

7.4.6. Training Program

(1) Necessity of Training

Table 7.4.2. shows that about 260 operators and 480 drivers are necessary for the Project even if the assistant operators are ignored. So a good training program is also one of the important measures to implement the Project successfully.

With the start of the project of Inpres of Support Aid for Kabupaten Roads, the Government of Indonesia started a massive training program of DPUK staffs. As stated in Chapter 2, Section 5, in the fiscal year 1979/1980, with aid for education and training of Kabupaten DPU personnel, at least 2,000 personnel were trained.

In fiscal year of 1979/1980, the training of DPUK's Head, foreman and supervisor has been conducted at the Places of Medan, Palembang, Bandung, Semarang, Surabaya, Banjarmasin, Ujung Padang and Jayapura. The courses for surveyors and operators have been implemented in their own Provinces.

The period of training was as follows:

- Courses for Head of Kabupaten D.P.U.	<u>±</u> 25 days
- Courses for Supervisors	<u>±</u> 20 days
- Courses for Foremen	<u>±</u> 20 days
- Courses for Operators	<u>±</u> 9 days
- Courses for Assistant Construction Supervisors	<u>±</u> 15 days

(2) General Suggestion of Training Program for the Project

To make sure that good engineers and workers are engaged in the Project, training programs are suggested as shown in Table 7.4.2. In preparing program, it should be considered that mechanics and operators are convertible in some case, especially in the field operation. It results that the training period becomes longer for mechanics and operators.

The training for drivers including dump-trucks has been neglected after consideration of the good Indonesian skills in driving.

The number for training is small enough that the training could be easily undertaken by the present Government training program.

(3) Preparation of Guidebook

In the course of training, especially, an operational guide book and mechanical guide book for the Kabupaten Support Work should be prepared to enhance the technical abilities of trainee. These books may be used both in the training course and in the job execution.

(4) Schedule of Training

It is proposed to start the training program advanced to the arrival of equipment.

Table 7.4.2. General Recommendation for the Training Program of the Project

	Objective Number of Trained Persons (For a Kabupaten)	Total Number of Trainees (For 21 Kabupaten) Persons	Suggested Training Period (Weeks)	Training Site				Remarks
				Training Center	DPUP Quarter	DPUP Workshop	Project Site	
1. Project Manager	1	21	3	0	0	0	-	
2. Leader of Planning	1	21	4	0	0	0	0	
3. Leader of Executing	1	21	4	0	0	0	0	
4. Leader of Accountant	1	21	3	0	0	0	-	
5. Foreman	2	42	4	0	0	0	-	
6. Mechanician	2	42	6	0	0	0	0	
7. Operator	10 - 20	257	4	-	-	0	-	
8. Driver	-	-	-	-	-	0	-	
Total	18 - 28	425	3 - 6	-	-	-	-	

8. SOCIAL AND ECONOMIC JUSTIFICATION OF THE PROJECT

8.1. Methodology of Economic Analysis

Economic activity along the Kabupaten roads in the Project Area is mainly in the field of agriculture. The economic and social impact of the improvement of Kabupaten roads is considered to be as follows:

(1) Direct Effect

a. Reduction of transportation cost

Reduction of transportation cost follows the reduction of input cost and the increase of output price of agricultural products.

Therefore, cultivated area and/or yield rates increase according to the amount of transportation cost reduction. The amount of input cost reduction or output price increase depends on the balance of power between the farmer and transporter or middleman.

b. Saving of travel time

The road conditions in the Project Area are in the main not yet suitable for motor vehicles such as passenger buses, and there are few routine bus services on Kabupaten roads.

On many Kabupaten roads, the average travelling speed by bus is only 5 - 10 km/hr. On the Kabupaten roads supported by the Project, vehicles, such as trucks, will be able to be operated at an average speed of 40 km/hr.

(2) Indirect Effect

a. Increase of population density

The population density increases in accordance with the increase of mobility. This will be followed by the increase of agricultural production due to the concentration of the labour force into the cultivated area and/or to the increase of cultivated area.

b. Social equality through the improved transportation to and communication with isolated areas

Most Kabupaten roads in the Project Area are passable by foot or bicycle even in the wet season. But, improved traffic conditions for motor vehicles on the Kabupaten roads supported by the Project, makes it easier for the people to obtain medical care and other community facilities.

It is very difficult to calculate the benefit due to social equality in money terms, so it is excluded from the analysis.

It is again difficult to calculate the economic benefit due to travel time saved because of lack of basic data on Kabupaten Roads.

Accordingly, the economic benefit is analyzed using two of the four items of benefit mentioned above in this study, namely those due to reduction of transportation cost, and the increase of population density.

The methodology based on the traffic volume, which is currently used for the estimation of the benefit of a road project (the so called road user's surplus method) is not suitable for the economic analysis of the Project Area where the economic activity is low and traffic is sparse, because of the inaccuracy of the forecast of generated or developed traffic due to the road improvement.

The methodology used in this report is principally based on the producer's surplus method.

In this study report however, two different methods of analysis are used. They are the consumer surplus method and the producer surplus method, because of the limited study time and the fact that the data available for economic analysis is not on the same level in each Kabupaten in the Project.

i) Consumer surplus method for 14 selected Kabupatens

This is a conventional method based on data such as the Kabupaten's total road length, population, cultivated area and yield rate.

The flow chart of this kind of analysis is shown in Fig. 8.1.1.

ii) Producer surplus method for 7 selected Kabupatens

This is a more detailed method, based on the producers' surplus analysis. The influence areas of this project may not be so exact because of the lack of detailed Kabupaten maps, road maps and land-use maps.

The flow chart of analysis is shown in Fig. 8.1.2.

The 7 Kabupatens analyzed by producer surplus method are also analysed by consumer surplus method. So the difference between two methods of analysis is obtained.

The assumptions of economic analysis are as follows:

- i) The reduction of transport costs, due to road improvement, is fully affected by the cost of agricultural input or the price of its output.

(This assumption is not exact, because the transport system of this country is very complicated and cost reduction might in the main be taken by the middlemen).

