

A THEORETICAL PLAN FOR
INCREASING THE LEVEL OF LABOUR FORCE UTILIZATION
ON AGRICULTURAL AREA IN PANJATAN DISTRICT
INDONESIA

By

SOENYOTO

A Practicum Submitted
In Partial Fulfillment of the
Requirement for the Degree
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ABSTRACT

Panjatan is a district, in south central Java, Indonesia, in which the economic structure based on agriculture. Recent estimates indicate that the population growth is 2.5 percent annually. At the present time the level of manpower utilization in this area is low and seasonal, and will continue to decrease annually because continued population growth provides an increased manpower supply for the same land base, because lack of available land for agricultural expansion.

This study investigates three alternatives for increasing the manpower utilization in the Panjatan district. These include extension of irrigation, use of the government transmigration program and construction and operation of a coconut fibre factory.

This study, conducted during the months of May through August 1978, shows that the people of Panjatan district generally lack capital and knowledge of modern technology. Government program, therefore, can play an important role in alleviating the underemployment problem.

This study concludes that the average annual manpower utilization in the Panjatan district can be increased from 31.43 to 44.84 percent for males and from 12.62 to 20.39 percent for females if an extension of irrigated land area is under taken, the transmigration program is implemented and a coconut fibre factory is built.

This study is important to regional planners, who are attempting to increase manpower utilization in the Panjatan district and other areas. It should be noted that this practicum is only a theoretical plan, however, and to apply these ideas, further detailed studies would be needed.

ACKNOWLEDGEMENT

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LIST OF TERMS

| | |
|--------------------------------|---|
| Agricultural Density | Number of inhabitants engaged in agriculture per unit area, or where specified, the density of population related to the area of land in agricultural use. |
| Distribution of the Population | Geographical concept showing different degrees of population density in different administrative areas, such as an island. |
| Forced Migration | Migration resulting from forcible action by government authorities. |
| Inmigration | Movement of individuals who have been residents outside the area previously to take up residence in a specific geographical area. |
| Migration | Movement of individuals from a place of origin to a place of destination. |
| Migration Policy | Government action designed to influence migratory movement. May be adapted to influence the geographical distribution of population within a given territory. |
| Outmigration | Abandonment of residence by a person in a distinct geographical area, followed by the establishment of residence in another area. |
| Population Density | Number of inhabitants per unit of area (generally measured in square kilometers). |
| Bouw | Unit of area used in Java; the size is about two-thirds hectare (four irings). |
| Iring | Unit of area used in Java; the size is about one-sixth hectare. |
| Kebun | Home yard. Crops usually grown include coconuts, mangoes, bamboo, oranges and different types of trees. In many kebun areas vegetables, such as spinach (<i>Amaranthus</i>) and frog (<i>Ipomoea reptans</i>) are grown, but these latter crops are grown only on a small area. |
| Padi gadu | Rice cultivation on sawah in the dry season. |
| Padi rendeng | Rice cultivation on sawah in the wet season. |

List of Terms Cont'd.

- Rakit Unit of ploughing equipment, consisting of two cows or two water buffaloes and one plough.
- Sawah Wet land rice cultivation, including small dykes around the land in order to hold puddling water in the land preparation until the third month after rice planting.
- Tegal Dry land cultivation; crops usually grown are cassava, long peppers, maize, sweet potatoes, tobacco, usually without small dykes around the land because these crops have no water puddling requirement.

LIST OF SYMBOLS

| | |
|----------|---|
| A | = Crop requirement (mm/day) |
| B | = Crop requirement (L/S/Ha) |
| C | = Tertiary water requirement (L/S/Ha) |
| C.B.R. | = Crude Birth Rate (per 1,000 people) |
| C.D.R. | = Crude Death Rate (per 1,000 people) |
| D | = Intake water requirement (L/S/Ha) |
| ET | = Evapotranspiration for rice sawah (mm/day) |
| ETP | = Potential evapotranspiration (mm/day) |
| f | = Crop factor according to growing stage of rice |
| Ha | = Hectare |
| Ls | = Limestone |
| Lri | = Laterit |
| MI | = Margalit |
| P | = Percolation (mm/day) |
| Q_J | = Discharge of the Jali River at North Bantar (m^3/S) |
| Q_{PB} | = Discharge of the Progo River at Bantar (m^3/S) |
| Rd | = Recent deposit |
| Re | = Effective rainfall (mm/day) |
| W | = Water Layer (mm/day) |

CHAPTER I

INTRODUCTION

1.1 Background: Indonesia

1.1.1 Population Distribution

Of the total Indonesian land area of approximately 190 million hectares, about 16 million hectares (8.4 percent) of which are used as agricultural land. (Public Works and Electric Power, 1978, p.12) The total population of Indonesia in 1976 was 138.3 million, with approximately 90 million (65 percent) engaged in agriculture. Java Island, which comprises only about 13.5 million hectares (6.7 percent of the total Indonesian land area), is the most densely populated and intensively farmed island in Indonesia. With about 87.1 million people, Java Island contains 63 percent of the total Indonesian population (Abdul Madjid, 1977).

After 1905, because of an unusual trend in population distribution, the government resettled people from Java to other islands; a process called transmigration (Widjojo, 1970, pp. 129-132). This was considered desirable both as a means of providing employment opportunities for Java's landless farmers and as a method of furnishing other islands with the necessary manpower. The annual number of households moved increased from one thousand in the 1950's to two thousand in the 1960's and to seven thousand by 1975. (Abdul Madjid, 1977, pp. 152-154).

1.1.2 Population Growth

According to the 1978 World Population Sheet (Kane, 1978), the birth rate of Indonesian people is 3.8 percent per year, and death rate is 1.4 percent per year. Thus, the rate of natural increase is 2.4 percent per year. In 1968, the government of Indonesia initiated a National Family Planning program, focusing on contraceptive distribution in Java and Bali. However, this program has not yet been very successful, due largely to the shortage of trained medical personnel. Recent estimates indicate that there is one Indonesian doctor for every 21,000 persons and one nurse for every 6,000 persons. By contrast, India has one doctor per 4,000; Malaysia, one per 4,700; and Thailand one per 5,800. Indonesia's population control program is less successful than those implemented by these other countries. The problem is compounded by the concentration of medical personnel in urban areas, especially in the capital, Jakarta. Recent studies tend to prove the assumption that the rural poor had the highest fertility. Even though funding from the Indonesian government reached \$28.5 million by the fiscal year 1976/77 and was expected to reach \$34.3 million in 1977/1978, (Hull, Terence H., 1977) results of the National Family Planning program have not yet been significant.

1.1.3 Agriculture

Rice, the predominant agricultural crop is the basic food of Indonesia. Rice production intensification programs, started in 1963, have shown good results in the areas of production and manpower utilization. Also, from the farmers' viewpoint, rice has significant advantages compared with other

crops. Because rice production in the wet season was 4.2 tonnes/hectare, and 3.7 tonnes/hectare in the dry season, the price of rice based on an exchange rate of Rp 620 per U.S. dollar was \$105 per tonne in 1977.

The farmer's gross revenue was \$442/Ha/crop in the wet season and \$339/Ha/crop in the dry season. In comparison with other crops, maize yields only about \$194/Ha/crop, cassava about \$149/Ha/crop, soybeans about \$184/Ha/crop, and long pepper yields \$233/Ha/crop. (FAO/UNDP, 1976, pp. 12-15). The major restraint to increasing rice production is the insufficient irrigation area available.

1.1.4 Labour Force

The problem of manpower supply and demand is difficult to solve. There is a great supply of manpower, while the demand for labour is sometimes very limited. The government does not allow the use of machinery for agriculture in many regions of Java to reduce unemployment.

1.2 Area of Investigation

The study area for this practicum is the Panjatan district, which lies in the southern region of central java, about 400 km from Jakarta. The district (Kecamatan) of Panjatan is economically based on agriculture, with about 83.72 percent of the inhabitants surveyed being engaged in farmland activities.

The 1977 population of Panjatan was 32,896 (about 5,088 households). The total farmland area, 6,225.8 hectares, is divided into sawah (wet land rice cultivation - 2,020 hectares), tegal (dry land cultivation - 1,254 hectares), and kebun (home

yards and settlement - 1,483 hectares). The average family farm size is 1.03 hectares (2.54 acres), which consists of 0.40 hectares of sawah, 0.25 hectares of tegal and 0.38 hectares of kebun.

1.3 Problem Statement

In Panjatan district, most of the people over fifteen years of age work five or more hours per day during the peak season (land preparation, nursery, transplanting, etc.). In contrast, during the slack season of the agricultural year, only a very small part of the labour force is active, with the remainder being idle. The monthly supply of manpower is nearly constant, but the monthly demand for manpower is always changing. Thus, the level of utilization of the labour force is very low in many months. The problem becomes: how to improve the level of utilization of manpower.

1.3.1 Objectives

1. To determine the monthly manpower supply within the agricultural area.
2. To determine the monthly manpower demand within the agricultural area.
3. To measure increased monthly labour demand within the agricultural area which would be created through an extension of the irrigated area.
4. To estimate the reduction in the monthly supply of manpower which would be created by transmigration to other islands.
5. To suggest methods to increase monthly labour demand outside agricultural activities.

1.3.2 *Delimitations*

As a result of time and budget constraints, this study did not discuss in detail the transmigration program, family planning, nor the benefit/cost analysis of irrigation extension. This study is limited to a discussion of the possibility that each program will improve the level of utilization of available manpower.

1.3.3 *The Importance of the Study*

The study will assist regional planners:

1. To understand the current level of manpower utilization in the study area, and
2. To determine benefits of the levels of utilization of labour in the area under investigation after a new plan of action has been instituted.

1.3.4 *Research Methodology*

The Panjatan district is divided into two water supply regions; an irrigated region and a non-irrigated region.

The irrigated region includes six villages; namely, Gotakan, Krembengan, Cerme, Tayuban, Panjatan and Kanoman. (It consisted of irrigated sawah, tegal and kebun.) The non-irrigated region, includes five villages: Depok, Bugel, Pleret, Bojong and Garongan (and consists of rainfed sawah, tegal and kebun).

A total of 52 respondents were selected randomly, of which 30 represented an irrigated region around the village of Cerme and 22 represented a non-irrigated region around Bojong, so that the crop labour input per hectare according

to the kind of crop and kind of activity could be determined. The total respondents were about one percent of the total households in Panjatan district.

The area of sawah, tegal, kebun and other land came from existing data for each village, but the unit of area used in this area is not the hectare. Use of different land area units such as "iring" and "bouw" greatly increased the difficulty of doing a quantitative study. In addition, the total and area registered in the district was different from that used for tax calculations. After recalculation of land areas into hectares, it became apparent that the "bouw" in one village was not the same as in another village. Because of these complications, it was decided that land tax calculations would be used to represent the most reliable form of land measurement.

Only a small part of Panjatan district was included on available topographical maps, and much of the district information was taken from district and village maps. The scale of the soil map is 1:1,000,000. The existing irrigation map was the only map available containing technical detail but it was a very old map and in many places was unreadable.

The transmigration concept used in this study was based on stated government policy and experience.

All data relating to extension of irrigation was taken from the Public Works Office in Jogjakarta. Also, the coconut fibre factory proposal came from the coconut fibre factory in Klaten.

The investigation included five sub-procedures so that in this methodology, complete data or information for the area could be obtained. The five sub-procedures were:

1. Developing questions for respondents.
2. Personal interviews with farmers.
3. Personal contact with government officers.
4. Observation in the field.
5. Obtaining existing data from government offices.

The enquiry was conducted in four rounds. In the first round, during the period May 26 to June 20, 1978, the author compiled an information inventory including maps, population data, occupations of residents, the area of sawah, tegal and kebun, and information about government policy in the Panjatan district.

The second round of investigation was conducted between the period June 21 to July 14, 1978, and during this period the questionnaires were distributed to 52 households, or about one percent of the total households in Panjatan district, so that data about labour input per hectare in the irrigated, non-irrigated, tegal and kebun areas would be obtained, depending upon the kind of crops grown and agricultural activities. Data on family size in that area were also obtained. Personal interviews were conducted with farmers to determine their impression of family planning. There were difficulties in this case, because respondents usually felt "shy". The biggest contribution of information came from the local school teachers.

Overall, it was felt that the information gained from the questioners was not reliable for this study. Age-sex composition data had to be compiled from information obtained from the individual family cards in each village.

The third round of investigation was conducted during the period July 15 to August 7, 1978. During this round, the author tried to estimate the number of landless farmers that would be satisfactory candidates for the transmigration program. Farmers' impressions about transmigration were sought, and contact was made with the Transmigration Department in Jogjakarta in order to obtain information on government policy and experience in other places concerning the transmigration program. To determine the possibility of extending irrigated sawah, information had to be obtained on such matters as available water, irrigable area, water requirements, farmer and government opinion. This information showed the basic framework of factors involved, but implementation of any plans to extend irrigation and to install a coconut fibre factory would have to await a more detailed study.

In the fourth round of investigation, from August 8th to September 30, 1978, the author tried to calculate manpower demand and manpower supply before and after irrigation extension, proposed transmigration and construction of a coconut fibre factory.

CHAPTER II

DESCRIPTION OF PANJATAN DISTRICT

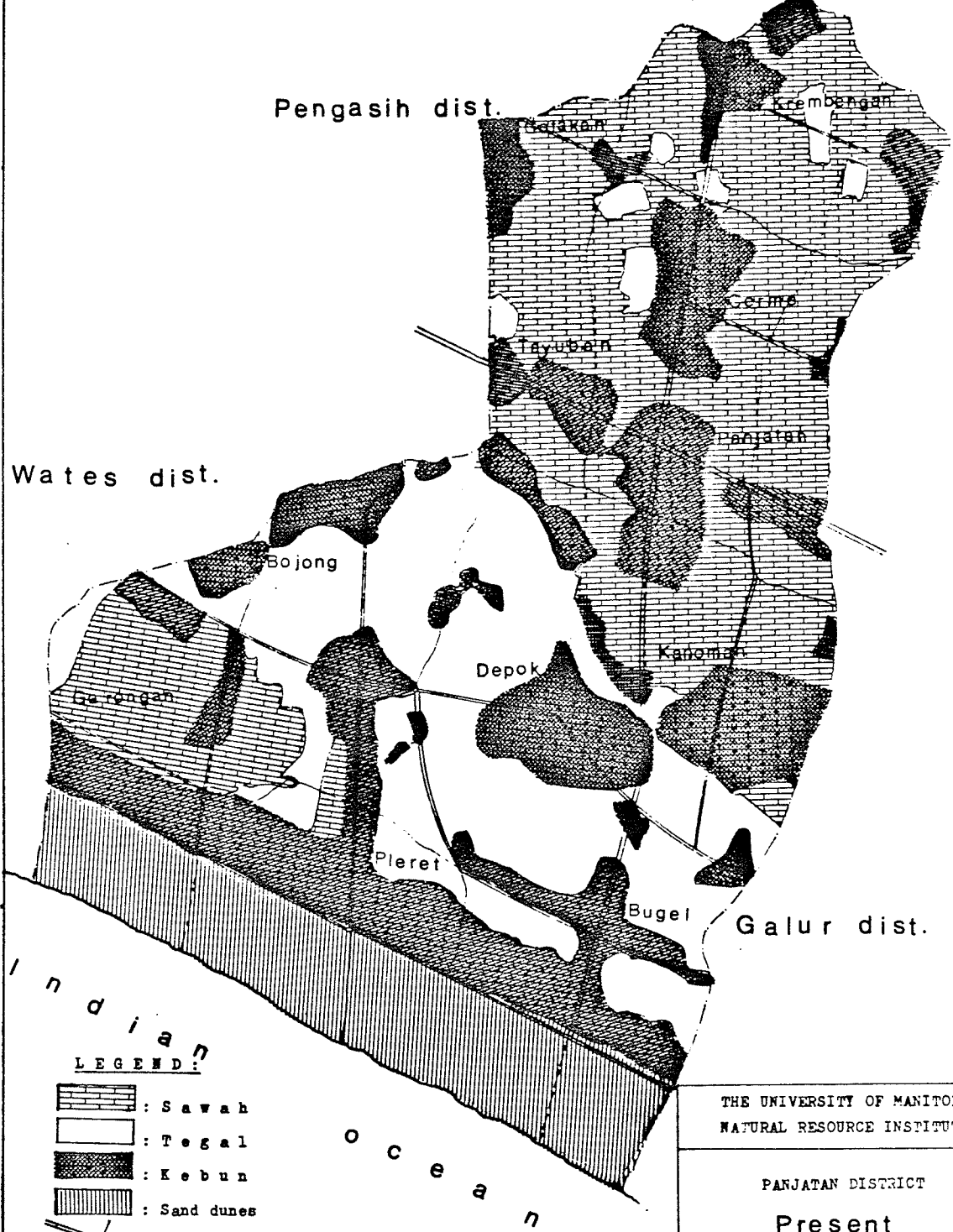
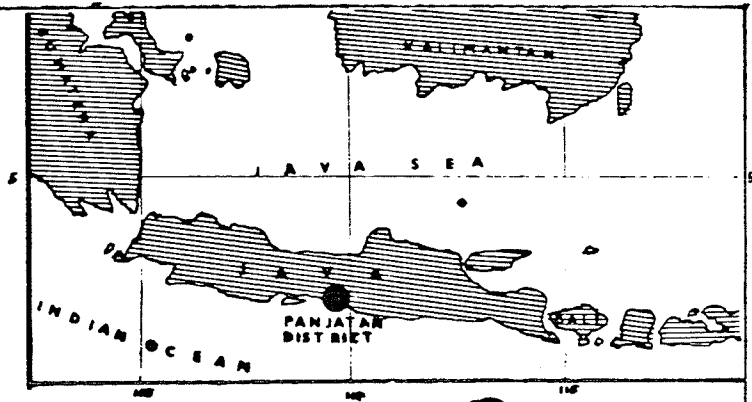
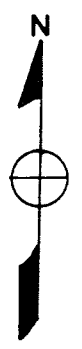
2.1 Location

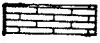



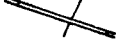
The Panjatan district lies between latitude 7°53'28"S to 7°62'37"S and between longitude 109°18'32"E to 109°23'59"E in the southern region of Central Java. This area is approximately 400 km from Jakarta, the capital city of Indonesia. The gross area is 6,225.8 hectares of which 2,020.6 hectares are in wetland rice cultivation (sawah) and 1,254 hectares are in dryland cultivation (tegal). Settlement areas and home yards occupy 1,983 hectares, and the remaining 968.6 hectares are sand dune roads, etc. (Table 1). Data on land use in the district is displayed in Figure 1.

TABLE 1: PRESENT LAND USE IN PANJATAN DISTRICT 1977

| Category | Area (Ha) | Percentage |
|----------------------------------|-----------|------------|
| Wetland rice cultivation (sawah) | 2,020.6 | 32.46 |
| Dryland cultivation (tegal) | 1,253.4 | 20.14 |
| Settlement and Homeyards | 1,983.2 | 31.86 |
| Others | 968.6 | 15.56 |
| Total | 6,225.8 | 100.00 |

Source: Panjatan District Office



- LEGEND:**
-  : Sawah
 -  : Tegal
 -  : Kebun
 -  : Sand dunes
 -  : roads

source: Village maps (1:10000)
District map (1:25000)

scale = 1 : 75 000

| | | |
|--|----------|------------|
| THE UNIVERSITY OF MANITOBA NATURAL RESOURCE INSTITUTE | | |
| PANJATAN DISTRICT | | |
| Present Land use | | |
| Prepared by | std. no: | figure no: |
| Soenyoto | 5080552 | 1 |

Panjatan District consists of eleven villages. From Table 2, it can be seen that Pleret village controls the largest land area (889.1 Ha), and Panjatan village controls the smallest (154 Ha).

TABLE 2: VILLAGES IN PANJATAN DISTRICT 1977

| Village | Area (Ha) | Percentage |
|------------|-----------|------------|
| Pleret | 889.1 | 14.28 |
| Garongan | 871.8 | 14.01 |
| Krembengan | 866.5 | 13.91 |
| Bugel | 842.5 | 13.62 |
| Cerme | 576.1 | 9.24 |
| Bojong | 537.6 | 8.63 |
| Gotakan | 486.2 | 7.80 |
| Depok | 380.5 | 6.10 |
| Kanoman | 312.3 | 5.01 |
| Tayuban | 308.8 | 4.96 |
| Panjatan | 153.6 | 2.45 |
| Total | 6,225.8 | 100.00 |

Source: Panjatan District Office

2.2 Climate

The climate of the Panjatan district is typically tropical. The average annual rainfall normally exceeds 1,600 mm (Table 3). According to Schmidt and Fergusson (1951), Panjatan district has a Q value for rainfall of 71.4 percent. This type of rainfall is known as type D. (Appendix II/A). Q is the ratio (in percent) between the number of dry months and the number of wet months. D is a classification of which rank from very wet region (A) to very dry region (H).

Panjatan district has two main seasons. The wet season (north-west monsoon) from the beginning of November to the end of April, and the dry season (south-east monsoon) from the end of May to the middle of October. Monthly precipitation varies between 97 mm and 340 mm from November through April. The dry season months register an average 0 to 154 mm of rain, which is insufficient to sustain a dry-season crop.

The average temperature annually is 26.2°C, based on 26.30°C for Indonesia as an average at 0 meter above the sea level, because there is no temperature data in the area.

TABLE 3
MONTHLY RAINFALL IN PANJATAN
1968 - 1977
(mm)

| Year | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jly. | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|------|------|-------|-------|-------|-----|------|------|------|-------|------|-------|-------|-------|
| 1968 | 254 | 265 | 240 | 227 | 76 | 82 | 58 | 18 | 5 | 19 | 98 | 251 | 2603 |
| 1969 | 257 | 276 | 234 | 364 | 89 | 54 | 48 | 9 | 7 | 21 | 97 | 201 | 1557 |
| 1970 | 301 | 310 | 210 | 196 | 97 | 32 | 29 | 3 | 0 | 29 | 137 | 247 | 1657 |
| 1971 | 284 | 247 | 237 | 201 | 95 | 37 | 19 | 2 | 0 | 58 | 93 | 247 | 1545 |
| 1972 | 255 | 297 | 242 | 138 | 154 | 28 | 24 | 0 | 9 | 49 | 232 | 237 | 1542 |
| 1973 | 283 | 266 | 257 | 210 | 137 | 57 | 32 | 0 | 0 | 37 | 105 | 207 | 1530 |
| 1974 | 237 | 315 | 216 | 187 | 98 | 59 | 28 | 14 | 11 | 37 | 107 | 214 | 1522 |
| 1975 | 298 | 320 | 255 | 296 | 92 | 32 | 18 | 10 | 0 | 47 | 147 | 242 | 1657 |
| 1976 | 258 | 340 | 245 | 252 | 105 | 31 | 19 | 0 | 7 | 47 | 133 | 227 | 1542 |
| 1977 | 262 | 270 | 260 | 236 | 97 | 39 | 10 | 9 | 6 | 38 | 131 | 257 | 1614 |
| Mean | 270 | 290.5 | 239.5 | 235.7 | 104 | 45.1 | 26.5 | 6.5 | 4.5 | 36 | 122.9 | 232.7 | 16054 |

Source: Agriculture Service

2.3 Soil

Panjatan district has four soil types (Fig. 2).

2.3.1 *Margalit (ML)*

Color of this soil ranges from black to grey. Its character is very plastic when wet, but very hard, compact and breaks easily when it is dry. The water holding capacity is high. This soil is found extensively in Bojong, Depok, Tayuban, and also appears in Panjatan and Gotakan. The percolation of this type of soil is approximately 1 mm/day.

