

## POPULATION AND POVERTY IN RURAL JAVA: SOME ECONOMIC ARITHMETIC FROM SRIHARJO

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## ERRATA

<u>Page</u>	<u>Line</u>	<u>Reads now</u>	<u>Should read</u>
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45	Line 8	Yogyarkarta	Yogyakarta
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111	1st reference	Gakjah	Gadjah
114	5 references from bottom	keuangan	Keuangan
115	4th reference	Ihalaw	Ilahaw
115	To follow last reference Wolf, E.R. 1966	<u>Peasants</u> , Prentice Hall, Englewood Cliffs.	

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## TABLE OF EQUIVALENTS, A NOTE ON INDONESIAN SPELLING, GLOSSARY

### Weights and Measures

hectare (Ha)	2.47 acres
kilogram (Kg)	2.2 pounds
quintal	100 Kgs, or 220 pounds
metric ton	1000 Kgs, or 2205 pounds
kilometer (Km)	0.62 miles

### Rate of Exchange

All conversions to dollars are based on the exchange rate that prevailed at the time that the study was done, i.e., at the rate \$US 1 equals Rp 380.

NB Money values are often misleading, if for no other reason than that someone in Indonesia finds it hard to imagine what a dollar (or 380 rupiah) is worth in the United States, and similarly, for, say, an American who has never visited Indonesia. It is for this reason that we have converted most of the money figures into food (rice) equivalents as well.

### Indonesian Spelling

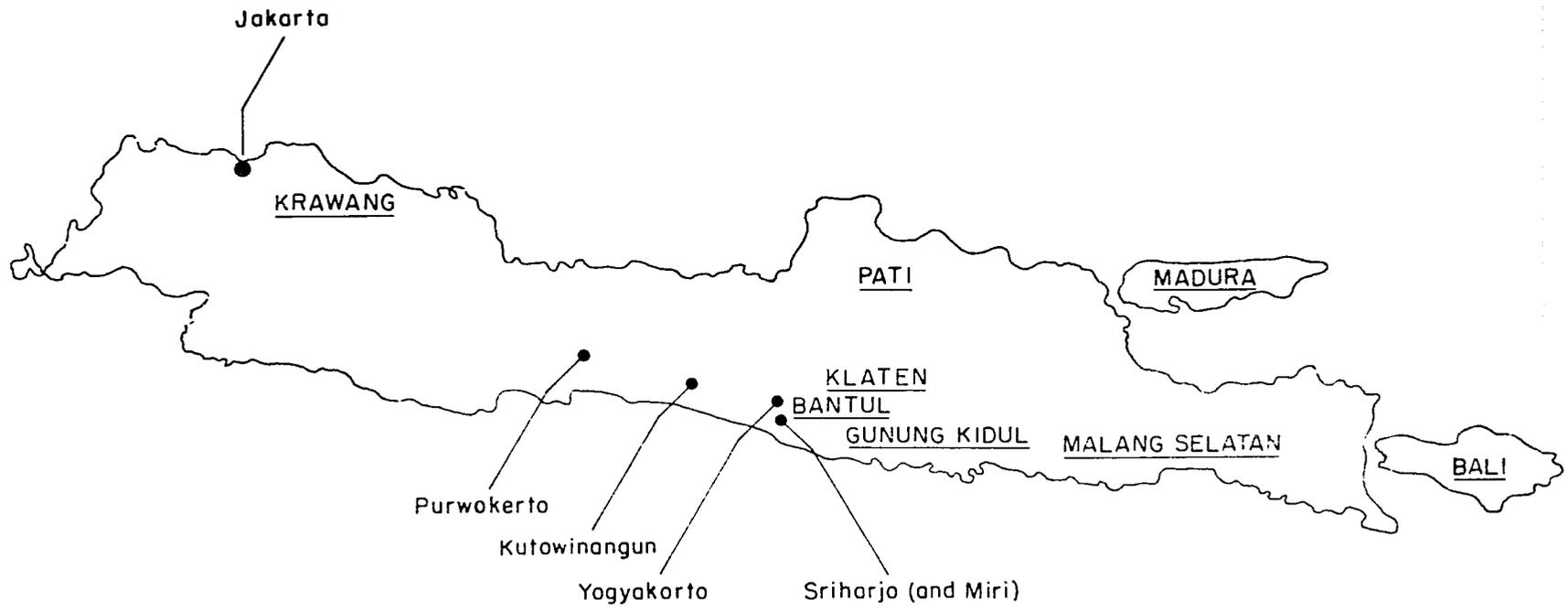
Indonesian spelling provides little difficulty to most non-Indonesian speakers. The letter "c" as in camat or cukupan is pronounced "ch" (as in church).

### Glossary

aniani	Cutting knife, used for rice-harvesting. With it the heads are cut one by one.
cukupan	<u>Cukup</u> means "enough." Throughout the text <u>cukupan</u> , i.e., the having or the possessing of "enough," has been given the explicit meaning of "a real income of 1200 Kg (milled) rice (or its equivalent) per family per year." It is also assumed that each family has 4-5 members. See also text, page 2.
kabupaten	Regency, or district. In the administrative hierarchy in Java the <u>kabupaten</u> lies between the residency (which is larger) and the <u>kecamatan</u> (which is smaller). In the Outer Islands only the provinces are larger.

kecamatan	Sub-district. See for <u>kabupaten</u> and <u>kelurahan</u> for its position in the administrative hierarchy. The sub-district head, or <u>camat</u> , is an appointive position within the Ministry of the Interior.
kelurahan	Village administrative district. The head of such a district in Java is called the <u>lurah</u> . The <u>lurahship</u> is an elective position. Within any <u>kelurahan</u> will be found a number of <u>dukuh</u> (hamlets, such as <u>Miri</u> ) and within a <u>dukuh</u> there are a number of <u>desa</u> ("villages," or residence clusters). NB Village organization and administration in the Outer Islands is often different from what it is in Java.
lurah	See under <u>kelurahan</u> .
pekarangan	House compound, or house garden. The agricultural land in Java is usually classified into three, <u>sawah</u> , <u>tegal</u> , and <u>pekarangan</u> . The <u>sawah</u> are levelled fields that can be irrigated and are first and foremost used for rice; <u>tegal</u> are unirrigated fields used for growing annual crops; and the <u>pekarangan</u> consists of land around the house and is used to grow tree crops of various sorts, vegetables, poultry, etc. The <u>pekarangan</u> form of land use is unique, or almost so, to the farmers of Java (Sudanese, Javanese, etc.): in many parts of the Outer Islands there are no house compounds.
pecat	A unit of time, approximately three hours, which indicates how long a pair of buffalo can work at a stretch.
sawah	See under <u>pekarangan</u> .
tanah	Land.
tanah kas	Land owned by the village treasury ( <u>kas desa</u> ), the net proceeds from which are used to finance village expenditures.
tanah milik	Land that is privately owned. ( <u>Milik</u> means property).
tanah oro-oro	Land that cannot be farmed, because too steep, rocky, etc.
tanah pelungguh	Land owned by the village, the land use rights over which are allocated to active village officials.
tanah peng-aremarem	Land owned by the village, the land use rights over which are allocated to retired village officials.
tegal	See under <u>pekarangan</u> .

# JAVA



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POPULATION AND POVERTY IN RURAL JAVA:  
SOME ECONOMIC ARITHMETIC FROM SRIHARJO

“Our family planning program must not be allowed to fail because we are faced with a critical, even an emergency situation which threatens us individually and also our whole society. I say this because if the family planning program fails and we cannot lower the birth-rate to the minimum then all our other development efforts will count for nothing and future generations will be endangered.”

President Suharto (16 August 1972)

“I was born and raised in the village and I have always lived there. But it was not until I began working as a research assistant [in a study of family planning in her home village] that I came to realize that there were so many poor people in the village and just how poor most of them were.”

A Research Assistant (1969)

“Indonesia does not have a population problem! Why, the countryside is green and beautiful - much nicer than in India. The houses look substantial; and the people themselves look very cheerful.” Impressions such as these have often been reported by foreign visitors to the rural areas of Java. On the other hand, writers such as Iso Reksohadiprodjo and Soedarsono Hadisapoetro (1960), B. Napitupulu (1968), M. Timmer (1960), K. V. Bailey (1962) and C. Geertz (1956, 1963) have for years stressed the seriousness of the population problem that has arisen in Java. Many Indonesians, too, do not see the problem or, if they do, do not regard it as serious: “Indonesia is a rich country, and we have much empty land in the other islands.” “We will soon be self-sufficient in rice.” “The economy is now on a sound footing because, in the past five years, production has markedly increased in almost every field - from oil and textiles on the one hand to rice and radios on the other.” It is nonetheless clear from what President Suharto has said (see above) that the level of public awareness and concern is much higher than it was in the Soekarno era. Until a few years ago family planning was thought to be quite unnecessary: it was also thought that Indonesia was so rich that it could easily support a population of 250 millions.

The earlier ideas do not, however, die easily, and both the foreign visitors and the Indonesians who continue to take a sanguine view of Indonesia's economic future can still be said to lack insight into the nature of the population problem. They fail to realize how many people are affected and the extent to which they are affected. This leads them to underestimate seriously the amount of effort

that would be required to build the "just and prosperous society" that has been promised for so long. They do not yet understand how to read the story the land itself tells. Steep hillsides are cultivated throughout Java because of a shortage of land suitable for growing irrigated rice. Forests are cut down, often illegally, because of the hunger for land. The rivers flood more frequently, because of the increased run-off from the denuded hills. All these symptoms of severe land shortage, and the subsequent desperate and land-destroying acts of a peasantry that loves the land, are clear to anyone who looks at the land with the eyes of an agricultural scientist or geographer.\*

The seriousness of the population problem is just as clearly evident from a careful reading of the statistics collected by the Central Bureau of Statistics and also of those collected by the various scholars who have made field studies. We will ourselves be using many of these statistics, but we should perhaps point out here that one of the reasons for the failure on the part of some of Indonesia's economic planners to appreciate the urgency of the population problem is that many of the available statistics have been so used (quite unconsciously, and with the best of intentions) that they conceal the extent of the problem.

The seriousness of the problem can also be learned directly, by talking to people in the areas where the problem, at least to the perceptive observer, very evidently exists. But here again, less is learned or realized by many local, or more remote, administrators than one might expect.

Over-population anywhere means not enough for most people to live reasonably well. In a farming area it means not enough land, not enough work, not enough pay for the work that is actually done, and not enough access to health or educational services. Incomes for most are far too low to afford them opportunities to make the choices that would affect in any significant way their present and their future lives. Their endless and grim struggle is to provide the bare essentials to enable them and their families to live each day: seldom enough to provide for tomorrow; sometimes not even enough for the day itself.

The Javanese peasantry, both its rich and its poor, has long had a concept of what constitutes "enough." The word they use is cukupan. It is applied to what they see as being the reasonable needs of the ordinary peasantry. It is recognized that the village leaders should have more than a cukupan level of income, and, of course, the average peasant would like to have more, too.

Their idea of "enough" is, however, modest indeed. A person who depends on agriculture for his livelihood is said to be cukupan (to have enough) if he can farm 0.7 hectares of rain-fed sawah (land for growing wet-rice) and has also a small area, say, 0.3 hectares, on which he can grow coconut, fruit and other trees, and some vegetables, herbs and other household needs. With just one hectare of land (or two and one-half acres), the average peasant knows that without undue labor he can produce enough to live on.

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\* The illustrations in the works of Dames (1955), Bailey and Timmer are helpful.

If a farmer is cukupan he will be happy. If he can produce some 900 kilograms of rice,\* plus what he can get from his house-garden (the equivalent of another 300 kg of rice) he will be cukupan and happy.\*\*

Some two thirds of the people in the area we have been studying are not cukupan.\*\*\*

We stress that the meaning given to cukupan has not changed for a long time. The real level of living implied has not changed with the advent of roads and railways, which opened new market opportunities for them last century; with the arrival of modern irrigation, from early in the twentieth century; or following the arrival of good rice seeds, fertilizer and pesticides, which started in the 1930s, and which have been pushed quite hard since the mid 1950s and particularly since 1968, in the so-called Green Revolution. The increase in the population of Java, from 29 million in 1900 to 75 million in 1971 has been so great that, unlike the peoples of the technically advanced countries, the mass of the peasantry have had no grounds to change their conception of what constitutes a satisfactory minimum level of living.\*\*\*\*

In the days before roads, modern irrigation, and improved seeds or fertilizer the farmers knew that they could earn from their largely unimproved land enough to keep their families simply but well fed, simply but well clothed, and simply but well housed. Given sufficient land, their labor-intensive technology worked very well. To operate with hand tools 0.7 hectares of sawah once a year lies comfortably within the capabilities of a farmer and his family. The average yield of 900 kilograms of rice is not high on a per hectare basis (some 2 tons of gabah, i.e., unhusked rice, per hectare). It can be obtained from unimproved varieties and with the use of traditional production methods. If we assume an average family size of 5 persons, then everyone could eat 120 kilos of rice a year,\*\*\*\*\* and still have some 300 kilos left over for sale or whatever after everyone had eaten their fill. The yield from the 0.3 hectares of house-garden would be suf-

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\* Milled rice equivalent.

\*\* The word Soedarwono used (1971:p. 9) is tenteram, which means "secure," "at peace with the world."

\*\*\* NOTE: Whenever the word cukupan is used without qualification in the text we are using it in this meaning, i.e., as a surrogate for a real income of 1.2 tons of rice, or its equivalent, per family, per year.

\*\*\*\* The concept of cukupan is explained further in Bennett (1957) and Soedarwono (1971). It is also interesting to note that the first transmigration schemes sponsored by the Dutch Colonial government early this century were based on this concept, and involved the allocation of 1 hectare plots, of which 0.7 hectare was sawah.

\*\*\*\*\* This is slightly less than the average rice consumption per head of the farmers in Pematang Johar, a "new settlement" established on the East Coast of Sumatra by Javanese explantation laborers in the 1940s.

ficient to meet the remainder of the families' modest consumption needs, with enough over to permit the sale of small surpluses.\*

As we have said, a Javanese peasant would feel that he has enough when by our standards, he has not very much at all. In dollar terms his family income would be about \$120 per year,\*\* or \$24 per head--enough by the modest standards of the majority of Javanese peasants, pitifully little by American or Australian standards. Yet it is still more than is earned today by the majority of people who live in the over-populated areas of Java.

Writing in 1934 Ochse and Terra said of the Koetowinangun district of kabupaten Kebumen (Kebumen regency), Central Java, that "further extension of the agricultural resources of the district is no longer possible" (Ochse, et. al., 1934, p. 357). At the time, the population density there was 700 persons per square kilometer of all land, and 750 per square kilometer of arable land.\*\*\* In the area of which we will be writing the population density is already (1970) about 1300 persons per square kilometer of all land, and more than 1700 per square kilometer of arable land. The same area had population densities of 740 and 960 persons per square kilometer of all land and arable land respectively in 1940, just seven years after the Koetowinangun study was done.\*\*\*\*

The evils from over-population in rural areas usually develop slowly and insidiously. The hills are denuded of trees... slowly. The people get poorer... slowly. The population itself increases slowly from year to year, one percent, two percent or perhaps three percent. But the ills and the sufferings are cumulative.

The area we will be describing in detail is one kelurahan (village administrative unit) in kabupaten Bantul, one of the four rural kabupaten in the Special Region of Yogyakarta, Middle Java.\*\*\*\*\* It has fertile soils, a good irrigation system, and good access to markets, both domestic and international, yet the

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\* In making these simple calculations we have assumed that the farmers own their own land and that the taxes they have to pay are small in terms of rice. Such conditions are the rule in the new Javanese settlements in Sumatra and Kalimantan.

\*\* Basis for calculation: rice at \$100 per ton; and total production from sawah and house-garden land, 1.2 tons of milled rice equivalent.