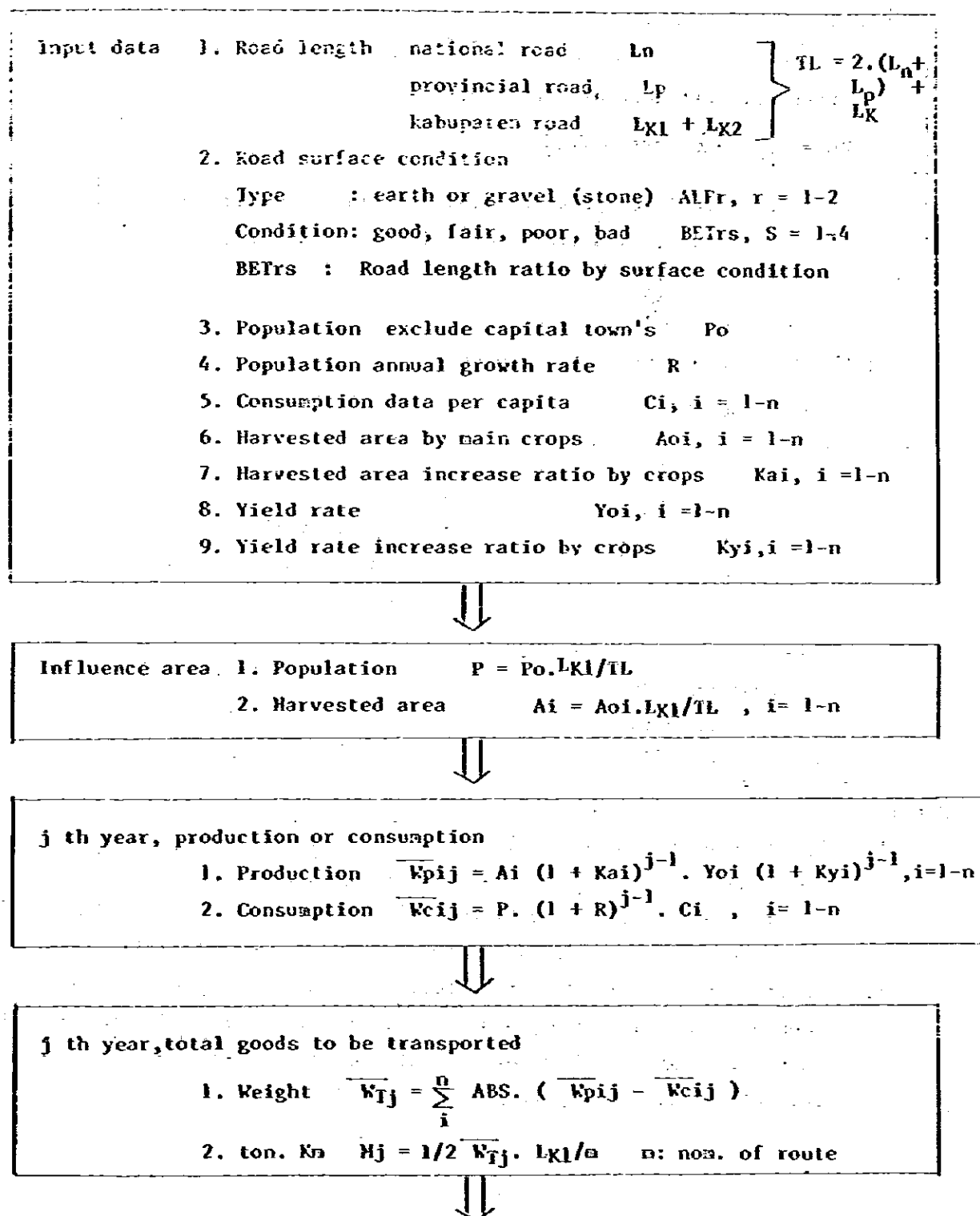
- ii) From the view-point mentioned above, the increases of agricultural products, due to transport costs reduction, are not taken into account, but it is assumed that the reduction of transport costs causes the increase of population density.

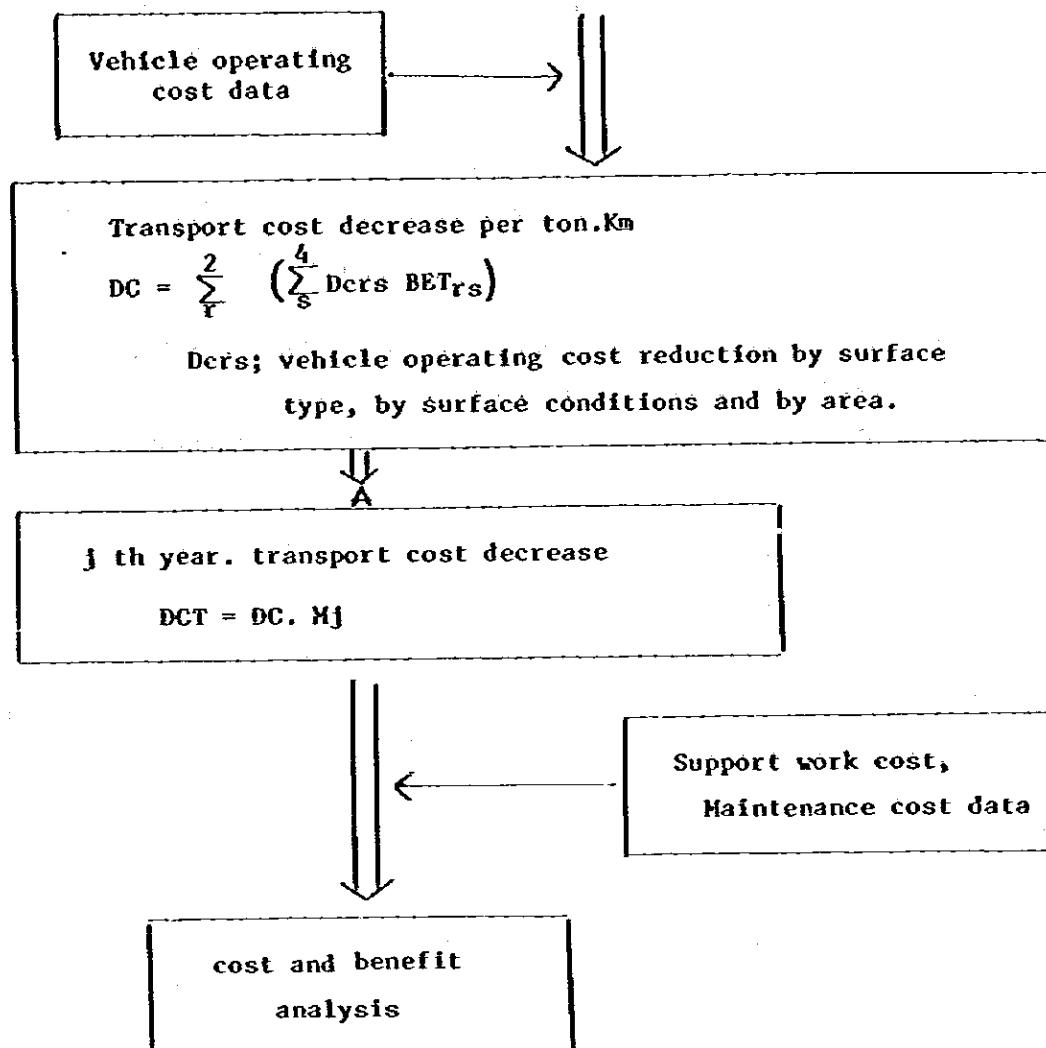
By making the roads passable for motor vehicles in the wet season with the Project, it is also assumed that the agricultural production is increased by 10%.

