural Road in National Development " (August 1979) proposed by Mr. Ruslan Diwirjo, Directorate of City and Regional Planning.

In the above-mentioned study report it was proposed to classify the Kabupatens to identity the different groups of development and serviceability level.

Kabupaten classification is achieved by cluster analysis techniques using two variables, level of productivity and the road serviceability as significant variables.

The above formulation was described by plotting kabupaten data across a X and Y axis as shown in Figure 3.2.1.

Here, Level of Productivity for each Kabupaten j

$$= \frac{\text{Working age population } (T_j^K)}{\text{Area of Kabupaten } (L_j^W)} \otimes \frac{\text{Area in cultivation } (L_j^P)}{\text{Area of Kabupaten } (L_j^W)}$$

and,

Level of Road Serviceability for each Kabupaten J

Road Value (  $N_j^J$  )

$$= \frac{\text{Area of Kabupaten ( } L_j^W \text{ )}}{\text{Road Value ( } N_j^J \text{ )}}$$

Where :

$$N_j^J = \sum_{i=1}^{12} \text{(Length of Road type i @ Value of Road type i)}$$

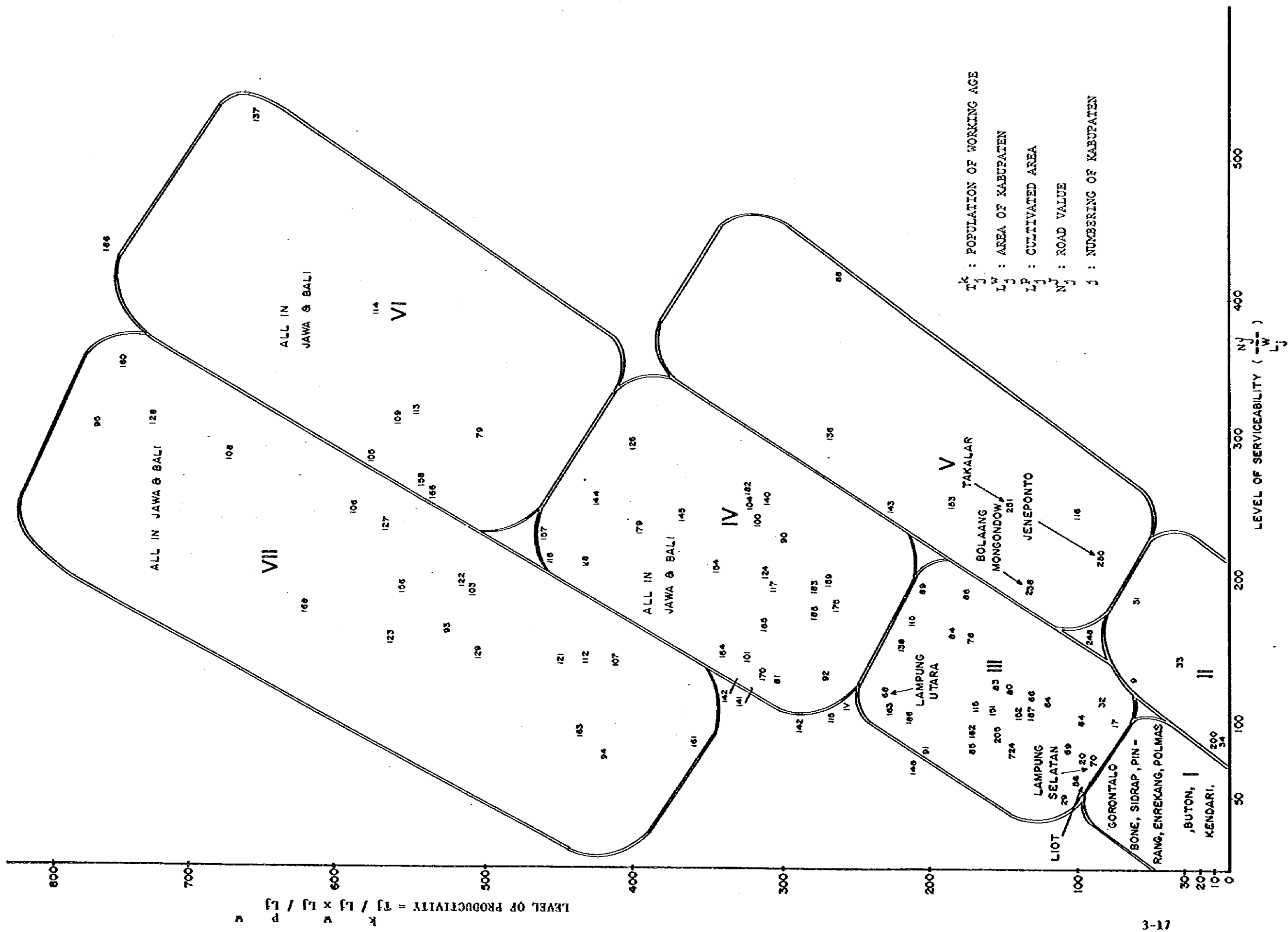
Each road type is scored according to the table 3.2.3.

Table 3.2.2. Proposed Score of Each Road Type

Type of Pavement Condition	Asphalt	Gravel	Earth
Good	12	8	4
Fair	11	7	3
Poor	10	6	2
Damage	9	5	1







FIGUR 3.2.1. KABUPATEN CLASSIFICATION BASED ON LEVEL OF PRODUCTIVITY AND LEVEL OF ROAD SERVICEABILITY  
 ( BY MR. RUSLAN . DIRECTOR OF CITY AND REGIONAL PLANNING CIPTA KARYA )



The assumption is that each group will have a unique rural road development approach as seen from the development and the accessibility of the areas. The results of this classification can be seen in figure 3.2.1.

The first group (I), as can be seen in figure 3.2.1. includes the kabupatens which have low level of development including productivity and serviceability of each Kabupaten. The development of roads and productivity suggest that the strategy is to move the position to a diagonal point.

The second group (II), as can be seen in figure 3.2.1. includes kabupatens that have high accessibility with low productivity. This group obviously requires the strategy of diagonalization. The third group (III) can be seen in figure 3.2.1. includes Kabupatens that have low productivity as well as low serviceability levels (under average).

The development should be aimed at combining to improve both productivity and rural roads.

The fourth group (IV), as can be seen in figure 3.2.1. includes kabupatens with both high levels of serviceability and productivity (above average).

Literally, the fourth group suggests kabupatens with balanced levels of serviceability and productivity. The development approach is generally a maintenance of this balance.

The fifth group (V), as can be seen in figure 3.2.1. indicates kabupatens with an average productivity level and with a slightly over capacity in serviceability level relative to productivity.

These conditions require an increase in productivity level till the development path is vertical and achieves a diagonal position in the development chart.

The sixth group (VI), as can be seen figure 3.2.1. includes kabupatens with high productivity and serviceability levels.

Development of this group should follow a similar line as those kabupatens in group four.

The seventh group (VII) represents kabupatens that have a high productivity level and low serviceability level relative to productivity as seen in figure 3.2.1.

This group suggests that development stress should focus more on serviceability first in a horizontal direction into the diagonal area of the development chart.

It is thus apparently recommended that Kabupatens of the seventh groups (VII) should be selected for the Project. In studying the Kabupatens with reference to Figure 3.2.1., it can be seen that there are no Kabupaten of the seventh group within the seven Provinces for this Project.

The Kabupatens of the seven Provinces studied in the report belong to the first group (I), the third group (III) and the fifth group (V). The majority of Kabupatens selected here belong to the first (I) and the third groups (III), and also three Kabupatens (Jeneponto, Takalar and Bolaang Mongondow) have been selected from the fifth group (V) as these have adequate capability for execution and could provide model Kabupatens of local Road Support Work.