\*\*\* A population density of 1,000 persons per square kilometer is the equivalent of 2,600 per square mile. If each family of five persons has one hectare, then the population density would be 500 persons per square kilometer.

\*\*\*\* Writing in 1956, Widjojo Nitisastro referred to the Koetowinangun study in the following terms: "Since before the war kabupaten Kebumen has been known as one of the densely populated districts on Java, and one where there is a deficit in rice production. The poverty of the people there is clear from, inter alia, what Ochse and Terra wrote in their Koetowinangun Report before the war." (Widjojo, 1956, p. 3).

\*\*\*\*\* This kelurahan is 80 kilometers (50 miles) east of Koetowinangun.

pressure of population on the land is such that the amount of arable land (including land planted to trees) available to each family has fallen to an average 0.22 hectares. It is still falling.

We have already mentioned that some two-thirds of the people in this kelurahan do not earn enough to reach the very modest level of prosperity known as cukupan. We have just pointed out that the amount of land per head is now very small, and is still falling. These two facts will be illustrated at length below. However, we should first make explicit the assumptions on which the analysis is based before we discuss resource availability (Chapters 2 and 3), the current economic situation (Chapter 4), and the likely economic future of the village (Chapter 5). The two things that readers should keep in mind are, first, that not all families are equally affected by the population problem. In this village, as in all communities, there are always some people who are better off than the others. Second, with minor exceptions (which will be noted below, as required), the people of the village have always striven to make the best economic use of the now very scarce resources they have available to them. They are not, and have never been, lazy. They understand quite well that economically efficient behavior means making best choices between alternatives. In short, we see them as following, for the most part, the laws of economics in their "getting and spending" . . . but we will show that, because of over-population, their readiness to act with reasonable economic wisdom has not prevented a poverty problem nor a worsening of the overall economic situation.

## 2. RESOURCE AVAILABILITY or NOT ENOUGH LAND

A peasant can attain the blessed state of cukupan if he can produce 1.2 tons of rice (or its economic equivalent) a year. It has always been accepted that "prosperous farmers" and village leaders would earn higher real incomes than this, and, of course, all farmers would like to earn more if they could do so without excessive additional sacrifice.

In the new settlements in North Sumatra, of which one of us has written (See Penny 1964 and 1966), the average size of a landholding is some 1.58 hectares, of which 1.04 hectares, or 66 percent, is rain-fed sawah.\* The largest single holding is 2.20 hectares, and, much more importantly, the smallest is 1.0 hectare. In the lowland part of Sriharjo the average landholding per family for people who depend on agriculture for their livelihood is one-seventh of this, just 0.22 hectares, or 0.043 hectares per person.

Kelurahan Sriharjo lies 2 kilometers south of Imogiri in kabupaten Bantul, some 17 km south of Yogyakarta. It straddles the dividing line between the fertile, well-watered Yogyakarta plain and the devastated line of hills that mark the beginning of the Gunung Kidul (South Hills). Javanese farmers are most adept at farming irrigated fields and will engage in dry-land farming only if compelled to do so. The original reason why Javanese peasants opened land within this largely inhospitable region was to escape the depredations of the Dutch during the period of the cultuurstelsel.\*\* but since then the largely infertile land in this region has been taken up by men who have lacked access to land on the plains (Iso: 1968).\*\*\* The devastation of 120 years occupation at most is easy to see, for the escarpment has lost almost all its trees and most of its topsoil. The few trees that remain are under pressure from people seeking firewood.

The land surface of Sriharjo occupies 583.5 hectares with a population density of 1290 persons per square kilometer (1970).\*\*\*\* This figure over-states,

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\* These figures are for Pematang Johar. Data on other such villages will be found below.

\*\* The cultuurstelsel, or culture system, was established in 1830, and involved the compulsory planting of certain crops, a high proportion of which had to be paid in taxes.

\*\*\* See Appendix 1 for an analysis of the relationship between population trends and the availability of irrigated land.

\*\*\*\* On this basis Sriharjo is one of the less densely populated villages in kabupaten Bantul. In terms of population density, measured in this way, Sriharjo lies 44th out of the 73 kelurahan in the kabupaten. (Data from official records, for 1969.)

however, the people's access to land for farming -- 66.6 hectares cannot be farmed at all (tanah oro2) and a further 8.1 hectare is allocated for graveyards, roads, etc.\* If this unusable land is excluded, the figure for population density rises to 1480 per square kilometer.

Figures such as these show merely that population densities are high, about twice as high as those reported by Ochse and Terra. As they stand they are not particularly helpful as a basis for understanding the dimensions of the population problem. There are two reasons for this: First, not all the 508.8 hectares of the usable land are of equal fertility; second, not all families have equal access to this all important means of earning a living. We shall take up these two matters in turn.

Table 1 shows that 86 percent of the cultivable land is in private ownership, and that only 80 percent of the all-important sawah is in private ownership. Village officials are themselves usually quite substantial owners of private land. Thus a further, albeit rather misleading, index of pressure on resources would be population density per square kilometer of cultivable land that is privately owned. For Sriharjo this figure is 1750 persons per square kilometer.

Table 1. SRIHARJO: LAND TYPES AND AREA

	Wet-rice fields	House- compounds	Dry- land	Total
	ha	ha	ha	ha
In Private ownership	156.4	141.3	132.7 <sup>a</sup>	430.4
Owned by village <sup>b</sup>	39.4	0.3	28.6	68.3
Total	195.8	141.6	161.3	508.7

Source: Village records.

Notes: a. Includes 11.2 Ha of land classified as "bare" in the village records.  
b. This land is of three types, land allocated to village officials in lieu of salary (tanah pelungguh), land allocated to retired village officials (tanah peng-arem2), and land used as a source of finance for the village administration (tanah kas). The land in these three categories is as follows.

	Wet-rice land	Dry-land	Total
	ha	ha	ha
T. Pelungguh	26.4	14.5	40.9
T. Peng-arem2	4.4	2.0	6.4
T. Kas	8.6	12.5	21.1
Total	39.4	29.0	68.4

For further information on the "village lands," see Appendix 1.

\* Tanah oro2 is classified in the village records as being part of tanah gundul, or land that has been denuded.

A more important statistical adjustment, however, is to "reduce" the three types of land, the sawah, the pekarangan (the house-compounds), and the tegal (the unirrigated land sown to annual crops) to a common denominator. In all the discussion that follows we have assumed that a hectare of pekarangan is equal to a hectare of sawah, and that a hectare of tegal is the equivalent of 0.4 hectares of sawah.\*

The total area of arable land (sawah-pekarangan equivalent) is 401.9 hectares, and population density would be 1870 persons per square km when calculated on this basis. Even this higher figure may represent an understatement of the extent of population pressure on the best land, because we have not yet taken the availability of irrigation water into account. If water is available all year long then the sawah will be more productive. In the one hamlet which we will be describing in detail well over half the sawah can be double-cropped to rice. It is therefore not surprising to find that population density here is rather higher than the village average for arable land. It is 2350 persons per square kilometer, or 26 percent more dense.

#### Not Enough Land. Details

One hundred sixty-four families, 694 people, live in the hamlet of Miri, one of thirteen hamlets in Sriharjo. It lies wholly on the lowland, and has no tegal. It also has an effective irrigation system, thus explaining the large proportion of land that can be irrigated year round. With very few exceptions (which will be discussed below) all families depend on agriculture for part or all of their livelihood.

The total area of arable land to which these 694 people have access is 29.5 hectares, thus land per head is 0.043 hectares, or just over one-tenth of an acre per person.

The 29.5 hectares consists of all land controlled by residents of Miri whether or not the land concerned lies within the geographical boundaries of the hamlet.

\* There is no physical difference between the land used for sawah or for pekarangan in a low-land area, and in any such area there will be no tegal. It is true, however, that the unirrigated arable land (tegal) could also be used for house-compounds. From the economic point of view the sawah differs from both the pekarangan and tegal. If the land is in a new area all will need clearing before it can be used. However, to make sawah requires a much greater expenditure of time and energy because the land must be levelled, bunds made, and an irrigation system built. None of these investments is needed in the case of tegal. To establish a pekarangan also involves quite a deal of investment, albeit of a different sort than that required in the case of sawah. Many trees must be planted, and the farmer must wait for some years before his pekarangan land becomes fully productive. In Sriharjo the price of sawah varies between Rp 1.5 and 2.0 million per hectare, whereas the price of tegal lies between Rp 0.75 and 1 million. The price of pekarangan land ranges between Rp 2.5 and 3 million.

It does not cover Miri land owned and operated by non-residents of Miri. According to the village records the total owned land (tanah milik) in Miri is 27.2 hectares, 41 percent of which is pekarangan. The discrepancy between this figure and the one we are using is explained in part by the fact that Miri residents own land elsewhere (and non-residents own land in Miri), and is also due to the fact that some Miri residents have rights in tanah pelungguh and tanah peng-arem2.

The "land controlled" by each family consists of all land owned (including t. pelungguh and t. peng-arem2) plus half the area rented in, minus half the area of own land rented out for operation by others. Land controlled can therefore be regarded as the best single measure of access to the produce of the land.\* (See tables 2 and 3 for details of the distribution of rights to land ownership.)

Table 2. MIRI: LAND OWNERSHIP<sup>a</sup>

Land Type	Number of families	Proportion in each category	Average holding per owner
		percent	ha
Irrigated land	104	63	0.20
House compound	123	75	0.09
Any land	128	78	0.24 <sup>b</sup>

Source: Village records.

Notes: a. Tanah pelungguh and tanah peng-arem2 have been classified as owned land.  
 b. Total land owned is 31.1 ha, or 1.6 ha more than the area of land controlled. This discrepancy is due to the fact that Miri residents are, on balance, net renters of land to people who reside elsewhere.

\* For further details on the meaning given to such terms as "land operated" and "land controlled," see Appendix 1.

Table 3. MIRI: DISTRIBUTION OF LAND OWNERSHIP RIGHTS  
(SAWAH ONLY)  
164 Families

Area of Land ha	Number of families	Percent of families each category	Percent of land in each category
None	60	37	None
0 - 0.05	21	13	3.6
0.051 - 0.10	28	17	10.5
0.101 - 0.20	28	17	19.2
sub-total	137	84	33
0.201 - 0.40	18	11	23.1
0.401 - 0.80	6	3.6	16.3
0.801 and above	3	1.8	27
sub-total	27	16	67
GRAND TOTAL	164	100	100

Source: Village records.

Both tables reflect what has happened to land ownership as a result of population increase. The three most striking features are, first, the very small size of farms; second, the number of families that no longer possess ownership rights in land; and third, the extent to which the ownership of the irrigated rice-fields has come to be concentrated in a few hands.\*

According to the Basic Agrarian Law (the "land reform" law, 1960) no person is allowed to own more than five hectares of rice-land in the "densely populated" regions. There is no family in Miri that owns even half this amount. Even more striking, there is only one family that has more than the amount of irrigated land - two hectares - designated in the same law as being the desirable minimum. Earlier we wrote of the concept of *cukupan*, and noted that the 0.7 hectares of irrigated land it implied represented an area that could easily be cultivated with family labor and hand tools. Only three families, two percent of all families, have as much rice-land as this.

The figures we have given here show a much lower average size of holding than do the data usually cited for Java. "According to the agricultural census of 1963, the average size of farm on Java is 0.7 hectares." This figure, however, is both out-of-date and misleading in a number of important ways. It is

\* We regret we have no historical data for Sriharjo other than those we have given already. Historical data relating to the economic situation in other villages in Java will, however, be found in Appendix 2.

out of date because population has increased by some 15 percent between 1963 and 1970. It is misleading because (1) it refers only to people who operated farms of 0.1 hectare or more, and (2) it refers to the area of arable land and not to sawah equivalent. As we have pointed out a hectare of tegal is by no means as productive as a hectare of sawah.

One of the complaints levelled against the agricultural census has been that the definition of farm holding was too restrictive, and that if farms of less than 0.1 hectare were excluded then the total amount of land in farming would be slightly understated and that the average size of holding would be considerably overstated. Such is indeed the case for Miri. Some 34 percent of the families have less than 0.1 hectare each (sawah and pekarangan combined), or about 6 percent of the arable land. If they are excluded from the statistics, as they were in the agricultural census, then the average size of farm holding in Miri would rise from its actual 0.22 ha to 0.36 ha, an increase of 64 percent.

According to the Agricultural Census the average size of farm holding in kabupaten Bantul is 0.49 hectare. If "adjusted" to take population increase into account (1963-70) it would now be 0.42 hectare. This figure is close to the 0.36 hectare we have just calculated for Miri - and it should also be remembered that Miri land is more fertile and better-irrigated than the average for Bantul. (See also Appendix 1.)

The house-listing (Pendaftaran Rumah tangga) which preceded the Agricultural Census showed that there were 2.15 million farmers who operated less than 0.1 ha. The 7.95 million farmers who operated 0.1 ha or more had 5.65 million hectares of land, or 0.71 hectares per family. This is the figure normally cited. If, however, we assume that the 2.15 farm families with less than 0.1 ha had 0.05 ha on average, then the total area in farms would rise to 5.76 million ha and the total number of farm families to 10.10 million. With this adjustment the size of the average holding falls from 0.71 to 0.57 ha.\*

The sampling procedure used for the 1,100 farm survey conducted by the Agro-Economic Survey in 37 villages throughout Indonesia since 1968 to evaluate the rice-intensification programs must also give figures which overstate the average size of farm holdings. For each village the sample of 30 consists of the five largest operational holdings, plus twenty-five other farms chosen at random from either or both of two lists - the farmers who have participated in the Bimas program, and those who have not. According to the Agro-Economic Survey reports the smallest average size of farm found for any village is 0.68 hectares, but no farm in this particular village was selected for study unless it consisted of at least 0.1 hectares of sawah.\*\*

It is clear from what we have just said that there is a great deal of statistical data on land availability, and also that the data have not so far been summarized

\* We are grateful to Professor Sajogyo for this information.

\*\* See Agro-Economic Survey. 1970, p. 16; and Harsojono: 1970, p. 27.

in the way needed to show the extent - or the seriousness - of the population problem. It is easy to see why the people who devised the agricultural census used 0.1 hectare of operated land as their "cut-off" point: it is rather difficult to envisage operational holdings smaller than this, even though there are many such. Similarly, one can easily see why those responsible for the major study on the results of the Rice Intensification Programs now being undertaken by the Agro-Economic Survey should have confined their samples to the three different types of rice-growers, with a special emphasis on those with large holdings, because the major concern of this research project is to evaluate the effect of the government rice production programs on the output of rice. However, the data they have collected could, if analyzed with care, help also to provide a better understanding of the much more serious problem, over-population.

The population problem tends to get overlooked by the people and the agencies that collect statistical data from, or about, rural people. This is the general rule, but has not always been so. In a study done 15 years ago Ismael (Ismael, 1956, p. 26), showed that, throughout Java, there are a large number of people who depend on agriculture for their livelihood but who own less than 0.1 hectares of sawah. In some places as many as 56 percent of the farmers owned less than this, i.e., even more than for Miri today.

So far our data have related to Miri as a whole, to the 164 families who reside in the hamlet. The remainder of the data, with only a few exceptions, comes from only 116 of the 164 families.\* We greatly regret that we do not have a "full coverage." Nevertheless the 116 are fully representative on the all-important point of access to land, because in both groups land per head is the same, i.e., 0.043 hectare per head.\*\* There are no grounds for supposing that the problems and the difficulties confronting these 116 families are in any way different - quantitatively or qualitatively - from those affecting the remaining 48 families in Miri, or the other people in Sriharjo, or even the people in the

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\* See also the notes for Study A in Appendix 1. This appendix summarizes data collection and coverage.