(= 2/12 months x 50 percent area).

- iii) Saving of travel time is neglected, because of the small number of person trips and the lack of time value at Kabupaten level.
- iv) Agricultural production costs are calculated on the basis of the price at 1979.
- v) The farmgate prices of agricultural production are assumed to be constant. Actually, they vary considerably in a year, according to the balance between supply and demand. The prices used in this report are based on the average data for 1979.
- vi) The calculations for the consumption of goods is based on the data for rural areas obtained from the national statistics of 1976.

Fig. 8.1.1. Flow chart of economic analysis of consumer surplus method applied for 7 Kabupatens

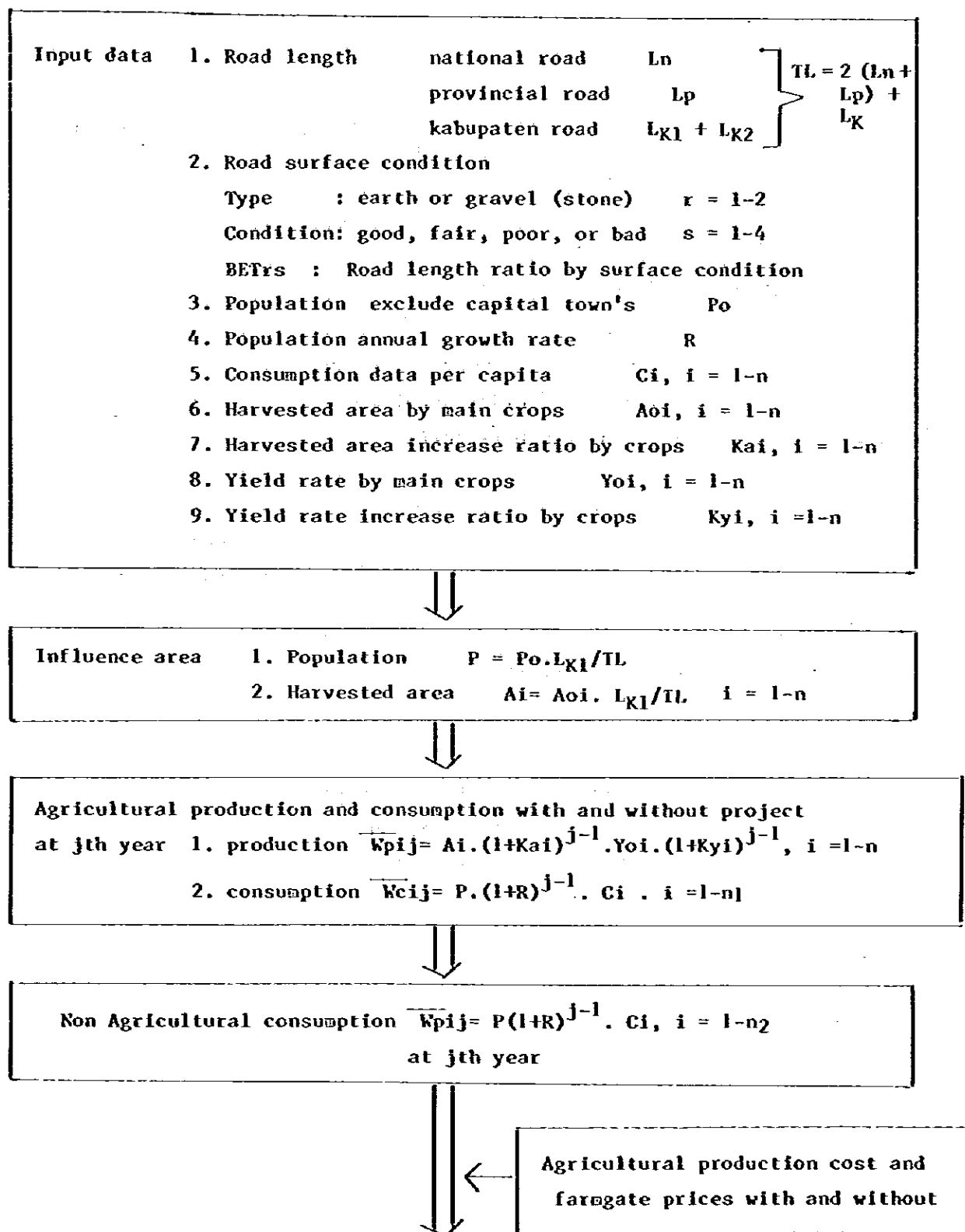


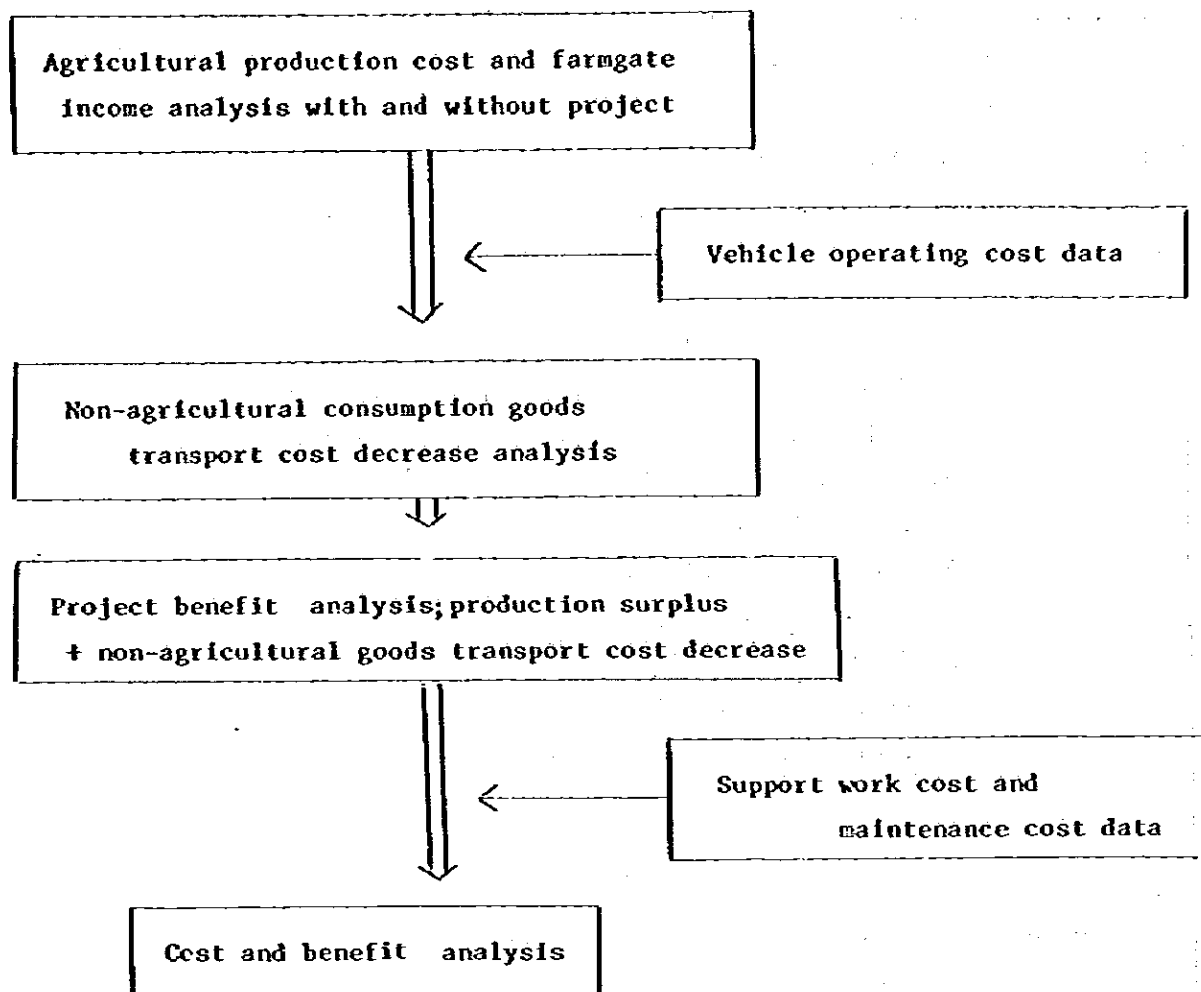


Note:

1. L_{x1} ; road length that will be supported in this project and that has already been surveyed in Bina Marga inventory study.
2. L_{x2} ; road length that will be supported after then.
There is no data about these road at this time.
3. Input data 4, 7 and 9 must be forecasted with and without project.
Then at jth year, total goods to be transported are added to some of this effect ΔM_j . Therefore at jth year, transport cost decrease of this effect are calculated by the formula $\frac{1}{2} DC \cdot \Delta M_j$.

Fig. 8.1.2. Flow chart of detailed economic analysis based on producers surplus applied for 7 Kabupatens





Note:

L_{K1} ; road length that will be supported in this project, and that has already been surveyed in Bina Marga inventory study.

L_{K2} ; road length that will be supported after then.

There is no data about these roads at this time.

8.2. Cost for the Economic Analysis

Economic cost and benefit, based on the producer surplus method, have been analysed for seven Kabupatens one in each of the seven Provinces namely Kapulauan Riau, Lahat, Lampung Selatan, Manggarai, Bolaang Mongondow, Bone and Buton.

The detailed cost of the Project for 7 Kabupatens out of the total of 21 Kabupatens is attached to this report in Appendix B.

The cost in these tables are in financial terms as at the beginning of the period of the 1980/81 fiscal year and so, the cost for the works in 1982/83 1982/83 and 1983/84 are not adjusted, unlike the cost reported in chapter 6 Section 2.