### 3.3. Social and Development Plan in the Project Area

#### 3.3.1. General

Pelita III ('79/'80 - '84/'85) gives primary emphasis for the development of social welfare and increased employment. According to that policy, the development of rural areas is one of the most important items of planning and policy formulation.

The investment for the improvement of social welfare in rural areas, will be the input into the leveling-up of housing, education, medical care etc. Also, the investment for development of economic activity in rural areas will be the input into the improvement of both production bases and the supporting social infrastructures.

#### 3.3.2. Province Riau

In Riau Province, the majority of investment is put into the agricultural, industry and transportation sectors.

Coconut and rubber, are grown along the mountainous area of the western part of the Province, and crude oil is produced in the low-land of the eastern part. The transmigration from Jawa island etc. is planned for Kabupaten Kampar.

Transportation by road, river and aviation is now used for passenger and freight movement. River transportation has been widely developed in the low-land area of the western part of the Province, because of the lack of a good road network.

#### 3.3.3. Province Sumatra Selatan

Sumatra Selatan Province give emphasis to the development of agriculture and transportation.

Coffee is grown in the mountainous area of the south-western part of the Province, and rice and rubber are widely grown in the remaining area.

Large scale transmigration continues in several areas. The development plan for wet field and rubber plantation is being carried out in almost all Kabupatens.

#### 3.3.4. Province Lampung Selatan

The primary emphasis is given to the development of agriculture and road transportation.

Around 40% of the Provincial budget is applied to road improvement. The irrigation of about 400,000 ha is planned in Pelita III, large scale in Lampung Utara and Tengah, and a many small scale in Lampung Selatan, including those under Japanese Aid.

Transmigration from Java to Lampung Province started in the decade of 1940, and many new settlements of that period have developed into beautiful and rich communities. The latest transmigration program is being associated with, and encouraged by, road construction, irrigation, and other investment.

In the swampy area of the eastern part of Lampung, the reclamation plan is being continued by Netherland Aid.

#### 3.3.5. Province Nusa Tenggara Timur

The primary emphasis is given to agricultural development. A large scale irrigation plan is continuing in Kabupaten Belu, in Timor island, as well as many small scale ones in Manggarai.

In the Flores island, the investment for provincial road improvement is continuing.

### **3.3.6. Province Sulawesi Utara**

The primary emphasis given to agricultural development.

Large scale irrigation plans and transmigration plans are continuing in Kabupaten Bolaang Mongondow.

### **3.3.7. Provincial Sulawesi Selatan**

The population is concentrated in the southern part of Sulawesi Selatan.

The transmigration of 5,000 families to the north is planned in the 5 years of Pelita III.

Large scale irrigation plans in the areas of Kabupaten Bone, Takalar, Gowa, and Sidrap are continuing.

Regional agriculture development plans, by JICA aid, are going on in the areas of Kabupaten Jeneponto and Enrekang.

### **3.3.8. Province Sulawesi Tenggara**

Transmigration from Bali island is continuing.

The development of agriculture, enlargement of wet field and irrigation, is planned.









#### 4. PRESENT STATUS OF KABUPATEN ROADS IN THE PROJECT AREA

##### 4.1. Topographic and Meteorological Conditions of the Project Area.

##### 4.1.1. Topographic and Geological Conditions.

###### **(1) Kampar**

Kampar is occupied mostly by flat or underlating area parts of which are swamp. There are a few exceptions of rolling terrain.

The elevation of Kabupaten is therefore mostly lower than 50 m.

There are granite rocks within both the rolling and flat terrain, together with a plentiful supply of river sand and gravel.

###### **(2) Kepulauan Riau**

As the name indicates, Kepulauan Riau consists of islands including three major islands, Bintan, Batam and Mendol.

The topography of these islands are mostly rolling and the elevation of the Kabupaten roads ranges between 0 - 100 m above sea level.

Bintan is rich in bauxite and coral reef rocks, both of which are suitable material for the support works.

###### **(3) Lahat**

This Kabupaten which is mostly in a mountainous and highland area, contains forest and many plantation areas. Rivers in Lahat are rich in gravels and sands and the mountains also contain boulders, and rock which can be quarried to provide materials.

The remaining part of Lahat is generally flat, but the area is small composed the previously described section.

**(4) O.K.I.**

The eastern border of O.K.I is the sea, and the remaining borders are with other Kabupaten.

O.K.I is occupied mostly by a low and swampy area, with general elevation not more than 50 m.

O.K.I has only one rocky mountain, and its quantity is sufficient for the major part of the Kabupaten road.

Filling material suitable is also available inside the Kabupaten.

**(5) O.K.U.**

This Kabupaten area is divided into a rolling area in the west and flat area in the east. There are many potential areas for material supply and the elevation is between 50 m - 200 m.

All rivers have plentiful gravel and also there is a existing stone quarry. Generally the soil condition is good.

**(6) LIOT**

In the southern part, the elevation is about 200 m, and the terrain is generally rolling, but the northern part is a flat area with elevation not more than 50 m. Rivers have gravel and sand, also there is a rock area which could be easily quarried.

**(7) Lampung Utara.**

Lampung Utara consists of flat and swampy area in the east, flat terrain in the middle and a mountainous area in the west.

The elevation of Kabupaten roads is generally lower than 200 m with a few exceptions where the elevation is more than 1,000 m.

There are some andesite and granite rocks in the flat terrain, but in limited places.

(8) Lampung selatan.

Lampung selatan consists of flat terrain in the east, flat or rolling terrain in the middle and mountainous area in the west.

The elevation of Kabupaten roads is again mostly lower than 200 m.

There are many sources of coral reef rocks or lime stone, andesite and granite rock, and river sand and gravel.

(9) Manggarai.

Manggarai is mountainous as a whole, but does contain some plateau with elevation about 1,000 m.

The elevation of Kabupaten roads ranges from 0 m to 1,300 m.

The roads run mostly through strongly profiled topography, but some runs on the flat plateau.

There are good quality diluvial deposits, but of limited quantity.

Other sources of material are boulders from rivers or quarrying of rock outcrops.

(10) Belu.

Most of this Kabupaten is mountainous area and the other part is coastal area with rolling but not steep terrain.

Elevation of this Kabupaten is generally about 200 m - 500 m in the mountainous area.

Some rivers have gravel and sand, good enough for support works.

The northern border is with the Sawu Sea and the southern border is the Timor Sea.

**(11) Bolaang Mongondow.**

Generally is mountainous area, with cool weather and with an elevation of more than 200 m. There are many lakes and the rivers have boulders and sands. There is good soil for use as fill material. The quantity of material is sufficient for the support works.

This Kabupaten has many forests and a sharp terrain.

**(12) Gorontalo.**

There is a mountainous area in the middle of this Kabupaten. Terrain of the existing road is located in an area of flat terrain and has a very poor horizontal alignment.

There are boulders in the rivers together with sand.

**(13) Takalar.**

Takalar consists of a low and flat area in the west and rolling terrain in the east.

The elevation of Kabupaten roads is generally lower than 100 m. There is plentiful river sand and gravel and andesite and granite rocks can be quarried within the rolling terrain.

**(14) Bone.**

Bone consists of low and flat area in the east and rolling terrain in the west.

The elevations of Kabupaten roads are either 0 - 20 m or 100 - 500 m.

Bone is rich in river sand and gravel of appropriate size and in lime stone.

(15) Sidrap.

Generally this Kabupaten land is a flat area and is very good for agriculture. Many rice field can be seen here. The remainder of the land is a mountainous area used for cattle farming.