2.3.2 *Laterit (Lr)*

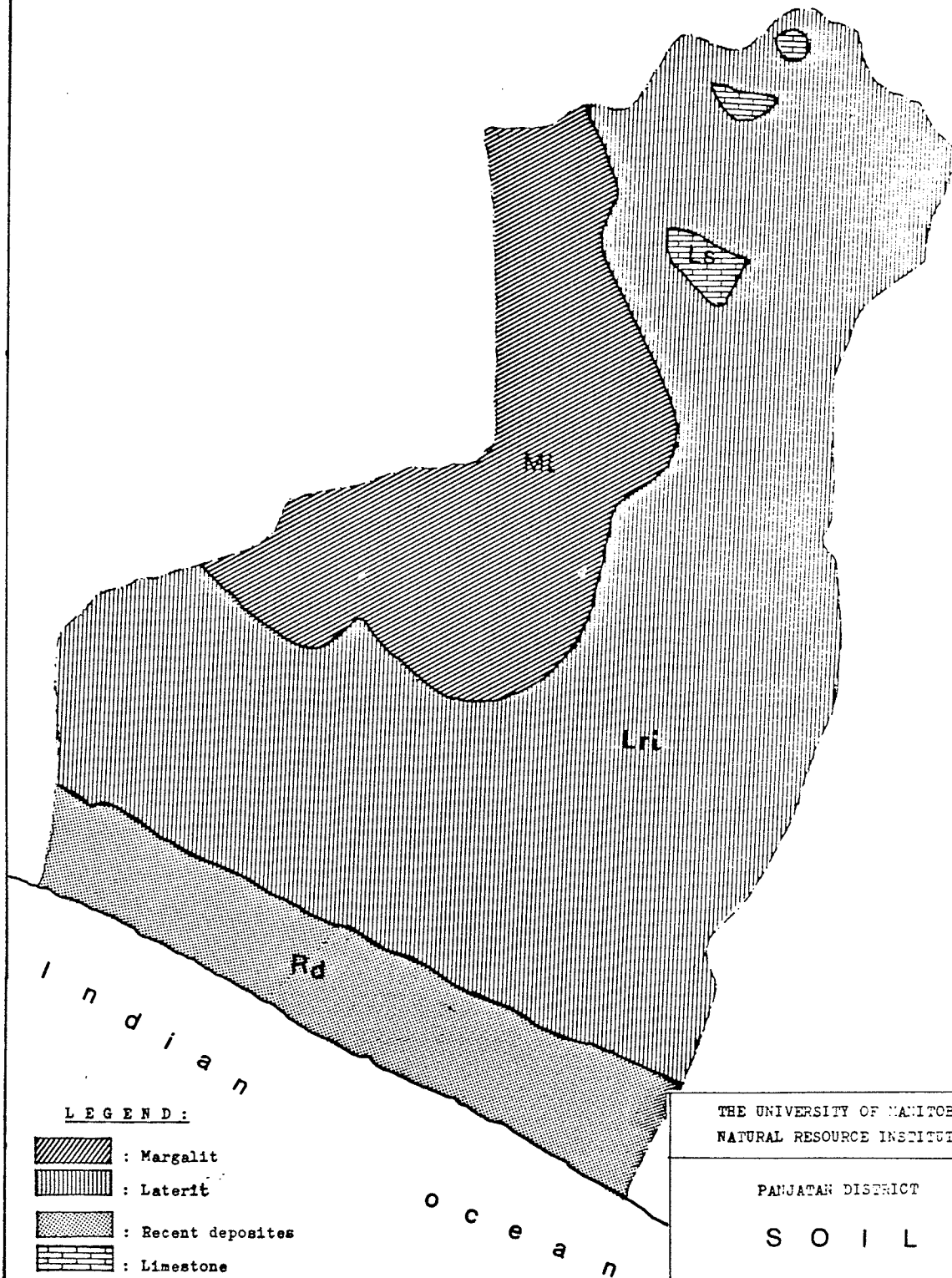
The color of this soil varies from brown to red. The character is not compact, and the structure is loose. Soil volume increases when it is wet, and decreases when dry. This soil type is predominant in Gotakan, Krembengan, Bugel, Pleret and Kanoman. The percolation of this type of soil is approximately 1.6 mm/day.

2.3.3 *Soil of Recent Deposits (Rd)*



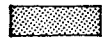
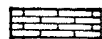
This soil type, which forms the soils of sand-dunes on the coast of the Indian Ocean, is found in the south part of the Panjatan district (in Garongan, Pleret and Bugel). The soil color is grey, brown and white. The present material originated from the volcano of Merapi (about 130 km to the north of this area) and is transported by the Serang River and the Progo River during the wet season. This type of soil is not suitable for agricultural activities.

2.3.4 *Limestone (Ls)*

This soil type is found on the small hills in Cerme and



LEGEND:

-  : Margalit
-  : Laterit
-  : Recent deposits
-  : Limestone

source: Peta Tanah Tinjau (1:1000000)

scale 1 : 75 000

THE UNIVERSITY OF MANITOBA
NATURAL RESOURCE INSTITUTE

PANJATAN DISTRICT

S O I L

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Krembengan. Home yards are located in these areas. Laterit and margalit soils only will be discussed in this report because of their connection with the use of manpower on the farmland. Further discussion will appear in Chapter III.

2.4 Land Use

According to Israelsen (1967), the role of irrigation on the farmland is:

- to add water to the soil to supply the moisture essential for plants.
- to provide crop insurance against drought in short duration.
- to reduce temperature of soil.
- to wash out salts in the soil.
- to reduce the hazard of soil piping.
- to facilitate land cultivation.

These factors indicate that the function of irrigation is very broad. It has a most important role and affects the use of manpower on farmland and the farmer's revenue.

According to conditions of irrigation, the farmland in the area of investigation was divided into three groups according to the stage of irrigation development and practice. Table 4 indicates the area and properties of each group.

TABLE 4: FARMLAND IN PANJATAN DISTRICT 1977

| No. | Category | Area in Ha | Percentage |
|-------|-------------------|------------|------------|
| A | Irrigated Sawah | 1,415.4 | 26.92 |
| B | Rain-fed Sawah | 605.0 | 11.51 |
| C | Dryland (Tegal) | 1,253.5 | 23.84 |
| D | Home yard (Kebun) | 1,983.2 | 37.72 |
| TOTAL | | 5,257.1 | 100.00 |

SOURCE: Panjatan's Agriculture Service

A. The Sawah Irrigation System

The water source is the Kali bawang weir in the Progo River. This area contains, 1,415.4 hectares, planted to rice, with cultivation twice a year. The area under investigation is at the end of a secondary canal, which has a flow capacity of $1.3 \text{ m}^3/\text{s}$. The length of the canal (from Taman) is 12 km and its slope is 0.0003.

B. Rainfed Sawah

This area of 605 hectares, planted in rice, is cultivated once a year. The dry season crop can be maize, cassava, or long pepper.

C. Tegal (Dryland area)

This area of 1,253.5 hectares has no irrigation system and rice cannot be grown. Crops grown in this area include maize, cassava, soybeans and long pepper.

From Table 4 it can be seen that the largest area in the district is kebun (37.72 percent), followed by sawah (26.92 percent), tegal (23.84 percent) and the smallest area is rainfed - sawah (11.51 percent).

Different stages of water development for irrigation are found in the study area resulting in different kinds of crops being grown and different kinds of agricultural activities being pursued. These differences also create a different labour requirement.

2.5 Society

The district of Panjatan is an agricultural region, where

83.72 percent of the inhabitants engage in agricultural activities. Village societies within the district are based on mutual aid (gotong-royong). This ethic of mutual-aid is displayed by the inhabitants in the general ceremonies, building houses, and working together for general need (as in repairing a road or canal) and in the security of the village. This is the result of custom, belief and tradition.

Almost all the people in Panjatan district are moslem. They pray five times per day, in early morning, at noon, afternoon, early evening, and about 8 p.m. In the evening, they pray together in the mosque, from 6 p.m. until 8 p.m. Between those two prayer times, they speak to each other about tomorrow's plans, and today's activities. This is like a daily general meeting, and also it is the best place to look for people for weeding, to hire people for transplanting, and to borrow pest control equipment, etc. The mosque is the informal communication centre in the villages.

The workday, in the field, begins at 7 a.m. and continues to 10:30 a.m., when workers go home for lunch and noon prayer. Between 10:30 a.m. and 3 p.m. it is too hot in the fields, and the second activity starts at 3 p.m. and continues to 4:30 p.m.

2.6 Income

Approximately ten percent of the inhabitants combine farming with other work to supplement their income. Nearly three-quarters (73 percent) were engaged in farm activities only, while about 15 percent were in non-farm occupations.

The 15 percent of the people engaged in non-farm occupations

had an average income of approximately \$20.00 per month, ranging from \$15.00 per month (labourers) to \$45.00 per month (school teachers).

The average annual income for the farmers was approximately \$300.00 (including the coconuts, fruits in their home yards and renting their buffaloes). Most farmers have a mixture of land types. The income from the mixture ranges between \$240 (tegal owners) and \$420 (sawah owners) annually.

About 5 percent of its inhabitants have annual revenue in excess of \$2,000.00. They are the chief of the district, the chiefs of villages, policemen, and rich farmers.

2.7 Markets

In Panjatan district there are three markets: Pasar Pon, Pasar Legi and Pasar Wage. These three markets are small. They function to sell and buy everyday necessities of the inhabitants. Almost all food production is consumed locally, except coconuts. People from the city come to the village every week to buy coconut meat. Unfortunately, the farmer can never decide on the price of the coconuts, since the price absolutely depends on the city buyer. To sell their coconuts at a better price, some people go to Pasar Wates.

Panjatan district is served by a medium-sized road (12 meters wide), but the traffic is minimal. This is due to the very small scale of economic activity. The kind of vehicles which pass there are trucks, cars, motorcycles, carriages and bicycles.

CHAPTER III

POPULATION CONDITIONS RELATED TO MANPOWER SUPPLY

The main significance of population is its relation to the supply of manpower. The following aspects of population will be discussed in this chapter:

1. Population totals, density and distribution
2. The composition of the population
3. Fertility, mortality and migration
4. Family planning
5. The supply of manpower

3.1 Population Totals, Density and Distribution

Total population of the study area in 1977 was 32,896 (Table 5). The area of the eleven villages in the study area totals 6,224 hectares (62.24 square kilometers). Population densities for all villages in Panjatan district, expressed as total population divided by total area, are shown in Table 5, Panajatan village had the greatest density (897

TABLE 5
DISTRIBUTION AND POPULATION DENSITY
PANJATAN DISTRICT 1977

| Village | Total Population | Total Area in km ² | Population Density |
|------------|------------------|-------------------------------|--------------------|
| Panjatan | 1,382 | 1.54 | 897 |
| Kanoman | 2,271 | 3.12 | 728 |
| Depok | 2,852 | 3.81 | 748 |
| Bojong | 3,743 | 5.37 | 697 |
| Tayuban | 2,108 | 3.09 | 682 |
| Krembengan | 4,453 | 8.67 | 514 |
| Cerme | 2,942 | 5.76 | 511 |
| Gotakan | 2,410 | 4.86 | 496 |
| Bugel | 3,981 | 8.43 | 472 |
| Pleret | 3,913 | 8.89 | 440 |
| Garongan | 2,875 | 8.72 | 330 |

SOURCE: Village Offices

persons/km²) and Garongan Village has the smallest density (330 persons/km²). The average population density is very high, and as a result, there is a shortage of land and an inability to absorb the labour supply at maximum capacity.

3.2 Composition of the Population

In studying the composition of a population, a number of characteristics of the inhabitants are of particular interest including:

- the age-sex composition of the society
- the size of the dependent population, including those people who are not yet productive, plus those who are no longer productive
- the size of the economically active population
- the occupational structure of the population

This section will examine these characteristics of Panjatan district population.

3.2.1 *Age - Sex Composition*

Age-sex composition data for Panjatan district were not readily available. The data for this study were collected from family card-list in each village and the results are listed in Table 6. The number of females (17,009) exceeded the number of males (15,887). Thus, the sex-ratio was found to be 93.40 males per 100 females. This may be the result of migration, as in-migration of females is higher than that for males, while out-migration of females is lower than for males.

The population pyramid for Panjatan district has a broad base (Fig. 3). The population pyramid can be classified as an expansive type (William Petersen, 1972), which means that

TABLE 6
AGE - SEX COMPOSITION
PANJATAN DISTRICT 1977

| Age-Group | Male | Percentage | Female | Percentage | Total | Percentage |
|-----------|--------|------------|--------|------------|--------|------------|
| 0 - 4 | 2,130 | 13.41 | 2,251 | 13.22 | 4,381 | 13.31 |
| 5 - 9 | 2,014 | 12.68 | 2,101 | 12.34 | 4,115 | 12.50 |
| 10 - 14 | 1,625 | 10.23 | 1,779 | 10.45 | 3,404 | 10.34 |
| 15 - 19 | 1,220 | 7.69 | 1,218 | 7.15 | 2,438 | 7.41 |
| 20 - 24 | 1,084 | 6.82 | 1,076 | 6.32 | 2,160 | 6.56 |
| 25 - 29 | 982 | 6.18 | 1,020 | 5.99 | 2,002 | 6.08 |
| 30 - 34 | 904 | 5.69 | 949 | 5.57 | 1,853 | 5.63 |
| 35 - 39 | 909 | 5.72 | 934 | 5.48 | 1,843 | 5.60 |
| 40 - 44 | 919 | 5.78 | 969 | 5.69 | 1,888 | 5.74 |
| 45 - 49 | 830 | 5.22 | 939 | 4.41 | 1,769 | 5.37 |
| 50 - 54 | 764 | 4.81 | 927 | 5.44 | 1,691 | 5.14 |
| 55 - 59 | 631 | 3.97 | 704 | 4.13 | 1,335 | 4.06 |
| 60 - 64 | 595 | 3.74 | 642 | 3.77 | 1,237 | 3.76 |
| 65 - 69 | 540 | 3.40 | 614 | 3.60 | 1,154 | 3.51 |
| 70 - 74 | 449 | 2.83 | 443 | 2.60 | 892 | 2.71 |
| 75 - 79 | 226 | 1.42 | 318 | 1.87 | 544 | 1.65 |
| 80 + | 65 | 0.41 | 125 | 0.73 | 190 | 0.58 |
| Total | 15,887 | 100.00 | 17,009 | 100.00 | 32,896 | 100.00 |

Source: Village Offices

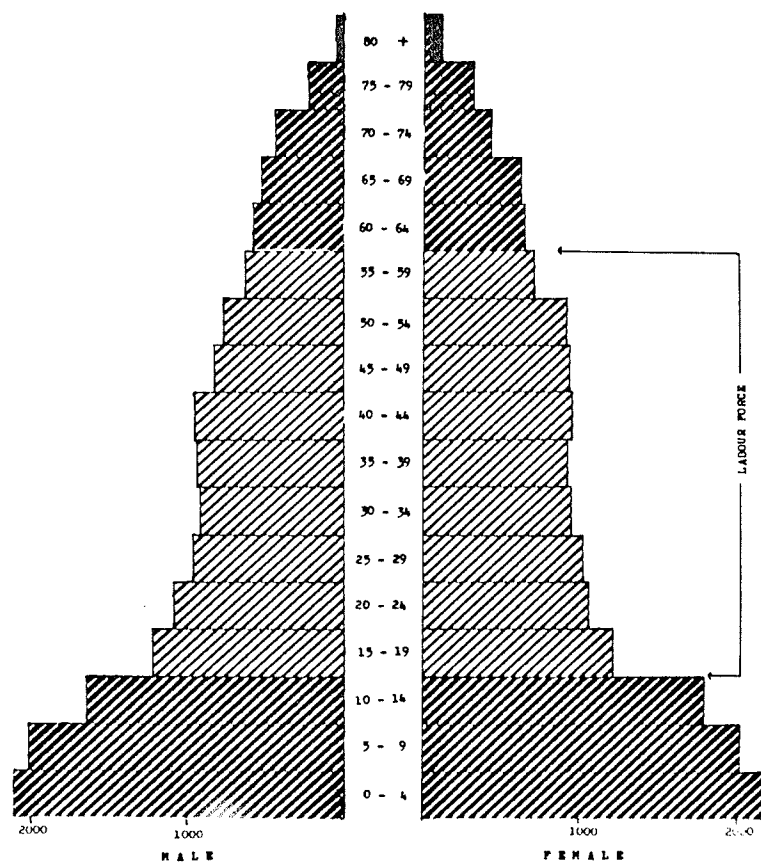


Figure 3
Age-Sex Composition 1977
Panjatan District

the proportion of children is high, the aged population is proportionally small, the population growth is very rapid.

According to Widjojo Nitisastro (1965), three age classifications occur in any population:

0 - 14 years = the group of people who are not yet productive

15 - 59 years = the age of economically active

60 + years = the group of people who are no longer economically productive.

In Panjatan district (Table 6), there were 11,900 (36.17 percent) people aged 0 - 14 years in 1977; 16,979 (51.61 percent) individuals aged 15 - 59 years, and 4,017 (12.22 percent) people 60 years of age and over.

The dependency ratio in Panjatan district is

$$\frac{11,900 + 4,017}{16,979} \times 100 = 93.74 \text{ dependents per 100 people of working age.}$$

Such a very high dependency ratio is characteristic of developing countries.

But "dependents" in Indonesia, however, are not absolutely dependent. Children 9 - 14 years old help their parents in the evening by bringing home cattle, feeding cattle, cleaning harrows and so on, while old people take care of their grandchildren while their mother works in the sawah.

3.2.2 *Occupational Composition*

The 1977 occupational structure of the Panjatan district population is shown in Table 7.

Farmers together with their wives and working age dependents make up 40.64 + 43.08 = 83.72 percent of the total working age population.

TABLE 7
OCCUPATIONAL COMPOSITION OF WORKING AGE POPULATION
IN PANJATAN DISTRICT 1977

| Occupation | Male | Female | Total | Percentage |
|-----------------------|-------|--------|--------|------------|
| Farmers | 6,901 | - | 6,901 | 40.64 |
| Housewife (Farm help) | - | 7,314 | 7,314 | 43.08 |
| Government Officer | 302 | 138 | 440 | 2.59 |
| Trade | 246 | 604 | 850 | 5.01 |
| Building workers | 644 | - | 644 | 3.79 |
| Others | 150 | 680 | 830 | 4.89 |
| TOTAL | 8,243 | 8,736 | 16,979 | 100.00 |

SOURCE: Panjatan District Office

3.3 Fertility, Motality and Migration

Fertility refers to the actual level of births in the population, namely the number of live births that occur annually. Mortality refers to the occurrence of deaths in the population of a unit area, namely the number of deaths that occur annually.

The crude birth rate (C.B.R.) is the total number of live births recorded within one year, per thousand people (mid-year population). The crude death rate (C.D.R.) is the total number of deaths recorded in one year, per thousand people (mid-year population).

Crude birth rate for Panjatan district has been calculated as 37.29 per 1,000 people, while the crude death rate is 12.03 per 1,000 people. Average of natural population growth each year is 25.26 per 1,000 people. This means that for each 1,000 persons there is an annual increase of 25.26 people. In comparison

TABLE 8

NATURAL POPULATION GROWTH, PANJATAN DISTRICT 1972-1977

| Year | Population in the middle Year | Birth Recorded | Death Recorded | C.B.R. | C.D.F. | Rate of Natural Pop- ulation Growth |
|---------|-------------------------------------|-------------------|-------------------|--------|--------|---|
| 1972 | 30,389 | 1,152 | 358 | 37.90 | 11.78 | 25.12 |
| 1973 | 30,945 | 1,147 | 387 | 37.07 | 12.50 | 24.57 |
| 1974 | 31,757 | 1,210 | 399 | 32.51 | 12.69 | 25.82 |
| 1975 | 31,757 | 1,188 | 386 | 37.42 | 12.15 | 25.27 |
| 1976 | 32,091 | 1,166 | 375 | 36.35 | 11.67 | 24.68 |
| 1977 | 32,451 | 1,184 | 368 | 36.50 | 11.34 | 25.14 |
| TOTAL | 189,053 | 7,047 | 2,273 | | | |
| AVERAGE | 31,509 | 1,175 | 379 | 37.29 | 12.03 | 25.26 |

SOURCE: Panjatan District Office

national data for Indonesia, (C.B.R. = 38 per 1,000 people and C.D.R. = 14 per 1,000 people) Panjatan district has similar for population growth. But C.D.R. in the Panjatan district was somewhat smaller than the national figure, possibly because Panjatan district is in Java Island, and Java is more developed than the other islands of Indonesia.

3.3.2 Migration

Migration is defined as movement of an individual from one regional unit to another for a certain minimum period of time. This involves a change of residence from one community to another and usually the crossing of a specific kind of administrative boundary (Kosinski, 1975, p. 27).

Migration in Panjatan is mainly permanent migration and seasonal migration is unimportant. Out-migration includes people who go to another island (transmigration program) or look for a job in the big cities. In-migration includes people

who have made an unsuccessful living in another island or country (return migration).

TABLE 9
IN-MIGRATION AND OUT-MIGRATION
PANJATAN DISTRICT 1972-1977

| Year | In-Migration | | | Out-Migration | | |
|-------|--------------|--------|-------|---------------|--------|-------|
| | Male | Female | Total | Male | Female | Total |
| 1972 | 68 | 87 | 155 | 76 | 50 | 126 |
| 1973 | 29 | 55 | 84 | 70 | 72 | 142 |
| 1974 | 37 | 48 | 85 | 70 | 68 | 138 |
| 1975 | 27 | 17 | 44 | 53 | 48 | 101 |
| 1976 | 86 | 62 | 148 | 37 | 34 | 71 |
| 1977 | 20 | 35 | 55 | 61 | 57 | 118 |
| TOTAL | 267 | 304 | 571 | 365 | 331 | 696 |

SOURCE: Panjatan District Office

Table 9 shows that during the past 6 years (1972-1977), in-migration totalled 571, and out-migration was 696 people. During these 6 years the population decreased due to the migration of 125 people, about 21 persons per year.

In comparison to the total population of Panjatan district in 1977 (32,896 persons), however, net migration (out migration - in migration) is only about $\frac{21}{31,896} \times 1000 = 0.64$ per 1,000, which can be considered insignificant. Net loss of population through migration accounts for only about 2.5 percent of the annual population increase.

3.4 Family Planning

Even though family planning is now seen as an integral part of Indonesia's development efforts (Hull, Terence, 1977) only a small part of Panjatan couples have accepted the family planning program. The majority of questionnaire respondents (about two-thirds) unequivocally stated they had not and would not accept family planning. Analysis of their reasons revealed that two major factors were involved. One was the strong desire to have more children, and the other reason was the apprehension or fear of family planning, as expressed in such terms as "I feel shy", "my wife feels shy", "I do not understand the reason for it", and so. Another factor is the general opposition of religious leaders to the family planning program. In Cerme village, for example, a total of 1,346 people had been born from the 267 women. The number reported by each women ranged from one to nine, with an average of five. In response to the question, "How many additional children do you want to have?", less than one-third of the couples said they did not want any more children. The majority wanted more children and depended on "God's will" to determine the actual number.

Attitudes and behaviour concerning family planning seemed to be related to age and education. The first person to accept family planning in villages was usually the local school teacher. The desire for more children was expressed as a reason for rejection of family planning by young people. Some young people said that they might accept family planning in the future, but not now. Religious attitudes were also reasons for not accepting

family planning (ie. family size determined by "God's will").