The cost of the Project is classified into three categories of administration fee, direct cost, and contingency. The administration fee contains the consulting service cost for the Project execution. Contingency is provided for the procurement of equipment.

The direct cost is classified into three items, main support work, reinforcement of bridges and maintenance work. The foreign portion of the main support work is for equipment costs (CIF Price). The local portion of the main support work is for the distribution and operating costs of equipment, material and labour costs.

In the case of the 6 year plan of main support work, equipment costs include the higher repair cost for equipments of 4 - 5 years economic life.

At the time when the main support work finishes, the submerged price of equipment has been counted.

Since the foreign currency required for the procurement of equipment, is all included in the main support work in the study for convenience sake only (in other words the foreign currency for procurement of equipment for maintenance purpose, is not separately computed), during the period

of main support work (3 years to 6 years in each corresponding Kabupaten), maintenance cost have to exclude the cost of equipment, in the following 10 years of the Project life, the maintenance cost will include, of course, that for equipment.

Two cases of the maintenance cost without the Project are considered.

- 1) Count nothing considering the actual state of the maintenance budget for Kabupaten road.
- 2) Count half of maintenance cost with the Project so as to maintain the present road condition during the Project life.

Case 2 above was only considered for the two Kabupatens, Bolaang Mongondow and Kepulauan Riau.

8.3. Cost Benefit Analysis of 7 Kabupatens

Benefits of the Project analyzed in this section are the reduction of transportation cost and/or farmer's production surplus. Other benefits of the Project such as time savings cost, convenience of travel, establishment of social equality, elimination of isolated area, improvement of accessibility for to medical and educational facilities will be discussed in section Chapter 8.5.

The forecasts of agricultural activity are based on the present trend of agricultural activity, population trend, regional G.D.P., and the relevant development plans such as irrigation plan, transmigration plan and so on.