Gravel and sand are easily found in the river. This Kabupaten also has a rocky mountain it is located in a isolated area.

(16) Pinrang .

Rich in rice fields and a good place for agriculture. The land area is flat with an elevation of about 50 m. Some rivers have boulders, but the quantity of gravel and sand is very small.

(17) Polmas.

Only a coastal area of about 10 Km length is flat with an elevation of about 100 m. But the other parts of Polmas is mainly consists of rolling and mountainous area. There are many rocky mountains and a large river with big size boulders, and sand.

(18) Enrekang.

A mountainous area with cool weather and a elevation generally more than 600 m.

Around the capital of the Kabupaten, there are stones and sand in the river. Other places mainly with rock mountains.

This area is used for cash crops, food crops, and a few rice fields.

**(19) Jeneponto.**

A very flat and coastal area with an elevation not more than 50 m. The land is used for rice fields and some is also used for fishery.

**(20) Kendari.**

This Kabupaten is bordered in the east by sea and in the west by a land area called Kabupaten Kolaka. Mostly of the area is rolling, with no sharp terrain. Material can be easily taken, from deposits of rock asphalt. There are plenty of forests, rich with rattan and timber.

**(21) Buton.**

This Kabupaten contains a number of islands with Buton island as the main island. In Buton island itself, there is a mountainous area in the center, and a flat area along the coast. This island is famous for its natural asphalt material, which exists in abundant quantity. Many isolated areas in forests still exist.



#### 4.1.2 Meteorological Conditions of the Project Area.

Numbers of day with rain in the selected seven (7) Provinces and the amounts of yearly rainfall are shown in Table 4.1.1 and 4.1.2 respectively.

Based on the five years records in both tables, the average number of working days in each Province is estimated and written in the right-hand column of Table 4.1.1.

**Table 4.1.1. Estimate of Working Days for**  
**Equipment based on the past records of**  
**rainy days in 7 Provinces**

Province	Number of Rainy Days					(1) Averaged Number of Rainy Days	365-63-(1) + (1) $\frac{63}{365}$	Adopted Number of Working Days
	1973	1974	1975	1976	1977			
Riau	130	122	143	72	56	105	215	210
Sumatra Selatan	147	182	159	160	145	159	170	170
Lampung	106	65	107	78	89	89	228	220
Nusa Tenggara Timur	219	194	231	150	137	186	148	150
Sulawesi Utara	140	154	178	105	123	140	186	190
Sulawesi Se- latan	183	166	141	81	105	135	190	190
Sulawesi Teng- gara	125	92	123	101	81	104	216	210

Note) 63 is total number of holidays in a year.

**Table 4.1.2. Past Records of Rainfall**

Province						(mm/year)
	1973	1974	1975	1976	1977	Averaged In 5 Years
Riau	3,502	3,546	3,377	2,124	2,347	2,980
Sumatera Selatan	3,254	3,097	2,718	4,468	3,695	3,450
Lampung	2,116	1,252	1,589	1,020	2,061	1,610
Nusa Tenggara Timur	5,642	3,758	3,996	2,561	2,271	3,650
Sulawesi Utara	2,117	2,319	2,882	1,405	1,813	2,110
Sulawesi Selatan	2,994	2,614	2,334	1,466	1,998	2,280
Sulawesi Tenggara	2,104	2,011	2,880	1,763	1,763	2,040

## **4.2. Inventory of Road Surface Conditions**

### **4.2.1. Methodology of Inventory Survey**

In October 1979, a guide book to carry out the Inventory Survey of Roads and Bridges was prepared by Directorate General of BINA MARCA.

In case of the road inventory, the survey data was processed by an electronic computer to make a summary list containing;

1) code number of Kabupaten, 2) numbering of link and segment, 3) lengths of segments and links, 4) widths of carriageways or paving, 5) widths of shoulders, 6) lengths of longitudinal gradient steeper than 10%, 7) type of paving (types 1, earth; 2, gravel and mechanical stabilization; 3, macadam, cobble and telford; 4, surface treatment with asphalt; 5, asphalt penetration macadam; and 6, asphalt concrete), 8) areas of paving, in accordance with the conditions, (light and heavy corrugation; light and heavy damage with potholes; bearing capacity of subgrade; insufficient bearing capacity of subgrade; asphalt is bleeding; and good), 9) lengths of side ditch in accordance with the conditions (good, to be repaired or to be reconstructed), 10) necessary lengths of sub-drainage, 11) length of box or pipe culverts, in accordance with the conditions (good, to be repaired or to be reconstructed), 12) volume of slope protection in accordance with the type, (grouted rip-raps or concrete retaining wall), 13) deteriorated volume of cut and fill, 14) daily traffic volume, (preferably the annual average daily traffic volume), 15) portion and height of roads used to being submerged in flood etc.

### **4.2.2. Results of Road Inventory**

The Inventory Survey of roads and bridges, conducted until March 1980, was the first one in Indonesia. Therefore, it does not cover all the Kabupaten Roads.

The coverage of the first Inventory Survey ranges from 44% to 100% in the 21 Kabupatens concerned, with an average 77%.

The lengths of roads inventory and the surface conditions are summarized in Table 4.2.1.

According to the observations of the study team during its field reconnaissance trip, there are many Kabupaten Roads whose riding quality is so poor that the operational speed is only about 10 km/h even when they are shown in the inventory survey as good. This is mainly due to the use of the cobbles and telford construction methods because of the lack of crushing plant.



Table 4.2.1. Summary of Surface Conditions of Kabupaten Roads based on the Results of the First Inventory Survey