This illustrates that family planning has not yet reached the rural poor area, and that natural population growth will likely remain constant for some time.

3.5 Labour Supply

According to Iskandar (1972), labour force may be defined as that part of the population which is already involved or could be drawn into the economic process.

In this case, manpower includes:

1. Persons who actually work.
2. Persons who do not work but are seeking a job.

TABLE 10
AGE-SEX COMPOSITION OF MANPOWER PANJATAN DISTRICT 1977

| Age Group | Male | Percentage | Female | Percentage | Total | Percentage |
|-----------|-------|------------|--------|------------|--------|------------|
| 15-19 | 1,220 | 14.80 | 1,218 | 13.94 | 2,438 | 14.36 |
| 20-24 | 1,084 | 13.15 | 1,076 | 12.32 | 2,160 | 12.72 |
| 25-29 | 982 | 11.91 | 1,020 | 11.68 | 2,002 | 11.79 |
| 30-34 | 904 | 10.97 | 949 | 10.86 | 1,853 | 10.91 |
| 35-39 | 909 | 11.03 | 934 | 10.69 | 1,843 | 10.85 |
| 40-44 | 919 | 11.15 | 969 | 11.09 | 1,888 | 11.12 |
| 45-49 | 830 | 10.07 | 939 | 10.75 | 1,769 | 10.42 |
| 50-54 | 764 | 9.27 | 927 | 10.61 | 1,691 | 9.96 |
| 55-59 | 631 | 7.65 | 704 | 8.06 | 1,335 | 7.21 |
| TOTAL | 8,243 | 100.00 | 5,736 | 100.00 | 16,979 | 100.00 |

SOURCE: From Table 6

As mentioned previously, the 1977 manpower supply consisted of 16,979 people (about 51.6 percent of the total population). This manpower was distributed among eleven villages as shown in Table 11.

TABLE 11

POPULATION AND MANPOWER SUPPLIED BY PANJATAN DISTRICT 1977

| Village | Total Population | Manpower | Percentage |
|-----------|------------------|----------|------------|
| Krebengan | 4,453 | 1,908 | 42.85 |
| Bugel | 3,981 | 2,310 | 58.03 |
| Pleret | 3,913 | 3,524 | 64.50 |
| Bojong | 3,743 | 1,640 | 43.81 |
| Cerme | 2,942 | 1,443 | 49.05 |
| Garongan | 2,875 | 1,741 | 60.56 |
| Depok | 2,852 | 1,193 | 41.83 |
| Gotakan | 2,410 | 1,282 | 53.20 |
| Tayuban | 2,108 | 1,050 | 49.81 |
| Kenoman | 2,271 | 1,271 | 55.97 |
| Panjatan | 1,382 | 616 | 44.57 |
| TOTAL | 32,896 | 16,979 | 51.60 |

SOURCE: Village Offices

Main attitudes of the population of Panjatan district include a high population density, high proportion of children, small proportion of the aged population, and population growth which is relatively rapid. Migration in this area is not important as compared with the natural population growth. The family planning program has not yet been successful. The supply of labour is also very high.

CHAPTER IV

AGRICULTURE IN CONNECTION WITH MANPOWER

Agriculture is the use of human effort together with materials and forces of nature with the aim of receiving harvests or products which originated from plants or animals. There are three types of land use in the area under investigation: wetland rice cultivation (sawah), dryland cultivation (tegal) and home yards (kebun). Land use, soil type, kind of crop, and the system of the water supply will all influence the manpower demand on the farmland.

4.1 Cropping Pattern

Differences in cropping patterns are necessitated by different soil types and the water supply system. There are generally three types of land use cropping pattern.

A. Sawah

Two kinds of sawah are found in the study area: irrigated sawah and rainfed sawah. *Irrigated sawah* can generally be planted twice a year. The crop rotation pattern consists of padi rendeng which is rice cultivation in the wet season with land preparation in November, nursery in November, transplanting in December and harvesting in March or April. While padi-gadu is rice cultivation in the dry season with land preparation in April, transplanting in May and harvesting in August or September. *Rainfed sawah* is found in the southern part of the study area. Padi rendeng usually is planted in December and harvested in March. After that the next crop is usually soybean, with

planting in April and harvesting at the end of June. If there is enough rainfall at the end of June, a third crop, maize, is sown and harvested in September or October.

B. Tegal

Generally on this type of land, only dry crops may be planted. Crops grown are maize, soybeans, long pepper and cassava, and only a very small portion of sweet potatoes, tobacco and small peppers. Long pepper and maize are planted in November and harvested in February or March. A second crop, usually cassava, is planted in March and harvested in August or September.

C. Kebun

Generally on this kind of land, coconut, banana, orange, bamboo and other trees are grown. Most of this land consists of housing and home yards. According to interviews with the Agriculture service officers in Panjatan and Jagyarkarta, the labour activities on the kebun area includes only about 0.2 to 0.3 of the irrigated sawah activities, such as monthly coconut harvesting, constructing bamboo fences once a year, harvesting bananas, mangoes, cleaning the grass, are common activities.

4.2 Land Use Methods

This section describes how farmers use farmland for various crops and farm activities. Land preparation, nursery, transplanting, crop care and harvesting will be discussed.

Land preparation. This activity includes cutting straw, nursery, ploughing I, ploughing II, harrowing, smoothing and bound restoration.

Crop care. This activity includes pulling the seed, transplanting, weeding, fertilizer application, pest control, and irrigating.

Harvesting. This activity includes harvesting and transporting the harvest to the owner's home.

In order to determine the kind of activities used for each crop, activities are divided into five types, according to the individual crops:

4.2.1 *Paddy*

Implements used for paddy cultivation in Panjatan are simple and resemble, more or less, those used in other countries in Asia. Main implements include the plough, harrow and rotary harrow and all are light enough to be pulled by bullocks or buffaloes. The Java plough consists of a curved wooden share, shod at the point with iron, handles, and a pole for attachment to the yoke on the necks of a pair of cattle. The harrow consists of a wood log five to six feet in length with ten to twelve wooden teeth, a cross-bar to enable the cultivator to push it into the ground and to be lifted in turning and in freeing the harrow from weeds and two poles for attachment to the yoke.

Land preparation for the coming growing season takes place each November when the cultivator usually hires a ploughman to help him. Bunds or small embankments which are usually 30 cm

to 45 cm (1 to 1.5 feet) wide and 30 cm to 40 cm (1 to 1.5 feet) high and which divide the farm into fields or plots which hold water in each field at a uniform depth, are repaired and the implements prepared.

Cultivation begins as soon as the first monsoon rains in November have softened the soil sufficiently to enable the implements to be used. Fields first cultivated are the nurseries, which comprise about 5 percent of the total area to be worked. Land is ploughed once and harrowed ten to twelve times. When about 20 cm of the top soil has been reduced to a fine soft mud and all weeds are removed or buried, the land is ready for sowing.

Before sowing, water in the nursery is drained off, and the sprouted seed scattered by hand at the rate of about ten baskets per hectare. After a few days, water is allowed to remain on the land and the depth is increased in accordance with the growing height of the plants. Seedlings are transplanted after four weeks in the nursery, when they have attained a height of 50 cm.

While seedlings are growing in the nursery, main fields are ploughed and harrowed in the same manner as the nursery, though usually less thoroughly. From the first week of December, transplanting is done in most districts. In non-irrigated areas if precipitation water has not sufficient, transplanting may be delayed.

Seedlings are plucked and carried from the nurseries by men, but the actual transplanting is done both by men and women. Transplanters work in a line, moving backwards. Two or three

seedlings are pushed into a soft mud by hand spaced about 20 cm apart. This is done with remarkable speed and precision due to long practice.

Weeding is done by men and women. The first weeding is done 20 days after planting followed by a second weeding 16 days later, and the third weeding usually when the rice is 53 days old.

Fertilizer is applied three times, usually 10 days after planting, two days before second weeding, and two days before third weeding. Pesticides are used two days after first seeding and two days after third weeding.

Even though paddies are found on irrigated sawah, the landowner must give special attention to irrigation.

Harvesting is done using a Javanese custom, where groups of 20 or more women and men carefully harvest the rice, stalk by stalk, and neatly tie the grain into small bundles for drying.

4.2.2. *Maize*

Maize needs non-compact, dry soil. Activities include ploughing, smoothing, holing, planting and weeding.

Water spraying is done one day after fertilizer application in order to percolate fertilizer into the soil.

Fertilizer is applied 16 and 36 days after planting. All activities are done by hand.

4.2.3 *Soybeans*

Soybeans also need non-compact, dry soil. This crop usually requires one weeding and one application of pesticide. All activities are similar to those used for maize.

4.2.4 Long Pepper

Long pepper needs non-compact, moist soil, with planting usually taking place in the wet season. Activities are similar to those used for maize and soybean, long pepper needs twice as much labour as soybean.

4.2.5 Cassava

Cassava does not grow well under wet conditions and grows well in non-compact dry soil. It does not need very much labour input, because after the crop is 45 days old, it can be left to grow without additional input until ready for harvesting.

4.3 Farm Size

The total population of study area in 1977 was 32,896 people, comprised of 5,088 households. Thus, the average family farm size is about 1.03 hectares (2.57 acres), consisting of 0.40 hectares (0.99 acres) sawah, 0.25 hectares (0.62 acres) tegal and 0.38 hectares (0.94 acres) kebun. In order to determine family farm size in the study area under investigation, 52 respondents were questioned about their farming activities. Table 12 shows that families having a farmland (sawah and tegal) of 0.00 - 0.49 hectares make up 50 percent of the total population,

TABLE 12: FAMILY SIZE OF 52 RESPONDENTS IN PANJATAN DISTRICT 1978

| No. | Family Land Size (Ha) | Total Farmers | Percentage |
|-------|-----------------------|---------------|------------|
| 1 | 0.00 - 0.49 | 26 | 50 |
| 2 | 0.50 - 0.79 | 13 | 25 |
| 3 | 0.80 - 0.99 | 4 | 8 |
| 4 | 1.00 - 2.99 | 8 | 15 |
| 5 | 3.00 - 4.99 | 1 | 2 |
| 6 | 5.00 + | - | - |
| TOTAL | | 52 | 100.00 |

SOURCE: Primary data

and no family possesses farmland of more than five hectares.

4.4 Job Opportunities per Hectare of Farmland

The method of determining job opportunities per hectare of the farmland is as follows:

1. Calculate the number of man days needed per hectare according to the kind of crop grown for sawah, tegal, and kebun.
2. Calculate job opportunities each month, as obtained from respondents' answers.

Table 13 shows the approximate working hours needed per hectare (labour input per hectare) according to the kind of crop grown, and the type of activity on the sawah, tegal and kebun.

TABLE 13
CROP LABOUR INPUT PER HECTARE IN PANJATAN DISTRICT 1978
ACCORDING TO THE KIND OF CROP AND THE KIND OF ACTIVITY

| Land Use | Land preparation | | Crop Care Man hrs. Per Ha. | Harvesting Man Hrs. Per Ha. | Total | |
|-------------------|---------------------|----------------------|----------------------------------|-----------------------------------|---------------------|-----------------|
| | Man hrs. Per Ha. | Pair Hrs. Per Ha. | | | Man Hrs. Per Ha. | Pair Hrs./Ha |
| <u>SAWAH</u> | | | | | | |
| Rice: Male | 330 | 70 | 300 | 220 | 850 | 70 |
| Female | - | - | 225 | 220 | 445 | - |
| Soybean: Male | 85 | 55 | 85 | 40 | 210 | 50 |
| Female | - | - | 50 | 40 | 90 | - |
| Maize: Male | 55 | 45 | 125 | 40 | 220 | 45 |
| Female | - | - | 25 | 40 | 65 | - |
| <u>TEGAL</u> | | | | | | |
| Maize: Male | 55 | 45 | 125 | 40 | 220 | 45 |
| Female | - | - | 25 | 40 | 65 | - |
| Soybeans: Male | 85 | 55 | 85 | 40 | 210 | 50 |
| Female | - | - | 50 | 40 | 90 | - |
| Long Pepper: Male | 90 | 55 | 150 | 80 | 320 | 55 |
| Female | - | - | 140 | 80 | 220 | - |
| Cassava: Male | 70 | 40 | 80 | 40 | 190 | 40 |
| Female | - | - | 30 | 35 | 65 | - |
| <u>KEBUN</u> | | | | | | |
| Male | - | - | - | - | 30 | - |
| Female | - | - | - | - | 15 | - |

Source: From Appendix IV/B and IV/C

The table also shows that rice cultivation needs the greatest total man-hours per hectare (1,295 man-hours/Ha, or 259 man-days/Ha), while the cassava only requires 230 man-hours/Ha, or about 46 man-days/Ha.

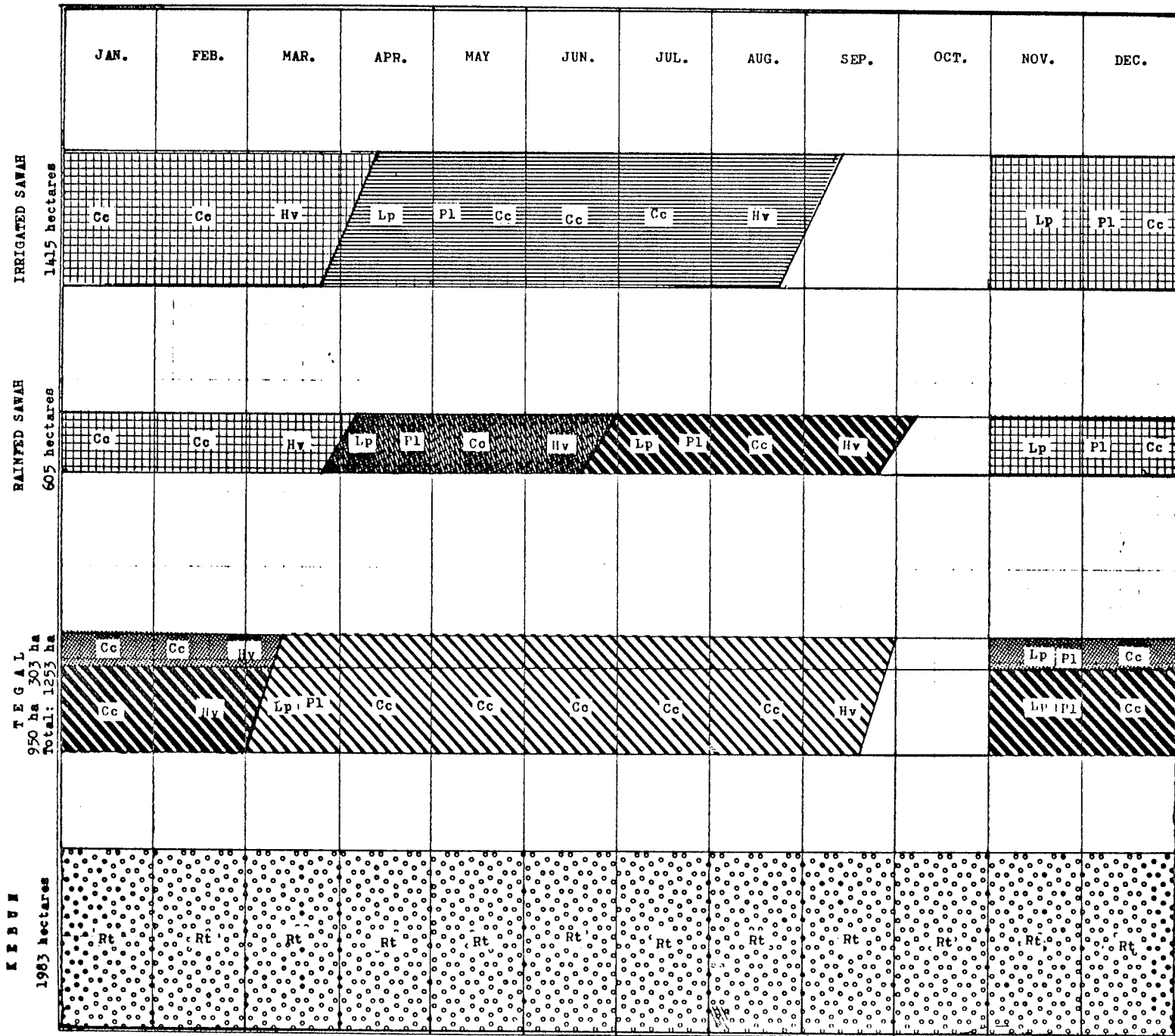
4.5 Monthly Job Opportunities

According to the number of man-hours required per hectare (Table 13) it is possible to calculate the monthly job opportunities for the farmland (Table 14). Size of the planting and harvest area by month was obtained from the Agriculture Service in the Panjatan district (Fig. 4), while the crop labour input per hectare per each kind of crop was obtained from the questionnaire respondents and fieldwork.

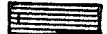






TABLE 14
MANPOWER DEMAND EACH MONTH AT THE PRESENT LAND USE
PANJATAN DISTRICT 1977

| Land Use | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sept. | Oct. |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| IRR. SAWAH 1,415 ha. | | | | | | | | | | | | |
| male | 466,950 | 148,575 | 134,425 | 141,500 | 311,300 | 466,950 | 148,575 | 134,425 | 141,500 | 311,300 | - | - |
| female | - | 91,975 | 99,050 | 99,050 | 311,300 | - | 91,975 | 49,050 | 99,050 | 311,300 | - | - |
| SAWAH 605 ha. | | | | | | | | | | | | |
| male | 199,649 | 63,525 | 57,475 | 60,500 | 133,100 | 5,272 | 51,425 | 24,200 | 33,275 | 75,625 | 24,200 | - |
| female | - | 39,325 | 45,375 | 54,559 | 133,100 | - | 30,250 | 24,200 | - | 15,125 | 24,200 | - |
| TEGAL 303 ha. | | | | | | | | | | | | |
| male | 27,270 | 24,240 | 21,210 | 24,240 | 21,210 | 9,090 | 15,150 | - | - | - | 12,120 | - |
| female | - | 21,210 | 21,210 | 24,240 | - | - | 9,090 | - | - | - | 10,605 | - |
| TEGAL 950 ha. | | | | | | | | | | | | |
| male | 52,250 | 76,000 | 52,250 | 38,000 | 66,500 | 28,500 | 47,500 | - | - | - | 38,000 | - |
| female | - | 19,000 | 4,750 | 38,000 | - | - | 28,500 | - | - | - | 32,250 | - |
| KEBUN 1,983 ha. | | | | | | | | | | | | |
| male | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 |
| female | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 |
| TOTAL (man-hours) | | | | | | | | | | | | |
| male | 805,609 | 372,420 | 324,660 | 323,530 | 591,160 | 615,285 | 321,970 | 218,035 | 191,705 | 505,655 | 133,730 | 59,490 |
| female | 29,745 | 201,125 | 199,980 | 245,305 | 193,705 | 29,745 | 163,460 | 132,660 | 128,795 | 356,120 | 97,720 | 29,745 |
| TOTAL (man days) | | | | | | | | | | | | |
| male | 161,122 | 74,484 | 64,935 | 64,706 | 118,232 | 123,057 | 64,394 | 43,607 | 38,341 | 101,131 | 26,746 | 11,898 |
| female | 5,949 | 40,225 | 39,997 | 49,061 | 38,741 | 24,611 | 32,692 | 26,532 | 25,759 | 71,224 | 19,544 | 5,949 |

Source: Graph 4, Table 13



LEGEND:

-  : Rice in the dry season
-  : Rice in the wet season
-  : Soy bean
-  : Maize
-  : Long-pepper
-  : Cassava
-  : Kebun
- Lp : Land preparation
- Pl : Transplanting
- Cc : Crop-care
- Hv : Harvest
- Rt : Routine

source : Agriculture Service
 Primary data
 Table I/1 and I/4

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**PRESENT
 CROPPING PATTERN**

| | | |
|-------------|------------|-----------|
| Prepared by | student no | figure no |
| Soenyoto | 5080552 | 4 |

Table 14 indicates that the month of November requires 167,071 man-days (161,122 male and 5,949 female), due to the preparation of 1,415 Ha irrigated sawah, 605 Ha rainfed sawah, 1,253 Ha tegal and 1,983 Ha kebun. October requires the least use of manpower, only 17,847 man-days (11,898 male and 5,949 female), because during this month only kebun activities are required (Fig. 4). Kebun activities are assumed to require 21 percent of manpower for irrigated sawah activities.

4.6 Utilization of Manpower

This section will attempt to show the balance between manpower supply and demand will be calculated, particularly with respect to agricultural activities and determine if there is a surplus of manpower on the farmlands.

Table 7 showed that there were 14,215 farmers (6,901 males and 7,314 females) in the Panjatan district or about 83.72 percent of total manpower. In the next discussion the manpower on the farmland is defined as farmers.

Table 15 shows that there is a difference in demand for manpower each month, because agricultural labour force demand is not always constant. This creates monthly variations in labour surplus. Demand for male labour and female labour is also different each month because different agricultural activities are performed by males and females. Male activities include land preparation, nursery work, irrigation, pest control, weeding and harvesting. Female activities include transplanting, weeding, and harvesting. Average labour utilization

TABLE 15
LEVEL OF UTILIZATION OF MANPOWER ON FARMLAND
PANJATAN DISTRICT 1977

| Month | Supply (Man-days) | | Demand (Man-days) | | Level of Utilization (Percent) | |
|-----------|-------------------|---------|-------------------|--------|--------------------------------|--------|
| | Male | Female | Male | Female | Male | Female |
| January | 213,931 | 226,734 | 64,935 | 39,997 | 30.35 | 17.64 |
| February | 193,228 | 204,792 | 64,705 | 49,061 | 33.49 | 23.91 |
| March | 213,931 | 226,734 | 118,232 | 38,741 | 55.27 | 17.09 |
| April | 207,030 | 219,420 | 123,057 | 24,611 | 59.44 | 11.22 |
| May | 213,931 | 226,734 | 64,394 | 32,692 | 30.10 | 14.42 |
| June | 207,030 | 219,420 | 43,607 | 26,532 | 21.01 | 12.05 |
| July | 213,931 | 226,734 | 38,341 | 25,759 | 17.92 | 11.31 |
| August | 213,931 | 226,734 | 101,131 | 71,224 | 47.27 | 31.41 |
| September | 207,030 | 219,420 | 26,747 | 19,544 | 12.92 | 8.91 |
| October | 213,931 | 226,734 | 11,896 | 5,949 | 5.56 | 2.62 |
| November | 207,030 | 219,420 | 161,122 | 5,949 | 77.83 | 2.71 |
| December | 213,931 | 226,734 | 74,484 | 40,225 | 34.82 | 17.74 |

Source: Table 14
Table 7

for male is 35.50 percent of the available labour force while female labour utilization is only 14.26 percent. This indicates that the level of utilization of manpower on farmland in Panjatan district is very low. The high surplus of manpower is likely due to the following factors:

1. Irrigated sawah makes up only 22.7 percent of the total land area. (Rice cultivation requires more labour input than any other kind of crop).
2. There is a very high supply of manpower.
3. Average amount of land per family is small.
4. Job opportunities outside of agriculture are very limited.

Moreover, population is growing rapidly, so the manpower surplus is likely to get worse if no mitigating measures are taken.

CHAPTER V

METHODS OF IMPROVING THE PERCENTAGE OF MANPOWER UTILIZATION

Monthly supply of manpower in the Panjatan district is almost constant, but monthly demand for manpower in agricultural activities is variable. Thus, the degree of utilization of manpower changes each month, from 5.56 percent in October to 77.83 percent in November for males, and from 2.62 percent in October to 31.41 percent in August for females (Table 15).