8.3.1. Transportation Cost (Vehicle Operation Cost)

The most suitable methods are used for the cost estimate of transportation of goods or passengers, in accordance with the local conditions of Kabupaten Roads. The conditions of Kabupaten roads vary greatly, with surface types of asphalt, gravel (stone) or earth and with conditions from good to bad.

Table 8.3.1. is a summary of transportation cost of goods on gravel or earth roads.

The definition of road condition, such as good, fair, poor or bad are not suitable for numerical calculation, so the average vehicle running speeds are assumed as shown in Table 8.3.1. respectively.

The figures in Table 8.3.1. are by financial term, not by social and economic terms. The differences between them may be several percent in the case of light trucks and more than 20 percent in the case of medium trucks due mainly to the fuel cost difference.

Detailed calculations of vehicle operation costs is given in Appendix B.

Based on the assumptions, described below, the transport costs reduction due to road improvement are calculated in Table 8.3.2.

- 1) The trucks now used on Kabupaten roads are of a capacity of less than 1 ton, due to the limited load capacity of bridges.
- 2) After the support works, the trucks on those roads will be able to change their net loading capacity from light to medium, an increase of 50%.
- 3) In the heavy (middle) wet season, a period of about 2 months, the goods are transported on poor or bad condition roads, by bicycles in flat area, and on foot in rolling areas, before support works.
(The wet season usually lasts for about four months, from December to March. However, it is wrong to assume that the goods are transported by bicycles for the whole of the wet season, because road conditions are not too bad during the beginning of the wet season, and possible stocks of goods may allow the reduction of transportation of more goods during the end period of the wet season).
- 4) The transportation cost of goods in rolling areas increases by 50% compared to that in flat areas mainly because of the increased fuel consumption and the reduction of operating speeds.

Table 8.3.2. shows the results of goods transportation cost decreases by road improvement.

Table 8.3.1. Transportation Cost Summarized

		Financial Cost							
Road Surface type		Earth				Gravel			
Road Surface condition		good	fair	poor	bad	good	fair	poor	bad
Light Truck	Average Running Speed (km/hr)	40	30	15	5	40	35	20	5
	Fuel Cost (Rp/km)	26.0	33.0	46.0	58.0	26.0	30.0	41.0	58.0
	Tyre Cost (Rp/km)	9.6	10.1	11.3	15.1	8.1	9.0	11.6	17.6
	Vehicle Dep. Cost (Rp/km)	18.4	19.6	21.1	23.9	18.4	19.6	21.1	23.9
	Standing Cost (Rp/km)	9.9	13.2	26.4	79.2	9.9	11.3	19.8	79.2
	Maintenance Cost (Rp/km)	9.9	10.9	12.4	14.9	9.9	10.9	12.4	14.9
	Wage Cost (Rp/km)	7.4	9.8	19.7	59.0	7.4	8.4	14.8	59.0
	Operating Cost (Rp/km)	81.2	96.6	136.9	250.1	79.7	89.2	120.7	252.6
	Transport Cost (Rp/T.km)	95.5	113.6	161.1	294.2	93.8	104.9	142.0	297.2
Medium Truck	Average Running Speed (km/hr)	40	30	20	10	40	35	20	10
	Fuel Cost (Rp/km)	13.8	18.6	23.8	29.8	13.8	16.1	23.8	29.8
	Tyre Cost (Rp/km)	37.7	39.7	44.4	58.7	32.0	35.4	45.5	69.5
	Vehicle Dep. Cost (Rp/km)	34.6	36.9	39.7	45.0	34.6	36.9	39.7	45.0
	Standing Cost (Rp/km)	24.6	32.8	46.2	98.4	14.6	28.1	49.2	98.4
	Maintenance Cost (Rp/km)	15.2	16.7	19.0	22.8	15.2	16.7	19.0	22.8
	Wage Cost (Rp/km)	12.4	16.5	24.8	49.5	12.4	14.1	19.8	49.5
	Operating Cost (Rp/km)	138.3	161.2	197.9	304.2	122.6	147.3	197.0	315.0
	Transport Cost (Rp/T.km)	27.7	32.2	39.6	60.8	24.5	29.5	39.4	63.0
By Foot	Average Speed (km/hr)	3.0							
	Average Capacity (kg)	20.0							
	Wage Rate (Rp/Day)	800.0 (8 hours)							
	Transport Cost (Rp/Ton.km)	1,667							
By Bicycle	Average Speed (km/hr)	8.0							
	Average Capacity (kg)	60.0							
	Wage Rate (Rp/Day)	1,500.0 (8 hours)							
	Transport Cost (Rp/Ton.km)	391							

Table 8.3.2. Transportation Cost Reduction by Road Improvement

Surface Type		Earth				Gravel (Stone)			
Surface Condition		Good	Fair	Poor	Bad	Good	Fair	Poor	Bad
Cost Decrease									
Flat Area (Rp./ton km)	Dry Season	36.4	54.5	102.0	235.1	34.7	45.8	82.9	238.1
	Wet Season	"	"	331.9	331.9	"	"	331.9	331.9
	Average	36.4	54.5	140.3	251.2	34.7	45.8	124.4	253.7
Rolling Area (Rp./ton km)	Dry Season	54.6	81.8	153.0	352.7	52.1	68.7	124.4	357.2
	Wet Season	"	"	1,578.3	1,578.3	"	"	1,578.3	1,578.3
	Average	54.6	81.8	390.6	557.0	52.1	68.7	366.7	560.7

8.3.2. Agricultural Production Cost and Farmgate Price

Agricultural production costs and farmgate prices are shown in Table 8.3.3. by food crops and cash crops.

Production costs of food crops are mainly for labour cost, and input costs which are small, are the costs of seeds, fertilizer etc.

Compared with the farmgate prices, production costs are fairly low. Therefore, input cost reduction due to transportation costs reduction, seem to have little influence on the increase of production cost for food crops.

Production costs of cash crops, consist of depreciation cost of initial input, such as seeds cost, planting cost, maintenance cost during growth period etc., and annual maintenance costs.

The labour used for picking the crops, is usually paid with crops at the ratio of 1/6 - 1/10 of the crops gathered, instead of cash.

A growth period of 5 - 9 years is needed for cash crops, and so, a large amount of capital investment is necessary for cash crops production.