Province	Kabupaten	Total length of Kabupaten roads (km)		Inventory survey is completed until March 1980															
				Total length (km)		Light corrugation		Heavy corrugation		Light damage		Heavy damage		Less bearing capacity		Insufficient bearing capacity		Good and others	
		(1) 1978	(2) 1980	(3) 1980	(3)/(2)X 100 %	length (km)	% in (3)	length (km)	% in (3)	length (km)	% in (3)	length (km)	% in (3)	length (km)	% in (3)	length (km)	% in (3)	length (km)	% in (3)
Riau	Kampar	813	813	502	62	7.58	1.5	2.29	0.5	108.73	21.7	94.78	18.9	0.12	0	0	0	288.5	57.4
	Kepulauan Riau	516	473	411	87	28.20	6.9	28.64	7.0	75.62	18.4	71.27	17.3	20.76	5.0	16.73	4.1	169.78	41.3
Sumatra Selatan	Lahat	259.4	325	255	78	11.47	4.5	2.25	0.9	31.73	12.4	71.32	28.0	22.53	8.8	0	0	115.70	45.4
	O.K.I	372.7	395	317	80	0.03	0	4.72	1.5	77.22	24.4	104.71	33.0	0.10	0	0	0	130.22	41.1
	O.K.U	387.3	461	257	56	4.67	1.8	12.00	4.7	22.12	8.6	96.19	37.4	0	0	0	0	122.02	47.5
	L.I.O.T	395.5	466	280	69	14.99	5.4	9.40	3.4	49.42	17.6	51.36	18.3	3.32	1.2	2.27	0.8	149.24	53.3
Lampung	Lampung Utara	187.0	589	261	44	0	0	200.00	76.6	11.52	4.4	11.01	4.2	0	0	0	0	38.47	14.8
	Lampung Selatan	214.9	348	225	65	2.88	1.3	6.45	2.9	34.84	15.5	19.90	8.8	0.08	0	0.61	0.3	160.24	71.2
Nusa Tenggara Timur	Manggarai	307.0	408	332	81	5.03	1.5	9.04	2.7	36.09	10.9	68.96	20.8	4.09	1.2	6.65	2.0	202.14	60.9
	Belu	287.0	287	282	98	4.67	1.7	7.66	2.7	42.59	15.1	75.83	26.9	19.79	7.0	67.87	24.1	63.59	22.5
Sulawesi Utara	Bolaang Mongondow	559.8	591	474	80	26.30	5.5	24.75	5.2	58.92	12.4	110.75	23.4	1.51	0.3	38.41	8.1	213.36	45.1
	Corontalo	946.7	947	947	100	67.61	7.1	62.60	6.6	176.98	18.7	379.16	40.0	3.48	0.4	7.25	0.8	249.92	26.4
Sulawesi Selatan	Tokalar	153.5	192	192	100	5.41	2.8	0.50	0.3	52.59	27.4	10.48	5.5	0	0	0	0	123.02	64.0
	Bone	278.8	312	295	95	15.24	5.2	2.21	0.7	77.96	26.4	46.50	15.8	8.33	2.8	13.00	4.4	131.76	44.7
	Sidrap	276.5	314	238	76	46.82	19.7	37.57	15.8	8.50	3.6	16.96	7.1	16.49	6.9	12.44	5.2	99.22	41.7
	Pinrang	423.0	344	268	78	8.60	3.2	27.41	10.2	12.45	4.7	26.85	10.0	0.71	0.3	0	0	191.98	71.6
	Polmas	155.0	174	152	87	22.77	15.0	9.54	6.3	23.61	15.5	7.47	4.9	12.26	8.1	5.39	3.5	70.96	46.7
	Enrekang	237.0	237	140	59	20.39	14.6	1.20	0.9	9.85	7.0	47.59	34.0	0	0	0	0	60.97	43.5
	Jeneponto	343.2	362	277	77	0	0	0	0	30.00	10.8	143.24	51.7	0	0	0	0	103.76	37.5
Sulawesi Tenggara	Kendari	482.0	550	550	100	22.74	4.1	17.35	3.2	63.29	11.5	154.24	28.0	0	0	103.00	18.7	189.38	34.5
	Buton	244.4	580	405	70	0.96	0.2	1.12	0.3	42.71	10.5	65.47	16.2	0	0	202.19	49.9	92.55	22.9
Total		7,839.7	9,168	7,060	77	316.36	4.5	466.70	6.6	1,046.74	14.8	1,674.04	23.7	113.57	1.6	475.81	6.7	2,966.78	42.1



### 4.3 Inventory of Road Structures and Drainage Facilities

#### 4.3.1 Methodology of Structure Inventory Survey

For each road link, the overall condition of the culverts and bridges were rated separately as follows :

##### Culverts

- |     |                   |                                       |
|-----|-------------------|---------------------------------------|
| (1) | good condition    | ; still fully functionable            |
| (2) | to be repaired    | ; need betterment / cleaning up       |
| (3) | to be constructed | ; need a replacement ( $\phi$ 80 cm ) |

##### Bridges

#### (1) Superstructure

##### a) condition

- |           |   |   |
|-----------|---|---|
| Good      |   | ; still fully functionable  |
| Damaged   |   | ; need betterment / replacement of<br>some parts (floor, handrail.....) |
| Dangerous | } | need a new bridge   |
| Collapsed |   |   |
| No bridge |   |   |

##### b) Type of bridge

- Steel ( I-beam and wooden floor )
- Concrete
- Timber
- Stone
- Others



(2) Substructure

a) Condition

Good, Damaged, Dangerous, Collapsed.

b) Type of structure

Concrete, Stone, Timber, Pile, Others.

4.3.2. Results of Culvert Inventory

Results of the inventory survey show that 38,0% of culverts are in good condition, 26,5% need to be repaired and 35,5% need to be constructed.

Culvert inventories are summarized in Table 4.3.1.

Culverts have been installed along the roads at an average at 300m intervals.

It is noted that in many flat areas, culverts have been positioned higher than the actual road surface. As a result, they are not effective for drainage.

Most of the culverts, of less than 40 cm in diameter, are in an unpassable condition, because of soil settlement, especially in flat areas.

Table 4.3.1. Inventory of Culverts rt

Province	Kabupaten	Good Condition (m)	to be repaired (m)	to be constructed (m)	Total Length (m)
RIAU	Kampar	1,040	104	258	1,402
	Kepulauan Riau	1,074	961	321	2,356
SUMATRA SELATAN	Lahat	1,008	374	370	1,752
	O.K.I	1,281	275	256	1,812
	O.K.U	2,207	82	572	2,861
	L.I.O.T	1,302	706	413	2,421
LAMPUNG	Lampung Utara	1,807	163	496	2,466
	Lampung Selatan	2,623	902	221	3,746
NUSA TENGGARA TIHUR	Hanggarai	66	-	3,966	4,032
	Belu	124	-	1,538	1,662
SULAWESI UTARA	Bolaang Mongondow	1,233	951	3,007	5,191
	Gorontalo	2,797	9,410	4,463	16,670
SULAWESI SELATAN	Takalar	423	34	59	516
	Bone	1,439	208	372	2,019
	Sidrap	699	23	325	1,047
	Pinrang	697	75	225	997
	Polmas	367	244	400	1,011
	Enrekang	378	98	1,743	2,219
	Jeneponto	506	347	1,095	1,948
SULAWESI TENGGARA	Kendari	1,882	1,650	697	4,229
	Buton	1,134	193	1,673	3,000
Total		24,087	16,800	22,470	63,357
		38.0%	26.5%	35.5%	100.0%

### 4.3.3 Results of Bridge Inventory

At the present time, results of the bridge (including substructure) inventory survey has not yet been summarized in detail by Bina Marga's electric computer.

Bridge inventory, by type of bridge, condition and aggregated lengths are summarized in Table 4.3.2.

Table 4.3.2. Bridge Inventory (21 Kabupatens)

Type of Bridge Con- dition	Steel		Concrete		Stone		Timber		Others		Total		
	Num- ber	Le- ngth (m)	Num- ber	Le- ngth (m)	Num- ber	Le- ngth (m)	Num- ber	Le- ngth (m)	Num- ber	Le- ngth (m)	Num- ber	Le- ngth (m)	
Good	81	1,212	323	3,447	4	26	218	2,349	90	878	776	7,912	32.4%
Dama- ged	67	1,004	23	160	4	17	488	4,683	45	377	627	6,241	25.5%
Dange- rous	12	258	1	36	-	-	169	1,775	23	242	205	2,309	9.4%
Coll- apsed	2	41	3	25	-	-	21	209	55	1,405	81	1,680	6.9%
No- thing	-	-	7	45	1	4	25	254	269	6,017	302	6,320	25.8%
Total	162	2,513	417	3,713	9	47	921	9,270	482	8,919	1,991	24,462	100%
		10.3%		15.2%		0.1%		37.9%		36.5%			100%

Inventory data of each Kabupaten is given in Appendix C.2 .

More than 50% of existing bridges are rated as damaged and in very bad condition.

These damaged condition apply to either superstructure, or substructure or both.

Bridges classified as " others " are those regarded as temporary, log stringer of coconut tree.

Classification " steel " is used for structures mainly of I-beam bridges wooden floor, except in L.I.O.T Kabupaten where a steel pipe beam bridges are being used.

It should be assumed that most of the existing bridges, except concrete bridges, have a bearing capacity of less than 10 tons.

75% of the total bridge length is classified as timber and temporary, ( log stringer ), 15% concrete and 10% steel.

Only one third of the total bridge length is in good condition.

Most bridge spans range from 10 to 15 m, and widths are 3.0 to 3.5 m.

#### **4.4 Inventory of Maintenance Organization and Manpower**

The maintenance of the Kabupaten roads is being carried out by the Road Section of DPUK (Public Work Kabupaten).