\*\* Where the families differ is primarily in the number of dependents per family. The 116 families for which we have additional economic information have 5.1 dependents on average (including head of family), whereas the 48 other families (mainly families headed by widows) have but 2.1 dependents each. For Miri as a whole the average number of dependents (including head of family) per family is 4.2 people.

many hundreds, perhaps thousands, of other villages where pressure on land is of about the same severity as it is in Miri.\*

Perhaps the best single indication of the extent to which the increase in population has come to deny the majority of people access to sufficient land is the data showing the distribution of rights to the produce of the land. See table 4.

Table 4. MIRI: DISTRIBUTION OF RIGHTS OF DIRECT ACCESS  
TO THE PRODUCE OF THE LAND ("LAND CONTROLLED")<sup>a</sup>  
116 Families

Area of land controlled	Number of families	Proportion of families in each category	Proportion of land in each category
hectare		percent	percent
None	7	6	0
0 - 0.05	14	12	4
0.051 - 0.10	19	16	6
0.101 - 0.20	38	33	22
sub-total	78	67	32
0.201 - 0.40	27	23	31
0.401 - 0.80	7	6	13
0.801 and above	4	4	24
sub-total	38	33	68
TOTAL	116	100	100

Source: Study A.

Note: a. For the definition of "land controlled," see p. 9.

The data in this table cover 25.2 hectares, or 85 percent of the land available to the 694 residents of Miri. The average amount of land controlled per family

\* We regret that we cannot show with any precision the extent to which the situation in Miri/Sriharjo can be considered to be "typical" or "representative" of the situation in other areas. We also recognize that the usefulness of the information from this one "case" would be greatly enhanced if we could show just where this particular case "fits" in the overall situation. Some comparative data will, however, be found in tables 21-31, and in appendixes 1 and 2. Our general impression is that the population-and-poverty problem in Miri/Sriharjo is more serious than in some other parts of Java, but that the problem is even worse in such places as the Gunung Kidul and Malang Selatan. For example, wages for day labor in Sriharjo are (1970) Rp 30, or \$0.08 equivalent, whereas in Gunung Kidul they are but Rp 15-25 per day.

is 0.22 hectares, of which 0.078 ha are pekarangan (31 percent). All the remaining land is sawah.

Not all families depend solely on the all too scarce land for their livelihood. Among the 116 families are seventeen where the men are village officials (pamong desa) or government employees (pegawai pemerintah).<sup>\*</sup> Only one man in this group (a retired government official) controls no land whatever. The group as a whole controls an average of 0.56 hectares per family. If the holdings of this "privileged" group are excluded then the average area of land controlled by the remaining 99 families would fall from its present meagre 0.22 hectares per family to 0.17 hectares per family.

The two other main occupations apart from farming and farm laboring are trading and working as artisans in one field or another. All eight who give trade as a primary or a secondary source of income control some land (average for the group 0.19 hectares); and seven of the nine who work primarily or secondarily as artisans likewise control some land (the average holding for the group is 0.15 hectares). The majority of both groups still regard themselves primarily as farmers, in particular the six, (i.e., 38 percent) who control areas above the all-village average.

The processes that led to the emergence of these "other occupations" in a completely rural setting where there is no natural resource other than the land, that is, apart from the energy and ingenuity of the people themselves, are derivatives of the population problem. Prosperous farmers can, and do, establish themselves as traders or artisans. However, the majority of men who work as traders or artisans (or as laborers) do so because they have no other alternative.<sup>\*\*</sup>

Land and Poverty. The high man-land ratios, and the absence of natural resources other than the land, make it inevitable that most of the people of Miri are poor.

"Only one-third of the people in Miri are cukupan." This estimate was given to us by a village official (who is also one of the larger farmers among the 116). We asked him what he meant by the term. He replied: "A person regards himself as having enough if he knows from day to day that he will certainly eat on the morrow." He also agreed that his definition was a little less generous than the meaning traditionally given (see page 2 above), but he felt that, given the difficulty of making a satisfactory living as population continues to increase, it was inevitable that people should lower their standards.

Our data show that no more than 37 percent of the families can be regarded as being cukupan, even at the more modest income standards that have come to

\* The government employees are schoolteachers, clerks, office help (pesuruh), and a policeman. No senior government employee resides in Miri.

\*\* See also Dewey's "Peasant Marketing in Java" (Dewey: 1962).

prevail. To show this we calculated an index of economic welfare. It has just two components: the number of months in a year that the family is able to eat rice (max. 12 points), and the sort of house the farmer lives in (max. 12 points for any one house).\* We have assumed that a family will be cukupan if the point score totals 12 or more. We feel justified in using such an apparently simple measure for the following reasons: First, Javanese farmers do not feel that they are cukupan if they cannot eat rice year round (in an area suited to rice-growing as is Sriharjo); second, the Indonesian government, with its stress on the need to grow more rice, indicates most clearly that it feels that all Indonesians who regard rice as their basic food (like the farm people in Sriharjo) should be able to eat their fill of it; and third, this simple measure correlates well with all the other information we have about the "problem of scarcity" in the village.\*\*

Table 5 shows the poverty of most families in Miri. It also shows that the area of land controlled by a family is an important determinant of whether a family is cukupan.

It is not surprising to find that the amount of land controlled is a good predictor of economic welfare. But the figures given here are for land controlled per family, and do not take family size into account. A large part of the explanation for the low index scores among the top 30 percent of families (21 percent of families controlling 0.22 hectares or above had scores of 11 or less on the index of economic welfare) lies in the fact that these families have less than the average amount of land per head (due to the larger size of families).

\* Points were allocated for houses as follows:

Class	Points given	Proportion of houses percent	Proportion of families percent
I	12	1	1
II	8	7	7
III	4	22	22
IV	2	29	31
V	1	41	39

Class I houses are solidly built, usually of brick, and their structural timbers consist of teak. They are roofed with good quality tiles, and have cement floors. They have 4 bedrooms, and quarters for the servants. The living room, or area, would be approximately 9 meters by 9 meters. Class V houses have walls of plaited bamboo, and the structural timbers are also of bamboo. The roofs are thatch, and they have earthen floors. They will have 1 or 2 bedrooms, and the living area, if any, will be about 3 meters by 3 meters. The cost of building a class I house is at least 20 times the cost of a class V house. A few families own more than one house.

\*\* Additional information on personal wealth will be found on p.29 below.

**Table 5. MIRI: AREA OF LAND CONTROLLED AND THE INDEX OF ECONOMIC WELFARE**  
116 Families

Decile: The families have been ranked according to area of land controlled <sup>a</sup>	Proportion of families in decile (sub-group) with a score of 12 or more, i.e., who are <u>cukupan</u>		Index score - average for sub-group
	percent	score	
1. (top 10%)	100	18.5	
2.	83	15.8	
3.	46	11.3	
sub-total (top 30%)	79		15.2
4.	50	11.7	
5.	9	6.7	
6.	17	8.0	
7.	25	8.4	
8.	17	7.5	
9.	0	5.3	
10. (bottom 10%)	25	9.8 <sup>b</sup>	
sub-total (bottom 70%)	17		8.2
OVERALL	37 <sup>c</sup>		10.3

Source: Study B.

Notes: a. Deciles 1, 3, 5 and 8 each contain 11 families. the remainder 12.  
 b. The heads of the three families in this group that had a score of 12 or more work as a craftsman, and as a factory laborer, while the third is the retired government servant previously mentioned.  
 c. Five families received scores of exactly 12 and thus do not qualify, strictly speaking, as having enough rice to eat throughout the year: each member of this group had been allocated 1 - 2 points for the house. If these families are excluded from the cukupan group the proportion falls to 33 percent, or exactly the same figure as that given by the village official. (No family with a score of 13 or more was unable to eat rice throughout the year.)

Tables 6 and 7 show that there is a close relationship between occupational status and land controlled on the one hand, and economic welfare on the other.

If we disregard the factory worker who has only one child and whose wife works in agriculture in the village we can see that there is a close correlation between social status and economic welfare. Also of interest is that of the 73 percent who nominated agriculture as their primary source of livelihood, the farmers, the farmer-laborers (buruh-tani) and the laborers, only 27 percent were cukupan. By way of contrast it may be noted that all the 180 North

Sumatran peasants from eight villages studied by Penny in 1962 (Penny: 1964) were cukupan. The low scores for many of the people who classified themselves primarily as artisans or traders is an indication that these men would probably have preferred to remain farmers, if they could have afforded to do so.

Table 6. MIRI: OCCUPATIONAL DISTRIBUTION<sup>a</sup> AND INDEX  
OF ECONOMIC WELFARE  
115 Families<sup>b</sup>

Occupation	Proportion of family heads in each category	Proportion of families in each category that are <u>cukupan</u>	
	percent	percent	
"Officials" <sup>c</sup>	15	88	
Farmers	34	52	
Artisans, etc.	6	43	
Traders	3.4	25	
Farmer-laborers	35	5	
Laborers	3.4	0	
TOTAL	100	OVERALL	37

Source: Study A.

- Notes:
- The family heads are classified here according to what they regard as their primary source of income. All people who work secondarily as traders or artisans (see text, p. 14) give farming as their first occupation.
  - The factory-worker has been omitted.
  - "Officials" are both village officials (4 families) and government employees (13 families). All village officials were farmers before their election as members of the village government.

The role played by farm size as a determinant of economic welfare can also be seen from table 7.

We see once again that the various occupational categories are ranked according to social status. More important for the population problem, however, is that the members of the one category ("officials") that has an assured outside income not only have the highest proportion with land in excess of the village average (table 7, column 2), but also on average control the largest areas of land (column 1).

Table 7. MIRI: FARM SIZE (LAND CONTROLLED),  
OCCUPATIONAL DISTRIBUTION AND INDEX OF ECONOMIC WELFARE  
115 Families<sup>a</sup>

Occupation	Average area of land controlled by family head	Proportion of family heads (in each category) that control more than 0.22 ha, <sup>b</sup>
	ha	percent
"Officials"	0.56	53
Farmers	0.23	45
Artisans, etc.	0.17	28
Traders	0.14	25
Farmer - Laborers	0.12	12
Laborers	0.02	0
WHOLE VILLAGE	0.22	30 <sup>c</sup>

Source: Study A.

- Notes:
- The factory worker has been omitted.
  - 0.22 Ha is the size of the average holding (whole sample).
  - Cf table 5 where it is shown that 74 percent of the families with land in excess of the village average are cukupan. Even in the important "farmer" category, only 78 percent of such families are cukupan.

But just as controlling 0.22 hectares or more does not guarantee that a family will be cukupan, having access to less land than this does not necessarily mean that a family will not be cukupan. Of the 81 families who control less than this amount of land, 17, or 22 percent, are cukupan. Of the 17, 7 class themselves as farmers, 6 are officials, 2 are craftsmen, one is the aforementioned factory worker, and one classes himself as a farmer-laborer.

Moreover, as the number of people living on and from the limited land resources of Sriharjo has risen it is not surprising to find that the number of livestock has fallen.\* See table 8.

\* For the Yogyakarta region as a whole the numbers of livestock in the large (cattle, etc.) and medium (goats, etc.) categories were some 20 percent less in 1970 than they had been in 1950.

Table 8. SRIHARJO: LIVESTOCK AND PEOPLE 1967-1971<sup>a</sup>

Year	Livestock: cattle equivalent <sup>b</sup>	People
	no.	
1967	844	7439
1968	817	7445
1969	780	7520
1970	786	7526
1971	772	7564

Source: Village records.

Notes: a. The figures relate to the situation at the beginning of each year.  
 b. Horses, cattle, buffalo, each-1; goats and sheep, each-0.2. The great stock are kept as work animals. The smaller animals are primarily kept for sale.

#### Land and People: Summary

Twenty-five years ago the population in Sriharjo was only 57 percent of what it is today (annual compound rate of increase 1.8 percent, or somewhat less than the average rate of increase for Java as a whole in the same period). We do not have comparable figures for Miri, but we do know that its population increased 3.6 percent in the six years from 1964 to 1970. The population of Sriharjo increased by 6.5 percent in the same period. We regret that we cannot say why the population of Miri (or Sriharjo for that matter) has risen so slowly in the six year period. It may be due primarily to a rising death rate or to an increased rate of out-migration, or a combination of both. Singarimbun's demographic study (Singarimbun: in preparation) should be able to answer this question in part. The fact remains that population density was already so high and the opportunities for making an adequate living so scarce for the majority that even the small recorded increase in population must be regarded as making it more difficult to achieve the goal of giving each person the chance to make himself cukupan.

The outlines of the population problem have now been delineated. We have shown how dense the population has become in this rural area and that by 1970 some two-thirds of the people are earning incomes below the level which the peasants themselves regard as the necessary (in fact a very low) minimum. We have also shown that access to land is the main factor determining whether or not a family will be cukupan.

3. RESOURCE AVAILABILITY (Cont.)  
or  
TOO MANY PEOPLE FOR THE WORK

The peasants of Sriharjo know full well that rice does not grow of itself. They know they must work to live. They also know how hard they must work if they want to become cukupan, but they lack the land needed to do all the work they are able and willing to do. There is also considerable unemployment.\*

The peasants can easily be cukupan, provided they have adequate land, even without irrigation or buffalo power. In a study of rice-growing in East Sumatra, Hutabarat (Hutabarat, 1962) has shown that Javanese farmers planted 0.84 hectares on average to rice even though they had no animal power, nor even the assistance of hired labor, except a little at harvest time. In these villages the total labor input, up to and including threshing, was at the rate of 290 (six hour) days per hectare, or 240 days on average per farm.\*\* With this labor each farm produced some 1,150 kilograms of milled rice equivalent on average, or about 4.8 kilograms per day worked.\*\*\* Thus, with only human power and simple tools, such as the heavy hoe (caugkol) and the extremely inefficient cutting-knife (aniani), used for harvesting, these farmers were able to meet all family needs, 125 kg rice per head on average, and produce a surplus for sale.

In Sriharjo animals are still used even though each family operates, on average, less than a quarter of the land operated by the farmers in East Sumatra without the assistance of buffalo power.\*\*\*\*

In the "new settlements" on the East Coast of Sumatra all the men, including the village head, work in the rice-fields. In Sriharjo, all men work, but 8 percent

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\* This question is taken up at the end of the chapter.

\*\* Many readers of earlier drafts have asked about the six hour 'day.' In Sriharjo the heavy work in the rice enterprise (slashing, hoeing, etc.) is measured in terms of the number of pecat worked. A pecat is approximately three hours, and represents the length of time a buffalo can be worked on any one day. Farmers doing heavy hand work also seem to work for three hours (or somewhat less) at a time, morning or afternoon. In the East Coast of Sumatra farmers will work longer per day during the busy periods than do the farmers in Sriharjo.

\*\*\* The farmers planted some of their land to such crops as soybeans and peanuts in the dry season. In addition they had the output from their gardens (average area, 0.52 ha).

\*\*\*\* The use of hand tools (in Sumatra) does not mean that the farmers prefer them. Buffaloes have since been introduced in one of the villages studied by Hutabarat, with the result that the double-cropping of rice became possible.

do no agricultural work whatever, and a further 4 percent do no work in rice.\* The data from Sriharjo suggest that the much greater availability of labor in Sriharjo does lead to a greater labor input per hectare.

Table 9. RICE PRODUCTION: LABOR INPUT PER HECTARE  
Sriharjo (main season) and East Sumatra

Step in production process	Sriharjo (men only) man days <sup>a</sup>	East Sumatra (men and/or women) man days <sup>a</sup>
Slashing	20	17
Land Preparation		
Hoeing	52	99
Ploughing	11	-
Sub-Total (Hoeing equivalent) <sup>b</sup>	140	99
Weeding	63 <sup>c</sup>	38
TOTAL <sup>d</sup>	223	154

Source: For Sriharjo, Study B; for East Sumatra (Hutabarat: 1962, p. 18).