The farmgate prices of cash crops are very high compared those of production costs, except for rubber.

The cost and benefit are based on the following conditions and assumptions.

- 1) The Project life proposed is 10 years, starting after the completion of the main support work in the first stage.

Table 8.3.3. Agricultural Production Cost

Food Crops					Per Ha	
Crop	Input Cost (seeds, fertilizer, insecticides, etc)	Labour Cost	Production (Ton)	Production Cost (Rp/Ton)	Farmgate Price (Rp/Kg)	
Paddy (Wet Paddy)	14,375 (25 Kg. 125 Kg. 2.0 Kg.)	233,500 Rp	4.5	55,080	90	
Paddy (Dry Paddy)	14,650 (30 Kg. 120 Kg. 2.0 Kg.)	139,500	2.2	70,070	90	
Peanut	54,500 (100 Kg. 100 Kg. 2.0 Kg.)	183,250	0.80	297,190	400	
Cassava	2,550 (- , 15 Kg. 1.0 Kg.)	109,500	8.0	14,010	40	
Sweet Potato	2,830 (- , 19 Kg. 1.0 Kg.)	109,500	7.2	15,600	40	

Source: Kabupaten I.I.O.T. '78

Cash Crops					Per Ha	
Crop	No. of Seeds	Growth Period and Maintenance Cost Rp.	Initial Input Capital (Rp.)	Yearly Pro. Cost + Dep. Cost (10%Rp)	Production Cost (Rp/Ton)	Farmgate Price (Rp/Kg)
Coconut	100	5 years. 5th year 10 pieces product	246,300 *2 -26,600	30.0+39.8=69.8	30 years, 8.5 Kg/seed (40 pieces/seed)	91,200
Coffee	1,600	6 years. 5th year 150 g/seed product 6th year 500 g/seed product	1,682,300 -1,033,700 *2	68.0+121.2=189.2	20 years, 1 Kg/seed	138,000
Pepper	1,600	4 years. 4th year 125 g/seed	1,737,500 *2 -226,600	267.5+296.8=564.3	15 years, 1.25 Kg/seed	329,200
Clove	200	9 years. 6th year 100 g/seed 7th year 300 g/seed 8th year 1 Kg/seed 9th year 2.5 Kg/seed	1,959,500 -10,630,400 *2	-109.0	20 years, 5.0 Kg/seed	127,200
Rubber						70,000

*1. This Cost is calculated at the time of the first production year with opportunity cost 18%.

*2. Production Income at Growth Period

Source: Interviews with Agro-economist.

- 2) The start of the Project is the year 1981.
- 3) The cost and benefit, calculated in the analysis, are based on the prices of 1980.
Any price rise has not been counted in the analysis except as a contingency for the procurement of equipment.
- 4) The exchange rate of Yen to Rupiah used is ¥1.00 = Rp.2.70.

8.3.3. The Results of Cost Benefit Analysis

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.

The internal rate of return for each representative Kabupaten varies widely, 72 % for Lampung Selatan, 36% for Labat, 18% for Buton, 7% for Bone, 6% for manggarai and uncountably low for Kepulauan Riau.

Table 8.3.4. shows a summary of the economic evaluation of the Project that make up the representative sample of the Project. Detailed figures of economic cost and benefit analysis is shown in Appendix B.

8.3.4. Economic Evaluation of the Project at Kabupaten's Level

1) Kepulauan Riau

Kabupaten Kepulauan Riau consists of three major islands. Main island is Bintan island. The Project supports 411 km of Kabupaten Roads in the first stage.

These roads serve a cultivated area of 95,100 ha and a population of about 349,000 persons who are engaged primarily in growing cassava, coconut and rubber and in fishing.

Main industry of this Kabupaten is bauxite mining and the necessary transportation routes are maintained by the mining company.

Rubber production was formerly the main agricultural product, but this is now at low level of production.

Table 8.3.4. Summary of the Economic Evaluation of the Projects

Province	Kabupaten	Influence Area		Result of Producer Surplus Method		
		Population	Harvested Area (ha)	I.R.R.	N.P.V. at 10%	Million Rp.
Riau	Kampar Kepulauan Riau	349,300	95,100	- (-)	-	-
Sumatra Selatan	Lahat	116,200	17,900	36.1	2,015	
Lampung	Lampung Selatan	291,100	47,800	72.3	9,512	
N.T.T.	Manggarai	118,600	32,400	6.5	-	
Sulawesi Utara	Bolaang Mongondow	118,200	41,200	0.0 (5.5)	-	
Sulawesi Selatan	Bone	195,300	93,300	6.6	-	
Sulawesi Tenggara	Buton	150,100	37,500	18.2	1,179	
Total * (7 Kabupaten)		-	-	21.8	8,383	

*) Note 1. The Project Life is assumed to be 10 years from 1984/85 to 1993/94 for total seven Kabupaten.

It may be also worthwhile to mention, that Bintan island is located in a strategic position of national defence and also provides many refugee camps.

It is estimated that the internal rate of return on the Project would be less than 0%, considering the maintenance cost without the Project.

2) Lahat

The Project supports 255 km of Kabupaten Roads in the first stage. These roads serve a cultivated area of 17,900 ha and a population of about 116,000 persons who are engaged primarily in growing rice and coffee.

The coffee production area is the rolling area in the southern part of the Kabupaten.

It is estimated that the internal rate of return would be 36%. The net present value, discounted at 10%, is estimated to be 2,015 million Rps.

3) Lampung Selatan

The Project supports 225 km of Kabupaten Roads.

These roads serve a cultivated area of 47,800 ha and a population of about 291,000 persons who are engaged primarily in growing many food crops and cash crops.

The Kabupaten Lampung Selatan is one of the most developed Kabupaten in the Project Area. The private transmigration from Java island started in the decade of 1940 and is still continuing.

Many small scale irrigation programs are being carried out.

It is estimated that the internal rate of return would be 72%. The net present value, discounted at 10%, is estimated to be 9,512 million Rps.

4) Manggarai

The main area of Kabupaten Manggarai is located on the plateau of about 1,000 m elevation. The Project supports 332 km of Kabupaten Roads. These roads serve a cultivated area of 32,400 ha and a population of about 118,000 persons who are engaged primarily in growing rice, coffee and coconuts and in raising cattle.