With the limited funds available, it should be said that the present maintenance service level is very poor, with a few exceptions of those Kabupatens where the tax income is fairly high from the natural resources development.

Some examples of organization charts of DPUK, are shown in Figures 4.4.1., 4.4.2. and 4.4.3.

The manpower resources are also presented in table 4.4.1, with the number of staff of Road Section and total of DPUK by type of work in the six Kabupatens.

In studying the data in Figures 4.4.1 - 3 the following should be remembered.

- (1) The general average number of staff of DPUK is something between 50 - 60.
- (2) The organizational structure of DPUK, is not standard in all the Kabupatens.  
In most cases there are administration, planning, road, housing & building, irrigation and public sections.

In some Kabupatens, the road maintenance is being carried out by the dry construction or technical section.

( In some Kabupatens only, the equipment sections can be identified.)

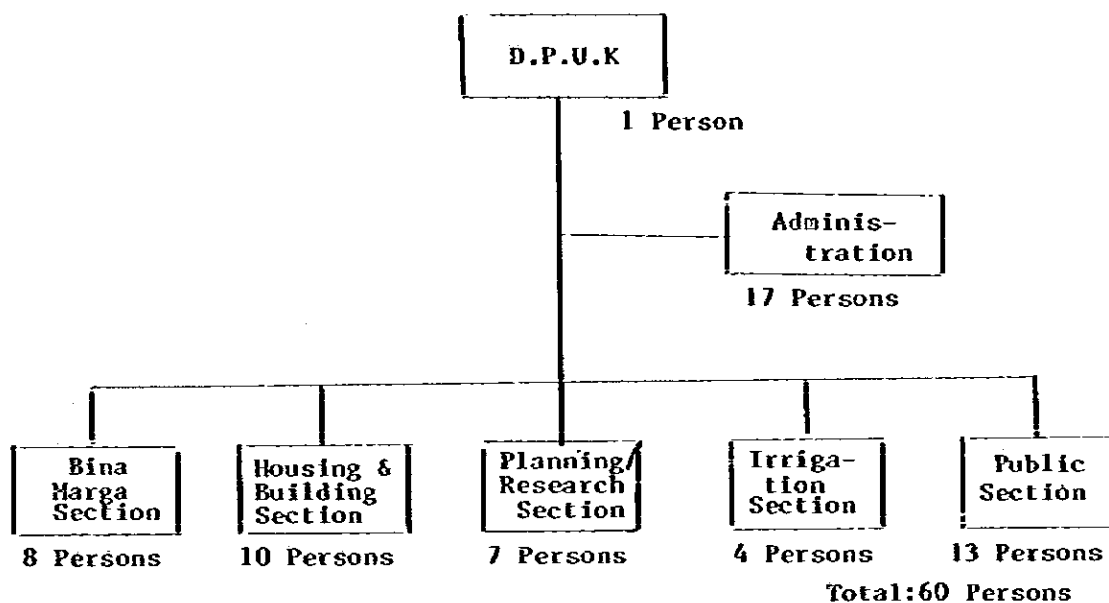
- (3) Generally speaking the average number of staff of road sections of DPUK is around 10.

Fig. 4.4.1. An Example of DPUK Organization

SULAWESI UTARA

KAB. GORONTALO

Organization Chart



Number of Staff

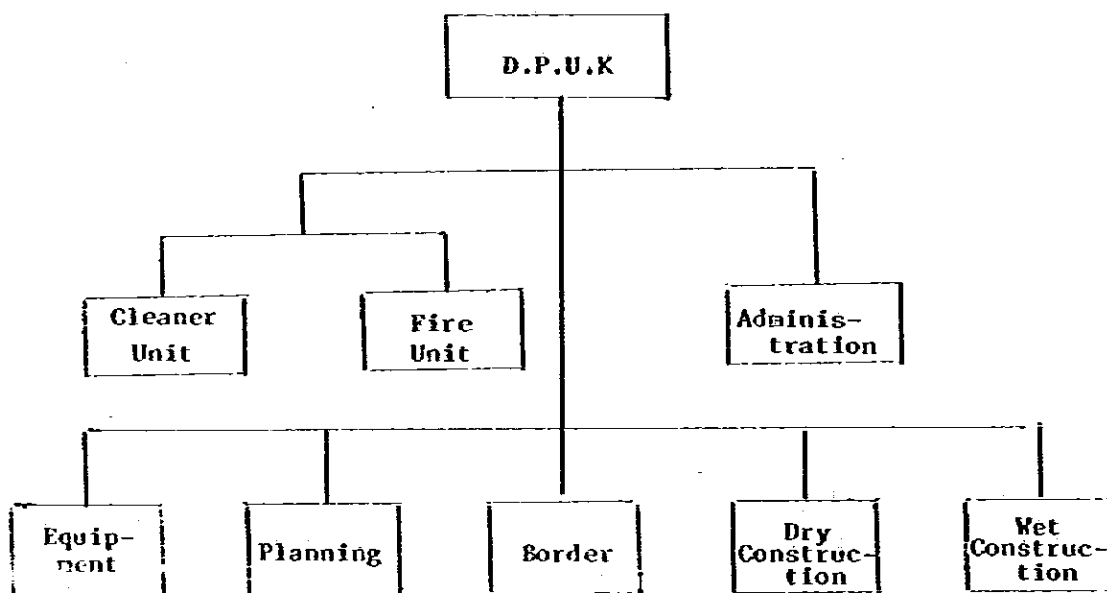
Kind of Work	Bina Marga	Housing & Building	Plan- ning/ Re- search	Irriga- tion	Public	Admi- nistra- tion	Total
1.Chief	1	1	1	1	1	1	6
2.Skill Labour							
-Civil	-	-	-	-	-	-	-
-Machine	-	-	-	-	-	-	-
3.Foreman	-	-	-	-	-	-	-
4.Operator							
-Truck	-	-	-	-	-	-	-
-Grader	-	-	-	-	1	-	1
-Stone wales	-	-	-	-	1	-	1
5.Hechanical	-	-	-	-	-	-	-
6. Permenant Employee	7	9	6	3	10	16	51
<b>Total</b>	<b>8</b>	<b>10</b>	<b>7</b>	<b>4</b>	<b>13</b>	<b>17</b>	<b>59</b>