Notes: a. Man-day of 6 hours.

b. With buffalos the work can be done approximately eight times as fast.

c. Women as well as men do this work in Sriharjo.

d. Total labor input only for steps in production process for which comparable data are available.

It is not surprising to find the farmers in Sriharjo using some 45 percent more labor (man and buffalo) per hectare than the farmers in the new settlements. They have much more labor at hand, and no doubt feel it is worth their while, labor being relatively much cheaper, to increase the labor input in the hope of getting a higher income. But, as we have said, the buffalo is still used in Sriharjo, and its continued use denies the poor access to both work and income. See table 10.

Less than 5 percent of the sample operated more than 0.84 ha of sawah (the average in the new settlements), and the average area of sawah operated by users of buffalo power in Miri was less than half that operated by the hoe-wielders in the new settlements. The families who used only man-power operated 0.13 ha on average, or only some 16 percent of the area operated with the self-same technology in Sumatra. If the buffaloes were eliminated the work for people would increase, on a per hectare basis, by 77 man-days per season.

\* Just under half of these men have sufficient land to justify their working in agriculture if they wished but they choose to have their land worked by others. The remainder lack rice land and work in very low paying jobs - laboring and wood collecting.

Table 10. SRIHARJO: THE RICE ENTERPRISE, ANIMAL POWER  
AND HUMAN POWER  
Per Farm Averages (rice farmers only)

Source of power used in land preparation phase	Number of families	Sawah operated	Land owned
	percent	ha	ha
a. Possess work-stock, and use on own farm	22	0.49	0.55
b. Do not possess workstock, but hire for ploughing	11	0.19	0.29
Sub-total (groups a and b)	33	0.39	0.46
c. Use only manpower (cangkol)	67	0.13	0.12
WHOLE SAMPLE	100	0.19	0.23

Source: Study B.

The area of sawah operated by each family little affects the amount of work each man and family does in the rice enterprise. See table 11.

Table 11. SRIHARJO: THE RICE ENTERPRISE, DAYS OF  
PRODUCTIVE WORK PER MAN AND PER FAMILY (MEN ONLY)  
Wet Season (180 days) 1969/70

Area of sawah operated	Number of families	Rice-work		All productive work	
		Per man	Per family	Per man	Per family
hectare	percent	man-days	man-days	man-days	man-days
0	19	14	18	85	100
0 - 0.05	26	15	18	80	95
0.051 - 0.10	21	22	31	73	103
0.101 - 0.20	16	14	18	73	98
0.201 - 0.40	11	20	43	87	188
0.401 and above <sup>a</sup>	7	20	43	63	143
WHOLE SAMPLE	100	17	25	79	115

Source: Study B.

Note: a. All farmers in this group operated more than 0.7 hectare of sawah.

These figures should be used with caution as they cover only a proportion (probably about two-thirds) of all work done by men on rice. We have no information on the time spent on such tasks as preparing the seedbed, repairing the bunds, cleaning irrigation channels, or supervising the application of irrigation

water. This understatement of the total number of days of work on rice means also that the total number of days of all work is understated (probably by 10 percent or so).\*

The most employment in rice on a per family basis is obtained by the rice farmers who operate the most land (43 days per family in the two largest size-groups). The men who have no rice land of their own are nonetheless able to obtain work in rice (on a per man basis) at a rate not much less than the men from the families that operate the larger areas. One, at least, of the reasons for this can be seen from table 12.

Table 12. SRILARJO: THE RICE ENTERPRISE, SAWAH OPERATED AND FAMILY SIZE

Area of <u>sawah</u> operated	Number of families	Average area of <u>sawah</u> operated per family	Number of adult males per family
ha	percent	ha	ha
0	19	0	1.2
0.20 and less	63	0.08	1.3
0.201 and above	18	0.62	2.2
WHOLE SAMPLE	100	0.16	1.44

Source: Study B.

The table shows that, on average, the less the land the fewer the men per family. It shows, too, the crucial importance of the land for employment, subsistence and income.\*\*

Table 13 shows once again that the rice enterprise is a very important source of work for most families not only for those that have much sawah but even for those who have none whatever, either of their own or rented from others.

\* See also the notes on Study B in Appendix 1.

\*\* The figures for the number of adult males per family given in table 12 understate the actual numbers as some men from the sample families were not able to be interviewed at the time the survey was undertaken. If these "missing" men are taken into account the averages for the two groups would change as follows: families operating 0.20 ha or less, from 1.27 to 1.32; and families operating more than 0.20 ha, from 2.20 to 2.60; and the overall average would rise from 1.44 to 1.54.

It should be noted that the omission of information from these men will mean that some of the other data, e.g., labor inputs per hectare, will likely be understated to a small extent (about 7 percent).

Table 13. SRIHARJO: THE RICE ENTERPRISE AS A SOURCE OF EMPLOYMENT

Area of sawah operated	Proportion of men who do some work on own fields	Proportion of men who do some work on the fields of others	Proportion of men who do some work in rice production
hectare	percent	percent	percent
0	0	62	62
0.20 and less	88	49	92
0.201 - 0.40	92	38	92
0.401 and above	100	0	100
WHOLE SAMPLE	76	46	88

Source: Study B.

Growing rice is labor-intensive, and there is certainly plenty of labor in Sriharjo to do the work. In the new villages in East Sumatra there is little wage work. A peasant who has enough land does not need to work as a laborer and he does not like being an employer either, because he values his independence. In Sriharjo, by contrast, many men have so little land that the only way they can combine their labor with this most important form of capital is by working for those who do.\*

Forty-six percent of the men work as wage laborers in the rice enterprise. The total amount of work in rice such men are able to get is related to the area of land that each of them controls: Those who work mainly on their own fields are able to get a maximum of 62 days of work in rice; those who work mainly for others get a maximum of 57 days; those who work solely as wage laborers get no more than 35 days. By contrast, the maximum number of days worked by those who work only on their own fields - rented or owned - was 76. Even this last figure is below the minimum number of days worked by any of the farmers in the new settlements.

\* There are other forms of wage or quasi-wage employment - all of them low-paid - in Sriharjo. They include collecting wood and other fuel for the coconut sugar industry, tapping the coconut trees owned by others, collecting stones for building, itinerant selling and acting as a carrier of trade goods. These other ways of gaining a living will be discussed further in the next section. We are concentrating on the rice enterprise here because it is regarded as being by far the most important single way of making a living - by the rural people themselves, and by the vast majority of other Indonesians.

The average number of days worked in rice is 18 per man for the whole sample. As one might expect this distribution is also skewed to the right - 41 percent of the sample get more than 18 days of work, and 59 percent get less.

Those who work for others in rice for part or all of the time are forced by circumstances to do so. As in the new settlements, wage laboring in Sriharjo is regarded as being much less socially desirable than working for oneself: Not only does working for wages put them in a dependent position, in an economy where labor is already abundant and the employers themselves cannot afford to be generous, the status of wage laborer is a permanent reminder that they (or their forbears) no longer possess the rights in land that they once possessed. Some 46 percent of all days worked are spent working for others, not for themselves. More than half the hoeing, the heaviest and least pleasant work among the four types listed on page 21, is done by wage labor.

The men who lack sufficient access to land are enabled to get work (though not the right to rent or to own land) because the people who own much land do only a proportion of their own work. See also table 14.

Table 14. SRIHARJO: SIZE OF RICE ENTERPRISE, AND LABOR INPUT PER HECTARE  
Main Rice Season 1969-70

<u>Area of sawah operated</u>	<u>Family labor per hectare on own land</u>	<u>Days of wage/labor in rice per man</u>	<u>Family labor per man on own land</u>
hectare	man-days per hectare	man-days	man-days
0	not applicable	14	not applicable
0 - 0.05	320	7	8
0.051 - 0.10	188	12	10
0.101 - 0.20	82	4	10
Sub-group	120	9	9
0.201 - 0.40	96	7	13
0.401 and above	38	0	19
Sub-group	54	5	17
WHOLE SAMPLE	86	8	11

Source: Study B.

The very high labor input on farms in the less than 0.05 hectare category is a further indication that there is far too much labor, or people, and far too little land. Furthermore, as the size of the rice enterprise increases, family labor is able to get or do more work in rice (column 4). However, the rate of increase is very slow compared with the rate of increase in land area. On the other hand,

the greatest amount of wage work is done by the landless - yet the amount of employment in rice they are able to get is just fourteen days in a season of 180 days, less, but not much less, than the average for all other groups combined.

In the new villages in Sumatra each family can get work for 97 days in the land preparation phase. The Sriharjo average of 18 days (for the equivalent stages in the production process) thus gives some indication of the wastage of "capacity to produce." Give the people more land, and they could produce more, much more than they do today, even without buffalo, without "improved seeds" or fertilizer, or without any other of the miracles of modern science!

Wage work in the rice enterprise in Sriharjo is, as one might expect, poorly paid, just Rp 30 per day, or the equivalent of 0.75 kilogram of milled rice.\* The average wage for those who worked for wages was 11 kg of rice per man for the one season. This is less than 20 percent of 62.5 kg, the average need per person for half a year.

During the rice growing season in the new villages farmers do little work other than rice work: neither the house compounds nor the supplementary live-stock enterprises require much labor. In Sriharjo on the other hand the shortage of land forces people to seek other employment even in the main rice season. See table 15.

Table 15. SRIHARJO: THE RICE ENTERPRISE AS A SOURCE OF EMPLOYMENT FOR MEN  
Main Rice Season 1969-70

Area of sawah operated ha	Rice <sup>a</sup> percent of all work done	Other <sup>a</sup>	
		Coconut sugar percent of all work done	Non-agricultural percent of all work done
0	16	40	44
0.20 and less	26	50	24
0.21 and above	22	28	50
WHOLE SAMPLE	22	42	36

Source: Study B.

Notes: a. Work in rice is in six-hour days; "other work" is in eight-hour days. See also note a to table 11.

\* In 1971, money wages were unchanged, which meant that the rice equivalent rose to 0.8 kg, as a result in a fall in the price of rice from Rp 40 per kg to Rp 38 per kg on average. By mid-1972 money wages (for hoeing and weeding, the two most common forms of wage work in rice) had risen to Rp 50 a day (\$0.12 equivalent). At the prices then prevailing for rice one full day's wages would have bought 1.2 kg of rice. However, by October 1972, when the price of top quality rice had risen to Rp 68-75 per kg, the rice equivalent of the wage would again have been 0.8 kg.

The importance of other sources of work is clear from this table. Most of the "other work," moreover, is low-paying, and distinctly not preferred. The returns that can be obtained from these other sorts of jobs will be further discussed in the next section, but it is enough here to note that there is also a great deal of underutilized "capacity to produce," i.e., involuntary unemployment, in the coconut sugar enterprise, just as there is in the rice enterprise. It is generally agreed that, if a man works full-time at tapping, he can tap 30 trees. Only one man interviewed in study B was able to get access to as many trees as this. The greatest number of trees tapped by the men interviewed in study A was 19.

We had hoped that we would also be able to measure unemployment for men, but the data are somewhat incomplete. One of the reasons has already been explained in note a to table 11. There are no data on approximately a third of the work men do in the rice enterprise. Another is that we have no information on the work men do in the house-garden, other than in the arduous task of tapping the coconut trees. Still, we have good reason to believe that little such work is done, and that the consequent understatement of the total days of work is only slight. Data on employment are given in table 16.

According to these figures men were able to work for 78 days on average, or for only 43 percent of the time. If we exclude the work figures for male members of the work force still at school, the average, for the remainder, rises to 82 days. The work men are able to get or do, in rice alone in the new villages in Sumatra during the main rice season exceeds by a substantial margin all the work the men of Sriharjo are able to find for themselves.

Summary: In the first part of this section we showed that there was not enough land. We have now shown the other side of the coin, viz., that there is too much labor.

Indonesia's farmers have long possessed a productive rice technology. It is not modern in any respect, but it is quite good enough to enable them to produce sufficient to meet in full their family needs of 125 kg per head on average and a surplus for sale. This technology, moreover, requires only hand tools - and enough land.

The land available per family at Sriharjo is now less than 20 percent of the area that farmers in the new villages in East Sumatra are able to operate. The shortage of land in Sriharjo has resulted in unemployment and in very low returns for wage labor, in short in a large-scale wastage of man's capacity to produce. It has also resulted in the evolution of a complex system of employer-employee relationships, which is absent in East Sumatra, and in a transfer of opportunities to work in agriculture from those who have relatively much land to those who have little or none. This phenomenon is also absent in East Sumatra.

Most men in Sriharjo lack sufficient access to land and thus to opportunities to work, for both wage or self-employment. We can see no way that this wastage

of human labor - and of human hopes - can be overcome unless the people of Sriharjo can somehow be given access to more land.\*

Table 16. SRIHARJO: EMPLOYMENT - AND UNEMPLOYMENT  
Main rice season, 1969-70 (180 days)

Quintile - the men have been ranked according to the total number of days worked	Type of work			Median of sub-group
	Rice	Coconut sugar <sup>a</sup>	Non-agricultural <sup>b</sup>	
	days <sup>c</sup>	days <sup>c</sup>	days <sup>c</sup>	days
1. (top 20%)	20	30	95	145
2.	21	41	35	98
3.	14	50	13	77
4.	13	32	6	52
5. (bottom 20%)	11	3	1	15
WHOLE SAMPLE	18	33	28	78

Source: Study B (whole sample).

Notes: a. Includes wood-collecting.

b. The non-agricultural work is of two types - the first are low status jobs which have traditionally been poorly paid: such jobs include duck-tending, common laboring, tile-making, local market official, bicycle-repair, barber, the carrying of trade goods and stone-collecting. The second group consists of jobs that are better paid, for the most part, and are of higher social status. It covers such jobs as clerk, factory laborer, telephone operator, schoolteacher, official, and hospital orderly.

The average number of days worked by people in jobs of the first sort was 17 (whole sample); it was 11 for jobs of the second.

c. A day in rice is 6 hours; it is 8 for all others, including coconut work.

\* We will show in chapter 5 why we have stressed land rather than other forms of capital (e.g., factories) as a source of additional employment.

#### 4. PRODUCTION AND INCOME

“Income is a flow of opportunities for making choices between alternative uses for scarce resources.”

If people have to make a living from unimproved land they have no choices open to them other than hunting and gathering. However, the people of Sriharjo have long since exercised most of the options open to them as members of a peasant society to improve the land. Rice fields have been made and are served by a good irrigation system, the house-compounds are full of mature trees; all-weather roads connect the village and all its hamlets to markets at home and abroad. These improvements in the productive capacity of the land have been made because the farmers chose to use some of their labor to create capital (the rice fields, the irrigation ditches, the roads, etc.) rather than to devote their whole efforts to current production, and because they decided to wait for their coconut and other trees to bear fruit rather than choosing to plant only those crops that give quick returns.

The Sriharjo farmers have created much capital, in the form of trees and of improvements to the land, and this has increased the land's capacity to produce. However, apart from these improvements they possess little other capital, productive or personal. They have few work stock, indeed fewer today than 20 years ago; their houses are simple (the 116 Miri families live in a total of 96 houses, of which 40, or 42 percent, are of the cheapest sort - class V); some 64 percent of the families own a bicycle, 13 percent own a plough, and 10 percent have a radio.\* Their lack of such capital goods is not surprising given what we have said above about not enough land (with all its improvements) and too many people for the work.

Rice Production. In most parts of Indonesia, including Sriharjo, rice is the “staff of life.” No farmer considers himself cukupan unless he can grow enough rice to meet his family's needs. No non-farmer will feel cukupan either unless he can get enough rice.