Flores island is one of the less developed among the Project Areas. It is estimated that the internal rate of return would be 6.5%.

5) Bolaang Mongondow

The Project supports 474 km of Kabupaten Roads. These roads serve a cultivated area of 41,200 ha and a population of about 118,000 persons who are engaged primarily in growing food crops and coconuts.

The Province of Sulawesi Utara is another one of the less developed area among the Project Areas.

It is estimated that the internal rate of return would be 5.5%, considering the maintenance cost without the Project.

6) Bone

Bone is one of the most developed Kabupaten in the Project Area and has a lot of exportable surplus rice production.

The Project supports 295 km of Kabupaten Roads.

These roads serve a cultivated area of 93,300 ha and a population of about 195,000 persons who are engaged primarily in growing many food crops and cash crops and in raising cattle.

It is estimated that the internal rate of return would be 6.6%.

7) Buton

The Project supports 405 Km of kabupaten Roads. These roads serve a cultivated area of 37,500 ha and a population of about 150,000 persons who are engaged primarily in growing cassava and coconut. The island of Buton has resources of rock asphalt and it is planned to produce about 500,000 ton a year in the near future.

It is estimated that the internal rate of return would be 18.2 %. The net present value, discounted at 10 %, is estimated to be 1,179 million Rps. From the results of economic analysis of the representative sample of 14 Kabupatens in 7 provinces, the following conclusions are obtained.

- (a) To evaluate the economic benefit of the local road support work, the method based on consumers surplus (vehicle operation cost reduction count) is not considered to be appropriate.
- (b) The economic effect of the Project depends on the economic potential and topographic conditions in the Project Area.
The following are important factors to determine the economic benefits.

(i) Areas growing cash crops.

As the price of cash crops are unstable, the effect of the road improvement would be estimate somewhat lower in the area of Lahat, Lampung Selatan.

(ii) Average length of the route.

The effect of the road improvement is almost linearly proportional to the average length of the route, assuming factors such as distribution, production volume, total road length etc, remain the same (the area of Buton).

(iii) Areas of already highly developed agriculture.

In these areas it is necessary to improve the road network to allow more efficient transportation of the product. (the area of Bone).

(iv) Areas of high development potential and adequate labour supply.

(c) In some Project Areas, economic benefit could not be expected in the near future because of low economic activity and the relatively high cost of support work and maintenance.

(d) Generally speaking, the Project should be economically sound. For agricultural development of the Project area, the roads supported should play the important role of access to market from the farmgate.

8.4. Effect of the Project upon the Agricultural Development

The effects of the Project upon agricultural development can be divided into direct and indirect.

The direct effects, are reduction of production cost, increases of farm-gate prices and production, due to the establishment of transportation routes in the wet season.

The indirect effects, are the increase of cultivated area and/or the increase of yield rate, due to the increase of population density and up-grading of the transportation system of the agricultural produce.

The agricultural activity in the Project Area are presented in Appendix B.

The effects of the Project upon the agricultural development, will not be distributed uniformly throughout the 21 selected Kabupatens, where the present agricultural activity and its potential for future development, vary to a considerable degree. For example, Lampung Selatan is provided with a wide and well cultivated area where a large amount of food crops as well as cash crops are being produced, and the population density is already reaching quite high level of some 213 persons per square kilometer (See Table 8.4.1.).

The effect of the Project in this area, is expected to be more on the increase of yield rate of production, through the improvement of the transportation system of the agricultural produce, that upon the increase in size of the cultivated area.

On the other hand, Manggarai has a low level of agricultural activity and a population density of 52 persons per square kilometer.

**Table 8.4.1. Agricultural Activity of Lampung Selatan
And Manggarai**

	K a b u p a t e n	
	Lampung Selatan	Manggarai
Area (Km2)	6,766	7,105
Population/Density	212.5/Km2	51.5/Km2
Cultivated Area for Food Crops	102,597 ha	58,501 ha
Cultivated Area for Cash Crops	111,756 ha	16,267 ha
Population Growth Rate (%)	3.7	1.8

However, the potential for agricultural development is still very high, due to the wide area available in the future for food crops and cash crops production. The effect of the Project upon the agricultural development, will gradually appear with the increase of the population density and the increase of the cultivated area.

The effect of the Project, upon the reduction of the agricultural production costs is considered to be relatively small. as can be shown with the following example.

Paddy Production Cost

	Labour Cost	Input Cost	Total
Without Project	51,885/ton	3,195/ton	55,080Rp./ton
With Project	51,885/ton	3,125/ton	55,010Rp./ton

Transportation Cost reduction $8.7\text{km} \times 225 \text{ Rp./t.km} = 2,000 \text{ Rp./ton}$

Proportion of seeds, fertilizer and insecticide per 1 ton paddy production
= 35 Kg/ton.

The increase of farmgate prices to be expected, is principally due to the reduction in the portion of transport cost as indicated above.

The transportation system of the agricultural produce is not so simple that the reduction of transport cost will be shared among the many different factors constituting the production cost.

The following example shows the system of the agricultural production transportation from the farmgate to the central market in the Project Area.

**Table 8.4.2. Example of Transportation System
of Agricultural Products**

Location	Distance (km)	Market Price of Product	Transport Cost
Farm	0.5 (Desa Road)	160 Rp./kg	0.5 Rp./kg (1.0 Rp./Kg.km)
Village Market	20.0 (Kabupaten Road)	170 Rp./kg	2.5 Rp./kg (0.125 Rp./kg.km)
Kecamatan Market	62.2 (Province road)	225 Rp./kg	4.3 Rp./kg (0.07 Rp./kg.km)
Central Market		260 Rp./kg	
Total Transport Price		100 Rp./kg	
Total Transport Cost		7.3 Rp./kg	

The effect of the establishment of a transportation route in the wet season for some crops in the Project Area, where a poor road system is not passable for motor vehicles at present, will be quite considerable. A detailed survey and study on this effect has not been carried out, but the following ratio is an estimate.

Months not passable in rainy season . 2 months

Area of poor and bad road condition 50 %
estimated from road inventory

Production increase ratio = $2/12 \text{ months} \times 50\% = 10\%$

The influence of the increase of the population upon the agricultural production is difficult to estimate quantitatively, but may be roughly estimated using past trends of agricultural production and population trend in the Project Area.