Fig. 4.4.2. An Example of DPUK Organization

SULAWESI SELATAN

KAB. BONE

Organization Chart



Number of Staff

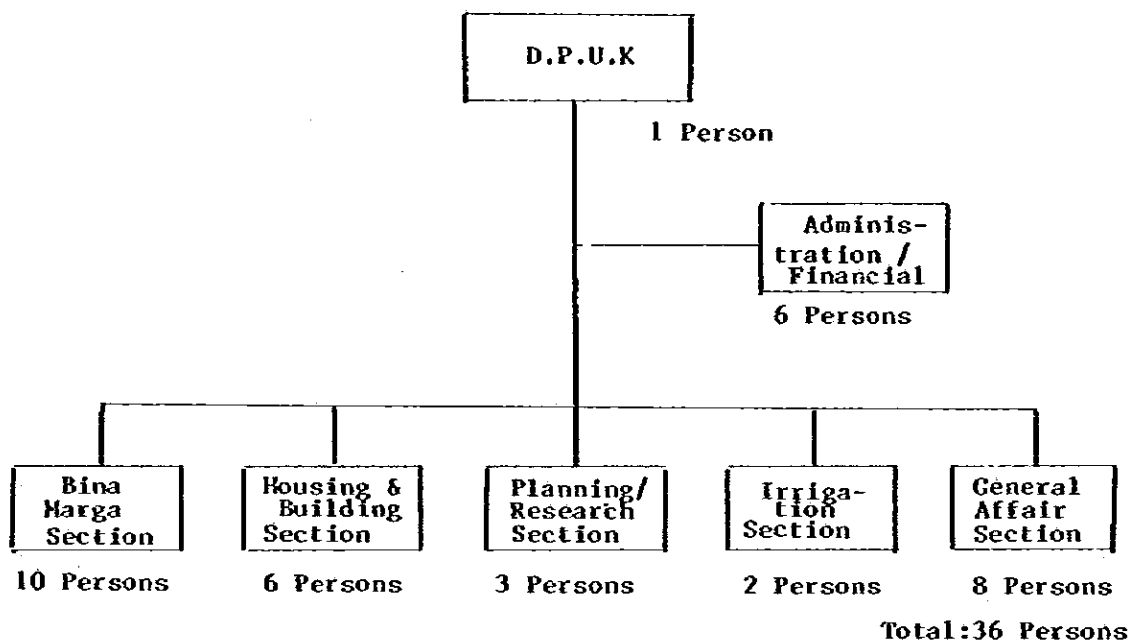
No.	Kind of Work	Div.	Work- shop	Branch	Total
1.	Head	1	-	6	7
2.	Engineer	6	-	-	6
	- Civil	1	-	3	4
	- Mechanical	7	1	14	22
3.	Foreman	4	-	21	25
4.	Operator				
	- Truck	5	-	5	10
	- Grader	-	-	-	-
	- Stone wales	-	-	5	5
	- Stone crusher	-	-	1	1
5.	Fire Unit	-	-	1	1
	Total	24	1	56	81

Fig. 4.4.3. An Example of DPUK Organization

SULAWESI TENGGARA

KAB. BUTON

Organization Chart



Number of Staff

Kind of Work	Bina Marga	Housing & Bldg.	Plan- ning	Irriga- tion	Gen. Affair	Total
1. Head	1	1			1	3
2. Inspector			3	2		5
3. Adminstration					1	1
4. Planner		2				2
5. Foreman	5					5
- Draftman		3				3
6. Operator						
- Treuk	1					1
- Grader	1					1
- Stone wals	2					2
- Driver					2	2
7. Employee					4	4
<b>T o t a l</b>	<b>10</b>	<b>6</b>	<b>3</b>	<b>2</b>	<b>8</b>	<b>29</b>



Table 4.6.1. Number of Staff by Types of Work (Road Section and Total of DPUK)

Province	Kiau			Sulawesi Utara			Sulawesi Selatan			Sulawesi Tenggara		
	Kampar		Total	Corontalo		Total	Bone		Total	Enrekang		Total
Kabupaten	Road	Total		Road	Total		Road	Total		Road	Total	
1. Head		1		1	7			7			4	
2. Engineer		-		-	-			6			-	
- Civil		-		-	-			4			-	
- Mechanical		-		-	-			22			-	
3. Inspector		-		-	-			-			-	
4. Administration		-		-	-			-			-	
5. Planner		-		-	-			-			-	
6. Foreman		40		-	-			25			5	
7. Skilled Labour	n.a	-		-	-		n.a	-		n.a	-	
- Civil		-		-	-			-			5	
- Mechanical		-		-	-			-			-	
8. Draftman		-		-	-			-			-	
9. Operator		-		-	-			-			-	
- Truck		-		-	-			10			6	
- Grader		-		-	1			-			2	
- Road Roller		-		-	1			3			2	
- Stone Crusher		-		-	-			1			-	
- Driver		-		-	-			-			-	
10. Permanent Employee		13		7	51			-			24	
11. Fire Unit		-		-	-			1			-	
T o t a l	-	54		8	60		-	81		8	49	
										Technical Section		
											58	
											10	
												29

#### **4.5. Inventory of Maintenance Equipment**

Table 4.5.1. shows the equipment held by DPUK (Kabupaten Public Works) together with their types, quantity and condition.

The road rollers available are exclusively Macadam and Tandem, the capacity of which is 6 - 8 t. In March 1980, eleven (11) DPUK were operating 3 - 7 usable (condition good and fair) rollers.

The remaining ten (10) DPUK do not have any or only 1 - 2 usable road rollers. Numbers and types of road rollers are considered to be satisfactory for conventional support work, especially for the Macadam construction method.

There are only two (2) graders and three (3) bulldozers available for use in the total 21 DPUK.

In 1979, one unit of crusher, of 5 t/h capacity, was supplied to each DPUK. They were found to be useful, but there are a few Kabupatens, which cannot repair their crushers nor ask their Provincial workshops to do so.

Numbers of dump trucks and/or trucks available are usually only 0 - 2 in each Kabupaten.

This means that there are many DPUK, which are hiring trucks for the maintenance of Kabupaten Roads.

Some of these usable equipments were observed working on the Kabupaten's roads during the study team's field reconnaissance.

Table 4.5.1. Inventory of Maintenance Equipment

Equipment	Grader			Bulldozer			Road Roller			Grusher			Dump Truck			Truck			Concrete Mixer		
Condition	G	F	P	G	F	P	G	F	P	G	F	P	G	F	P	G	F	P	G	F	P
Kabupaten																					
Kampar	-	-	-	-	-	-	-	1*	-	-	1*	-	-	-	-	-	-	-	-	-	-
Kepulauan Riau	-	1*	-	-	-	-	-	-	-	-	1*	-	-	1*	-	-	-	-	-	-	-
Labac	-	-	-	-	1	-	-	7	-	1	-	-	-	-	-	3	-	-	-	-	-
O.K.I	-	-	-	-	-	-	-	1*	-	-	1*	-	5	2	-	-	-	-	-	-	-
O.K.U	-	-	-	-	-	-	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-
L.I.O.T	-	-	1	-	1	-	3	1	-	1	-	-	-	-	-	1	-	-	-	-	-
Lampung Utara	-	-	-	-	-	-	-	5	-	1	-	-	-	-	-	-	-	-	-	-	-
Lampung Selatan	-	-	-	-	-	-	7	3	-	1	-	-	-	-	-	-	-	-	-	-	-
Manggara	-	-	-	-	-	-	2	3	-	1	-	-	-	-	-	2	-	-	-	-	-
Belu	-	-	-	-	-	-	-	5	-	1	-	1	2	-	-	1	-	-	-	-	-
Belaang Mongondow	-	-	-	-	-	-	2	2	2	1	1	-	-	-	-	1	-	-	2	-	-
Corontalo	-	-	-	-	-	-	3	1	-	-	1	-	-	-	-	-	-	-	-	-	-
Tekalar	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
Bone	-	-	-	-	-	-	5	-	-	1	-	-	2	-	-	-	-	-	-	-	-
Sidrap	1	-	-	1	-	-	5	-	-	1	-	-	1	1	-	1	-	-	-	-	-
Pinrang	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Polmas	-	-	-	-	-	-	-	2	-	1	-	-	-	1	-	-	-	-	-	-	-
InteleKang	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-
Jeneponto	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-
Kendari	-	-	-	-	-	-	5	-	-	1	-	-	-	-	-	1	-	-	-	-	-
Bucon	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1	1	1	1	2	-	39	22	14	18	4	2	10	4	3	5	6	4	-	-	2
Grand Total	3			3			75			24			17			15			2		

Note: 1. Number and condition of equipment in this table are corrected by result of field survey from the original inventory data of DINA MANCA.

2. Condition G is good, F is fair, P is poor.

\* Condition is unknown.

#### **4.6. Inventory of Equipment Repair Resources**

##### **4.6.1. General**

Bina Marga (Directorate General of Highways) operates many items of equipment for road construction and road maintenance.