Rice has long been grown in Sriharjo. Indeed the great effort needed to clear and build the sawah would not have been undertaken if the farmers had chosen to plant any other crop. Over many centuries Javanese peasants have

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\* Some Rp 6,100 (\$16 approximately) worth on average of bicycles, radios, sewing machines, and watches or clocks was owned per family in Sriharjo. Families living in class I or class II homes owned Rp 20,900 worth of ‘consumer durables’ on average. Farmers living in class V houses owned Rp 2,800 worth on average, or about an eighth as much. No family in the first group owned less than Rp 5,000 worth, but 54 percent of the families in the latter group possessed none of these things at all. There are 8 families in the first group, and 46 in the latter.

come to learn how to grow rice well: how to choose the best time for planting, a satisfactory method of land preparation, a satisfactory seeding rate, the best seed to keep for the following year, and much more.

As we have said earlier, their technology of rice-culture may not have been "modern," but it was more than adequate to allow them to produce all the rice needed to meet family consumption requirements and to provide a surplus for sale or taxes as long as each farmer had access to 0.7 hectare, or thereabouts, of rain-fed sawah. It was not then of great concern whether or not the land was irrigated, or whether buffalo was available to extend the capacity of family labor. Irrigation and buffaloes, however, have also long been used in Indonesia. The Javanese peasantry has thus long possessed both the agronomic knowledge and a production technology sufficient to meet not only the whole rice needs of the farm community but also of a quite large number of non-farming people as well (civil servants, artisans, soldiers, artists, traders).

The farmers of Sriharjo now have access to and are already benefiting from modern technology: the rice varieties developed at the International Rice Research Institute and elsewhere, inorganic fertilizer, pesticides and new cultivation methods. But their farms are now so small that even with the most modern technology the farmers cannot produce enough to meet the rice needs of their own families. See tables 17 and 18.

Table 17. SRIHARJO: RICE - AREA AND PRODUCTION<sup>a</sup>  
Per Farm<sup>b</sup> Averages - 1969-70

	"Large" farms	"Small" farms	Village- weighted average
Wet season (69/70)	0.72 ha	0.13 ha	0.17 ha
Dry season (1970)	0.60 ha	0.07 ha	0.10 ha
Average of the two seasons	0.66 ha	0.10 ha	0.14 ha
Gross <sup>c</sup> production (in milled rice equivalent)	3.23 tons	0.45 tons	0.62 tons
Rice production per head (rice-growing families only)	0.68 tons	0.088 tons	0.125 tons

Source: Study C.

Notes: a. The figures for rice production are estimates; for details see Appendix 1.

b. Rice-growing families only.

c. No deductions for fertilizer, etc., or for rent or wage payments have been made.

The last row of table 17 shows that the average gross production per head per year for the families in Sriharjo that grow rice is 125 kilograms. Gross

production per head for the whole village would be about 100 kilograms. In the new villages in East Sumatra a single harvest of rice, grown in the traditional, labor-intensive way, without "improved seeds" and without fertilizer or even irrigation, yields a total output of 210 kilograms per head, of which 125, on average, is eaten, and 85 kilograms are available for sale or for meeting the very small production expenses.\* No family in one of the new villages produces less rice than is needed to meet his family requirements of 125 kilograms per head. The situation in Sriharjo is vastly different despite the widespread use of high-yielding varieties and fertilizer, and an irrigation system that allows fully 60 percent of the land to be double-cropped to rice. See table 18.

Table 18. SRIHARJO: RICE PRODUCTION<sup>a</sup> PER HEAD - RICE GROWING FAMILIES ONLY

Gross rice production per head per year	Proportion of total growers
Kg/head	percent
180 kg and above (a good safety margin)	5
120-179 kg (probably enough, and perhaps some to spare)	15
80-119 kg (not enough, but near the national average)	24
SUB-TOTAL	44
40-79 kg	28
Less than 40 kg	28
SUB-TOTAL	56

Source: Study C.

Notes: a. See Note a, Table 17.

Only 20 percent at most of the rice-growers are able to produce enough to be cukupan in rice as a direct result of their own efforts.\*\* The data in table are for gross production, generously estimated, and take no account of the cost of water (this cost is not known), of pesticides (negligible), of improved seeds (the equivalent of not more than 0.5 percent of gross output) or of fertilizer (the equivalent of just over 2 percent of gross output).

The dependence of the rice-growers on the goods and services produced by "the market" (fertilizer and pesticides), and by other institutions external to the village, such as the Department of Public Works and Agricultural Experiment Stations (water and improved seeds), is not great as a proportion of gross output, perhaps no more than 4 percent, but the availability of such goods and services

\* These data are for Suka-Mulia (Pematang Johar). See (Penny: 1964).

\*\*It should be recalled that the results of study B (see table 12) showed that 19 percent of the families grew no rice. Of these, the great majority had little or no land, and scored low on the index of economic welfare.

from outside the village is crucial to the achievement of current levels of output. We estimate that, with water only, and with none of the modern inputs, total gross output would have been at most 80 percent of the gross production attained in 1969-70.

The use of fertilizer and improved seeds is highly profitable for Indonesia as a whole, and also for the farmers of Sriharjo. The first recorded use of fertilizer on rice that we know about for Sriharjo occurred in 1957: the farmer who used it had learned about it from a nearby sugar estate and found that he was already growing a variety of rice (Mentel) that responded well to fertilizer. Nineteen fifty-seven was two years before the government's first major rice production program (Self-Supporting Beras: 1959-1962). Sriharjo's population in 1957 was some 10-12 percent lower than it is today.\*

The farmers of Sriharjo, then, knew something about the use of fertilizers before the S-S.B. program (1959-1962) was launched.\*\* Today 70 percent of the farmers use fertilizer (mainly urea) on rice. Of these, about half use it at the recommended rate (100 kg urea per hectare per season), or above. Their use rates are well above the national average of 55 kg per year (per Ha of sawah). See table 19.

In Sriharjo the large farmers have used more fertilizer per hectare than the small farmers. This reinforced the advantage they already possessed from their relatively greater control over the better-watered land (see the last column of table 19).

The large farmers do not, moreover, need any vast capital to finance their fertilizer purchases. The average annual expenditure per farm in this group is Rp 5,300 (\$US 15). It is just Rp 265 (\$US 0.70) for the small farmers.

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- \* Some fertilizer-responsive rice varieties, like Mentel, have long been grown in various parts of Indonesia. As early as 1934 Ochse and Terra (Ochse et al.: 1934) were recommending that farmers be encouraged to use artificial fertilizer on rice, and farmers in a number of villages were doing so by the late 1930s. The Pacific War and the war for independence interrupted this very desirable trend, as did subsequently the government's insistence that fertilizer distribution should be a government monopoly. For further details on fertilizer distribution see (Kolff: 1970).
- \*\* Professor Iso (private communication) has pointed out to us that, to his knowledge, inorganic fertilizers were first made available to, and used by Javanese farmers in 1921. In most cases prior to independence such fertilizers were used only for high value crops such as tobacco and sugar cane. They were little used for rice owing to the low price policy for rice, the basic "wage good," of the colonial government. In 1950 rice prices were high, and fertilizer could have been used with profit but no fertilizer was to be had even though the farmers were willing to pay cash.

Table 19. SRIHARJO: FERTILIZER (UREA) USE PER HECTARE  
AND INDEX OF DOUBLE-CROPPING  
1969-70 crop year

	Fertilizer per ha	Fertilizer expenditure per family	Index of double- cropping <sup>a</sup>
	kg	Rp	No.
Large farms	245	5,300	183
Small farms	67	265	153
WHOLE SAMPLE	114	595	160

Source: Study C.

Note: a. An index of double-cropping of 160 means that 60 percent of the rice-land was double-cropped.

A further analysis of these data showed that the men who farmed the very smallest areas used more fertilizer per hectare than those who operated farms of a middling size. A likely explanation for this apparently anomalous behavior (Cf. table 5) is that the men who operate the smallest farms buy fertilizer because, to them, rice is a commercial crop, not grown to be eaten but for sale.\* This group cannot afford to eat much rice, and must depend on the cheaper, less nutritious foods.

So far, we have said nothing about the division of the total gross product except to show that the area operated by each farmer must have a big influence. The total product: If there were no expenses, and rice could be sold at its retail price then the value of the gross product (rice only) on a per head basis would be Rp 6,000, or \$15.70 (1970).\*\* Deduct 4 percent for paid out costs and Rp 5,760 (\$15.20) per head is left.\*\*\* Deduct a further Rp 300 per person for taxes (estimated), most of which is for IPEDA, the Contribution for Regional Development, and Rp 5,460 (\$14.40) per head is left. However, to know how much each person and each family, gets in return for the labor and capital used to grow rice

\* The farmers in the largest size category grow it both for home consumption and for sale. The farmers in the middle-size category seem to grow it primarily for own use, i.e., not primarily as a commercial crop.

\*\* On a per hectare basis it is about Rp 144,000. or \$380.

\*\*\* We should stress that all the calculations made here exclude the families who grow no rice. As most such families (about 20 percent of the total) are landless and also depend to some extent on working for rice farmers for their livelihood (tables 14 and 15), the figures we give here for value of production per head are overstated by 13 percent or so.

would require a number of other - and very complicated - adjustments for which, unfortunately, we have no concrete information. Land is rented, both in and out.\* In addition, tenants typically pay at least 50 percent of the gross output as rent (maro, 450 percent), sometimes two-thirds (mertelu), and this means that there is a net flow of rice and wealth from those who have small farms to those owning larger areas.\*\* Government agricultural credit cost 1 percent a month (this was not available in Sriharjo in 1969-70) and can be most easily obtained by the men operating areas of 0.3 Ha or more. The cost of money borrowed from other sources, which include the wealthier farmers, is much higher, up to 10 percent a month.\*\*\* The total effect of the workings of the land tenure system and of the credit system is therefore a net flow of rice from those who have less to those who have more. A further result is an increase in the size of the marketable surplus.\*\*\*\*

But there are also forces that lead to a flow in the opposite direction, from those who have much land to those who have little. In the previous section we showed that the contribution of own family labor to production decreased steadily as the size of the sawah operation increased (Table 14). The fact that the men who had little or no sawah were able to get a small amount of work in rice (the equivalent of 55 kilograms of rice per hectare, or 2 1/2 percent of main season production) offsets to a small extent the transfers mentioned earlier.\*\*\*\*\*

To sum up: Rice production in Sriharjo is technically efficient. Most of the rice grown consists of high-yielding varieties; most of the land can be double-cropped; most farmers are already using fertilizer (at rates, moreover, that greatly exceed the national average); and yields per hectare are well above the all-Indonesian average. Rice-growing is also quite commercialized. Farmers buy modern inputs in substantial quantities; there are elaborate and widespread credit, land tenure and wage employment transactions; and a considerable

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\* In Miri each land-lord rents out 0.23 Ha on average, and each tenant rents in 0.10 Ha on average. About 20 percent of the rice land is subject to rental agreements, and about 30 percent of the rice-growers rent some, or all, of the land they operate.

\*\* John Kolff found that the majority of the rental agreements in Miri and Pelemadu were mertelu, not maro. In Klaten (see Utami and Ilahauw, 1972) most rental agreements are mrapat, i.e., the operator's share is just 25 percent of the gross (after the harvest share has been deducted). There are also reports of yet higher rents elsewhere.

\*\*\* The government pawnshop at Imogiri charges 7 percent a month.

\*\*\*\* The implications of these flows for the self-sufficiency goal are discussed in section 5.1 below.

\*\*\*\*\* Some, at least, of this rice will also reach the market because many of those who work for wages cannot afford to eat rice, and will therefore be forced to sell in order to be able to buy cheaper foods. We also regret that we have no information on the wage-work done by women. Almost all harvesting, for example, is done by non-family, female, labor. The standard wage rate is 5 percent of the harvest.

proportion of the gross output leaves the village for sale to city and other consumers. Despite the great increase in technical efficiency that has occurred in the last decade or so and the high degree of commercialization, the conclusion is inescapable that most of the people of Sriharjo are unable to produce enough rice. There are far too many people for the land. It is therefore not surprising to hear the Javanese settlers in the new villages in East Sumatra say, as they all do if they are cukupan in land (even though their production methods may have remained fully traditional), "No, we will never return to live in Java. Our lives there were hard, and there is even less land today than there was when we left. Here we can produce by our own effort all the rice our families need and still have a surplus to sell."

There is no likelihood that the rice-fields of Sriharjo will, in the near future, yield enough rice to enable even the rice-growing families to eat enough of their basic food. Further technical advances will help to raise output, but as long as population continues to increase (or even if it remains as it is now) and the institutional arrangements for the division of the product remain as at present many of the people will continue to be unable to reach their most basic goal of enough rice.

Sawah and Pekarangan. Sawah is always seen as being the most important type of land, because it produces rice. In the new settlements in Sumatra and elsewhere the Javanese, and most other peasants as well, concentrate most of their efforts on the sawah.\* The government has since independence devoted almost all of its efforts in the field of peasant agriculture to raising rice output. Yet sawah is only about 60 percent of the land at Miri. Farmers have therefore turned to the house-compound land (pekarangan) to supplement the little they get from the sawah.

All land is in short supply, but it is only the rice enterprise that has received any serious attention from agricultural scientists, from officers of the agricultural extension service, or from government banks. Consequently there has been a substantial increase in rice output. Yet the incomes per hectare earned from the sawah remain well below those earned from the pekarangan.\*\* The value of output per hectare from the sawah is not more than Rp 144,000, whereas the income (value added) from just one pekarangan enterprise, coconut sugar, is Rp 162,000 per hectare, or 15 percent more. By contrast, in the new settlements,

\* If they can make it. But even in areas more suited to rubber or coffee, rice production tends to be given top priority.

\*\* We have used the 1970 rice prices and the 1971 prices for coconut sugar to make these calculations. Both prices are "high." Two recent studies done in the Yogyakarta region (Sutarmadi et. al.: 1971; and Gani et. al.: 1971) have shown that Rp 144,000 per hectare would be a high figure for the value of output per hectare of sawah, and that Rp 80,000 - Rp 130,000 would be a more normal range at current prices.

indeed in any area where there is no population pressure, the pekarangan is used as a supplementary source of food, and of occasional cash income; and little time or effort is spent on caring for the crops grown in it.

#### The Coconut Sugar Enterprise

"In the areas where coconut sugar can be - and is - made there are no other alternatives open to the farmers to make up the deficit in their incomes due to the shortage of sawah."

(Soedarwono: 1971, p. iii, paraphrased.)

Geertz once wrote that fertilizer was "Java's last trump in peasant agriculture" (Geertz: 1963, p. 146). Fertilizer has indeed helped, and will raise output even more in the future, but it has come too late and spread too slowly.\* The farmers of Sriharjo learned long ago that the coconut sugar enterprise gives the highest income per hectare. It also requires much more labor per hectare. Thus it provides much needed employment but at a price: low returns, even by local standards, for very hard work.

The farmers in the new settlements in East Sumatra do not make coconut sugar even though they have enough coconut trees. Their incomes from other activities are sufficient to save them from the hard and low-paying task of making coconut sugar. If Javanese peasants have enough land they will not let themselves be driven to the making of coconut sugar.

As Soedarwono has pointed out, farmers make cocunut sugar because they have no other alternative. It is an unattractive way of earning a living because:

- (1) to tap the trees requires strength and agility on the part of the tappers (the trees must be climbed); it involves some danger (a tapper can be killed if he falls); and it also means that the men who tap become economically immobile, as the trees must be tapped twice a day throughout the year in order to keep the sap flowing. Despite all this, the work is very poorly paid.
- (2) to make cocunut sugar is hard and hot work, which also must be done throughout the year.

The cocunut sugar enterprise in Sriharjo resembles the rice enterprise in every essential way. Average incomes per head are low; there is much underutilized capacity to produce (i.e., much unemployment); the area of land controlled by a family has a big influence on family income (the index of economic welfare). We will therefore present the data on it without any great amount of discussion in the text.