In order to improve the efficiency of manpower utilization, two basic methods are available:

1. Improve manpower demand
2. Reduce manpower supply

Improving manpower demand may be accomplished by increasing the irrigated area (because manpower demand for rice cultivation is greater than any other crops). The creation of a new industry will also increase seasonal labour demand (such as a coconut fibre factory; producing coconut carpets, brooms, etc.). One method to reduce manpower supply is to move some people to other places (the transmigration program).

5.1 Extension of Irrigated Sawah

An increase in the amount of irrigated sawah will result in an increase in labour demand over the entire year. Planning for irrigation extension basically consists of determining:

1. available water and quality of water for irrigation
2. irrigable area, type of soil present, and its suitability for sawah

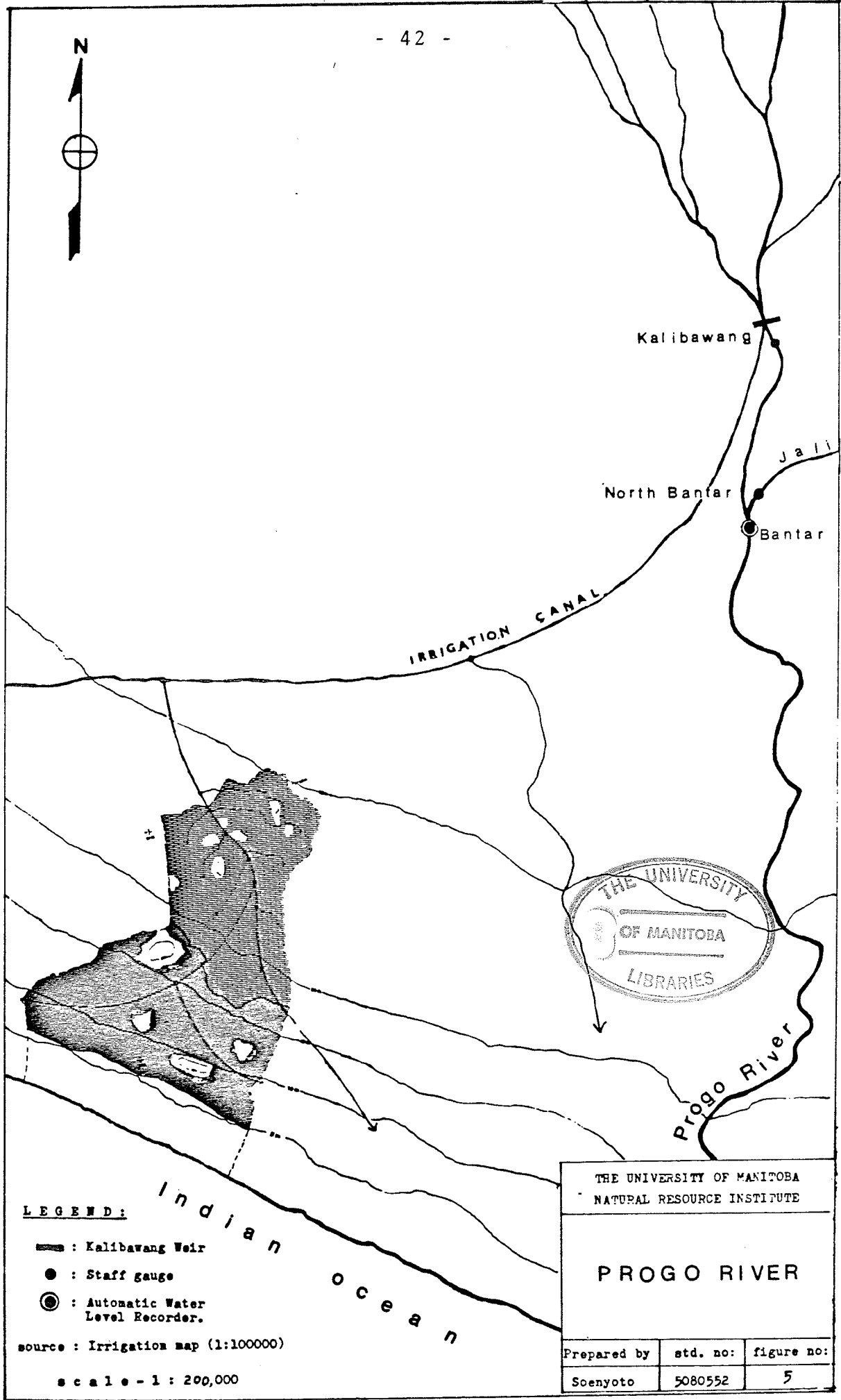
3. irrigation requirements

4. benefit/cost analysis




An adequate water supply, in both quantity and quality is essential for proper irrigation development. After the amount of available water is known, its quality for irrigation purposes must also be determined. Total irrigable area (hectares) can then be calculated in accordance with the available water. Irrigable area depends on topography, soil type and the crops to be grown. The quantity of water needed to meet the consumptive use of the crop to be irrigated must be specified. Water required by irrigation is represented as the difference between crop requirements (consumptive use) and that provided by precipitation. If water requirements are less than effective rainfall in each month, the area does not need irrigation, but if water requirements are greater than effective rainfall in certain months, however, the area needs irrigation. Finally, a benefit/cost analysis should be performed in order to justify project feasibility. Time and budget constraints, however, did not permit this study to deal with irrigation in detail, and does not include a benefit cost analysis.

5.1.1 *Available Water*

Kalibawang weir is the last irrigation diversion canal in the Progo River (Fig. 5). The weir was built in 1931 to ensure irrigation water for two crops of sawah (18,257 Ha) (Dinas Pekerjaan Umum, 1977). At Bantar, about 7 kilometers downstream from this weir, there is one Automatic Water Level Recorder (A.W.L.R.) which was constructed in 1964. Average flow of



LEGEND:

-  : Kalibawang Weir
-  : Staff gauge
-  : Automatic Water Level Recorder.

source : Irrigation map (1:100000)

scale - 1 : 200,000

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PROGO RIVER

| | | |
|-------------|----------|------------|
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| Soenyoto | 5080552 | 5 |

the Progo River at Bantar was calculated using 15 years of data obtained from the AWLR (Table 16). The low flow rate of 12 m³/S occurs in September, the critical dry season in the watershed.

TABLE 16
MONTHLY DISCHARGE OF PROGO RIVER AT BANTAR 1964-1978
in m³/s

| Year | Jan | Feb | Mar | Apr | May | Jne | Jly | Aug | Sept | Oct | Nov | Dec |
|-------|-------|-------|-------|-------|-------|-------|-----|-----|------|-----|-------|-------|
| 1964 | 187 | 190 | 176 | 152 | 87 | 78 | 32 | 18 | 12 | 10 | 58 | 87 |
| 1965 | 197 | 204 | 167 | 149 | 96 | 84 | 26 | 15 | 13 | 17 | 67 | 90 |
| 1966 | 201 | 199 | 177 | 157 | 101 | 86 | 30 | 19 | 12 | 10 | 72 | 90 |
| 1967 | 198 | 203 | 181 | 154 | 104 | 91 | 34 | 18 | 14 | 17 | 64 | 87 |
| 1968 | 192 | 210 | 164 | 147 | 97 | 69 | 35 | 21 | 11 | 21 | 73 | 84 |
| 1969 | 189 | 192 | 168 | 144 | 84 | 72 | 34 | 18 | 12 | 19 | 79 | 85 |
| 1970 | 179 | 192 | 172 | 161 | 89 | 71 | 30 | 19 | 13 | 21 | 83 | 91 |
| 1971 | 191 | 198 | 181 | 157 | 93 | 69 | 34 | 17 | 13 | 18 | 84 | 84 |
| 1972 | 199 | 205 | 184 | 152 | 94 | 64 | 32 | 21 | 11 | 17 | 91 | 92 |
| 1973 | 203 | 211 | 179 | 142 | 101 | 62 | 38 | 24 | 13 | 10 | 76 | 80 |
| 1974 | 196 | 206 | 162 | 147 | 97 | 72 | 39 | 22 | 14 | 18 | 67 | 87 |
| 1975 | 187 | 199 | 167 | 153 | 88 | 68 | 29 | 20 | 13 | 19 | 59 | 88 |
| 1976 | 189 | 197 | 172 | 154 | 92 | 74 | 30 | 17 | 12 | 17 | 57 | 91 |
| 1977 | 193 | 199 | 154 | 156 | 96 | 78 | 35 | 18 | 12 | 10 | 62 | 81 |
| 1978 | 195 | 204 | 168 | 151 | 84 | 82 | 32 | - | - | - | - | - |
| Total | 2,896 | 3,015 | 2,572 | 2,268 | 1,403 | 1,120 | 508 | 257 | 174 | 244 | 1,004 | 1,222 |
| Mean | 193 | 201 | 171 | 152 | 94 | 75 | 34 | 19 | 12 | 18 | 72 | 87 |

Source: Irrigation Office, Yogyakarta

Between Kalibawang weir and Bantar, there is one small tributary of the Progo river, Jali River, (Fig. 5). A staff gauge (manual river gauge) is located in the Jali River, which has been observed three times a day (morning, noon and evening), since 1971. Stream flow from the Jali to the Progo River is shown in Table 17.

TABLE 17
MONTHLY DISCHARGE OF JALI RIVER AT NORTH BANTAR 1971-1978
in m³/s

| YEAR | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|-----|------|------|------|------|------|------|------|
| 1971 | 87 | 82 | 71 | 56 | 39 | 21 | 11 | 2 | 2 | 2 | 18 | 34 |
| 1972 | 86 | 76 | 69 | 56 | 41 | 23 | 9 | 2 | 2 | 3 | 18 | 37 |
| 1973 | 91 | 84 | 68 | 61 | 38 | 18 | 8 | 2 | 2 | 3 | 20 | 38 |
| 1974 | 83 | 81 | 57 | 54 | 35 | 17 | 9 | 3 | 2 | 2 | 24 | 42 |
| 1975 | 82 | 79 | 64 | 52 | 37 | 17 | 10 | 3 | 2 | 2 | 21 | 38 |
| 1976 | 92 | 82 | 68 | 49 | 42 | 19 | 11 | 2 | 2 | 4 | 19 | 33 |
| 1977 | 86 | 76 | 74 | 54 | 37 | 18 | 9 | 2 | 2 | 2 | 23 | 39 |
| 1978 | 85 | 81 | 67 | 55 | 38 | 20 | 8 | - | - | - | - | - |
| TOTAL | 692 | 641 | 538 | 437 | 307 | 153 | 75 | 16 | 14 | 18 | 143 | 261 |
| MEAN | 87 | 80 | 67 | 55 | 38 | 19 | 9 | 2.3 | 2 | 2.5 | 20 | 37 |

Source: Irrigation Office Jogjakarta

Approximately 115 meters downstream from the Kalibawang weir, there is a staff gauge, also observed three times a day, which was installed in May 1977. Stream flow for 14 months of observation is contained in Table 18.

TABLE 18
MONTHLY DISCHARGE OF PROGO RIVER AT KALIBAWANG 1977-1978
in m³/s

| YEAR | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|-----|------|------|------|------|------|------|------|
| 1977 | - | - | - | - | - | 51 | 23 | 14 | 9 | 12 | 33 | 36 |
| 1978 | 93 | 101 | 85 | 87 | 39 | 52 | 21 | - | - | - | - | - |
| TOTAL | 93 | 101 | 85 | 87 | 39 | 103 | 44 | 14 | 9 | 12 | 33 | 36 |
| MEAN | 93 | 101 | 85 | 87 | 39 | 52 | 22 | 14 | 9 | 12 | 33 | 36 |

Source: Irrigation Office, Jogjakarta

From Tables 16 and 17, discharge of the Progo River without additional flow from the Jali River can be calculated. Because the distance between Kalibawang weir to Bantar is about 7 kilometers, the ratio between $(Q_{PB} - Q_J)$ and Q_{PK} must also be calculated (Table 19).

TABLE 19
THE DISCHARGE RATIO BETWEEN Q_{PK} and $Q_{PB} - Q_J$
June 1977 - May 1978

| 1977-78 | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q_{PB} | 78 | 35 | 18 | 12 | 16 | 62 | 81 | 195 | 204 | 168 | 161 | 84 |
| Q_J | 18 | 9 | 2 | 2 | 2 | 23 | 39 | 85 | 81 | 67 | 55 | 38 |
| $Q_{PB} - Q_J$ | 60 | 26 | 16 | 10 | 14 | 39 | 42 | 110 | 123 | 101 | 106 | 46 |
| Q_{PK} | 51 | 23 | 14 | 9 | 12 | 33 | 36 | 93 | 101 | 85 | 87 | 39 |
| $\frac{Q_{PK}}{Q_{PB} - Q_J}$ | 0.85 | 0.88 | 0.88 | 0.90 | 0.86 | 0.85 | 0.86 | 0.85 | 0.82 | 0.85 | 0.82 | 0.85 |

Source: Tables 16, 17, 18

Note: Q_{PB} - Discharge of Progo river at Bantar
 Q_J - Discharge of Jali river at North Bantar
 Q_{PK} - Discharge of Progo river at Kalibawang

The $\frac{Q_{PK}}{Q_{PB} - Q_J}$ ratio for this river ranged between 0.82 and 0.90. To determine the amount of surplus water at Kalibawang weir which may be used for extending the irrigation area necessary to calculate the Progo River discharge downstream of Kalibawang weir over the long range (Table 20).

TABLE 20

THE Q_{PK} AVERAGE ESTIMATION (Available Water)

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q_{PB} Ave (1964-1978) | 193 | 201 | 171 | 152 | 94 | 75 | 34 | 19 | 12 | 18 | 72 | 87 |
| Q_J Ave. (1971-1978) | 87 | 80 | 67 | 55 | 38 | 19 | 9 | 2.3 | 2 | 2.5 | 20 | 37 |
| $Q_{PB} - Q_J$ average | 106 | 121 | 104 | 97 | 56 | 56 | 25 | 16.7 | 10 | 15.5 | 52 | 50 |
| $\frac{Q_{PK}}{Q_{PB} - Q_J}$ | 0.85 | 0.82 | 0.85 | 0.82 | 0.85 | 0.85 | 0.88 | 0.88 | 0.90 | 0.86 | 0.85 | 0.86 |
| Q_{PK} Av. ESTIMATION | 90 | 99 | 88 | 79 | 48 | 48 | 22 | 15 | 9 | 13 | 44 | 43 |

Source: Tables 16, 17, 18, 19

Water in the Progo River is always at a surplus to the requirements upstream of Kalibawang. For September average estimation (the critical dry season month in this area), the surplus was found to be approximately $9 \text{ m}^3/\text{s}$. Salt content was in the range of 100 - 200 ppm, acceptable for irrigation, and the river drains a volcanic watershed area is rich in nutrients. Thus, the water quality is satisfactory for irrigation.

5.1.2 *Irrigable Area*

Irrigation canals generally follow contour lines of fields. A main canal leads water from the weir (or dam) to places where irrigation is to be practiced. Water is turned into the main canal and diversion weirs constructed downstream to divert the water into secondary canals. Weirs are constructed further downstream diverting it into tertiary canals along lower contours and finally onto the land.

The secondary diversion canal in Taman village is at an elevation of 36 metres. If one assumes the slope of the irrigation canal to be 0.00030, and the length of the canal to be 10 kilometers, the elevation of a proposed distribution gate to be 22 metres, and the elevation of the end of the proposed canal will be:

$$\begin{aligned}
 &= 22\text{m} - (0.00030 \times 10 \text{ km}) \\
 &= 22 - (0.00030 \times 10,000) \\
 &= 22 - 3 \\
 &= 19 \text{ metres}
 \end{aligned}$$

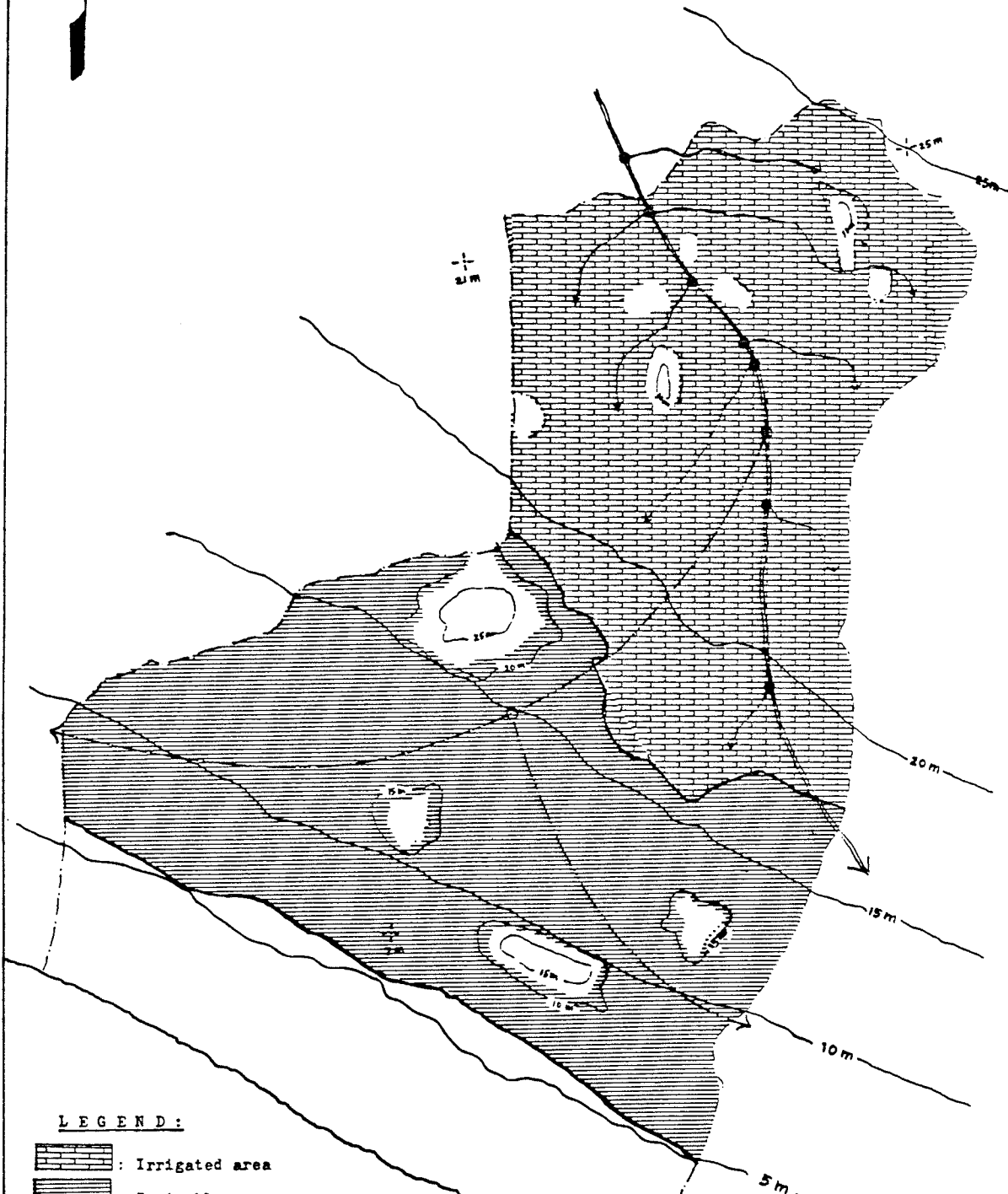
The elevation of the proposed area for irrigation is between 6 metres and 19 metres. Thus all of the rainfed region appears to be irrigable (Fig. 6).

A study of topographical maps and interviews with the Agriculture officer, the chief of Panjatan district, and Public Works Officer in Wates, however, revealed that the maximum new irrigable area would be about 1,482.4 hectares (Table 21).







TABLE 21
IRRIGABLE AREA FOR IRRIGATION EXTENSION
PANJATAN DISTRICT

| Category | Before Extension Ha | After Extension Ha | Increment Ha |
|-------------------|------------------------|-----------------------|-----------------|
| 1 Irrigated Sawah | 1,415.4 | 2,898.0 | + 1,482.4 |
| 2 Rainfed Sawah | 605.2 | 0 | - 605.2 |
| 3 Tegal | 1,253.4 | 376.0 | 877.2 |
| 4 Kebun | 1,983.2 | 1,983.2 | 0 |
| 5 Others | 968.6 | 968.6 | 0 |
| | 6,225.8 | 6,225.8 | 0 |

SOURCE: Table I Interviews



LEGEND:

-  : Irrigated area
-  : Irrigable area
-  : Unirrigable area
-  : Existing canals
-  : New canal proposal
-  : Contour lines

source: District map (1:25000)
 Irrigation maps (1:10000)
 Topographic map (1:10000)

scale = 1 : 75 000

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PANJATAN DISTRICT

Irrigation

| | | |
|-------------|----------|------------|
| Prepared by | std. no: | figure no: |
| Soenyoto | 5080552 | 6 |

Soil in the proposed area is the same as the soil type under existing irrigation, which should be satisfactory for sawah.

5.1.3 *Irrigation Requirements*

There are no available data defining water requirements in this area, but water requirements have been calculated approximately 180 kilometers from this area, based on the assumptions used for the Sala River Basin (from the "Sala River Basin Study in Surakarta). The assumptions are as follows:

1. ETP computation using a modified Penman formula in mm/day needs to be calculated. (ETP = Potential evapotranspiration)

2. ET computation for:

ET = evapotranspiration for rice sawah

* Growing stages: $ET = ETP \times f(\text{mm/day})$

Cropping factors proposed for Indonesia are:

| | |
|-----------|-------------|
| 1st month | 1.10 mm/day |
| 2nd month | 1.35 mm/day |
| 3rd month | 1.30 mm/day |
| 4th month | 1.05 mm/day |

f = crop factor according to growing stage of rice

* Land preparation use zylstra-Van de Goor formula

3. Re (in mm/day) = Effective rainfall.

- for land preparation, 80 percent of rainfall

- for growing stages, 60 percent of rainfall

4. W (in mm/day) = Water layer

- provision of 2.5 mm/day during 2 months after transplanting

5. P = Percolation

- depending on soil characteristics
- For margalit soil = 1 mm/day
- For laterit soil = 1.6 mm/day

6. A (in mm/day) = Crop requirement

* Growing stages: $A = ET + W - Re + P$

7. B (in L/s/Ha) = Crop requirement

$$B = A \times 0.116$$

8. C (in L/s/Ha) = Tertiary water requirement

$$C = 1.2 B$$

9. D (in L/s/Ha) = Intake water requirement

$$D = 1.4 B$$

Using potential evapotranspiration data from the Sala River basin, and applying the equation under assumptions (similar to the Sala River basin), irrigation requirements in Panjatan district were calculated (Table 22).