In order to repair and maintain this equipment, Bina Marga has provided 7 base workshops in Indonesia, with at least one Provincial workshop located in each Province (DPUP, Public Works Province).

However, almost all the Kabupatens (DPUK, Public Works Kabupaten) have not yet been provided with workshops in the real sense, having only a very small pool of vehicles and equipment.

##### **4.6.2. Base Workshops**

The Seven (7) base workshops are located at Medan, Padang, Palembang, Cikampek, Semarang, Surabaya and Ujung Pandang, and are directly administered by Bina Marga.

There are four major tasks for these base workshops.

The First task, is the administration of the equipment belonging to Bina Marga.

This applies not only to those items being repaired and maintained in the base workshops, but also routine and minor maintenance for equipment operating on the job sites.

The Second task, is the repair of Bina Marga equipment, which is administered by the base workshops themselves. Base workshops are also regional central repair shops for the area (2 - 7 Provinces concerned) and thus they carry out the overhaul of equipment belonging to the Provinces.

The third task, is the stockholding and control of spare parts and general materials.

These spare parts are used by the base workshops for repairs and are also distributed to the Province workshops in response to requests.

The Fourth task, is to oversee the Provincial workshops. Each base workshop administrates the 2 - 7 Provincial workshops in its territory.

Table 4.6.1. shows the seven (7) Base Workshops and the Provinces they administrate.

Fig : 4.6.1 shows the "Organization Chart for typical Base Workshop".

Table 4.6.2. shows "Typical Facilities of Base Workshop".

Fig. 4.6.2. shows "Repair house of Base Workshop".

**Table 4.6.1****Seven (7) Base Workshops and Provinces They Administrate**

<b>Base Workshop</b>	<b>Province of Location</b>	<b>Provinces in Territory</b>
<b>Medan</b>	<b>Sumatera Utara</b>	<b>Aceh</b> <b>Sumatera Utara</b>
<b>Padang</b>	<b>Sumatera Barat</b>	<b>Sumatera Barat</b> <b>Riau</b>
<b>Palembang</b>	<b>Sumatera Selatan</b>	<b>Sumatera Selatan</b> <b>Jambi</b> <b>Bengkulu</b> <b>Lampung</b>
<b>Cikampek</b>	<b>Jawa Barat</b>	<b>Jawa Barat</b> <b>Jakarta</b> <b>Kalimantan Barat</b>
<b>Semarang</b>	<b>Jawa Tengah</b>	<b>Jawa Tengah</b> <b>Yogyakarta</b>
<b>Surabaya</b>	<b>Jawa Timur</b>	<b>Jawa Timur</b> <b>Bali</b> <b>Nusa Tenggara Barat</b> <b>Nusa Tenggara Timur</b> <b>Timor Timur</b> <b>Kalimantan Selatan</b> <b>Kalimantan Timur</b> <b>Kalimantan Tengah</b>

Continued

Base Workshop	Province of Location	Provinces in Territory
Ujung Pandang	Sulawesi Selatan	Sulawesi Selatan Sulawesi Tengah Sulawesi Tenggara Sulawesi Utara Maluku Irian Jaya