\*See also footnote \*\*, p. 33.

Table 20. MIRI: LAND - SAWAH AND PEKARANGAN<sup>a</sup>  
Land Controlled per Farm<sup>a</sup>

	Total land	House- compound	House-compound to total land
	ha	ha	percent
Largest single farm <sup>b</sup>	2.26	0.37	16
First quintile (top 20%)	0.67	0.18	27
Village average	0.22	0.08	36
Fifth quintile (bottom 20%)	0.05	0.03	59

Source: Study A.

Notes: a. Some of the figures in this table over-state the true position. The figures given here are from the data collected from 116 Miri families. Of the 116, 102 (or 88 percent) own house-compound land. The members of the first quintile consist of the 20 farmers who control the most land, and who also own house-compound land. The same is true for the 20 farmer-members of the fifth quintile. We have thus excluded from the table the admittedly very small amount of land (all sawah) controlled by the remaining 14 families. This means that the averages we have calculated for the farmers in the first and fifth quintiles are somewhat overstated. The figures given for the largest single farmer and for the village average are, however, the actual figures.

b. The data for the 'largest single farmer' are also included in the data for the first quintile.

It is most important to note that the pekarangan becomes relatively more important as farm size decreases.

Furthermore, the farmers with least land are the most likely to use their trees to make coconut sugar. Land and coconut trees are both parts of the capital with which farmers combine their labor in order to earn a living. If farmers are land-short, and thus possess few coconut trees as well, their willingness to devote their abundant - and all too cheap - labor to the production of coconut sugar becomes high.

The capacity to work does not decline as access to land declines (except insofar as lack of food may affect it). The amount of productive work men can do does decline. There are just not enough trees to allow men to work as much as they would like, even in a job that is as labor-demanding and as poorly paid as making coconut sugar. By contrast, the farmers who own relatively many trees tap only a small proportion of the trees themselves.

As in the rice enterprise, a large proportion of the actual physical work is done by men who are short of land and trees.

Table 21. MIRI: FARM SIZE AND COCONUT TREES  
Per Farm Averages<sup>a</sup>

Farm groups ranked according to area of land controlled	Coconut Trees		Proportion trees used for sugar	Planting density
	Total owned	Tapped for sugar		
	no.	no.	percent	trees per ha of house- compound
Largest single farm	33	3	9	89
first quintile	18.3	6.6	36	100
Village average	8.2	4.4	52	122
fifth quintile	3.4	2.9	85	115

Source: Study A.

Note: a. See note a. for table 20.

Table 22. MIRI: COCONUTS, FOR FRUIT AND SUGAR  
Per Farm Averages<sup>a</sup>

Farm groups ranked according to area of land controlled	Coconut trees			Trees tapped	
	Total	For Fruit	For Sugar	By owner	By wage labor
	no.	no.	no.	no.	no.
Largest single farm	33	30	3	0	3
first quintile	18.3	11.7	6.6	1.4	5.2
Village average	8.2	3.8	4.4	2.4	2.0
fifth quintile	3.4	0.5	2.9	1.9	1.0

Source: Study A.

Note: a. See note a. for table 20.

Growing coconuts for fruit requires very little labor. There is thus a dramatic increase in the proportion of income derived from sugar as one goes from the largest farms to the smallest: the incomes of the large farmers are mostly returns to capital; returns to labor predominate in the incomes of men with little land.

The landless and near landless depend a great deal on the trees of those who have relatively many. Such dependence is disliked by the poorer people (see p. 25); the work is also very poorly paid (see also table 27).

Table 23. MIRI: COCONUTS, VALUE ADDED PER YEAR<sup>a</sup>  
Per Farm Averages<sup>b</sup>

Farm groups ranked according to area of land controlled	Fruit	Sugar and/or rent from own trees	Total from own trees <sup>c</sup>	Return from tapping the trees of others <sup>d</sup>	Value added (income) per family	Sugar as proportion of total
	Rp'000	Rp'000	Rp'000	Rp'000	Rp'000	percent
Largest single farm	27.0	4.1	32.1	0	32.1	16
first quintile	10.6	10.8	21.2	0.3	21.5	51
Village average	4.0	6.9	10.9	3.8	14.7	73
fifth quintile	0.7	6.8	7.5	4.2	11.7	94

Source: Study A.

- Notes:
- For details of how the data on value added were calculated see appendix 1.
  - See note a. for table 20.
  - This figure shows the income per family from their own capital (trees) and what they earn from tapping, and manufacturing coconut sugar.
  - The figures in this column are for pure labor income.

Eighty-three percent of the 116 families own one or more coconut trees, 86 percent depend in some way or other on coconuts as a source of income, and 51 percent of all families are engaged in the twice-daily task of tapping. The families who tap are, in general, poorer than the other people in the village.\*

\* Forty-two percent of those who tap, tap only their own trees, and 16 percent tap only the trees of others.

Table 24. MIRI: COCONUT SUGAR - LABOR INCOME<sup>a</sup>  
Per Farm Averages<sup>b</sup>

Farm groups ranked according to area of land controlled	Labor Income			Other's trees as proportion of total labor income percent
	From own trees tapped by self Rp'000	From tapping trees owned by others Rp'000	Total Rp'000	
Largest single farm	0	0	0	..
first quintile	1.8	0.3	2.1	14
Village average	3.2	3.8	7.0	40
fifth quintile	2.5	4.2	6.7	61

Source: Study A.

Notes: a. Labor income is value added less the rental cost (actual or imputed).  
b. See note a. for table 20.

Table 25. MIRI: THE ECONOMIC WELFARE OF TAPPERS<sup>a</sup>

Index of economic welfare	Proportion of all tappers	Proportion for whole village
	percent	percent
12 or more ( <u>cukupan</u> )	14	37
7 - 11	54	} 63
6 or less	32	
	<u>100</u>	<u>100</u>

Source: Study A.

Notes: a. The average score on the index of economic welfare for these families is 8.0. It is 10.3 for the village as a whole.

One of the major difficulties is that there just are not enough trees to provide most tappers with the opportunity to get a sufficient amount of extra work - and income. See table 26.

Table 26. MIRI: COCONUT SUGAR, TREES PER TAPPER PER DAY  
59 tappers

Number of trees tapped per tapper per day <sup>a</sup>	Only 'own' trees	Both 'own' and other's trees	Only other's trees
	No. tappers	No. tappers	No. tappers
1 - 4	13	1	2
5 - 9	10	6	3
10 - 14	2	14	-
15 and over	-	4	4
TOTAL	25	25	9

Source: Study A.

Note: a. The average number of trees tapped per tapper per day is 8.6. The maximum number tapped by any one man in each of the three categories is as follows:

only own trees	12 trees
both own and other's trees	15 trees
only other's trees	19 trees

It is generally agreed that a tapper has the capacity to handle 30 trees a day. In Miri there are so few trees, and so many people seeking the opportunity to enhance their meagre incomes, that the average number tapped is only 8.6 and the maximum is 19.

The coconut sugar enterprise makes a rather small but steady contribution to family budgets - about Rp 50 (\$0.13) a day on average, or the equivalent of about 1.3 kilograms of rice. This figure (i.e., Rp 50 per day) assumes that the sugar is sold at its normal wholesale price. If, however, the producer is in debt to the buyer (and many are), then the price received falls to about 60 percent of the market price.

The families' main concern is with total income and not with how much they can get per hour. Many would willingly tap more trees each day, if only there were more trees, even though incomes per hour worked are very low indeed. If a family taps only 5 trees (owned by someone else) they earn less than Rp 3 per hour worked, less than \$0.01 per hour. The labor income per hour from 19 trees (the maximum in Miri) is only a little over Rp 4 per hour, just over \$0.01 per hour.\*

\* Economies of scale in the manufacture of coconut sugar explain the difference in earnings per hour. The input-output data we have used to make these calculations come from (Soedarwono: 1971). In the villages studied by Soedarwono the average return to labor per hour is less (Rp 2.4 approx. per hour) than for Sriharjo, in large part due to the lower prices prevailing at the time his study was done.

Table 27. MIRI: COCONUT SUGAR - INCOME PER DAY FROM TAPPING AND SUGAR MANUFACTURE COMBINED

Number of trees tapped	Income per family <sup>a</sup>	
	If tapping only 'own' trees <sup>b</sup>	If tap only for others <sup>c</sup>
	Rp/day	Rp/day
5	38	19
10	76	38
12 <sup>d</sup>	91	46
15	n.a.	57
19 <sup>d</sup>	n.a.	72

Source: Study A.

- Notes: a. Both men and women work in the coconut sugar enterprise. Indeed, more women than men do so (77 as against 51 percent). Unlike the men, many do not have to work every day. This is because of the way in which the share-renting system works.
- b. This is a return to both capital and labor.
- c. This is the return to labor alone.
- d. See note a. to table 26.

Coconut Sugar - Summary: The coconut tree is something like the pig, of which all can be used, it has been said, but its squeal. It is a plant that has many uses. Its fruit can be used in a variety of ways, for oil, for grated coconut, etc.; its sap can be used to make sugar or wine, in which case no fruit can be had; its leaves can be used for thatch, or firewood; once it has been cut down its trunk can be used for building; and, as in Sriharjo, its roots can be dug up and used for firewood.

Its contribution to the "national income" of Sriharjo almost equals that of rice even though less land is used for coconuts than for rice. (The value added per family that depends in some way or another on coconuts as a source of livelihood averages Rp 20,100 per year.) The coconut land, i.e., the pekarangan, is, moreover, planted with a bewildering variety of other economic crops, 64 types in all. It is also the home for a number of different animals as well - buffalo, ducks, fish, chickens, etc.

The people of Sriharjo would appear to be fortunate to possess so many coconut trees to increase the very small incomes they earn from their sawah.<sup>\*</sup> The coconut trees can indeed yield more income per unit of land but: firewood is needed to boil the sap. This comes mainly from the already ravaged hills, which means that part, at least, of the "income" consists of capital (the trees that have

<sup>\*</sup> However, they possess many fewer on average than did the farmers of Kutowinangun in 1933. See Appendix 2.

been cut for firewood and not replanted);\* - the returns to labor are very low, about one U.S. cent per hour; - and, as with rice, the greatest returns go to those who control the most land.

Just 32 percent of the families with incomes from coconuts earn more than the average amount, Rp 20,100 per year, from this source. More than two-thirds of these are from the group that controls more than 0.22 Ha (the village average), and as we have said, are much more likely to rely on fruit than sugar for their income from coconuts. The remaining 68 percent, who are much more dependent on coconuts as a source of income, earn less than Rp 20,100 a year from their mostly arduous endeavors, i.e., less than \$49 a year. This is less than \$1 per head per month.

Table 28. MIRI: COCONUTS, INTENSITY OF RESOURCE USE  
Per Farm Averages<sup>a</sup>

Farm groups ranked according to area of land controlled	Value added per hectare from own trees	Value added per tree owned
	Rp'000	Rp'000
Largest single farm	86	0.97
first quintile	118	1.18
Village average	139	1.43
fifth quintile	226	3.31

Source: Study A.

Note: a. See note a. for table 20.

Table 28 shows that there is nonetheless some possibility of squeezing more income from the coconut trees. The data in column 2 show that the making of coconut sugar, rather than using the trees for fruit, means higher returns per unit of land. This means, in turn, that the "national income" of Sriharjo would rise if those who had much land, and thus many trees, would allow more of those with little capital, and much labor, to tap the trees which are currently used only for fruit production. That they do not themselves do so is understandable from

\* Gathering firewood from the nearby, and almost bare, hills is yet another source of income for the people of Sriharjo. Some 35 percent of the men gather firewood and other combustible materials (grass, leaves, etc.) for an average of 36 days each year, and their average net income per day is about Rp 40 (\$0.11).

In this field, too, the economy is thoroughly commercialized - the wood collectors pay from Rp 10 - 15 on each occasion for the right to scavenge for firewood.

the viewpoint of economic logic. Those who possess many trees earn what they consider to be sufficient incomes without themselves undertaking the arduous task of tapping. The supply price - or "cost" - of their labor is much higher than for those who have little land. What is less easy to understand from the viewpoint of economic logic is the unwillingness of those with many trees to allow them to be tapped by others. We have estimated that the average income per tree per year from fruit is Rp 900, and that it rises to Rp 2,000 if sugar is made - with the owner's labor. If the trees are tapped by others, the rent, i.e., the return to capital per tree, is about Rp 1,300, or rather more than can be obtained from fruit. Soedarwono explains this apparent anomaly by noting that people who have many trees regard them as something like money in the bank, to be drawn on when the need arises (Soedarwono: 1971).

Other Income from the Pekarangan: The small pieces of land around the houses are used to grow many things besides coconuts. We do not know their net contribution to family incomes, but it is probably of the order of 30-40 percent of the income from coconuts.\*

Remembering that coconuts alone produce more income per hectare than rice, it is not surprising to find the people of Sriharjo are currently expanding the area under pekarangan crops. They are slowly converting their "unproductive" sawah into pekarangan, and even planting trees in the market place (tanah desa, i.e., public land).

#### Incomes, in General

An itinerant seller slipped crossing a small creek, and broke the entire stock of pots she had been carrying. She wept, and said "I am bankrupt, ruined." The total value of her load had been Rp 160 (\$0.40).

Source: Singarimbun (field notes).

Wage work pays Rp 30 (0.08) a day - when there's work to be had. An adult woman was paid a cash wage of Rp 5 (\$0.013) a day and one meal, but she thought herself fortunate as she could work every day. A wood-gatherer earns Rp 80 from two hard days work in the dry season, when wood is easier to get. A man

\* A study of the economics of the pekarangan in Miri is currently being undertaken. The fieldwork finished in May 1972. Preliminary results show that the smaller the land area, the greater the planting density of all plants (Cf. table 21, col. 5), and also that the pekarangan provides very little employment other than for coconut sugar.

who tends ducks - a 'full-time job', even though he has only 20 ducks to look after - earns Rp 200 a month in cash plus his meals.\*

No complete income survey has been done in Sriharjo, but the information we have been able to provide shows that the majority of people in Sriharjo are quite poor, and that many of them are very poor indeed. In this the situation in Sriharjo appears to differ little from the situation in the Yogyakarta region as a whole. Tables 29 to 31 give some of the results of the two major income and consumption studies of the Yogyakarta Special Region that have been done at the Faculty of Economics, Gajah Mada University, Yogyakarta.\*\*

Table 29. YOGYAKARTA SPECIAL REGION:  
INCOME DISTRIBUTION - 1959

Category	Annual income per family	Average income per family in rice equiv. <sup>a</sup>	Number of families
	rupiah	kg/family/year	percent
1	0 - 1,199	138 <sup>b</sup>	7.4
2	1,200 - 2,399	320	23.1
3	2,400 - 3,599	466	22.7
4	3,600 - 4,799	640	13.8
5	4,800 - 5,999	819	8.9
6	6,000 - 8,399	1,047	10.3
7	8,400 - 11,999	1,455	7.8
8	12,000 - 17,999	2,318	4.3
9	18,000 - 23,999	3,235	0.8
10	24,000 & over	5,617	0.8

Source: Sukamto, 1962, p. 343.

Notes: a. Milled rice Rp 6.50/kg av.

b. No data on family size are given in the original source, but it is clear from the other data provided that the majority of the households in the lowest income category are single person households.

\* The Pakistani refugees in India (1971) will almost certainly have eaten better than the poorest people in Sriharjo. The daily allowance for each adult refugee was \$0.13, it was \$0.07 for children, and thus \$0.47 (Rp 180) a day for a family of five. This \$0.13 per adult was enough to provide them daily with 300 grams of rice, 100 g of other grain (wheat or atta), 100 g of pulses, 25 g of oil and 25 g of sugar, and \$0.04 to spend on other things. On an annual basis the grain ration is 110 kg rice plus 36 kg other grain per adult (Ray: 1971).