TABLE 22
INTAKE WATER REQUIREMENT FOR EXTENSION IRRIGATION AREA (PER HECTARE)
IN PANJATAN DISTRICT

| | Jan | Feb | Mar | Apr | May | Jun | Jly | Aug | Sept | Oct | Nov | Dec |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|
| R (mm/month) | 270 | 291 | 240 | 237 | 104 | 45 | 29 | 7 | 5 | 38 | 123 | 233 |
| R (mm/day) | 8.7 | 10 | 7.7 | 8 | 3.4 | 1.5 | 0.9 | - | - | 1.2 | 4 | 8 |
| Re grow. | 5.2 | 6 | 4.6 | - | 2.0 | 0.9 | 0.5 | - | - | - | - | 4.8 |
| Re Lp. | - | - | - | 6.4 | - | - | - | - | - | - | 3.2 | - |
| Re. (mm/day) | 5.2 | 6 | 4.6 | 6.4 | 2.0 | 0.9 | 0.5 | - | - | - | 3.2 | 4.8 |
| ETP (MM/day) | 4.5 | 4.5 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 | 5.0 | 5.5 | 5.5 | 5.0 | 4.5 |
| Et | 6.1 | 5.9 | 5.3 | 5.0 | 4.9 | 6.1 | 5.9 | 5.3 | 5.5 | 5.5 | 5.0 | 4.7 |
| W | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 5 | 5 | 2.5 | 2.5 |
| P margalit | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| P Laterit | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| A margalit | 4.4 | 3.4 | 4.2 | 2.1 | 6.3 | 8.7 | 8.9 | 8.5 | 9.0 | 9.0 | 5.3 | 3.7 |
| A Laterit | 5.0 | 4.0 | 4.8 | 2.7 | 7 | 9.3 | 9.5 | 9.1 | 9.6 | 9.6 | 5.9 | 4.2 |
| B marg. L/S/ha | 0.51 | 0.39 | 0.49 | 0.24 | 0.73 | 1.01 | 1.03 | 0.99 | 1.04 | 1.04 | 0.62 | 0.42 |
| B Latr. L/S/ha | 0.58 | 0.46 | 0.56 | 0.31 | 0.81 | 1.08 | 1.10 | 1.06 | 1.11 | 1.11 | 0.68 | 0.47 |
| D Marg. L/S/ha | 0.71 | 0.55 | 0.69 | 0.34 | 1.02 | 1.41 | 1.44 | 1.39 | 1.46 | 1.46 | 0.87 | 0.59 |
| D Latr. L/S/ha | 0.81 | 0.64 | 0.78 | 0.44 | 1.13 | 1.51 | 1.54 | 1.48 | 1.55 | 1.55 | 0.95 | 0.67 |

Under Assumption:

Source: Table 3

1. ETP is the same with ETP in Sala River basin.
2. W = 2.5 mm/day
3. P Margalit = 1.0 mm/day
4. P Laterit = 1.6 mm/day
5. R from Table 3
6. November and April is the month for land preparation

According to the Agriculture service officer in the Panjatan district, the proposed irrigation area includes: 614.2 hectares of Margalit soil and 868.2 hectares of Laterit soil. Therefore, water requirements for extending the irrigated area from the Progo River have been calculated (Table 23).

TABLE 23

INTAKE WATER REQUIREMENTS FOR IRRIGATION EXTENSION
PANJATAN DISTRICT

| | Margalit soil | | | Laterit soil | | | Total |
|-----------|---------------|---------------------|----------------|--------------|---------------------|----------------|----------------|
| | Area (Ha) | Water req. (L/S/Ha) | Water Req. l/s | Area (Ha) | Water Req. (L/S/Ha) | Water req. L/S | Water req. L/S |
| January | 614.2 | 0.71 | 436.1 | 868.2 | 0.81 | 103.2 | 1,139.3 |
| February | 614.2 | 0.55 | 337.8 | 868.2 | 0.64 | 555.6 | 893.4 |
| March | 614.2 | 0.69 | 423.8 | 868.2 | 0.78 | 677.2 | 1,101.0 |
| April | 614.2 | 0.34 | 208.8 | 868.2 | 0.44 | 382.0 | 590.8 |
| May | 614.2 | 1.02 | 626.5 | 868.2 | 1.13 | 981.1 | 1,607.6 |
| June | 614.2 | 1.41 | 866.0 | 868.2 | 1.51 | 1,310.9 | 2,176.9 |
| July | 614.2 | 1.44 | 884.5 | 868.2 | 1.54 | 1,337.1 | 2,221.6 |
| August | 614.2 | 1.39 | 853.7 | 868.2 | 1.48 | 1,284.9 | 2,138.6 |
| September | 614.2 | 1.46 | 896.7 | 868.2 | 1.55 | 1,345.7 | 2,242.4 |
| October | 614.2 | 1.46 | 896.7 | 868.2 | 1.55 | 1,345.7 | 2,242.4 |
| November | 614.2 | 0.87 | 534.4 | 868.2 | 0.95 | 824.8 | 1,359.2 |
| December | 614.2 | 0.59 | 362.4 | 868.2 | 0.69 | 599.1 | 961.5 |

Source: Table 22

TABLE 24

ESTIMATED SURPLUS WATER IN PROGO RIVER AFTER IRRIGATION EXTENSION

| CATEGORY | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEP. | OCT. | NOV. | DEC. |
|-------------------|------|------|------|------|------|------|------|------|------|-------|------|------|
| Available water | 90 | 99 | 88 | 79 | 48 | 48 | 22 | 15 | 9 | 13 | 44 | 43 |
| Intake water req. | 1.1 | 0.9 | 1.1 | 0.6 | 1.6 | 1.2 | 2.2 | 2.1 | 2.25 | 2.25 | 1.4 | 0.9 |
| Surplus water | 88.9 | 98.1 | 86.9 | 78.4 | 46.4 | 46.8 | 19.8 | 12.9 | 6.75 | 10.75 | 42.6 | 42.1 |

Source: Table 20; 23

Table 24 shows that a surplus of water remains in the Progo River over the yearly cycle after the estimated water for the proposed irrigation extension has been removed. Therefore the irrigation extension appears to be possible.

5.1.4 *Benefit of Extension in Irrigation*

As mentioned before, as a result of time and budget constraints this study did not present a benefit/cost analysis in irrigation extension, because it was very hard to determine the true cost, especially costs for canal and weir improvements, and other technical matters. Also social benefit such as reducing the idleness is difficult to be calculated. But using a very rough calculation, the increasing revenue to farmers can be calculated in the area. This analysis uses the assumptions that there is no crop damage in the area due to flooding, pest and any other problems, and that the price of the crop will remain constant.

TABLE 25
ROUGH CALCULATION OF INCREASING REVENUE TO FARMERS
DUE TO IRRIGATION EXTENSION

| Item | Price of crop / ha | Present Cropping Pattern | | Future Cropping Pattern | |
|--------------|--------------------|--------------------------|-------------|-------------------------|-------------|
| | | Area (ha) | Revenue | Area (ha) | Revenue |
| Padi rendeng | \$442 | 2,020 | \$892,840 | 2,989 | \$1,280,916 |
| Padi gadu | 389 | 1,415 | 550,435 | 2,898 | 1,127,322 |
| Cassava | 149 | 1,556 | 231,844 | 376 | 56,024 |
| Long pepper | 233 | 303 | 70,599 | - | - |
| Soybeans | 184 | 605 | 111,320 | - | - |
| Maize | 194 | 1,858 | 360,452 | 376 | 72,944 |
| TOTAL | | | \$2,217,490 | | \$2,537,504 |

The increasing revenue (benefit) to farmers is \$320,014 annually or about 14.5 percent of their present revenue. Another benefit would be the increasing activities in the study area.

5.2 Coconut Fibre Factory

The coconut is the most valuable palm of Indonesia and its product has many uses. The green coconut supplies a nutritious drink, the ripened nuts furnish food and oil, and may later be used for cooking and lamp fuel. Coconut shells serve as cups and as fuel. An alcoholic drink, syrup, and sugar are made from the sap of the unopened flower cluster. Leaves are used for thatching and for baskets, the trunk serves as a building material, and coir, a fibre obtained from coconut husks, is used in brushes, ropes, mats, baskets and brooms.

The coconut attains its greatest marketable value as copra, the dried extracted kernel, or meat, from which coconut oil, the world's major ranking vegetable oil is processed. Coconut oil has many uses, entering into the manufacture of soaps and shampoos, detergents, edible oil, margarines, vegetable shortening, synthetic rubber, glycerin, hydraulic brake fluid, and plasticizers for safety glass.

Coconut harvesters climb the trees every month to cut the ripened fruits. People in the Panjatan district sell ripened nuts to a buyer from a city market, who makes weekly trips to the villages and transports coconuts to the city by truck or carriage. People from the city buy only the coconut meat, thus the coconut shells and the coirs remain in the village. Some residents use them for cooking fuel, but a majority are wasted.

In 1970, a coconut fibre factory was built in Klaten. People collected coconut coirs and sold them to the factory. From that money, people were able to buy coconut fibre at a special price (after factory processing), and then get orders from the factory including what kind of material they have to make, such as: baskets, mats, brooms, ropes in certain sizes, etc. These individuals bring home the factory processed coconut fibre, and work at home with their wives, children and other dependents. Two or three weeks later, the factory buys their handicraft at a given price. All of these activities occur in September and October. In other months, the factory only collects coconut coir from the people, and receives orders from the city.

Permanent employment in this factory is limited to four males and two females, but in September and October the factory can absorb 740 males and 200 females as a seasonal employment opportunity. The factory makes intensive use of labour in September and October because at this time the labour costs are relatively cheap, due to the fact that level manpower utilization in agriculture is very low. Initially, training programs are required to familiarize members of the seasonal labour force with the type of handicrafts to be made. Training programs may be arranged through local villages. A whole family thus employed in villages could supplement household income even while remaining at home.

If one looks at the Klaten market situation every year, one may assume that, if Panjatan district was to build another

coconut fibre factory, there is still enough of a market to produce the desired effect upon the labour situation.

5.3 Methods to Reduce Monthly Manpower Supply

5.3.1 *Transmigration from 1905 to Date*

Transmigration is the transfer or removal of people from one region to settle in another, within the territory of Indonesia, in the interest of national development, or for such other reasons as may be considered necessary for government. (Soekardi, 1961). The transmigration program is one of the many ways to reduce local manpower supply.

Transmigration in Indonesia was started in 1905. This was a program which was sponsored and organized by the government, was aimed at reducing Java's population pressures by resettling Javanese farmers in agricultural settlements in Southern Sumatera. During the first thirty years of the program, very little was achieved. As of 1935, the total number of people who had been resettled amounted to only 40 thousand (Sukardi, 1961). This lack of success has been attributed to the lack of soil investigation, mapping, and land-use planning in the resettlement area.

After 1931, a number of improvements were introduced, culminating with the establishment in 1937 of a special commission in charge of this program. Under this commission, the annual number of migrants increased to 14,700 in 1938 and 52,800 in 1940 (Sukardi, 1961). Before a settlement was established, surveys were made on property rights to land, and on soil fertility, climate, topography, water supply, etc., which were the ingredients for land development plans.

Since 1950, the procedure of resettlement was such that after the necessary surveys had been completed, the areas designated for settlements were cleared, and roads, irrigation works and temporary housing units were built.

After 1970, the government built permanent housing units and the migrants received free transportation from origin to destination. Migrants received 2.0 hectares of land, 0.8 hectares of which were cleared and ready for planting. They also received food, clothing, seeds and some agricultural equipment for one year. The annual numbers of these government-organized settlers increased from 10,000 people (2,000 households) in 1970 to 51,000 people (11,000 households) in 1974 (Abdul Madjid, 1978).

5.3.2 *Government Policy*

In the next 20 years of the transmigration program in Indonesia, the government plans to prepare land, irrigation, housing and other infrastructure for 12,750,526 households. An illustration of the planned transmigration population is shown in Table 26. The government intends to send transmigrants to 12 provinces, with the main destinations planned as Irian Jaya, Kalimantan Barat and Kalimantan Tengah. Up to present, transmigrants have been directed mainly toward Sumatera Selatan and Lampung.

TABLE 26

CAPACITY OF TRANSMIGRATION PROGRAM 1975 - 1995

| No. | Province | Space Capacity (households) | Local population growth (households) | Transmigrant from Java (households) |
|-------|----------------|-----------------------------|--------------------------------------|-------------------------------------|
| 1. | Aceh | 327,200 | 193,856 | 133,344 |
| 2. | Sumatera Utara | 270,000 | 657,312 | - |
| 3. | Sumatera Barat | 129,810 | 158,237 | - |
| 4. | Jambi | 407,000 | 124,277 | 282,723 |
| 5. | Riau | 822,600 | 160,257 | 662,073 |
| 6. | Bengkulu | 108,300 | 86,479 | 21,821 |
| 7. | Sum - Sel | 708,300 | 465,001 | 243,299 |
| 8. | Lampung | 157,300 | 672,927 | - |
| 9. | Kal - Bar | 2,373,700 | 270,732 | 2,165,968 |
| 10. | Kal - Sel | 154,100 | 531,543 | - |
| 11. | Kal - Tim | 1,108,600 | 211,294 | 897,306 |
| 12. | Kal-Teng | 1,571,300 | 111,813 | 1,459,487 |
| 13. | Sul-Sel | 150,156 | 347,729 | - |
| 14. | Sul-Teng | 642,500 | 109,306 | 533,194 |
| 15. | Sul-Tera | 184,900 | 47,082 | 137,818 |
| 16. | Sul-Ut | 13,760 | 137,658 | - |
| 17. | Maluku | 697,700 | 127,578 | 770,122 |
| 18. | Irian Jaya | 2,729,300 | 94,651 | 2,634,649 |
| TOTAL | | 12,729,526 | | 9,941,804 |

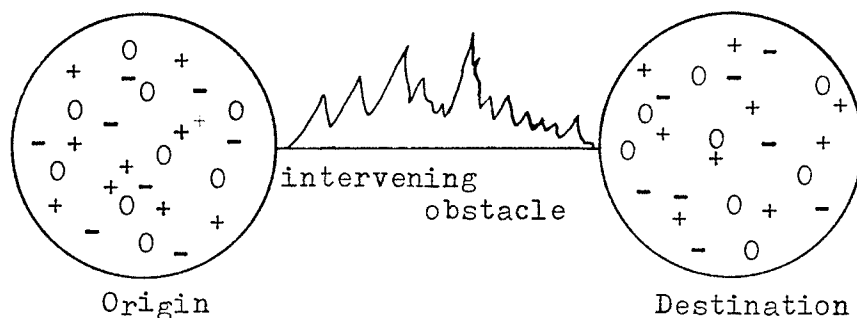
SOURCE: Rencana Dasar Transmigrasi
1975 - 1995
Jakarta, 1973.

5.3.3 *Transmigration in General*

According to Lee (1966), factors which enter into a person's decision to migrate and the process of migration may be summarized under four headings:

1. Factors associated with the area of origin
2. Factors associated with the area of destination
3. Intervening obstacles

4. Personal factors



source: Lee, 1966

The first three of these are indicated schematically in the diagram above. In every area there are countless factors which act to hold people within the area or attract people to it, and there are others which tend to repel them. These are shown in the diagram as + and - signs. There are others, shown as 0's, to which people are essentially indifferent. Some of these factors affect most people in much the same way, while others affect different people in different ways.

1. *Factors associated with the area of origin:* positive factors may include fear of family separation, cemetery ceremonies, religious ceremonies, memories, etc., while negative factors may be small portions of land, very limited job opportunities, very low wages, etc. Negative factors serve as "push" factors in the area of origin.

2. *Factors associated with the area of destination:* The government creates "pull" or positive factors in the area of destination, such as 2.0 hectares of land, a small house, roads, seeds and agricultural equipment, which are all free. Negative factors could include poor knowledge of the area

of destination and there is always an element of ignorance or even mystery about the area of destination, since the migrant does not absolutely believe the transmigration agent's information, even though the information is true.

3. *Intervening obstacles* have been eliminated by the government i.e. free transportation from origin to destination plus another economic factor such as free living allowance for one year.

4. Finally, there are *many personal factors* which affect individual thresholds and facilitate or retard migration. Some of these are difficult to migrate due to their status in religion in the area of origin but others may be no problem because they have no status at all in the communities.

One might expect that the easy availability of improved land in Sumatera and various forms of government assistance for migrants, plus the scarcity of land and large landless populations in Java would automatically lead to people being eager to participate in transmigration. With the coincidence of very strong "push" factors in the area of origin, and strong "pull" factors in Sumatera, plus the removal of intervening obstacles by government assistance, one would expect transmigration to be a very popular program in Indonesia. In reality the government's target has never been reached in any year. This is illustrated in Table 27.

TABLE 27
TRANSMIGRATION IN INDONESIA 1970 - 1975
(in households)

| Year | Target | Actual | Percentage |
|------|--------|--------|------------|
| 1970 | 4,489 | 2,131 | 47.5 |
| 1971 | 3,885 | 3,508 | 90.3 |
| 1972 | 4,600 | 3,847 | 83.6 |
| 1973 | 11,200 | 10,814 | 86.5 |
| 1974 | 16,412 | 10,951 | 66.7 |
| 1975 | 17,212 | 7,443 | 43.2 |

SOURCE: Statistical Yearbook of Indonesia, 1976.

One major reason for not attaining their target is the method of information provision by the government agency. Even though information provided is correct, people still are not absolutely convinced that it is. Moving to a different island involves considerable risk for people when they lack any guarantee that their life will be better.

Another inhibition to movement is the presence of rumors. "A rumor is an unconfirmed message transmitted by person-to-person communication channels. The message content may be 'correct' or 'incorrect', it may be positive or negative toward any given program, e.g. family planning, transmigration, etc., usually rumors spread very quickly, often they are anti-establishment." (Rogers, E. Rumors in Family Planning, Mimeo. ND).

Rumors arise in the study area when unsuccessful migrants come back to their origin, and make true or exaggerated claims about difficulties in transportation, unfertile land, very small

houses, bad roads and so on. As a result, the ordinary people become suspicious about promises of transmigration agents. If transmigration agents promise 2.0 hectares of land, the ordinary people may think this means, for example, "two hectares of forest or rocks".

Another important inhibition to movement is from the social sphere. The settlements originally were filled up with transmigrants without regard to the ethnic, linguistic or religious affiliations of the settlers. Since 1971, however, the Indonesian government has undertaken two measures. First, only one third of the settlement plots will be granted to transmigrants coming directly from Java; the second third will be given to local transmigrants who are already accustomed to the environment of the project area; the third part of the projected plots will be reserved for the descendants of both groups. Secondly, to encourage social contacts within the settlement schemes the transmigrants will be settled in blocks of equal ethnic groups even with regards to the district of Java, from where they have been coming (Gerhard Sandner, 1975).

General reluctance to move, shown by low levels of migration even within Java are attributed to the attachment to home and lack of success of previous migrants from the district. Also, there have been very few migrants in the past and thus few contacts for new migrants leaving Panjatan district.

5.3.4 *Selection in Transmigration Program*

Transmigration program is a very expensive program. The Indonesian Government spends U.S. \$3,000 per household for cost

of transportation, living, housing, land, small roads and irrigation construction (Sukardi, 1961).

In order to make this expensive program successful, the government selects transmigrant applicants. Selection of prospective migrants is based on the following criteria (Widjojo, 1965):

1. The applicant should be a true farmer, because if he is not a true farmer, he will be a burden to the others.
2. He must be of a young age, in order to slow down Java's population growth (between 20 and 40 years old).
3. He should be a married man, because unmarried men may create trouble with somebody else's wife.
4. He should not have many children.
5. He should not be with a pregnant wife.
6. He should be landless.
7. He should have a healthy family.
8. He is politically acceptable (He is not a P.K.I. member).
9. He should have no dependent relatives over 60 years of age.

A survey was conducted to determine the number of married, landless farmers, with few children, from the eleven villages in Panjatan district. The number of people suitable for migration was 2,278 or 710 households.

TABLE 28
 LANDLESS, YOUNG, MARRIED AND REAL FARMERS*
 IN PANJATAN DISTRICT 1977

| No. Village | Landless, young, married & real farmer Household | Manpower | People | Percentage of Village Population |
|--------------|--|----------|--------|----------------------------------|
| 1 Garongan | 42 | 84 | 160 | 5.5 |
| 2 Pleret | 72 | 144 | 248 | 6.3 |
| 3 Bojong | 78 | 156 | 258 | 6.9 |
| 4 Depok | 58 | 116 | 180 | 6.3 |
| 5 Tayuban | 36 | 72 | 124 | 5.9 |
| 6 Gotakan | 56 | 112 | 142 | 5.9 |
| 7 Cerme | 62 | 124 | 164 | 5.6 |
| 8 Krembengan | 82 | 164 | 284 | 6.4 |
| 9 Panjatan | 66 | 132 | 194 | 14.0 |
| 10 Kanoman | 92 | 184 | 300 | 13.2 |
| 11 Bugel | 64 | 128 | 214 | 5.3 |
| | 710 | 1,420 | 2,278 | 6.9 |

SOURCE: Village Offices

* Note: Landless farmer is a farmer who only has a less than 500 m² agricultural land.
 Young farmer is a farmer less than 45.

According to experiences from many other locations, only about 60 percent of these are likely to agree to move (interview with transmigration officer 1977).

If the assumption of 60 percent is correct, approximately 1,375 people would be willing to move. The number of households is approximately 425, consisting of 425 males and 425 females in the labour force.

In the future, the transmigration program can be extended to farmers in the 0.05 hectare to 0.5 hectare range, since most are poor farmers and few of these farmers own any sawah. If a 0.5 hectare cut-off is used in the future, and the assumption

of 60 percent still exists, roughly 5 percent of the total population could be considered as potential transmigrants.

5.3.5 *Farmer Labour Force in 1982*

Given that C.B.R. is 37.29, C.D.R. is 12.03 and net out-migration is 0.64 per 1,000 people, the annual population in the Panjatan district is $37.29 - 12.03 - 0.64 = 24.62$ per 1,000 people.

If one assumes that the annual population growth remains constant in the next five years, the number of male farmers will be 7,794 and the female farmers 8,263 in 1982 (Appendix V/A).

After the transmigration program, the total number of male farmers will be $7,794 - 425 = 7,369$, and the female farmers will number $8,263 - 425 = 7,838$.

These numbers will be used in calculating the manpower supply in order to determine manpower utilization for agricultural activities in Panjatan district in the next five years, because if this plan needs one more year of study (in more detail) while the mitigating action may need two more years. So for these reasons the calculation is based on the year 1982.

CHAPTER VI

DISCUSSION

In rural agricultural areas of developing countries, the level of manpower utilization usually decreases year by year because continued population growth provides increased manpower for the same land base.

At the present time, the average annual level of manpower utilization in the Panjatan district is 32.92 percent of the available male labour force and 14.26 percent of the female labour force (Table 15). In the next five years, without mitigating action, the level of manpower utilization will become 31.43 percent for males and 12.62 percent for females, due to an expected population increase (32,896 to 37,150).

TABLE 29
LEVEL OF MANPOWER UTILIZATION ON FARMLAND
PANJATAN DISTRICT 1982
(man day)

| Month | No. Day | Supply | | Demand | | Level of Utilization (percent) | |
|-----------|---------|---------|---------|---------|--------|--------------------------------|--------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 241,614 | 256,153 | 64,935 | 39,997 | 26.87 | 15.61 |
| February | 28 | 218,231 | 231,364 | 64,706 | 49,061 | 29.65 | 21.21 |
| March | 31 | 241,614 | 245,153 | 118,232 | 38,741 | 48.93 | 15.12 |
| April | 30 | 233,820 | 247,890 | 123,057 | 24,611 | 52.63 | 9.93 |
| May | 31 | 241,614 | 256,153 | 64,395 | 32,692 | 26.65 | 12.76 |
| June | 30 | 233,820 | 247,890 | 43,507 | 26,532 | 18.65 | 10.70 |
| July | 31 | 241,614 | 256,153 | 38,341 | 25,759 | 15.87 | 10.06 |
| August | 31 | 241,614 | 256,153 | 101,131 | 71,224 | 41.86 | 27.81 |
| September | 30 | 233,820 | 247,890 | 26,746 | 19,544 | 11.44 | 7.88 |
| October | 31 | 241,614 | 256,153 | 11,898 | 5,949 | 4.92 | 2.32 |
| November | 30 | 233,820 | 247,890 | 161,122 | 5,949 | 68.91 | 2.40 |
| December | 31 | 241,614 | 256,153 | 74,484 | 40,225 | 30.83 | 15.70 |
| Average | | | | | | 31.43 | 12.62 |

Source: Table 14

When any area cannot support a growth of population at a given level of technology, either by subsistence production or by trade, then the choice lies between a new technology, population control or migration (Hunter, Guy 1974). This study investigates all of these alternatives, for the Panjatan district, but an effort is made to combine them, in order to maximize beneficial results.