In this study the agricultural production increases with the Project are considered by about 10% due to the establishment of access to market at any time.

It would have more effects for some crops and/or in some Project Areas.

It may be need to study local agricultural production system in depth so as to forecast such effect upon agricultural production by road improvement.

8.5. Social and Economic Effect of the Project

Beside the effect of the Project upon the agricultural development the following social and economic effects are considered to be worthy of note.

(1) Travel time savings and public bus services.

On the Kabupaten Roads in the Project Area, the passenger transportation by trucks or minibuses were observed even on those on which a bus can hardly drive with a speed more than 10 km/h.

The lack of public transportation system is often caused by the lack of bridge or by low bearing capacity of bridges.

Many routes of public transportation services will be able to operate after the Support Works of Kabupaten Roads.

On those Kabupaten Roads, on which there is already public transportation services available, the travel time will be reduced significantly through the Support Works.

For example, the operating speed on cobble roads is now more or less 5 km/h and that on gravel road in good condition may be more than 20 km/h even when loading and unloading time is counted.

(2) Better accessibility to medical care and education facilities.

In almost all villages, small public medical facilities were observed but higher level facilities such as health center or public polyclinic and hospital are located in the capital city of Kecamatan and Kabupaten respectively as shown in Table 8.5.1. (referring Appendix B).

Table 8.5.1. The Medical and Educational Facility in some Kabupatens.

	1978		
	Kabupaten O.K.I.	Kabupaten Corontalo	Kabupaten Manggarai
Number of Kecamatan	12	16	17
Number of Desa	314	219	255
Number of Elementary School	358	466	330
Number of Junior High School	32	20	25
Number of Health Center	12	17	17
Number of Hospital	1	1	2

The level of medical care available in isolated areas is very poor now, but improved road communication will allow easier access to the centralised facilities available in the capital cities of the Kecamatan and Kabupaten.

As for education, elementary or primary school were observed in every village in the Project Area, but with the present poor condition of the Kabupaten Roads, access is not adequate throughout the Project Area.

The higher level education facilities such as junior high school and senior high school are concentrated in the capital city of Kecamatan and Kabupaten, respectively.

Although the number of students who accept such high level education is low now, (only 24.4% of elementary school boys and girls are engaged in junior high school in 1979), it hoped to increase this percentage up to 41.6% in 1984, and the improvement of accessibility will obviously help to achieve this target.

(3) Increase of Labour Demand.

A direct effect of the Project implementation will be a labour demand for the Project execution work.

The number of equipment operators, foremen, drivers and administrator, required for the Project is more than 800. Other labour employed by the Project is estimated at more than 50 thousand man/month. (10% of direct cost of the support work/average wage rate x 25 day).

An indirect effect of the project will be a labour demand due to the increase in agricultural activity.

8.6. Comprehensive Justification of the Project.

8.6.1 Legal Authority

The Ministry of Public Works as part of the centralized administration of the Republic has the legal capacity to execute the project through the Directorate General of Highways (D.G.H).

8.6.2 Technical Feasibility

From the technical standpoint the project is feasible for the following reasons :

- (1) 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.
- (2) 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.
- (3) 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.

- (4) 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 work and for Kabupaten Roads.
- (5) For the education and training of Kabupaten DPU's personnel the D.G.H. has carried out a training program involving over 2,000 persons in the fiscal year of 1979/1980.

8.6.3 Financial Background

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

- (1) For the fiscal year of 1979/1980, the first year of the local road support work 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 Rp.
- (2) The budgetary schedule of local portion of the Project is as follows.

Table 8.6.1. Budetary Schedule of Local Portion

billion Rps.

Physical Year	81/82	82/83	83/84	84/85	85/86	86/87
Budget Required	6.2	7.1	7.5	4.8	5.4	6.0

The budget required in physical year 81/82 is about 16% of the national budget prepared in 80/81.

(3) The budget for the support works of Kabupaten Roads in the project, comes from the National Government budget A.P.B.N.

(4) 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:

(i) The Government desire to increase their income and thus allow more project to start.

(ii) The Government policy to reduce and/or eliminate oil subsidies.

8.6.4. Economic Justification.

Cost Benefit Analysis was carried in 7 Provinces. The internal rate of return based on agricultural activities is estimated as 22 % in the 10 years Project Life. The high figures of internal rate of return justifies the economic feasibility.

8.6.5. Social Evaluation.

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

- (1) an opportunity for equalising the distribution of the Government's budget.
- (2) an equalising of opportunity for food and cash crop producers.
- (3) Encouragement of development in isolated areas.
- (4) Easier access to education, medical and other facilities, which must be located in the capital towns.

8.6.6 Repayment

Repayment schedule is calculated on following basic aspects of Overseas Economic Cooperation Fund of Japan.

- | | |
|--|-------------------|
| a. Approval | ; June, 1980 |
| b. Contract signature | ; September, 1980 |
| c. Disbursement for the Procurement of equipment | : January 1981. |
| d. Amortization Term | ; 20 years |
| e. Grace Period | ; 10 years |
| f. Interest | ; 2.5 % |

First year of Repayment	; March, 1992
Amount of Yearly Repayment	; Yen 402,355,000
Last year of Repayment	; March, 2011.

Table 8.6.2. Loan List for Road Construction

10³ US \$

Year	Bilateral						Multilateral		
	U.S.A	Saudi Arabia	Japan	Netherland	West Germany	Canada	Kuwait	I.B.R.D	A.D.B.
Pelita I									
'69/70				936				28,021	
'70/71	3,580		209					1,625	
'71/72			8,650					34,000	
'72/73			1,159			7,200			
'73/74	26,000							14,000	
SUB TOTAL	29,580	-	10,018	936	-	7,200	-	77,646	-
Pelita II									
'74/75			54,159						580
'75/76	18,523		2,768						
'76/77			40,190	13,494				130,000	102,210
'77/78		50,000	107,830	2,894	31,771				
'78/79			16,285		47,722				
SUB TOTAL	18,523	50,000	221,232	16,388	79,493	-	-	130,000	102,790
Pelita III									
'79/80							1,467	130,000	
'80/81									
'81/82									
'82/83									
'83/84									
SUB TOTAL	-	-	-	-	-	-	1,467	130,000	-
T O T A L	48,103	50,000	231,250	17,324	79,493	7,200	1,467	337,646	102,790

ADP