\*\* Results from the first study have been published by Sukamto (1962) and by Mubyarto and Fletcher (1966). Results from the second will be found in Deuster's dissertation (1971).

Table 30. YOGYAKARTA SPECIAL REGION: INCOME DISTRIBUTION, BY OCCUPATIONS - 1959

Occupation	Annual income per family		Expenditure on food as proportion of income
	cash equiv.	rice equiv.	
	Rp.	kg	percent
Farmer-laborer	2,956	455	75
Farmer-tenant	3,296	507	68
Trader	3,610	555	70
Farmer-owner	3,803	585	64
Laborer	4,240	652	64
Transfer receiver (pensioner, etc.)	5,592	860	60
Other	5,800	892	65
Self-employed, n.e.i.	6,190	952	55
Cottage-industry (own business)	7,537	1,159	63
White collar	12,742	1,970	54

Source: Sukanto, 1962, p. 343.

Table 31. YOGYAKARTA SPECIAL REGION: MEDIAN HOUSE-HOLD INCOMES IN RICE EQUIVALENTS, BY OCCUPATIONAL GROUPS  
Kg per Year, 1959 and 1968

Occupation group	Kg per year		Proportion of all families	
	1959	1968	1959	1968
Small farmer	352	266	12.1	17.1
Farmer-laborer	500	448	10.2	12.5
Medium farmer	689	766	12.7	11.4
Farmer-other	706	621	13.5	11.1
Laborer	725	489	9.9	11.8
Transfer receiver	825	565	9.7	6.8
Other	974	957	13.1	11.8
Large farmer	1,237	1,411	11.0	11.1
White collar	1,970	1,435	7.8	6.4

Note: The above table was derived by Penny (1972, p. 94) from data provided by Deuster (1971). The 1959 data cited by Deuster are from the earlier Consumption Survey (see Tables 29 and 30). It should be noted that Deuster has changed the occupational classifications.

The 1959 data for the Yogyakarta region show that household incomes were low and unequally distributed. The 1968 data show that the situation was worse in both respects in the latter year. The absolute figures for household incomes by income classes are not available for 1968, but the 1959 figures (table 29) show that 76 percent of all families (urban and rural) had incomes of less than 1,000 kg milled rice equivalent per year, and that 86 percent had less than 1,200 kg. Table 31 shows that, among the farming community, only the 'large farmer' group earned incomes higher than this (in both years), and that the incomes of all other groups that directly depended on agriculture for a living had average incomes that were less, sometimes very much less, than the cukupan level of income earned by the families in the new settlements in East Sumatra.

The majority of people in the Yogyakarta region, Sriharjo included, are poor, and many among them are desperately so. At least half the families do not earn enough to be able to eat rice, the preferred basic food, the year round. If we assume an average family size of about 4.5 persons, that rice consumption per family should be 450 kg rice per year (100 kg per person per year), and that about 20-25 percent of income must inevitably be used for items other than food, then the 50 percent of families with incomes of 500 kg or less (table 29) would not be able to afford to eat rice at the rate of 100 kg per head. These calculations are, moreover, unduly conservative. One hundred kg rice per head per year would provide only 780 calories per day whereas minimum average daily requirements are at least 1,600 calories. The average rice consumption of Javanese farmer families in North Sumatra is 125 kg per head per year. It was even higher than this for the people in the high income groups in the 1964 All-Indonesia consumption Survey.\*

Further evidence of the poverty of the people in Sriharjo, and in Yogyakarta generally, comes from Mubyarto and Fletcher (1966), where they show that the income elasticity for rice ranged between 0.50 and 2.39 for the various rural kabupaten in the Yogyakarta region (Mubyarto and Fletcher: 1966, p. 39).\*\* The farmers in the new settlements have an income elasticity of demand for rice of zero, because, with sufficient land, they are able to produce all the rice they want to eat. And when real incomes per head are even higher, as they are in the United States, the income elasticity of demand for basic foods becomes negative, i.e., the per capita consumption of such foods falls as income per head rises. Even by the 1940's the income elasticities of demand for potatoes, flour and bread were already negative (Schultz: 1953, p. 73). The figures from the Mubyarto-Fletcher study thus provide excellent confirmation of the general conclusion we have drawn regarding the degree of poverty in the Yogyakarta region as a

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\* For details, see Appendix 3.

\*\* If the income elasticity of demand for rice is 1.0 this means that a 10 percent change in income will lead to a 10 percent change (in the same direction) in the expenditure on rice. Income elasticities of demand for rice of 0.50 and 2.39 mean that the expenditure on rice will change by 5 percent and 23.9 percent respectively if income changes by 10 percent.

whole, and not only in Sriharjo.\* A figure of 0.50 for the income elasticity of demand for a basic foodstuff like rice means that, to many customers, rice must be a luxury, or near luxury. If the income elasticity of demand for rice is as high as 2.39, as it is in Gunung Kidul, this means that the people there see rice as being the luxury of luxuries.\*\*

Income is a flow of opportunities for making choices, but with incomes at the level they are the range of choice open to the people of Sriharjo is not great. The poorer people in the community find it hard to include in their range of possible choice such things as meat (Rp 160 a kg), a visit to the doctor (Rp 150), a bus trip to Yogyakarta (10 miles, Rp 40), or even an egg (Rp 12). Few among the remainder find it easy to buy shoes (Bata: Rp 750 a pair) or to go to the dentist for an extraction (Rp 1,000). A Honda motor-cycle (125 cc) costs Rp 155,000.\*\*\* Nor would the majority of the people of Sriharjo be able to include the sending of their children even to junior high school within their range of choice:

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- \* The data on income elasticities of demand for rice have important implications for an economic evaluation of the self-sufficiency goal (Appendix 3), and for an understanding of the relationship between food consumption and income (Appendix 2).
- \*\* To put it simply - if economic conditions are bad in Bantul (Sriharjo) how much worse they must be in Gunung Kidul. Such large differences in income, even between adjacent districts, are commonly found in Java. Other districts, e.g., Krawang, have much higher incomes than Bantul. For details of other studies, see Appendix 2.
- \*\*\* \$1 = Rp 380; 1 kg rice = Rp 38; cukupan level of income = 1200 kg rice. By way of contrast both authors earn more than 24,000 kg bread equivalent a year (after taxes; Australian retail prices), and like some people in Jakarta can include an automobile, a record player and a camera in their range of choice.

Table 32. SCHOOL FEES - FIRST YEAR OF JUNIOR HIGH SCHOOL.

		Minimum	Average Maximum <sup>a</sup>
		Rp	Rp
Registration	SS <sup>b</sup>	500	1,500
	WS <sup>b</sup>	(1,500)	(3,000)
Total monthly fees	SS <sup>b</sup>	1,200	2,400
	WS <sup>b</sup>	(3,000)	(3,600)
Uniforms		2,000	2,000
Textbooks		1,500	2,000
Exam fees		200	300
Miscellaneous fees <sup>c</sup>		300	300
Total <sup>d</sup>		Rp 5,700	Rp 11,200
Total, in rice equivalent		150 kg	290 kg

Source: We are indebted to Rudi Daroesman for these figures. See also Daroesman (1971 & 1972).

- Notes:
- Occasional schools charge higher fees.
  - SS = South Sulawesi; WS = West Sumatra. We have no figures for the situation in the Yogyakarta area, and school fees may be lower there. For example, the wearing of uniforms is not required in the Imogiri Junior High School.
  - Sumbangan sukarela, s. wajib belajar, s. pesta tahunan, s. kesejahteraan, s. naik kelas, uang sosial, dsbnya.
  - The total does not include costs of transport or for subsistence, or for board and lodging if living away from home. The cost of the latter is at least Rp 2,500 (65 kg) a month. About ten percent of families in Sriharjo have children in high school.

To conclude: When population densities were lower the peasants chose wisely (according to their lights), but they then had a flow of income that was large enough for them to make choices among a fairly wide range of good possibilities, as the new settlers in East Sumatra and elsewhere do today. That the people of Sriharjo "chose" to denude their hills is due merely to lack of income, i.e., to the shortage of opportunities for making other choices.

The continued growth of population and the inability of the larger society to increase the flow of income-earning opportunities at a comparable rate has meant declining incomes for most of the people in Sriharjo. All this has occurred in spite of the people's willingness to improve the land, to adopt modern methods of rice-growing, to work hard, and to integrate the village economy with the national and international economies. And they do not waste resources: the leaves that fall from the trees are collected for fuel, and they even dig up for fuel the roots of the coconut trees that have been felled.

## 5. WHAT ECONOMIC FUTURE FOR SRIHARJO?

A population problem as immense as that faced by the people of Sriharjo can have no quick or easy solution. There is no wand that can be waved to quadruple, or even double, farm sizes, or to bring the birth rate down to the point where population will stop growing. These are not, of course, the only ways in which population pressure on the land can be alleviated. New jobs can be created in industry; the land could be made even more productive than it is now; and families could be encouraged to migrate to areas where there is empty land suitable for agriculture.

The present government has given a much higher priority to economic development than did the previous government. In the past few years it has been able to frame new and better policies in the four fields that hold the key to the solution of the population problem -- agricultural intensification, family planning, industrialization and transmigration.

We will discuss each of these in turn and the likely impact on Sriharjo's future.

(a) Agricultural Intensification. Sriharjo has been fortunate in that much of its land is sawah. Almost all the agricultural programs of the government since independence have been directed towards increasing rice production from the irrigated land. If Sriharjo had had only dry-land it is likely that its capacity to support people would in fact have fallen, as it already has in some of the dry-land villages in kabupaten Bantul. Even in Sriharjo the fertilizer and the high-yielding varieties have come too late to maintain even a modestly adequate level of living. The population densities are already too great.

Mubyarto has shown that in the period 1960-69 the production of the basic food crops has risen far more rapidly in Sumatra than in Java, and that the food situation in Java had deteriorated somewhat over the same period. See table 33 (and table 4, Appendix 1).

Table 33. JAVA AND SUMATRA: TOTAL OUTPUT OF BASIC FOOD CROPS - 1960-1969

	Java Increase over period percent	Sumatra Increase over period percent
Rice	19	51
Maize	MINUS 48	2
Sweet Potatoes	MINUS 50	144
Cassava	MINUS 4	52

Source: Mubyarto (1971: p. 3).

His data confirm what we have called "the great productivity of the pre-'modern' methods of rice culture." Most of the increased output in Sumatra has so far been the result of bringing new land into cultivation and is not to any great extent the result of using fertilizer or of growing improved varieties.\*

In Sriharjo, as in Java as a whole, all the arable land is already in use, so an improvement in output per hectare is the only possible way of raising output. In the case of the hills this would mean re-afforestation, or, at the very least, the planting of trees that yield nuts, fruit, oil, etc.\*\*

We have already shown that there is some as yet unexploited potential in the rice enterprise. More fertilizer could be used profitably than at present; there could be an even fuller adoption of the best of the high-yielding varieties currently available - and, of course, there are even newer and more productive varieties that have not yet reached the village. It is well within the realms of possibility that output per hectare could increase by 50 percent in the next, say, ten years. Even so, the overall impact on the population problem would be slight: First, a 50 percent increase in gross output would mean a lower increase in income (say 40 percent, because production costs will rise, and taxes will still have to be paid); second, population will continue to increase (possibly at a faster rate if incomes rise); third, such an increase in output will make only a very small contribution to a solution of the farm size and employment problems. It may in fact lead to a worsening of them. Fourth, the rice-fields provide only about half of total income from all sources, so an increase in income from rice of 40 percent will mean an increase in total income of about 20 percent; and, finally, there will still be the problem of how the increase in income will be

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\* See Arkhipov (1971) for a fuller discussion of the reasons why peasant farmers in Sumatra, and in many other parts of the outer islands as well, were able to increase food production so rapidly throughout the whole period of unstable economy (1950-67). The farming community in Java suffered far more from the economic mismanagement of the Soekarno era than did the farmers of Sumatra.

A similarly valuable expansion occurred in the sea fishing industry from 1960 on, mainly outside of Java. This expansion, moreover, was financed and carried out by the fishermen themselves, and was little hampered by the inflation and the other economic disturbances of the pre-stabilization era (Krisnandhi: 1969).

\*\* For a report on one such attempt, see Iso (1968). Professor Iso (private communication) has also pointed out that successful reforestation projects were carried out by the agricultural extension service as early as 1924. He stressed that such projects succeed only when they obtain the full cooperation of the people in the district concerned. He also noted that "reforestation" is not a fully appropriate term to use and that "retreeing" would be better: farm people in such an area need to be able to earn the highest possible income from the land. The best income earners in most cases are trees that produce resins, fibers, fruits and nuts rather than timber alone.

distributed between capital and labor. This problem, too, has its bearing on the severity of the population problem, and on its solution.\*

If these and a few other possibilities not mentioned so far\*\* do indeed come to pass, the "bank" of unexploited potential will have declined almost to zero, which means, of course, that the farm size, employment, and income distribution problems will remain about as intractable as they are today (and could well become even more severe).

The farmers have responded quite well to the new rice production opportunities that have been provided in the government's rice intensification programs, and there is every reason to believe that they would respond as well to a program or programs aimed at increasing the productivity of their dry-land enterprises. The pekarangan already gives them substantial income and employment. If a well-planned, well-staffed, and well-executed program, similar to the rice program, could be carried out, it could yield more, though only over a longer period as trees take a much longer time to mature. The horticultural service of the department of agriculture has, however, much less money and many fewer staff than the branch that services the field crops. Even if it were able to obtain both staff and money in sufficient amounts it would still be faced with the difficulties posed by the fact that the breeding, or even the selection, of new varieties of tree crops of proven higher productivity, takes a long time, and also with the fact that a bewilderingly wide range of perennial economic crops, perhaps 200 and more (Terra: 1947), can be, and is, grown in the pekarangan.

It is even possible that a program designed to raise the productivity of crops grown in the pekarangan would yield higher returns for the money and the effort if for no other reason than that, compared to the amount of effort devoted to rice, little has been done so far in this field.\*\*\* The people of Sriharjo would also benefit from extension and other activities that resulted in an increased production of food crops, cassava in particular, typically grown on unirrigated fields (tegal). An increased output of cassava would, other things being equal, cause its price to fall and allow the very poor people to buy more. We do not know what scope there is for increasing the output of food crops from the tegal. The data suggest that the trend in total production has been unfavorable. In many villages

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\* We discuss this last issue further below.

\*\* It might even be possible to increase rice output by more than this: Perhaps the irrigation system could be further improved, and perhaps the farmers with an assured water-supply could move from double- to triple-cropping. We nonetheless feel that in the light of past trends a 50 percent increase in rice output would be about as much as could reasonably be expected in the next ten years.

\*\*\* Soedarwono (1971) lists a number of simple ways of increasing the profitability of the coconut sugar enterprise. It is clear that there are quite a few other development opportunities, as yet little used, in the pekarangan. See also Appendix 4.

with a mainly dry-land economy, erosion seems to have taken its toll (table 33). Even so, as with the crops grown in the pekarangan greater emphasis on research and extension directed towards the food crops grown under dry-land conditions would seem worthwhile. Yet other ways that might give useful results would be the support of "re-treeing" programs (see footnote, p. 51); the encouragement of further terracing; and a more widespread use of cover crops.\*

The effectiveness of present agricultural research and extension services could perhaps be enhanced further if some of the responsibility for conducting local field trials of new crops, new varieties, new methods, fertilizer, etc., could be transferred to the village (which has land and funds of its own) or to interested farmers with proven farming ability. Doing this would "stretch" the all-too-meagre resources of the extension service; it would probably also give quicker and more effective results because trials carried out jointly and on the spot carry more weight with the practicing, and very practical farmers. Ideally such applied research and development centers should be established in every village (kelurahan); but if this is not thought possible consideration might be given to choosing one or more good farmers, or suitable villages, as the sites for a few such centers in each district (Kabupaten). In many cases the applied research work done by the extension service on its own land could likely be made more quickly effective if closer ties could be built with the "good farmers" (tani maju) in each district, in particular at the time when the trials are being laid out.