Although family planning has been practiced in the study area for several years as a means of controlling population, the results have not been significant to date. Therefore, the emphasis of this study has been limited to two choices: a new technology and migration.

One new technology investigated involves increasing the manpower input per hectare by extending the irrigated land area (this also results in an increase in farm income). Table 13 shows that crop labour input per hectare for sawah averages 1,295 man hours or 259 man days (5 hours per day), and crop labour input per hectare for tegal is only between 51 and 108 man days. Thus, increasing the amount of land in sawah would increase the labour requirement.

From the physical viewpoint, it is feasible to extend irrigated land from the existing area of 1,415.4 hectares to 2,897.8 hectares (Chapter V). Extension of 1,482.4 hectares can be achieved by irrigating 605.2 hectares from rainfed sawah and 877.2 hectares from tegal (Table 21). The remaining 376.2 hectares of tegal can not be irrigated because of its topography. Manpower demand each month after irrigation extension is

illustrated in Table 30.

Fig. 7 and Table 30 illustrate that in November, 92 per cent of labour input is used only for land preparation on irrigated sawah, while land preparation on tegal accounts for only 2 percent of the total labour input.

TABLE 30
MANPOWER DEMAND EACH MONTH AFTER IRRIGATION EXTENSION
PANJATAN DISTRICT

| Land Use | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | Jun. | July | Aug. | Sept. | Oct. |
|----------------------------|-----------|---------|---------|---------|---------|-----------|---------|---------|---------|---------|--------|--------|
| IRR. SAWAH: 2,897.8 ha. | | | | | | | | | | | | |
| Male | 956,274 | 304,269 | 275,291 | 289,780 | 637,576 | 956,274 | 304,269 | 275,241 | 289,780 | 637,516 | - | - |
| Female | - | 186,357 | 202,846 | 202,846 | 637,516 | - | 188,357 | 202,846 | 202,846 | 637,516 | - | - |
| TEGAL: 375.2 ha. | | | | | | | | | | | | |
| Male | 20,691 | 30,096 | 20,691 | 15,048 | 26,334 | 11,286 | 18,810 | - | - | - | 15,048 | - |
| Female | - | 7,524 | 1,881 | 15,048 | - | - | 11,286 | - | - | - | 13,117 | - |
| KEBUN: 1,983 ha. | | | | | | | | | | | | |
| Male | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 | 59,490 |
| Female | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 | 29,745 |
| TOTAL: (man-hours) | | | | | | | | | | | | |
| Male | 1,036,455 | 383,855 | 355,472 | 364,319 | 723,340 | 1,027,050 | 382,569 | 334,781 | 349,270 | 697,006 | 74,526 | 59,490 |
| Female | 29,745 | 225,626 | 234,472 | 247,639 | 667,261 | 29,745 | 229,388 | 232,591 | 232,591 | 667,261 | 42,912 | 29,745 |
| TOTAL: (man-days) | | | | | | | | | | | | |
| Male | 207,291 | 76,771 | 71,094 | 72,864 | 144,668 | 205,410 | 76,514 | 66,956 | 69,845 | 139,401 | 14,408 | 11,638 |
| Female | 5,949 | 45,125 | 46,894 | 49,528 | 133,452 | 5,949 | 45,878 | 46,518 | 46,518 | 133,452 | 8,582 | 5,949 |

Source: Graph 7, Table 13

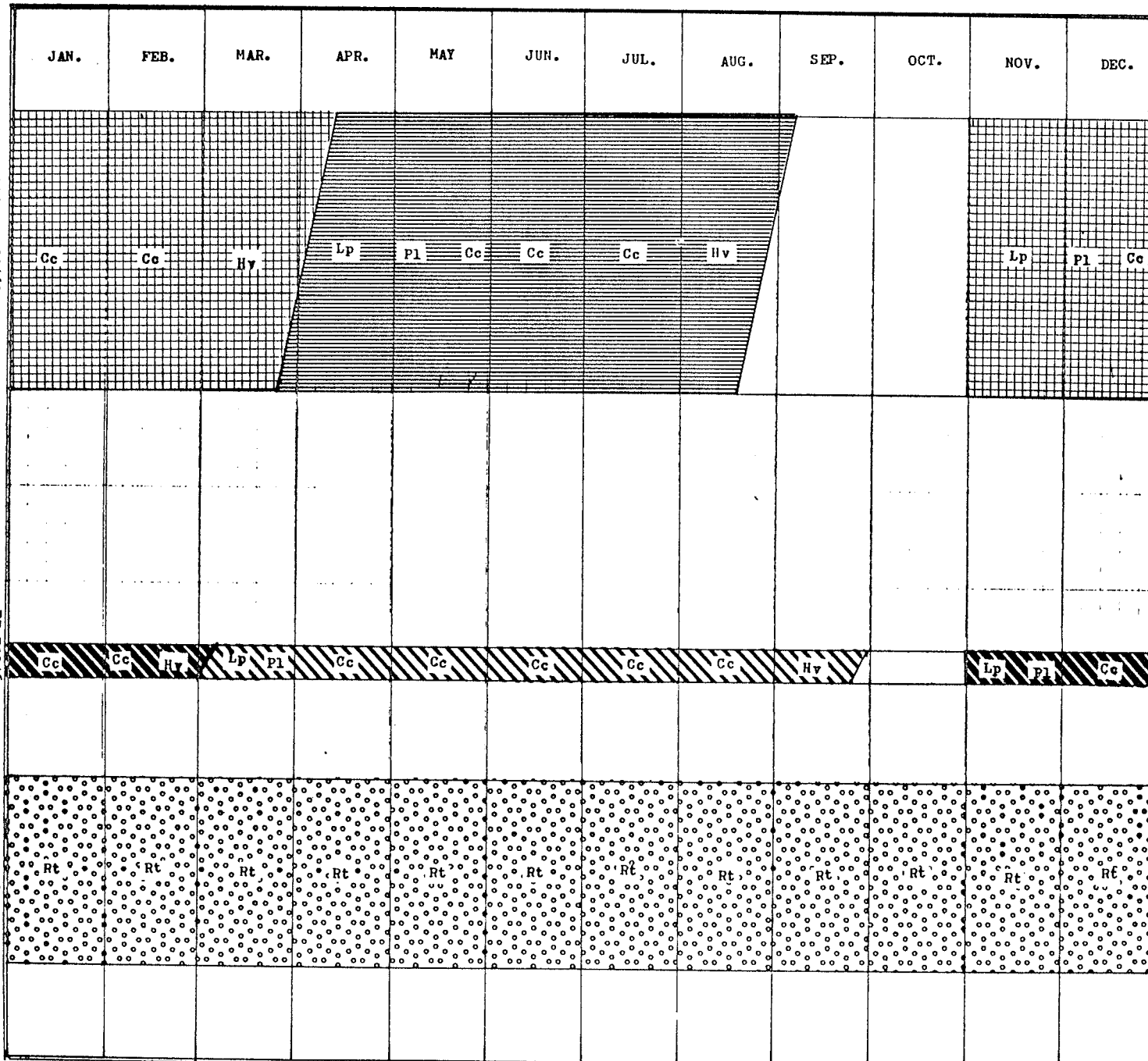
Based on 1982 manpower supply, the level of manpower utilization after irrigation extension in the Panjatan district is illustrated in Table 31.

After irrigation extension, the level of utilization of manpower will be 39.30 percent of available males and 18.91 percent for females. Thus, irrigation extension contributes an






IRRIGATED SAWAH
2897.8 hectares

TEGAL
376.2 ha

KEBUN
1983 hectares



LEGEND:

-  : Rice in the dry season
-  : Rice in the wet season
-  : Maize
-  : Cassava
-  : Kebun
- Lp : Land preparation
- Pl : Transplanting
- Cc : Crop-care
- Hv : Harvest
- Rt : Routine

source: Table IV/6

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**FUTURE
CROPPING PATTERN**

| | | |
|-------------|------------|--------|
| Prepared by | student no | figure |
| Soenyoto | 5080552 | 7 |

increase in activity of 8.17 percent for males and 6.29 percent for females. November and April are the peak months of male utilization, because land preparation occurs in those two months. Irrigation extension increases male activities by 21 percent in November and 25 percent in April, while increasing female activities 36 percent in March and 25 percent in August. In September and October, farmer activities are limited to kebun and tegal areas.

TABLE 31
LEVEL OF MANPOWER UTILIZATION ON FARMLAND AFTER IRRIGATION EXTENSION
PANJATAN DISTRICT 1982
(man day)

| Month | No. Day | Supply | | Demand | | Level of Utilization (percent) | |
|-----------|---------|---------|---------|---------|---------|--------------------------------|--------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 241,614 | 256,153 | 71,094 | 46,894 | 29.42 | 18.31 |
| February | 28 | 218,231 | 231,364 | 42,864 | 49,528 | 19.64 | 21.41 |
| March | 31 | 241,614 | 256,153 | 144,668 | 133,452 | 59.87 | 52.10 |
| April | 30 | 233,820 | 247,890 | 205,410 | 5,949 | 87.85 | 2.40 |
| May | 31 | 241,614 | 256,153 | 76,514 | 45,873 | 31.67 | 17.91 |
| June | 30 | 233,820 | 247,890 | 66,956 | 46,518 | 28.64 | 18.76 |
| July | 31 | 241,614 | 256,153 | 69,845 | 46,518 | 28.91 | 18.16 |
| August | 31 | 241,614 | 256,153 | 139,401 | 133,452 | 57.70 | 42.10 |
| September | 30 | 233,820 | 247,890 | 14,908 | 8,582 | 6.38 | 3.46 |
| October | 31 | 241,614 | 256,153 | 11,291 | 5,949 | 4.67 | 2.32 |
| November | 30 | 233,820 | 247,890 | 207,291 | 5,949 | 88.65 | 2.40 |
| December | 31 | 241,614 | 256,153 | 76,771 | 45,125 | 31.77 | 17.62 |
| Average | | | | | | 39.60 | 18.91 |

Source: Graph 7, Table 29

With regard to migration, the previous chapter showed that the migration program reduced manpower supply by approximately 850, consisting of 425 males and 425 females. Table 32 shows that the average decrease of manpower supply would be about 12,750 man days per month for males and for females. Thus, the average monthly manpower supply after transmigration will be 233,820 man days for males and 247,890 for females, while the labour input remains constant.

TABLE 32
MANPOWER NUMBERS EACH MONTH UNDER THE INFLUENCE OF THE TRANSMIGRATION PROGRAM
PANJATAN DISTRICT 1982
(man day)

| Month | No. Day | Farmer before Transmigration | | Transmigration | | Farmer After Transmigration | |
|-----------|---------|------------------------------|---------|----------------|--------|-----------------------------|---------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| February | 28 | 218,231 | 231,364 | 11,900 | 11,900 | 206,331 | 219,464 |
| March | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| April | 30 | 233,820 | 247,890 | 12,750 | 12,750 | 221,070 | 235,140 |
| May | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| June | 30 | 233,820 | 247,890 | 12,750 | 12,750 | 221,070 | 235,140 |
| July | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| August | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| September | 30 | 233,820 | 247,890 | 12,750 | 12,750 | 221,070 | 235,140 |
| October | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |
| November | 30 | 233,820 | 247,890 | 12,750 | 12,750 | 221,070 | 235,140 |
| December | 31 | 241,614 | 256,153 | 13,175 | 13,175 | 228,439 | 242,978 |

Source: Table 15, Table 27

The combination of following irrigation extension as well as the transmigration program is illustrated in Table 33.

TABLE 33
LEVEL OF MANPOWER UTILIZATION ON FARMLAND AFTER TRANSMIGRATION PROGRAM
PANJATAN DISTRICT 1982
(man day)

| Month | No. Day | Supply | | Demand | | Level of Utilization (percent) | |
|-----------|---------|---------|---------|---------|---------|--------------------------------|--------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 228,439 | 242,978 | 71,094 | 46,894 | 31.12 | 19.30 |
| February | 28 | 206,331 | 219,464 | 42,864 | 49,528 | 20.77 | 22.57 |
| March | 31 | 228,439 | 242,978 | 144,668 | 133,452 | 63.33 | 54.92 |
| April | 30 | 221,070 | 235,140 | 205,410 | 5,949 | 92.92 | 2.53 |
| May | 31 | 228,439 | 242,978 | 76,514 | 45,878 | 33.49 | 18.88 |
| June | 30 | 221,070 | 235,140 | 66,956 | 46,518 | 30.29 | 19.78 |
| July | 31 | 228,439 | 242,978 | 69,845 | 46,578 | 30.57 | 19.17 |
| August | 31 | 228,439 | 242,978 | 139,401 | 133,452 | 61.02 | 54.92 |
| September | 30 | 221,070 | 235,140 | 14,908 | 8,582 | 6.74 | 3.65 |
| October | 31 | 228,439 | 242,978 | 11,898 | 5,949 | 5.21 | 2.45 |
| November | 30 | 221,070 | 235,140 | 207,291 | 5,949 | 93.77 | 2.53 |
| December | 31 | 228,439 | 242,978 | 76,771 | 45,125 | 33.61 | 18.57 |
| Average | | | | | | 41.90 | 19.86 |

Source: Table 30, Table 31

The average monthly manpower utilization would become 41.90 percent for males and 19.86 percent for females. Thus, the transmigration program contributes an increase of 2.30 percent for males and 0.95 percent for females.

An examination of Fig. 8 and 9 reveals that September and October have the lowest labour utilization, because only a Cassava crop and kebun areas required a labour input. Following the Klaten experience with a coconut fibre factory, construction of a similar factory in the Panjatan district would contribute a partial solution to the idleness problem in September and October. If the design and capacity of the factory was exactly the same as for the Klaten factory, manpower demand would be increased especially in September and October (Table 34).

TABLE 34
MANPOWER DEMAND EACH MONTH AFTER THE COCONUT FIBRE FACTORY IS BUILT
PANJATAN DISTRICT

| Month | No. Day | Manpower demand before the factory is built | | employed | | Manpower demand after the factory is built | |
|-----------|---------|---|---------|----------|--------|--|---------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 71,094 | 46,894 | 124 | 62 | 71,218 | 46,956 |
| February | 28 | 72,864 | 49,528 | 112 | 56 | 72,976 | 49,584 |
| March | 31 | 144,668 | 133,452 | 124 | 62 | 144,792 | 133,514 |
| April | 30 | 205,410 | 5,949 | 120 | 60 | 205,530 | 6,009 |
| May | 31 | 76,514 | 45,878 | 124 | 62 | 76,638 | 45,940 |
| June | 30 | 66,956 | 46,578 | 120 | 60 | 67,076 | 46,638 |
| July | 31 | 69,845 | 46,518 | 124 | 62 | 69,969 | 46,580 |
| August | 31 | 139,407 | 133,452 | 124 | 62 | 139,525 | 133,514 |
| September | 30 | 14,908 | 8,582 | 22,200 | 6,000 | 37,108 | 14,582 |
| October | 31 | 11,898 | 5,949 | 22,940 | 6,200 | 34,838 | 12,149 |
| November | 30 | 207,291 | 5,949 | 120 | 60 | 207,411 | 6,009 |
| December | 31 | 76,771 | 45,125 | 124 | 62 | 76,895 | 45,187 |

Note: Permanent employment: 4 males
2 females
Seasonal employment: 740 males
200 females

Source: Table 29, and 32

The factory will absorb a manpower complement of 740 males (22,940 man days) in October, and 200 females (6,200 man days) also in October.

Table 35 illustrates combined effects of following plant for the extension in irrigation, transmigration program, and coconut fibre factory operation.

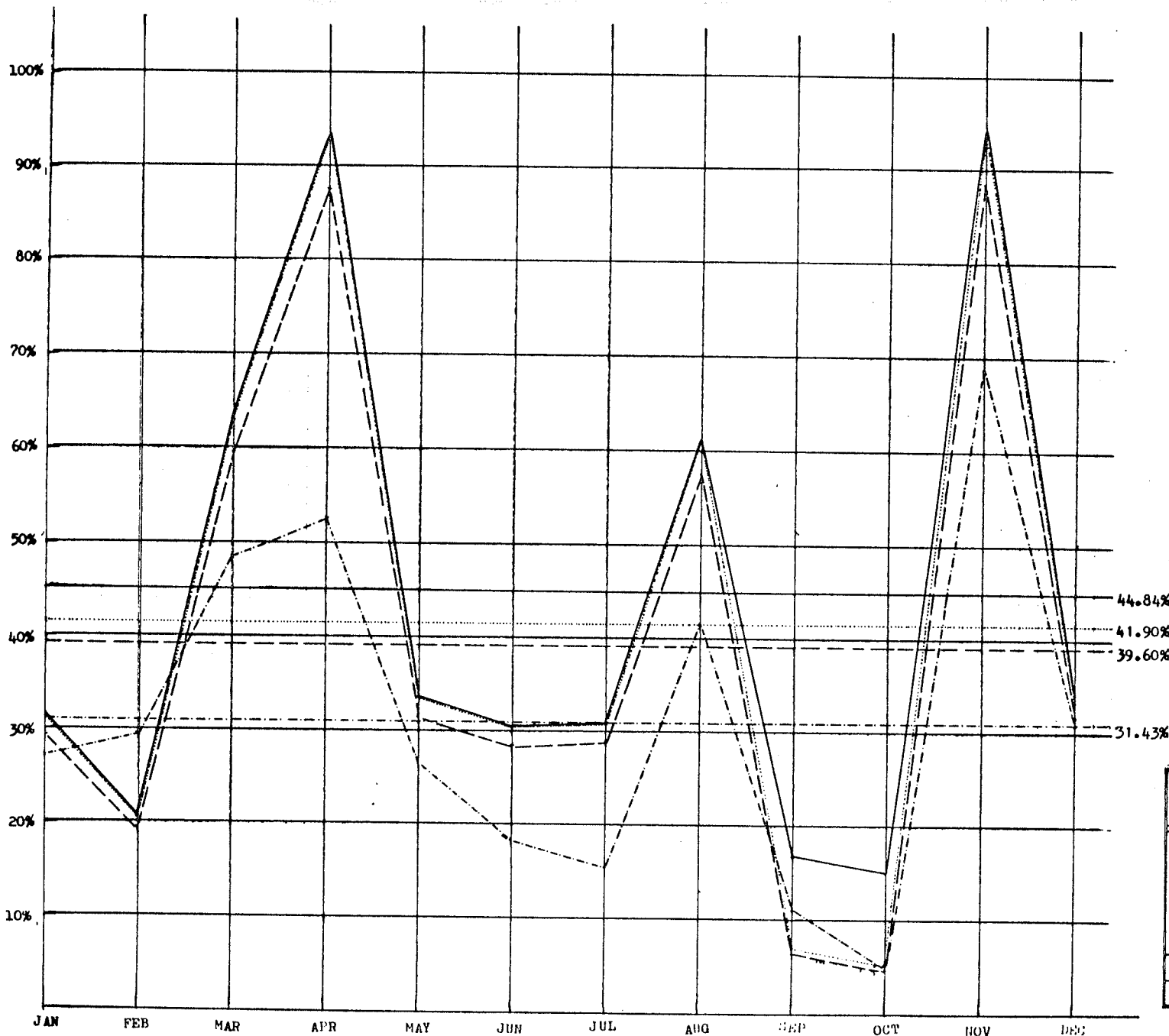
TABLE 35
LEVEL OF MANPOWER UTILIZATION ON FARMLAND AFTER COCONUT FIBRE FACTORY IS BUILT
PANJATAN DISTRICT 1982
(man day)

| Month | No. Day | Supply | | Demand | | Level of Utilization (percent) | |
|-----------|---------|---------|---------|---------|---------|--------------------------------|--------|
| | | Male | Female | Male | Female | Male | Female |
| January | 31 | 228,439 | 242,978 | 71,218 | 46,956 | 31.18 | 19.33 |
| February | 28 | 206,331 | 219,464 | 72,976 | 49,584 | 35.37 | 22.60 |
| March | 31 | 228,439 | 242,978 | 144,792 | 133,514 | 63.38 | 54.95 |
| April | 30 | 221,070 | 235,140 | 205,530 | 6,009 | 92.97 | 2.56 |
| May | 31 | 228,439 | 242,978 | 76,638 | 45,940 | 33.55 | 18.91 |
| June | 30 | 221,070 | 235,140 | 67,076 | 46,076 | 30.34 | 19.82 |
| July | 31 | 228,439 | 242,978 | 69,969 | 46,580 | 30.63 | 19.17 |
| August | 31 | 228,439 | 242,978 | 139,525 | 133,514 | 61.08 | 54.95 |
| September | 30 | 221,070 | 235,140 | 37,108 | 14,582 | 16.79 | 6.20 |
| October | 31 | 228,439 | 242,978 | 34,838 | 12,149 | 15.25 | 5.00 |
| November | 30 | 221,070 | 235,140 | 207,411 | 6,009 | 93.82 | 2.56 |
| December | 31 | 228,439 | 242,978 | 76,895 | 45,187 | 33.66 | 18.60 |
| Average | | | | | | 44.84 | 20.39 |

Source: Table 29, Table 32

The overall contribution of the coconut fibre factory to labour force utilization is 2.94 percent for males and 0.53 percent of females. The major contribution from this factory is in the months of September (10 percent for males and 3 percent for females) and October (10 percent for males and 2.5 percent for females).

Thus, by combining irrigation extension, transmigration and the coconut fibre factory, the level of manpower utilization in 1982 increases from 31.43 percent for males to 44.84 percent, and from 12.62 percent to 20.39 percent for females. This increment is very significant in this area, because farm income is increased while reducing worker idleness.



LEGEND :

- :Manpower utilization,without mitigating action in 1982.
- :After irrigation extension.
-:The combination of irrigation extension and Transmigration.
- :The combination of irrigation extension,Transmigration program and Coconut fibre fact.