**Fig. 4.6.1. Organization Chart of Base Workshop**

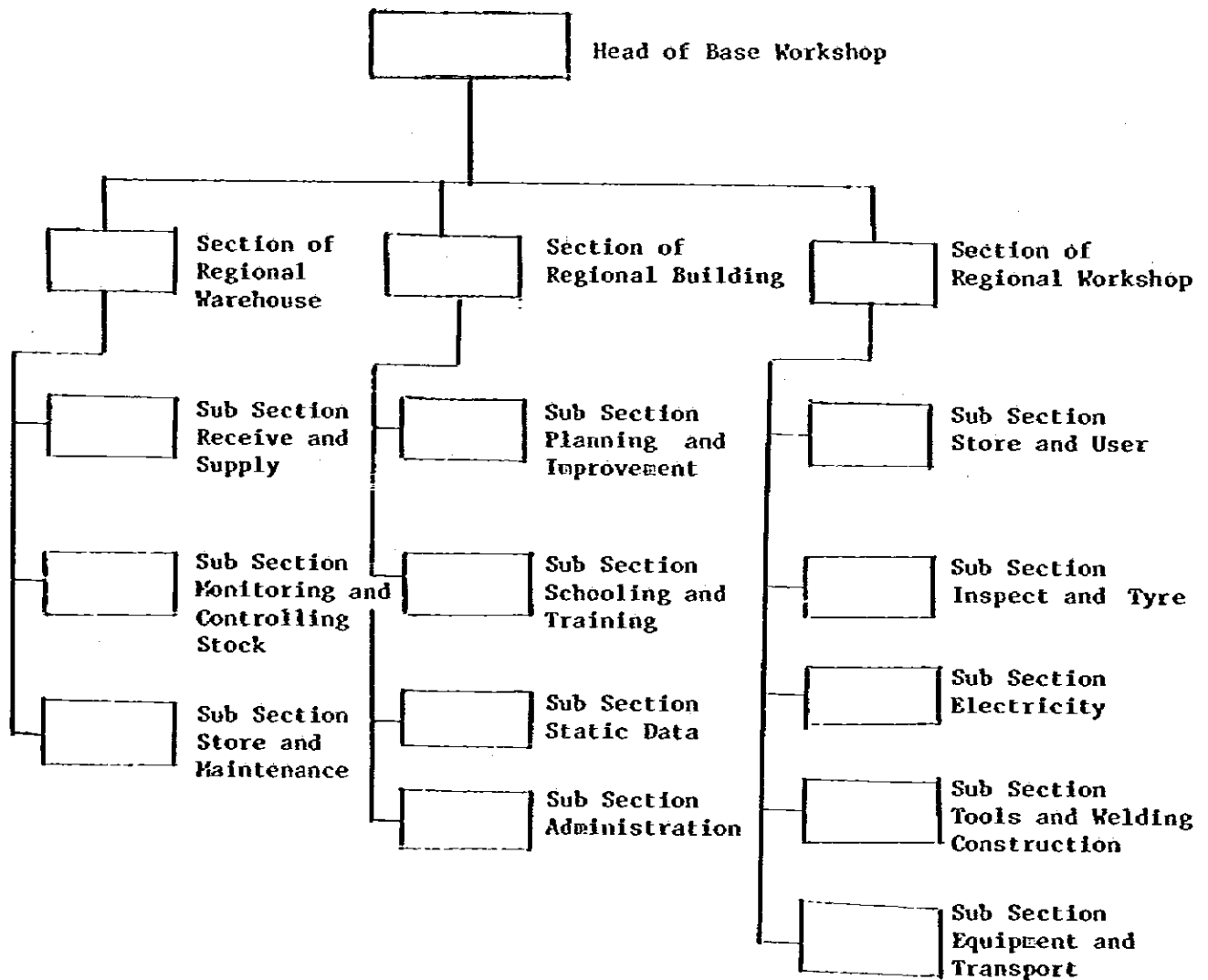




Table 4.6.2. Typical Facilities of Base Workshop

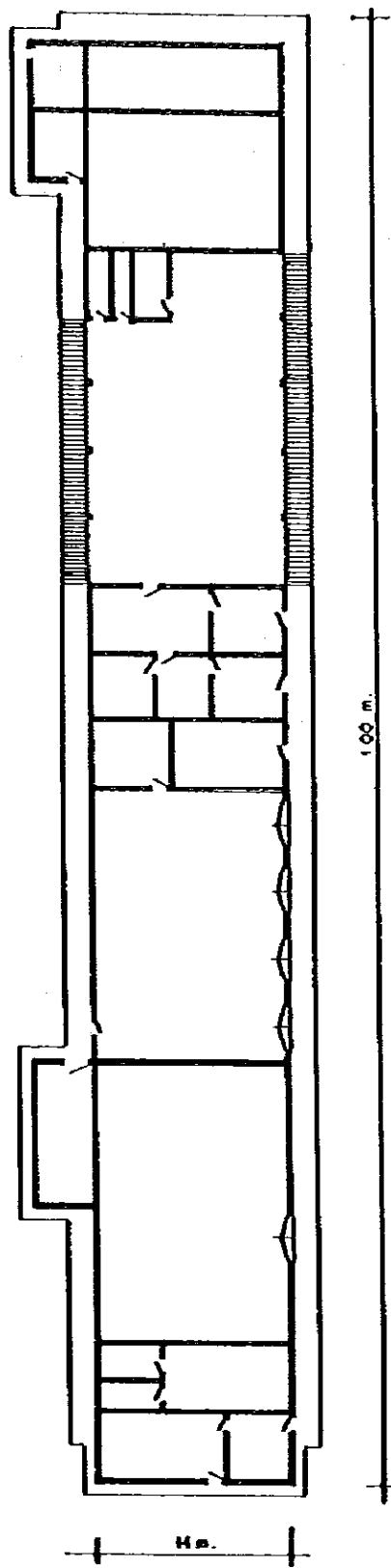
Description	Q'ty	Description	Qt'y
10 inch precision lathe		Tyre changer, air operated	1
16 inch precision lathe	1	Steam cleaner and pressure washer	2
Brake drum tooling group	1	Self Propelled 3 wheel shop hoist	1
Power hack saw heavy duty	1	Vulcanizing unit	1
Shaper bench model	1	Paint spray gun set	2
Vertical Milling machine	1	Generator Set	1
Valve face grinding machine	2	Crank shaft grinder	1
Bench grinder group HD	4	Drill stand	4
Horizontal grinder group	2	Drill press vice	6
Air impact wrench set 3/4 inch	2	Hydraulic track Press	1 *
Air impact wrench set 1/2 inch	2	Roller Ans idler rebuilder	1 **
Electric impact wrench set 1/2 inch	4	Tyre numbering desk	2
Electric impact wrench set 3/8"	4	Starting & Charging system tester	1
Drill press heavy duty	2	Vibrating electrical engraver	2
Boring Bar	1	Chain hoist	4
Portable electric sander	2	Bolt cutter	2
Electric drill 1 inch	2	Utility torch	2
Electric drill 3/4 inch	2	Black Smith Vice	1
Electric drill 1/2 inch	3	Swiper Bench Vice 6" HD	3
Electric drill 3/8 inch	3	Swiper Bench Vice 5" HD	10
Valve seat grinding group	2		
Spark plug cleaner	1	Black smith forge	1
Acetylene generator	1	Arbor press	2
Bearing Packer	2	Micrometer set	2
Air compressor	2	Blow torch	3
Mobile floor crane 1 ton	4	Electric Soldering iron set	2
Sprocket pin puller pesher set 50	1	Electric soldering gun	13
Hydraulic tester	1	Soldering iron set	3
Hydraulic press 50 T heavy duty	1	Creepers	6
Hydraulic press 10 T	4	Hand grease gun	4
Body repair Jack Set Hydraulic	1	Suction Pipe for oil recovery	4

Continued

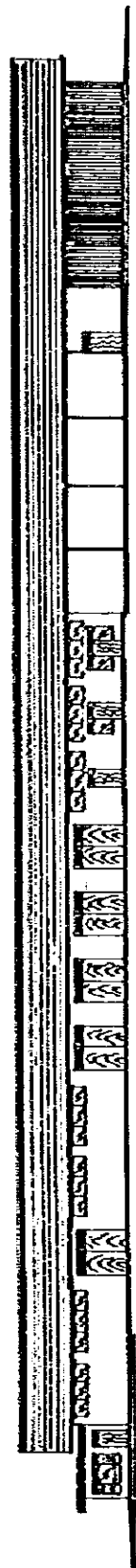
Description	Qt'y	Description	Qt'y
Clutch spring tester	1		
Sleeve puller and installer	1	Rotary hand pump	4
Dual Wheel dolly	4	Flood light	4
Service Jack	4	Storage battery carrier	4
Safety stand	24	Tyre pressure gauge heavy duty	4
Hydraulic Jack 5 Ton	4	Tyre inflator with gauge	4
Hydraulic Jack 12 Ton	2	Safety goggles	6
Battery charger group	2	Funnel Set	4
Wheel alignment set (Portable)	1	Oil can pressure	6
Wheel balancer	-	Oil filter measure set	2
Compression tester	2	First aid kit	1
Fuel pump tester	2		
Fuel injection nozzle tester	2	Battery terminal clamp cpreader	10
Hydraulic pump tester	1	Battery clamp lifter	10
Radiator pressure test set	1	Depth gauge	4
Portable analyser	1	Dial Indicator	2
Engine run in and test unit	2	Expanding line reamer	2
Engine transmission repair stand	6	Cylinder hone kit	2
Generator-Alternator test stand	1	Ridge reamer	2
Distributor tester	1	Trouble light	2
Armature drying oven	1	Mechanics tote tray	12
Commutator turning tool	2	Heavy duty load binder	2
Mica undercutter	2		
Armature tester with grawler	2	Roller chain hoist	2
Connecting rod honor	1	Wire rope cutter	1
Connecting rod aligner	1	Sledge hammer	4
Electrically heated krading iron	1	Backing out punch hammer	-
Time clock	1	Pinch point crew bar	-
Cold cut or out of hammer	1		
Timber carrier or cant hook	1	Socket set 3/4" Drive	4
Timber carrier or lug hook	1	Socket set 1" drive	2
Fire extinguisher 5 lbs	46	Metric tool set	6

Continued

Description	Qt'y	Description	Qt'y
Fire Extinguisher 2.1/2 gallon	29	Metric socket and wrench set	6
Engine lift sling	3	Mechanic tool set No. 1	8
Nut splitter	-	Mechanic tool set No. 2	10
Crate opener tool	1	Mechanics tool set No. 3	25
Bung wrench	1	Pipe and adjustable wrench set	4
Jumper cable set	1	Valve tool set	2
Fuel can with nozzle	4		
Die set	1	Cutting and slip joint plier set	2
Drill bit set	2	Philips clutch head & nut drive	4
Star drill set	1	set	
Tap and die set	2	Ball pein & Soft hammer	4
Drill set	2	Automatif plier set	2
Carpenter tool set	1	Punch & chissel set	4
Black smith tools	1	Metal shear set (snip)	2
Spark plug gauge set	6		
Four way rim wheel lub wrench HD	10	Ignation wrench set	8
Tyre tool set	2	Deep double offset & Ratcheting	4
Voltage regulator service kit	2	box wrench set	
		Open & wrench set	4
Ignation gauge set	6	Combination wrench set	2
Feeler gauge set	12	Open end box & Combination wrench	2
Set of master feeler gauge	24	Cocket set 1/4" Drive set	2
Automatic service tool set No.1	2	Socket set 1/2" drive set	2
Automatic service tool set No.2	2	Torque wrench 3/4" HD	2
Body and fender repair set No.1	2	Presetting torque wrench set	2
Body and fender repair set No.2	2	Socket set 3/8" Drive	2
Gear puller set	2		
Gear and hub puller set	2		
Universal gear puller set	2		
Puller and service tool set	2		
Stud settler and extractor	6		
Impact sockets	2		
Raun and square blade screw drive	6		
set			



DENAH



PANDANGAN MUKA

Fig. 4.6.2. Base Workshop