Note :

The average manpower utilization:

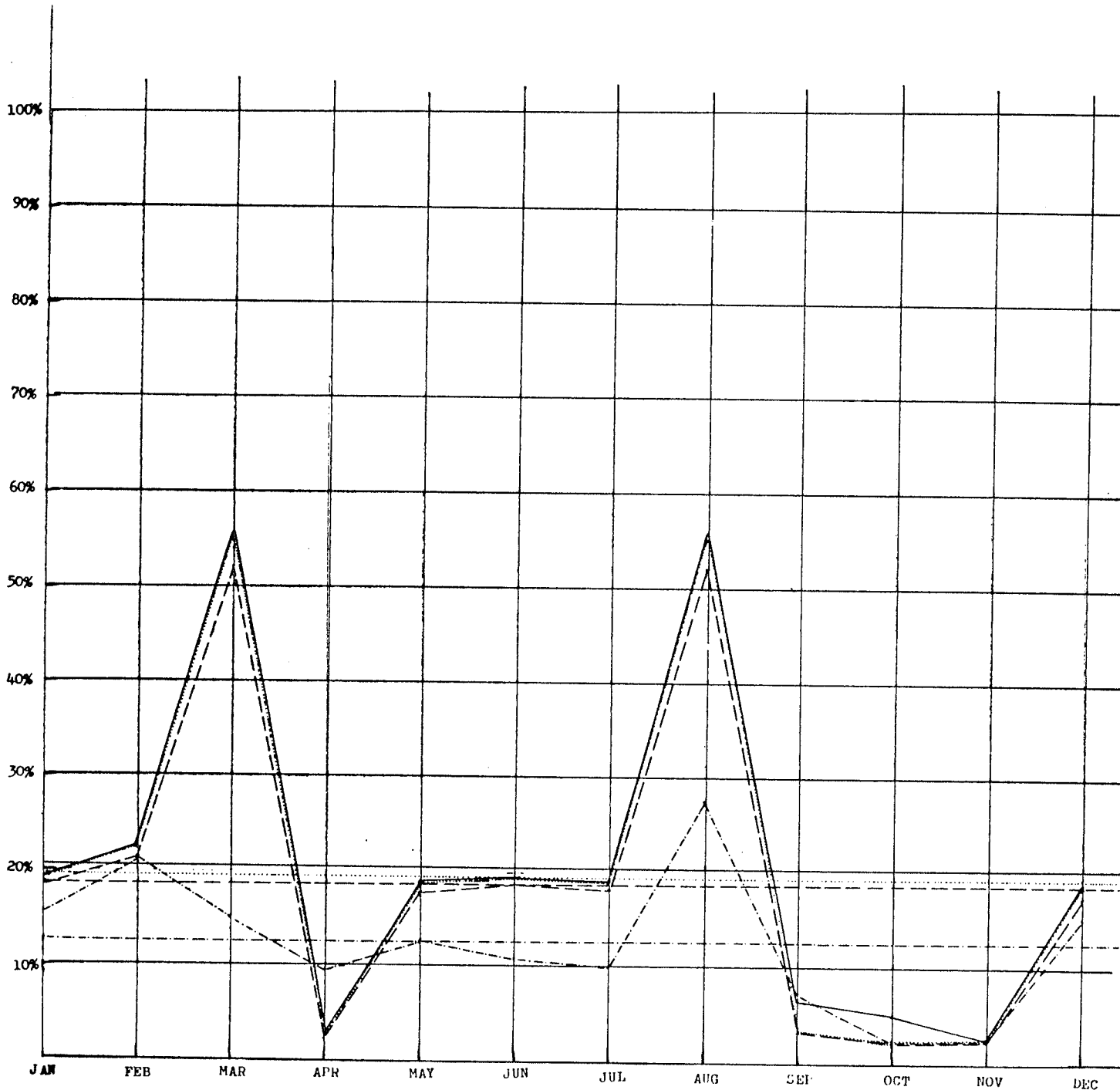
- *without mitigating action in 1982 31.43%
- *after irrigation extension. .39.60%
- *the combination of irrig. extension & transmigration. .41.90%
- *the combination of irrig. extension,transmigration & coconut fibre factory. . . 44.84%

44.84%
41.90%
39.60%
31.43%

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MANPOWER UTILIZATION (MALE)
ON FARMLAND
PANJATAN DISTRICT 1982

| Prepared by | student no | Figure no |
|-------------|------------|-----------|
| Soenyoto | 5080552 | 8 |



LEGEND :

-:Manpower utilization,without mitigating action in 1982.
- :After irrigation extension.
-:The combination of irrigation extension and Transmigration.
- :The combination of irrigation extension,Transmigration program and Coconut fibre fact.

Note :

- The average manpower utilization:
- *without mitigating action in 1982.12.62%
 - *after irrigation extension . .18.91%
 - *the combination of irrig. extension & transmigation. .19.86%
 - *the combination of irrig. extension,transmigration & coconut fibre factory. . .20.39%

| | | |
|--|------------|-----------|
| THE UNIVERSITY OF MANITOBA NATURAL RESOURCE INSTITUTE | | |
| MANPOWER UTILIZATION (FEMALE) ON FARMLAND PANJATAN DISTRICT 1982 | | |
| Prepared by | student no | figure no |
| Soenyoto | 5080552 | 9 |

This practicum represents only a short-term solution to the problem of manpower utilization in the Panjatan District. If present trends continue after 1982, the level of manpower utilization will decrease gradually. If not further mitigating action is taken, in the year 1994 manpower utilization will be nearly the same as at present. If the family planning program is vigorously promoted in this area, however, the decrease in the level of manpower utilization could be decelerated in future years.

The transmigration program does not play an important role in increased manpower utilization at the present time. This program only makes a contribution toward increasing manpower utilization of 2.30 percent for males and 0.95 percent for females while irrigation extension contributed 8.17 percent for males and 6.29 percent for females. In the next five years, however, transmigration will have a more important role, because the irrigated land cannot be extended further. "Pull" factors should be created in other Indonesian islands, such as Sumatera, Kalimantan and Irian Jaya. There is also a need for the government to design an improved transmigration policy, especially relating to information provision and communication, so that increased numbers of migrants would be attracted in the future.

Also job opportunities outside agriculture should be created, such as rattan and bamboo handicraft factories. These could be built and operated by local residents who could also pursue trade opportunities. Further study concerning cattle feeding

should also be undertaken, in order to determine whether this activity could be increased due to an increase in the level of land utilization in the area (to replace cattle activities with the hand tractor).

CHAPTER VII

CONCLUSION AND RECOMMENDATIONS

The total population in the Panjatan district is 32,916 people, consisting of 16,979 individuals who constitute the economically active ages (15 - 59 years). Of these, 14,215 (83.72 percent) work on farmland. The remaining 2,764 work as government officers, or in trade, construction, and other pursuits. In the short term, monthly manpower supply is nearly constant because the annual net outmigration is only about 0.06 percent. But, in the long term, manpower supply will increase year by year because the rate of net population growth is 24.62 per 1,000 people. The monthly manpower supply in 1977 was about 207,030 man days for males and 219,420 for females.

Irrigated sawah generally can be planted twice a year in the study area. Padi rendeng occurs in the wet season, with land preparation occurring in November, planting in December, and harvesting in March. Land preparation for the second crop (padi gadu) is completed in April, planting occurs in May, and harvesting in September. Manpower demand per hectare per crop is 259 man days, 170 of which are contributed by males and 89 by female workers. Tegal crops generally grown in the study area include maize, soybeans, long pepper, and cassava. Long pepper and maize are planted in the wet season, soybeans at the end of the wet season, and cassava is grown in the dry season. Manpower demand per hectare for each crop is: soybean = 60 man days (42 males and 18 females); maize = 57 man days (44 males and 13 females); long pepper = 108 man days (64 males and 44

females); and cassava = 51 man days (38 males and 13 females).

Trees generally grown in the kebun include coconut, banana, mango and orange. According to questionnaire respondents, the labour input at the kebun per month per hectare is 9 man days (6 males and 3 females). Job opportunities in agricultural activities have been calculated each month, according to the kind and area of each crop and the kind of activities in that month (Table 13). From these data, average utilization of manpower was 32.9 percent for males and 14.3 percent for females in 1977, and five years later will become 31.43 percent for males and 12.62 percent for females (1982).

Increased monthly labour demand in the agricultural area can be created through extension of irrigated land. Such extension is feasible based on the following factors:

- (a) the driest month of the year has $9 \text{ m}^3/\text{s}$ of water having acceptable quality available for irrigation.
- (b) the irrigable area, of acceptable soil type can be increased by 1,482.4 hectares for sawah.
- (c) the water requirements for irrigation range from 0.6 to $2.4 \text{ m}^3/\text{s}$, well below the minimum water ($9 \text{ m}^3/\text{s}$) available throughout the year.

With irrigation extension, the average level of utilization of manpower can be projected, becomes 39.60 percent for males and 18.91 percent for females in 1982.

The transmigration program is one method designed to reduce the monthly manpower supply in the Panjatan district. Program selection has been made from practicing farmers who are

young and married with a small family, and landless farmers with healthy families and non-pregnant wives. The number of people considered reasonable to migrate is estimated at 2,278 or 710 households. According to experience from other places in Indonesia, however, only about 60 percent of the transmigrant candidates will agree to move, or about 1,375 people (425 households). If a combination of transmigration and irrigation extension were followed the average level of manpower utilization in Panjatan would become 41.90 percent for males and 19.86 percent for females.

A coconut fibre factory can be built to increase monthly labour demand outside agricultural activities. A small number of people would be required to work in the factory, but in September and October, it could absorb 744 males and 202 females. The average level of manpower utilization could, therefore become 44.84 percent for males and 20.39 percent for females.

Recommendations for the Future

1. The family planning program should be vigorously promoted in the study area, to decelerate the decrease in the level of manpower utilization.

2. "Pull" factors should be created in other islands, such as Kalimantan, Irian Jaya, to attract increased numbers of migrants in the future.

3. Further study concerning the level of land utilization should be undertaken in order to increase the level of manpower utilization.

4. Job opportunities outside agriculture should be created.

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APPENDICES

Appendix II/A

TYPE OF RAINFALL

Classification by month:¹

- 1 Wet month: rainfall is more than 100 mm.
- 2 Medium month: rainfall is more than 60 mm. but less than 100 mm.
- 3 Dry month: rainfall is less than 60 mm.

According to Table I/3, the monthly rainfall 1968-77 is:

Wet month: 7

Medium month: 0

Dry month: 5

$$Q = \frac{\text{the total number of dry month}}{\text{the total number of wet month}} \times 100\%$$

$$= \frac{5}{7} \times 100\% = 71.4\%$$

According to classification of the type of rainfall, F. H. Schmidt and J. H. A. Ferguson²:

Type of rain: A if $0\% < Q < 14.3\%$
B if $14.3\% < Q < 33.3\%$
C if $33.3\% < Q < 60\%$
D if $60\% < Q < 100\%$
E if $100\% < Q < 167\%$
F if $167\% < Q < 300\%$
G if $300\% < Q < 700\%$
H if $700\% < Q$

The type of rainfall in Panjatan District is D.

¹Wisaksono Wirjodihardjo M., "Ilmu tubuh tanah III", Noordhoff Kolf, Jakarta, 1953. p. 57.

²Schmidt, F. H. and Ferguson, "Rainfall Types Based on Wet and Dry Period Ratios for Indonesia with Western New Guinea". Verhandelingerr No. 42, Kem Perhub. Djawatan Meteorologi dan Geofisika jakarta 1951, p. 8.

Appendix II/B

CALCULATION OF AVERAGE TEMPERATURES

In Panjatan district there are no temperature stations, so the temperature is calculated by the equation:¹

$$t = 26.3^{\circ} \text{ C} - 0.6 h$$

where t = the average temperature in the area

26.3° C = the average temperature at sea level in tropical areas

0.6 = constant

h = elevation in hundreds of meters

The elevation of Pleret village = 2 m.

$$\begin{aligned} t &= 26.3^{\circ} \text{ C} - 0.6 \times \frac{2}{100} \\ &= 26.3^{\circ} \text{ C} - 0.012 = 26.28^{\circ} \text{ C} \end{aligned}$$

The elevation of Gotakan village = 25 m.

$$\begin{aligned} t &= 26.3^{\circ} \text{ C} - 0.6 \times \frac{25}{100} \\ &= 26.3^{\circ} \text{ C} - 0.15 = 26.15^{\circ} \text{ C} \end{aligned}$$

$$\begin{aligned} \text{Average temperature} &= \frac{26.28 + 26.15}{2} \\ &= \underline{\underline{26.22^{\circ} \text{ C}}} \end{aligned}$$

¹Dames T. W. G. "The Soil of East Central Java", Penerbit Balai Besar Penyelidikan Pertanian Bogor 1953, p. 19.

Nomor: _____

DAFTAR PERTANYAAN

Dibagikan tgl: _____

Ditarik kembali tgl: _____

Nama: _____

Umur: _____

Desa: _____

Pendidikan: _____

Anggota Keluarga

| No. | Nama | Hubungan | Umur | Pekerjaan | Keterangan |
|-----|------|----------|------|-----------|------------|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| 13. | | | | | |
| 14. | | | | | |

TENTANG KELUARGA

1. Jumlah isteri : _____

2. Jumlah anak-anak : _____

 yang hidup : _____

 yang meninggal : _____

3. Ingin memp.anak lagi: ya / tidak

4. Jumlah anak yang dikehendaki : 1/2/3/4/5/6/7/8/9/10/11/12/13/14.

5. Sudah punya anak laki-laki: sudah / belum.

6. Terdaftar jadi anggota Keluarga Berencana: sudah / belum / tidak

7. alasan: _____

8. Pendapatnya tentang Keluarga Berencana: _____

PEKERJAAN:

1. Pekerjaan pokok : _____
2. Pekerjaan sambilan : _____
3. Pekerjaan isteri : _____
4. Penghasilan bulanan : _____
5. Keterangan lain-lain: _____

PERTANIAN:

1. Sawah yang dimiliki : _____ Hektare (1 Hektare 6 iring 1.5 bouw)
2. Tegall yang dimiliki : _____ Hektare
3. Kebun yang dimiliki : _____
4. Binatang yg dimiliki: _____ ekor Kerbau / Sapi.
5. Keterangan lain-lain: _____

PENDAPAT TENTANG TRANSMIGRASI:

1. Kalau pemerintah menanya untuk ikut transmigrasi: berangkat / tidak
2. Punya keluarga yang pernah ikut transmigrasi : ada / tidak
3. Kalau ada keluarga akan ikut transmigrasi : setuju / tidak
4. Alasan : _____

PENDAPAT TENTANG PERLUASAN DAERAH IRIGASI:

1. Kalau daerah irigasi diperluas : setuju / tidak
2. Pendapatan tahunan untuk petani : naik / tidak / turun
3. Bila terkena perluasan irigasi akan menanam: padi/jagung/kedele/ketala/
lombok
4. Keterangan lain-lain: _____

PENDAPAT TENTANG AKAN DIADAKANNYA PABRIK SABUT:

1. Bila didirikan pabrik sabut : setuju / biasa / menolak
2. Bila ada kesempatan kerja : senang / menolak
3. Bila akan dididik dikelurahan : setuju / biasa / menolak
4. Keterangan lain-lain : _____

PENDAPAT TENTANG AKAN MASUKNYA TREKTOR TANGAN:

1. Kalau trektor tangan masuk : setuju / biasa / menolak
2. Bila dididik untuk menjalankan trektor tangan : setuju/menolak
3. Bila sawahnya dibajak dengan trektor tangan: boleh / tidak
4. Keterangan lain-lain : _____

BERAPA JAM YANG DIPERLUKAN UNTUK SATU KALI TANAM (1 hari = 5 jam)

| No | Kegiatan Petani | P A D I | | | J A G U N G | | | K E T E L A | | | K E D E L E | | | L O M B O K | | |
|----|--------------------------------|---------|-----|----|-------------|----|----|-------------|----|----|-------------|----|----|-------------|----|----|
| | | Lk | Pr. | Rk | Lk | Pr | Rk | Lk | Pr | Rk | Lk | Pr | Rk | Lk | Pr | Rk |
| | <u>1. Penggarapan tanah</u> | | | | | | | | | | | | | | | |
| | *persiapan pesemaian | | | | | | | | | | | | | | | |
| | *irigasi di pesemaian | | | | | | | | | | | | | | | |
| | *memotong jerami | | | | | | | | | | | | | | | |
| | *membajak I | | | | | | | | | | | | | | | |
| | *membajak II | | | | | | | | | | | | | | | |
| | *perbaiki pematang | | | | | | | | | | | | | | | |
| | *menggaru | | | | | | | | | | | | | | | |
| | *meratakan tanah | | | | | | | | | | | | | | | |
| | *membuat lobang-lobang | | | | | | | | | | | | | | | |
| | *mencabut benih | | | | | | | | | | | | | | | |
| | <u>2. Pemeliharaan tanaman</u> | | | | | | | | | | | | | | | |
| | *penanaman | | | | | | | | | | | | | | | |
| | *penyiraman | | | | | | | | | | | | | | | |
| | *pemupukan | | | | | | | | | | | | | | | |
| | *penyiangan I | | | | | | | | | | | | | | | |
| | *penyiangan II | | | | | | | | | | | | | | | |
| | *pemupukan II | | | | | | | | | | | | | | | |
| | *irigasi 2x | | | | | | | | | | | | | | | |
| | *penyiangan III | | | | | | | | | | | | | | | |
| | <u>3. Menuai hasil panen</u> | | | | | | | | | | | | | | | |
| | *panen dan angkut kerumah | | | | | | | | | | | | | | | |

Keterangan tambahan:

Respondent Number: _____

LIST OF QUESTIONS

Distributed on: _____

Received on: _____

Name: _____

Age: _____

Village: _____

Education: _____

Family Member:

| No. | Name | Relation | Age | Occupation | Note |
|-----|------|----------|-----|------------|------|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| 13. | | | | | |
| 14. | | | | | |

ABOUT THE FAMILY

1. Number of wives: _____

2. Number of children born
 alive: _____
 deceased: _____

3. Additional children desired: yes / no

4. Ideal number of children: 1/2/3/4/5/6/7/8/9/10/11/12/13/14.

5. Male children? yes/no

6. Acceptance of family planning: yes / not yet / no

7. Reasons: _____

8. Your opinion about Family Planning: _____

OCCUPATION:

1. Primary occupation: _____
2. Secondary occupation: _____
3. Wife's occupation: _____
4. Monthly income: _____
5. Note: _____

AGRICULTURE:

1. Acres of sawah owned: _____
2. Acres of tegal owned: _____
3. Acres of Kebun owned: _____
4. Number of animals owned: Cows / Buffalos
5. Note: _____

OPINION ABOUT TRANSMIGRATION PROGRAM:

1. If the government asked you to follow transmigration program, would you comply?
yes / no/
2. Has any of your family ever followed the transmigration program: yes / no
3. If one of your family will follow transmigration program, would you? yes / no
4. Reasons: _____

OPINION ABOUT THE EXTENSION OF IRRIGATED LAND:

1. If the government would like to extend irrigated land, would you? agree/ no
2. Would your annual farmer income: increase / be constant/ decrease
3. If the extension included your land, would you plant: rice/maize/cassava/long
pepper/soybean.
4. Note: _____

OPINION ABOUT COCONUT FIBRE FACTORY IN THIS AREA:

1. If the government will construct coconut fibre factory, would you:
agree/maybe/reject
2. If you get a job opportunity, would you: agree/no
3. If you have to take course in coconut fibre handicraft, would you?
agree/no
4. Note: _____

OPINION ABOUT HAND TRACTORS IN THIS AREA:

1. If the government allowed hand tractors, would you: agree / no
2. If you have to learn about hand-tractor operation, would you? agree / no
3. If your sawah would be ploughed by hand tractor, would you: agree / no
4. Note: _____

LABOUR INPUT IN ONE CROP (MAN-HOURS)

| No. | Farm activities | Rice | | | Maize | | | Cassava | | | Soybean | | | Long Pepper | | |
|-----|----------------------------|------|---|---|-------|---|---|---------|---|---|---------|---|---|-------------|---|---|
| | | M | F | A | M | F | A | M | F | A | M | F | A | M | F | A |
| 1. | <u>Land Preparation</u> | | | | | | | | | | | | | | | |
| | * nursery | | | | | | | | | | | | | | | |
| | * irrigating (nursery) | | | | | | | | | | | | | | | |
| | * cutting the straw | | | | | | | | | | | | | | | |
| | * ploughing I | | | | | | | | | | | | | | | |
| | * ploughing II | | | | | | | | | | | | | | | |
| | * bound restoration | | | | | | | | | | | | | | | |
| | * harrowing | | | | | | | | | | | | | | | |
| | * smoothing | | | | | | | | | | | | | | | |
| | * holing | | | | | | | | | | | | | | | |
| | * pulling the seed | | | | | | | | | | | | | | | |
| 2. | <u>Crop Care</u> | | | | | | | | | | | | | | | |
| | * planting | | | | | | | | | | | | | | | |
| | * water spraying | | | | | | | | | | | | | | | |
| | * fertilizer appl. I | | | | | | | | | | | | | | | |
| | * weeding I | | | | | | | | | | | | | | | |
| | * weeding II | | | | | | | | | | | | | | | |
| | * fertilizer appl. II | | | | | | | | | | | | | | | |
| | * irrigating 2 X | | | | | | | | | | | | | | | |
| | * weeding III | | | | | | | | | | | | | | | |
| 3. | <u>Harvesting</u> | | | | | | | | | | | | | | | |
| | * harvest and transporting | | | | | | | | | | | | | | | |

Note: M - male F - female A - livestock

Appendix III/A

SUMMARY OF THE 52 RESPONDENT'S ANSWERS
PANJATAN DISTRICT 1978

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----|-----|--------------|---|----|---|---|---|---|------|------|------|----|----|----|----|
| 1 | 1 | Ahmad Usman | A | 6 | * | 8 | - | F | 0.50 | 0.10 | 0.60 | - | * | * | * |
| 2 | 8 | Abdullah | A | 3 | * | 5 | - | F | 0.45 | 0.15 | 0.35 | - | * | * | * |
| 3 | 17 | Hadisumarto | B | 4 | ? | 4 | * | F | 0.40 | 0.10 | 0.30 | - | * | * | * |
| 4 | 25 | Amat Istad | A | 2 | * | ? | - | F | 0.10 | 0.20 | 0.30 | - | * | * | * |
| 5 | 33 | Alisumarto | A | 4 | - | 4 | * | F | 0.20 | 0.15 | 0.40 | - | * | * | * |
| 6 | 37 | Amir | A | 3 | - | 3 | * | F | 0.40 | 0.10 | 0.30 | - | * | * | * |
| 7 | 42 | Ashari | B | 4 | ? | ? | - | F | 0.25 | 0.20 | 0.20 | - | * | * | * |
| 8 | 47 | Partono | A | 1 | * | ? | ? | F | 0.15 | 0.15 | 0.60 | - | * | * | * |
| 9 | 51 | Hariadi | C | 3 | - | 3 | * | T | 0.20 | 0.00 | 0.40 | - | * | * | * |
| 10 | 58 | Ronodipuro | A | 9 | ? | ? | - | F | 0.50 | 0.00 | 0.35 | - | * | * | * |
| 11 | 65 | Supardi | C | 4 | - | 4 | * | T | 0.30 | 0.00 | 0.45 | - | * | * | * |
| 12 | 71 | Hananto | A | 3 | - | ? | ? | F | 0.40 | 0.00 | 0.20 | - | * | * | * |
| 13 | 78 | Topah | A | 9 | ? | ? | - | F | 2.00 | 0.00 | 0.60 | - | * | * | * |
| 14 | 84 | Sastrodipuro | A | 6 | ? | ? | - | F | 0.40 | 0.00 | 0.05 | - | * | * | * |
| 15 | 89 | Hadisunarto | A | 2 | ? | ? | - | F | 0.30 | 0.10 | 0.45 | - | * | * | * |
| 16 | 97 | Martowardoyo | A | 2 | * | ? | - | F | 0.45 | 0.00 | 0.40 | - | * | * | * |
| 17 | 104 | Darwahadi | A | 2 | * | 5 | - | F | 0.35 | 0.10 | 0.50 | - | * | * | * |
| 18 | 110 | Hasan | A | 5 | - | 5 | ? | F | 0.55 | 0.00 | 0.25 | - | * | * | * |
| 19 | 118 | Parno | A | 3 | ? | ? | - | F | 0.00 | 0.00 | 0.25 | * | * | * | - |
| 20 | 129 | Harnan | A | 5 | - | 5 | ? | F | 0.00 | 0.00 | 0.20 | * | * | * | - |
| 21 | 138 | Parnadi | A | 6 | * | 8 | - | F | 2.30 | 0.00 | 0.45 | - | * | * | * |
| 22 | 154 | Adiswoyo | A | 7 | ? | ? | * | F | 0.60 | 0.00 | 0.35 | - | * | * | * |
| 23 | 167 | Martodionomo | A | 8 | - | ? | * | F | 0.00 | 0.00 | 0.30 | * | * | * | - |
| 24 | 177 | Dasuki | B | 11 | - | ? | ? | F | 2.05 | 0.35 | 0.45 | - | * | * | * |
| 25 | 191 | Hamat | B | 1 | * | 3 | * | F | 0.65 | 0.00 | 0.30 | - | * | * | * |
| 26 | 212 | Abas | A | 3 | * | ? | - | F | 0.00 | 0.00 | 0.45 | - | * | * | * |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----|-----|---------------|---|----|---|---|---|---|------|------|------|----|----|----|----|
| 27 | 243 | Mangunwiyadi | A | 8 | ? | ? | - | F | 0.80 | 0.00 | 0.15 | - | * | * | * |
| 28 | 257 | Harsono | B | 2 | * | 4 | * | G | 0.35 | 0.10 | 0.45 | - | * | * | * |
| 29 | 269 | Kasanwinoto | A | 4 | ? | ? | - | F | 0.45 | 0.00 | 0.00 | - | * | * | * |
| 30 | 279 | Kartowiranu | A | 7 | ? | 9 | - | F | 0.60 | 0.00 | 0.70 | - | * | * | * |
| 31 | 1 | Hasanudin | B | 1 | * | 3 | * | T | 0.00 | 0.80 | 0.15 | - | * | * | * |
| 32 | 6 | Bandono | A | 7 | ? | ? | - | F | 0.00 | 0.70 | 0.65 | - | * | * | * |
| 33 | 17 | Abdlrahim | A | 4 | - | ? | ? | F | 0.00 | 0.10 | 0.20 | * | * | * | - |
| 34 | 25 | Manan | A | 5 | - | 5 | ? | F | 0.00 | 0.00 | 0.30 | * | * | * | - |
| 35 | 39 | Kasim | A | 1 | * | ? | - | F | 0.00 | 0.75 | 0.20 | - | * | * | * |
| 36 | 52 | Harunsodik | A | 8 | ? | ? | - | F | 0.00 | 0.60 | 0.30 | - | * | * | * |
| 37 | 66 | Asmono | C | 2 | * | 4 | * | G | 0.00 | 0.40 | 0.05 | - | * | * | ? |
| 38 | 79 | Panutmartono | A | 6 | - | 6 | ? | F | 0.00 | 0.00 | 0.25 | ? | * | * | - |
| 39 | 93 | Darnowasito | A | 3 | ? | ? | - | F | 0.00 | 0.00 | 0.75 | ? | * | * | ? |
| 40 | 107 | Kartosentono | A | 1 | * | 4 | ? | F | 0.00 | 0.30 | 0.15 | - | * | * | * |
| 41 | 118 | Wiryidirun | A | 2 | - | 2 | * | F | 0.00 | 0.75 | 0.80 | - | * | * | * |
| 42 | 132 | Bambang | B | 10 | - | ? | * | F | 0.00 | 1.90 | 0.75 | - | * | * | * |
| 43 | 144 | Jokususanto | A | 5 | - | 5 | - | F | 0.00 | 0.00 | 0.50 | ? | * | * | - |
| 44 | 160 | Iman pracoyo | C | 5 | * | 7 | * | F | 0.00 | 3.25 | 0.50 | - | * | * | * |
| 45 | 177 | Wongsodirun | A | 7 | - | 7 | * | F | 0.00 | 1.50 | 0.90 | - | * | * | * |
| 46 | 189 | Marsidiq | A | 6 | ? | 6 | ? | F | 0.00 | 1.90 | 0.35 | - | * | * | * |
| 47 | 208 | Ibrahim saleh | A | 1 | * | ? | - | F | 0.00 | 0.00 | 1.10 | - | * | * | - |
| 48 | 231 | Moh. Amron | B | 2 | ? | 6 | ? | F | 0.00 | 1.80 | 1.45 | - | * | * | * |
| 49 | 249 | Kartoprayoga | A | 4 | * | 6 | * | F | 0.00 | 0.80 | 0.75 | - | * | * | * |
| 50 | 263 | Ngadimin | A | 5 | ? | ? | ? | F | 0.00 | 0.40 | 0.05 | - | * | * | * |
| 51 | 266 | Setrowinangun | A | 3 | ? | 5 | ? | F | 0.00 | 0.80 | 1.90 | - | * | * | * |
| 52 | 271 | Katamei | A | 2 | * | ? | ? | F | 0.00 | 1.35 | 0.20 | - | * | * | * |

source: 52 Respondents

Note:

- 1 = The number of respondents (Cerme : 1 - 30 and Bojong : 31 - 52)
- 2 = The number of Family Caru
- 3 = Respondent's name
- 4 = Education
- 5 = Number of children
- 6 = Need more children or not ?
- 7 = The number of ideal children.
- 8 = Opinion in Family Planning
- 9 = Occupation
- 10 = Family possess sawah
- 11 = Family possess Tegal
- 12 = Family possess Kebun
- 13 = Opinion in Transmigration program

- 14 = Opinion in Irrigation extension
- 15 = Opinion in Coconut Fibre Factory
- 16 = Opinion in Controlled mechanization (hand-tractor)

Education A : Primary school B : Secondary school C : High school
 More Children * : yes ? : I do not know (God's will) - : no
 Family Planning * : agree ? : I do not know (not now) - : no
 Occupation F : farmer T : Local school teacher G : gov't officer
 Transmigration * : agree ? : I do not know - : do not agree
 Irrig. Extension * : agree ? : I do not know - : do not agree
 Coconut fib. fact. * : agree ? : I do not know - : do not agree
 Hand tractor * : agree ? : I do not know - : do not agree

Appendix IV/A

NUMBER OF MANHOURS PERHECTARE FROM 52 RESPONDENTS
PANJATAN DISTRICT
C E R M E (1 - 30) and B O J O N G (31 - 52)

| No of Respondent | Kind of Crop | Land Prep. | Crop Care | Harvest-ing. | Kind of soil | Water supply | Kind of Land use |
|------------------|--------------|------------|-----------|--------------|--------------|--------------|------------------|
| 1. | Padi rendeng | 330 | 525 | 440 | M1 | Irr | S |
| | Padi gadu | 340 | 530 | 450 | M1 | Irr | S |
| | M a i z e | 55 | 150 | 90 | M1 | Rf | T |
| 2. | Padi rendeng | 335 | 530 | 430 | M1 | Irr | S |
| | Padi gadu | 340 | 530 | 440 | M1 | Irr | S |
| | M a i z e | 55 | 155 | 80 | M1 | Rf | T |
| 3. | Padi rendeng | 330 | 535 | 445 | M1 | Irr | S |
| | Padi gadu | 340 | 545 | 440 | M1 | Irr | S |
| 4. | Padi rendeng | 335 | 520 | 420 | M1 | Irr | S |
| | Padi gadu | 345 | 525 | 420 | M1 | Irr | S |
| | M a i z e | 50 | 160 | 80 | M1 | Rf | T |
| | Cassava | 70 | 115 | 85 | M1 | Rf | T |
| 5. | Padi rendeng | 340 | 525 | 450 | M1 | Irr | S |
| | Padi gadu | 345 | 530 | 435 | M1 | Irr | S |
| 6. | Padi rendeng | 340 | 515 | 445 | M1 | Irr | S |
| | Padi gadu | 350 | 520 | 435 | M1 | Irr | S |
| | M a i z e | 45 | 150 | 80 | M1 | Rf | T |
| | Cassava | 70 | 120 | 90 | M1 | Rf | T |
| 7. | Padi rendeng | 340 | 520 | 430 | M1 | Irr | S |
| | Padi gadu | 350 | 500 | 410 | M1 | Irr | S |
| 8. | Padi rendeng | 330 | 510 | 440 | M1 | Irr | S |
| | Padi gadu | 340 | 530 | 450 | M1 | Irr | S |
| 9. | Padi rendeng | 330 | 520 | 440 | M1 | Irr | S |
| | Padi gadu | 340 | 535 | 410 | M1 | Irr | S |
| 10. | Padi rendeng | 350 | 530 | 435 | M1 | Irr | S |
| | Padi gadu | 350 | 540 | 415 | M1 | Irr | S |
| 11. | Padi rendeng | 330 | 530 | 430 | M1 | Irr | S |
| | Padi gadu | 340 | 535 | 410 | M1 | Irr | S |
| 12. | Padi rendeng | 330 | 540 | 420 | M1 | Irr | S |
| | Padi gadu | 340 | 540 | 420 | M1 | Irr | S |
| 13. | Padi rendeng | 330 | 510 | 430 | M1 | Irr | S |
| | Padi gadu | 340 | 530 | 410 | M1 | Irr | S |
| 14. | Padi rendeng | 320 | 510 | 440 | M1 | Irr | S |
| | Padi gadu | 330 | 520 | 410 | M1 | Irr | S |

| No of Respondent | Kind of Crop | Land Prep. | Crop Care | Harvest-ing. | Kind of soil | Water supply | Kind of Land use |
|------------------|--------------|------------|-----------|--------------|--------------|--------------|------------------|
| 15. | Padi rendeng | 320 | 520 | 430 | M1 | Irr | S |
| | Padi gadu | 330 | 540 | 400 | M1 | Irr | S |
| 16. | M a i z e | 55 | 160 | 75 | M1 | Rf | T |
| | Cassava | 70 | 115 | 80 | M1 | Rf | T |
| 17. | Padi rendeng | 310 | 500 | 450 | M1 | Irr | S |
| | Padi gadu | 340 | 525 | 420 | M1 | Irr | S |
| 18. | Padi rendeng | 330 | 525 | 430 | M1 | Irr | S |
| | Padi gadu | 330 | 540 | 410 | M1 | Irr | S |
| | M a i z e | 60 | 160 | 80 | Lr | Rf | T |
| | Cassava | 70 | 110 | 90 | Lr | Rf | T |
| 19. | No land | - | - | - | - | - | - |
| 20. | No land | - | - | - | - | - | - |
| 21. | Padi rendeng | 340 | 540 | 420 | Lr | Irr | S |
| | Padi gadu | 330 | 550 | 410 | Lr | Irr | S |
| 22. | Padi rendeng | 320 | 510 | 450 | M1 | Irr | S |
| | Padi gadu | 340 | 530 | 410 | M1 | Irr | S |
| | M a i z e | 70 | 160 | 85 | M1 | Rf | T |
| | Cassava | 70 | 110 | 90 | M1 | Rf | T |
| 23. | No land | - | - | - | - | - | - |
| 24. | Padi rendeng | 330 | 525 | 440 | M1 | Irr | S |
| | Padi gadu | 340 | 540 | 420 | M1 | Irr | S |
| | M a i z e | 55 | 160 | 80 | M1 | Rf | T |
| | Cassava | 70 | 110 | 85 | M1 | Rf | T |
| 25. | Padi rendeng | 345 | 520 | 430 | M1 | Irr | S |
| | Padi gadu | 350 | 530 | 410 | M1 | Irr | S |
| 26. | No land | - | - | - | - | - | - |
| 27. | Padi rendeng | 330 | 540 | 440 | M1 | Irr | S |
| | Padi gadu | 345 | 555 | 420 | M1 | Irr | S |
| 28. | Padi rendeng | 330 | 525 | 440 | M1 | Irr | S |
| | Padi gadu | 340 | 540 | 430 | M1 | Irr | S |
| | M a i z e | 50 | 150 | 90 | M1 | Rf | T |
| | Cassava | 70 | 115 | 90 | M1 | Rf | T |
| 29. | Padi rendeng | 340 | 550 | 430 | M1 | Irr | S |
| | Padi gadu | 350 | 550 | 410 | M1 | Irr | S |
| 30. | Padi rendeng | 340 | 540 | 440 | M1 | Irr | S |

| No of Respondent | Kind of Crop | Land Prep. | Crop Care | Harvesting. | Kind of soil | Water supply | Kind of Land use |
|------------------|--------------|------------|-----------|-------------|--------------|--------------|------------------|
| 31. | Cassava | 70 | 110 | 80 | Ml | Rf | T |
| | Soybean | 85 | 155 | 80 | Ml | Rf | T |
| | Long pepper | 90 | 290 | 90 | Ml | Rf | T |
| | M a i z e | 55 | 150 | 90 | Ml | Rf | T |
| 32. | Cassava | 75 | 125 | 90 | Ml | Rf | T |
| | Soybean | 85 | 140 | 85 | Ml | Rf | T |
| | Long pepper | 110 | 280 | 90 | Ml | Rf | T |
| | M a i z e | 55 | 155 | 85 | Ml | Rf | T |
| 33. | No land | - | - | - | - | - | - |
| 34. | No land | - | - | - | - | - | - |
| 35. | Long pepper | 105 | 270 | 85 | Ml | Rf | T |
| | Cassava | 70 | 110 | 90 | Ml | Rf | T |
| 36. | Cassava | 75 | 120 | 80 | Ml | Rf | T |
| | Soybean | 80 | 140 | 80 | Ml | Rf | T |
| | Long pepper | 110 | 270 | 90 | Ml | Rf | T |
| 37. | Cassava | 70 | 120 | 80 | Ml | Rf | T |
| | M a i z e | 55 | 150 | 90 | Ml | Rf | T |
| | Long pepper | 100 | 275 | 80 | Ml | Rf | T |
| 38. | No land | - | - | - | - | - | - |
| 39. | No land | - | - | - | - | - | - |
| 40. | Cassava | 75 | 120 | 70 | Ml | Rf | T |
| | M a i z e | 60 | 150 | 85 | Ml | Rf | T |
| 41. | Cassava | 70 | 125 | 75 | Lr | Rf | T |
| | Long pepper | 90 | 250 | 100 | Lr | Rf | T |
| 42. | Cassava | 70 | 125 | 85 | Lr | Rf | T |
| | Long pepper | 95 | 225 | 90 | Lr | Rf | T |
| | M a i z e | 60 | 140 | 85 | Lr | Rf | T |
| 43. | No land | - | - | - | - | - | - |
| 44. | M a i z e | 60 | 125 | 85 | Lr | Rf | T |
| | Soybean | 85 | 140 | 80 | Lr | Rf | T |
| 45. | Cassava | 75 | 125 | 85 | Ml | Rf | T |
| | Long pepper | 90 | 240 | 90 | Ml | Rf | T |
| 46. | Cassava | 70 | 110 | 90 | Ml | Rf | T |
| | Soybean | 85 | 140 | 80 | Ml | Rf | T |
| | Long pepper | 85 | 270 | 85 | Ml | Rf | T |
| | M a i z e | 60 | 145 | 85 | Ml | Rf | T |
| 47. | No land | - | - | - | - | - | - |

| No of Respondent | Kind of Crop | Land Prep. | Crop Care | Harvesting. | Kind of Soil | Water supply | Kind of Land use |
|------------------|--------------|------------|-----------|-------------|--------------|--------------|------------------|
| 48. | Cassava | 70 | 110 | 90 | Ml | Rf | T |
| | Soybean | 80 | 140 | 80 | Ml | Rf | T |
| | Long pepper | 90 | 280 | 150 | Ml | Rf | T |
| | M a i z e | 55 | 150 | 90 | Ml | Rf | T |
| 49. | Cassava | 75 | 120 | 80 | Ml | Rf | T |
| | Long pepper | 110 | 270 | 90 | Ml | Rf | T |
| 50. | Cassava | 75 | 120 | 75 | Ml | Rf | T |
| | Soybean | 80 | 135 | 70 | Ml | Rf | T |
| | Long pepper | 90 | 275 | 140 | Ml | Rf | T |
| | M a i z e | 50 | 145 | 90 | Ml | Rf | T |
| 51. | Cassava | 75 | 120 | 80 | Ml | Rf | T |
| | Long pepper | 90 | 250 | 90 | Ml | Rf | T |
| 52. | Cassava | 75 | 100 | 90 | Ml | Rf | T |
| | M a i z e | 55 | 150 | 95 | Ml | Rf | T |

source : Primary data

Note: kind of soil : Lr = Laterit

Ml = Margalite

water supply : Irr = Irrigation system

Rf = Rainfed

Kind of Landuse: S = Sawah
(wetland rice cultivation)

T = Tegal
(dry land cultivation)

Appendix IV /B

RICE LABOUR INPUT PER HECTARE ON SAWAH

PANJATAN DISTRICT 1978

(1 man day = 5 man hours)

| Farmer Activities | Demand | | | Days | Total Demand (mh) | | |
|----------------------------|--------|----|---|------|-------------------|-----|----|
| | M | F | R | | M | F | R |
| <u>1. Land Preparation</u> | | | | | | | |
| *preparation for nursery | 4 | - | - | 1 | 20 | - | - |
| *irrigating for nursery | 1 | - | - | 4 | 20 | - | - |
| *cutting straw | 10 | - | - | 1 | 50 | - | - |
| *ploughing I | 4 | - | 2 | 3 | 60 | - | 30 |
| *ploughing II | 2 | - | 1 | 3 | 30 | - | 15 |
| *bound restoration | 1 | - | - | 4 | 20 | - | - |
| *harrowing | 2 | - | 1 | 5 | 50 | - | 25 |
| *smoothing | 3 | - | - | 2 | 30 | - | - |
| *pulling the seed | 5 | - | - | 2 | 50 | - | - |
| | | | | | 330 | | 70 |
| <u>2. Crop Care</u> | | | | | | | |
| *planting | 10 | 6 | - | 2 | 100 | 60 | - |
| *fertilizer appl. I | 1 | - | - | 1 | 5 | - | - |
| *weeding I | 3 | 4 | - | 3 | 45 | 60 | - |
| *weeding II | 3 | 4 | - | 3 | 45 | 60 | - |
| *fertilizer appl II | 1 | - | - | 1 | 5 | - | - |
| *irrigating 2x | 1 | - | - | 2 | 10 | - | - |
| *weeding III | 6 | 3 | - | 3 | 90 | 45 | - |
| | | | | | 300 | 225 | - |
| <u>3. Harvesting</u> | | | | | | | |
| *harvest & transport | 22 | 22 | - | 2 | 220 | 220 | |

note: M : male
 F : female
 R : rakit (pair of cows/water buffalos)
 mh : man-hours

source: Respondents/interviews
 District Agriculture service
 Fieldwork

Appendix IV /C

CROP LABOUR INPUT PER HECTARE ON TEGAL

PANJATAN DISTRICT 1978

(1 man day = 5 man hours)

I. M A I Z E

| Farmer activities | Demand | | | days | Total Demand (mh) | | |
|----------------------------|--------|---|---|------|-------------------|----|----|
| | M | F | R | | M | F | R |
| <u>1. Land preparation</u> | | | | | | | |
| *ploughing | 1 | - | 1 | 7 | 35 | - | 35 |
| *smoothing | 1 | - | 1 | 2 | 10 | - | 10 |
| *holing | 1 | - | - | 2 | 10 | - | - |
| | | | | | 55 | | 45 |
| <u>2. Crop Care</u> | | | | | | | |
| *planting | 1 | 2 | - | 2 | 5 | 10 | - |
| *water sprayer | 1 | - | - | 3 | 15 | - | - |
| *weeding | 6 | 1 | - | 3 | 90 | 15 | - |
| *fertizer appl. | 1 | - | - | 3 | 15 | - | - |
| | | | | | 125 | 25 | |
| <u>3. Harvesting</u> | | | | | | | |
| *harvest & transport | 8 | 8 | - | 1 | 40 | 40 | - |

II. S O Y B E A N

| Farmer activities | Demand | | | days | Total Demand (mh) | | |
|----------------------------|--------|---|---|------|-------------------|----|----|
| | M | F | R | | M | F | R |
| <u>1. Land Preparation</u> | | | | | | | |
| *ploughing | 1 | - | 1 | 6 | 30 | - | 30 |
| *smoothing | 2 | - | 1 | 5 | 50 | - | 25 |
| *holing | 1 | - | - | 1 | 5 | - | - |
| | | | | | 85 | | 55 |
| <u>2. Crop Care</u> | | | | | | | |
| *planting | 1 | 2 | - | 3 | 15 | 30 | - |
| *water spraying | 1 | - | - | 2 | 10 | - | - |
| *weeding | 3 | 1 | - | 4 | 60 | 20 | - |
| | | | | | 85 | 50 | |
| <u>3. Harvesting</u> | | | | | | | |
| *Harvest & transport | 2 | 2 | - | 4 | 40 | 40 | - |

Appendix IV /C

III. CASSAVA

| Farm activities | Demand | | | Days | Total Demand(mh) | | |
|----------------------------|--------|---|---|------|------------------|----|----|
| | M | F | R | | M | F | R |
| <u>1. Land Preparation</u> | | | | | | | |
| *ploughing | 1 | - | 1 | 8 | 40 | - | 40 |
| *smoothing | 1 | - | - | 2 | 10 | - | - |
| *holing | 2 | - | - | 2 | 20 | - | - |
| | | | | | 70 | | 40 |
| <u>2. Crop Care</u> | | | | | | | |
| *cutting the seeds | 1 | - | - | 2 | 10 | - | - |
| *planting | 1 | 2 | - | 2 | 10 | 20 | - |
| *water spraying 4x | 1 | - | - | 4 | 20 | - | - |
| *weeding | 4 | 1 | - | 2 | 40 | 10 | - |
| | | | | | 80 | 30 | |
| <u>3. Harvesting</u> | | | | | | | |
| *harvest & transport | 8 | 7 | - | 1 | 40 | 35 | - |

IV LONG PEPPER

| Farm activities | Demand | | | days | Total Demand(mh) | | |
|----------------------------|--------|---|---|------|------------------|-----|----|
| | M | F | R | | M | F | R |
| <u>1. Land Preparation</u> | | | | | | | |
| *ploughing | 2 | - | 1 | 5 | 50 | - | 25 |
| *smoothing | 1 | - | 1 | 6 | 30 | - | 30 |
| *holing | 1 | - | - | 2 | 10 | - | - |
| | | | | | 90 | - | 55 |
| <u>2. Crop Care</u> | | | | | | | |
| *pulling the seeds | 1 | - | - | 2 | 10 | - | - |
| *planting | 1 | 4 | - | 2 | 10 | 40 | - |
| *water spraying | 1 | - | - | 12 | 60 | - | - |
| *fertilizer appl. I & II | 1 | - | - | 4 | 20 | - | - |
| *weeding | 2 | 4 | - | 5 | 50 | 100 | - |
| | | | | | 150 | 140 | |
| <u>3. Harvesting</u> | | | | | | | |
| *harvest & transport | 1 | 1 | - | 16 | 80 | 80 | - |

note: M : male
 F : female
 R : rakit (pair of cows/buffalos)
 mh : man hours

source: Respondents / interviews
 District Agriculture Service
 Fieldworks

APPENDIX V/A

FARMER LABOUR FORCE 1982
Without Mitigating Action

1977

Total population in Panjatan district = 32,896 (Table 6)
Consists of: Male = 15,887 or 48.3% of total population
Female = 17,009 or 51.7% of total population
Male labour force = 8,243 or 51.9% of total males
Female labour force = 8,736 or 51.4% of total females
Male farmers = 6,901 or 83.7% of total male labour force
Female farmers = 7,312 or 83.7% of total female labour force

1982

Annual population growth = 24.62 per 1,000 people
Total population = $(1,02462)^5 \times 32,896 = 37,150$
Consists of: Male = $48.3\% \times 37,150 = 17,943$
Female = $51.7\% \times 37,150 = 19,207$
Male labour force = $51.9\% \times 17,943 = 9,312$
Female labour force = $51.4\% \times 19,207 = 9,872$
Male farmers = $83.7\% \times 9,312 = 7,794$
Female farmers = $83.7\% \times 9,872 = 8,263$