Some of the most effective applied research work in agriculture in recent years is that which has been done by Mr. H. Westenberg at "Kebun Jeruk," Tebing Tinggi, North Sumatra.\*\* Many peasants visit Kebun Jeruk, and they do so at their own initiative and at their own expense (sometimes from 300 Km or more away). Mr. Westenberg and his staff have over the years done many trials with new crops (e.g., sorghum), new varieties of 'old' crops (rice, rubber and coconuts in particular), new methods (fertilization, land preparation, etc.), and much more that peasant farmers find directly useful. The peasants are also able to buy many different sorts of high quality planting materials. They are also provided with pamphlets that give practical advice on how to grow this or that.

It would not be easy to reproduce on a wide scale what Mr. Westenberg has done and is doing at Kebun Jeruk, in large part because there are few men anywhere who possess his knowledge and experience. But it should be possible to put into practice some of the underlying principles on which his work is based.

Science and technology still have substantial contributions to make towards increasing agricultural production, though greater production may for a while

\* We are grateful to Professor Iso for the last-mentioned suggestions.

\*\* Mr. Westenberg was the recipient of the 1972 Magsaysay Award for community leadership. Also in 1972, the ownership of the land at Kebun Jeruk was transferred to a foundation whose aim it is to support and to expand the work that has already been done.

alleviate rather than make a decisive contribution towards a solution of the population problem. Not even quite large increases in agricultural production in Java will, over a term of years, save the people from harsh poverty unless population increase can be controlled. To put this in other words: programs aimed primarily at increasing agricultural production per hectare in Sriharjo will leave largely untouched the problems of "not enough land," "not enough work for the people," and the inequalities that have arisen in the distribution of income. We will be discussing in the final part of this chapter what seems to offer the best chance of solving the first two of these problems, transmigration, though we recognize that successful industrialization, family planning and agricultural intensification will each contribute to a small extent.\* The third of the difficult problems, inequalities in income distribution, can perhaps only be solved once substantial progress towards the solution of the farm-size and employment problems has been made. Land reform has often been suggested as a solution to the problem of inequalities of income distribution in the rural areas, but it should be clear from what we have said earlier that there is no simple solution. The pressure on the land is so great that any equalization in rights of access to land would be unlikely to raise output substantially; it would probably also make the employment problem even more difficult to solve inasmuch as the villagers who own land but do not themselves work it would, after the reform had been carried out, have to join the ranks of the cultivators, thus adding to the already over-large supply of labor in the village. Nor would land reform, by itself, make any direct contribution towards a solution of the possibly even more serious problem of inequalities of income between city and country.\*\*

A further impediment to any quick raising of the incomes of people in Sriharjo arises because it may well be difficult to persuade the government and its advisers to transfer resources sufficiently quickly from the rice intensification program to programs aimed at increasing production from the pekarangan and the tegal, or to augment the resources currently committed to agricultural programs. The farmers of Sriharjo are interested in rice only insofar as it is able to contribute to total family income. Their problem is to make the best possible use of their very scarce resources, and rice is only one of the alternatives open to them. They have shown that to shift from rice to pekarangan crops makes it

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\* There are, of course, a number of other problems that will need to be tackled before programs in each of these three fields can become as effective as they need to be. However, two general criteria that can be used to assess the likely effectiveness of such programs are 'changes--increases--in employment opportunities in the rural areas,' and 'changes--declines--in the (rural) man-land ratio.'

\*\* We have included this brief discussion of land reform and of its implications for a solution of the problem of over-population because such reform was for some years seen as a panacea to solve all rural problems, including those with which we have been concerned in this paper. The issue of land reform is also discussed in a somewhat different context in the section on transmigration below.

possible to raise total income even more than by the practice of the best modern methods of rice farming.

It would perhaps help if when making agricultural plans the government used as its main criterion the need to undertake in each district, or village, or farm, the sort of production program that will most quickly and cheaply raise the incomes of the farmers concerned. Such programs will need to be tailored to fit in with the resource endowments of each district, village, farm, and they would assuredly meet with a good response from farmers. Programs that promise the highest possible returns per farm, rather than for this crop or that would likely be the soundest in every way from the national economic viewpoint as well.

A third and related problem is that the government appears to feel that the long hoped for achievement of self-sufficiency in rice production (likely in 1973/74) will mean that Indonesia need worry no longer about the adequacy of the supply of its basic food (rice) and that agricultural (food) policy can be turned safely towards improving the quality of the diet (through increased production of pulses, livestock, etc.).

Appendix 3, Self-Sufficiency in Rice: Some Economic Arithmetic, deals at length with this question. It is enough here to point out that the increase in domestic rice production needed to achieve the self-sufficiency goal is of the order of 5 percent, and that such an increase would nonetheless leave half or more of the people in Sriharjo in the position where they cannot afford rice at even a modest 100 kg rate. Among them will be many who will still be hungry.

A recent article by C. Peter Timmer in the Bulletin of Indonesian Economic Studies illustrates how difficult it can be to come to grips with the population problem. Timmer wrote: "Markets, if left to themselves, are self-equilibrating mechanisms. Lower prices for rice (which will result from the successful adoption of the new technology thus increasing supply at a greater rate than demand) will mean, other things being equal, that less rice will be produced. But in Indonesia the other things are not equal, and it is not inevitable that somewhat lower real prices for rice will serve as a major deterrent to reaching the production targets" (Timmer: 1971, p. 85). He also wrote: "Active development and adoption of well-adapted high-yielding varieties can make rice progressively cheaper to the economy as a whole" (p. 85).

If one's major concern is with the population problem and with the desperate situation that is daily faced by the majority of the people in Sriharjo then arguments such as these are inadequate. "Lower real prices for rice" will indeed mean, as Timmer says, that farmers will continue to strive to increase output. What such an argument overlooks, however, is that a decline in real prices for rice will mean that many of the rice-growers who now grow rice to sell - in order to buy the cheaper carbohydrate foods on which they subsist - will be

able to consume even less food than they can today.\* Lower prices will also mean a continuation of the flow of landless and workless rural people to the cities. Such an argument also fails because it is based on the assumption that the market mechanism can do the job. The market may, as many writers suggest, be an efficient way of allocating resources for growth, but it is a very inept mechanism for dealing with the problems of inequality and absolute poverty described in this paper. If arguments such as Timmer's are correct then the main beneficiaries will probably be only those who are able to earn high incomes from other sources, and the farmers who have enough land. The others, and there would still be many of them, would likely have to endure even greater poverty.

We would certainly agree that the present target of self-sufficiency in rice can be achieved, but we fear that it would be at the cost of making it more, rather than less, difficult to solve the population problem. This could well happen if the achievement of the present self-sufficiency in rice goal led people to believe that the food problem had been solved in places like Sriharjo.

(b) Family Planning. Indonesia was a late starter in this field (1969). Its family planning program is still small, although it is growing rapidly. It was largely unsuccessful in its first year (1969/70), but in its second and third years it has done very much better.\*\* The target for the first five year plan period (1969/70 to 1973/74) is 6 million acceptors which, it is anticipated, will prevent a total of 1.2 million births in all by the end of the plan period. It cannot yet be predicted whether the targets will be achieved, but even if they are and the family planning program continues to grow successfully under future development plans it will still be a long time before Indonesia attains a stationary population. Iskandar (1971) has projected that, with family planning, Java's population will rise by 35 million between 1971 and 2001 (low projection). Without it, a rise of 61 million is projected.

The magnitude of the task becomes even clearer if we consider that if the family planning program is successful in reducing the net reproduction rate (NRR) to 1.0 within 30 years, and if it stays at this level thereafter, the rate of population increase will have fallen to 1 percent per annum only by 2020-2025. The population of Indonesia would then be 254 million. The rate of population increase will fall to zero by 2065-70, and total population would then be 329 million. An even more successful program, for example one that led to a decline in the NRR to 1.0 within ten years, would reduce the rate of natural

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\* There will no doubt be some among those who operate the very small holdings whose production of rice will rise sufficiently to compensate for the decline in price. But the total production from such "farms" is so small that any decline in price must cause great difficulties. For some figures on production per farm, see appendix 2, p. 88.

\*\* In 1971/72 there were 500,000 acceptors, or double the target figure of 250,000 (Suharto: 1972).

increase to one percent within 30 years (population 177 million), and the total population would stabilize after a further 60 or so years at 236 million, or about double the present population. (Department of Commerce: 1971, p. 23). Both these projections must, however, be regarded as optimistic: first, the goal of the present family planning program falls far short of the goals implied in the projections; second, no country has yet accepted as the goal a lowering of the Net Reproduction Rate to unity, i.e., to the point where each woman has one daughter on average.

Java, like the rest of Indonesia, has a young population - more than 40 percent of the population is in the age group 0-14 years.\* This means that there are growing numbers of people who are yet to marry and to have children.

There are, moreover, some special problems that will need to be overcome before family planning is likely to be widely accepted in villages like Sriharjo. The national family planning program relies heavily on the services provided by clinics and while the growth of clinics has been rapid in the last few years, it will not be long before further expansion becomes difficult. The main constraint will be a shortage of trained medical personnel, doctors and midwives. Present estimates show that in ten years the doctor-patient ratio will still not have reached present levels in India or Malaysia. There is also almost exclusive reliance on the IUD (inter-uterine devices) and the pill. Under the incentive system for fieldworkers, begun in 1971, each fieldworker gets Rp 200 and each clinic Rp 300 for each new acceptor, but the only contraceptive devices provided are the IUD and the pill. The system seems to have worked well so far. The number of acceptors has increased considerably, but it is too early to tell how effective this system will prove to be over a period of years.

One drawback of this system has already been mentioned, namely, the time it takes to train doctors and other staff. A further drawback is that it is relatively costly to establish and to maintain such clinics. Yet another is that many village people are reluctant to visit clinics.\*\* Some of the potential weaknesses of this program could, however, be mitigated if emphasis was placed on the distribution of condoms and on the dissemination of information on simple methods of birth control (for example, coitus interruptus and rhythm), especially in places where clinics are not available.

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\* The figure for Sriharjo is 41 percent. Its crude birth rate is 40 per thousand.

\*\* According to a recent study "... clinic-mindedness and income go together and are the major determinants of the willingness to accept modern contraceptive devices through clinics" (ECAFE, 1972, p. 26). A department of health study done in Jakarta and Singarimbun's study of Sriharjo (where over 97 percent of the children in the sample were not born in a clinic but at home under the care of the traditional midwife) show that the level of 'clinic-mindedness' is low among both urban and rural people. (Dinas Kesehatan, 1970; Singarimbun, 1972).

Another general difficulty is that contraceptives, condoms and pills, are relatively expensive to obtain from sources other than the official clinics.\* Perhaps the last-mentioned problem could be alleviated by measures designed to facilitate the widespread marketing of such materials, much as was done with such good results with fertilizer from 1967 on. Lower prices would also help.\*\*

There is also the question of motivation. Most people still desire to have large families, and this is likely to continue in places like Sriharjo as long as mortality rates remain high and as long as there are no changes in social values or in provisions for social security. The present program is particularly effective among people who wish to avoid unwanted pregnancies and whose main aim is to achieve the desired family size (usually 4-5 children). To reduce the birth-rate further will require a level of motivation for family limitation much stronger than at present. So far there are only a very few families in Sriharjo that regard two or three children as being enough. A problem of motivation also seems to exist within the family planning agency itself. Writing in 1972, Hanna has said "The program to provide information and techniques for family planning in Indonesia is not, in the eyes of the field-workers we interviewed, a program of population control. We detected little sense of urgency, no awareness of imminent catastrophe. To our informants, any discussion of family planning as a measure of population control - transmigration for instance - seemed almost irrelevant." (Hanna, 1972, p. 21). Against this, however, may be set President Suharto's urgent plea of August 16, 1972 (text, p. 1): it can only be hoped that soon there will be significant changes in the vital motivational factor, within the family planning agency itself and the public at large.

The people of Sriharjo have already practiced family limitation to an extent for a long time. One contraceptive method, abstinence, is widely practiced, and some have practiced induced abortion. The Miri data seem to indicate that the poorer people tend to abstain more than do the better off and to bear fewer children.\*\*\* See tables 34 and 35.

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\* We know of at least one unofficial (clinical) program, run, however, by a qualified licensed person, which faced supply difficulties because the bureaucratic procedures for obtaining supplies of pills and IUDs from official sources have turned out to be very complicated.

\*\* See also Singarimbun (1970).

\*\*\* Other data for Java that show a direct relationship between income and fertility will be found in (Gille and Pardoko: 1965) and (Univ. Diponegoro & B.K.K.B.N.: 1971).

Table 34. MIRI: FAMILY LIMITATION (ABSTINENCE) AND INDEX OF ECONOMIC WELFARE

Score on index of economic welfare	46 women of 41 years or older <sup>a</sup>		
	No. of families	Average period of abstinence after birth of each child	No. of ever-born children
	no.	months	no.
≥12 (i.e., <u>cukupan</u> )	21	19.2	5.6
≤11	25	21.7	4.8
Total Sample	46	20.6	5.1

Source: Study A.

Notes: a. The information we have given comes only from women who have "completed families," but we have no reason to suspect that the general situation is any different as far as the younger wives and mothers are concerned, namely, that most try to limit the number of children they have, and that the poorer women try somewhat harder on average to limit the number of children born to them.

A further analysis of the same data showed that the length of the average period of abstinence had a significant effect on the number of children born to each mother: when the period was a year or less on average the mothers concerned bore 7 children on average; when the period was two years or more on average the mothers concerned had only 3.5 children on average. However, neither the "poor" nor the "rich" yet appear to be willing to limit the number to two or three, a necessary step towards a future stationary population. See table 35.

The better-off families have more children, and a smaller proportion of these children die early. They feel, too, that the "ideal" number of children is even more than has been in fact borne to them, yet as table 12 shows, they already have more people dependent on them.

We cannot pretend that the data presented in tables 34 and 35 give an exhaustive picture of the attitudes of the rural people, both rich and poor, to family limitation, but the data are suggestive nevertheless. All the people still seem to want to have more children than their economic circumstances warrant; second, even though the poor have a smaller "ideal family size" in mind - and also have fewer children - any increase in prosperity for them could well lead to their desiring to have more children. The families in the new settlements in Sumatra are themselves from poor backgrounds, and have more children than the poor families in Sriharjo.

Table 35. MIRI: INDEX OF ECONOMIC WELFARE AND ACTUAL,  
AND DESIRED, FAMILY SIZE  
46 women of 41 years or older

Score on index of economic welfare (as for table 34)	No. of ever-born children: Av. no.	No. of children still living Av. no.	No. of children still living, as proportion of ever- born children percent	"Ideal" no. of living children <sup>a</sup> no.	No. of dependents per family <sup>b</sup> no.
≥12 (i.e., cukupan)	5.6	4.0	71	5.8	5.0
≤11	4.8	3.0	62	4.6	4.4
WHOLE SAMPLE	5.1	3.5	67	5.1	4.7

Source: Study A.

Notes: a. Information was available from only 35 families in all.  
b. All people, i.e., includes parents.

(c) Industrialization. Industrialization is a huge topic and we cannot presume to cover it adequately here. But we believe the broad contours of its present and potential contribution to the solution of the population problem are clear. We will illustrate with a brief comparison with Japanese experience and try to draw some implications for Java, and for the people of Sriharjo and Miri.

In the period after independence industrialization was seen as a key means by which countries like Indonesia would rapidly achieve rising incomes, and employ the large surplus of unemployed, and under-employed rural labor. The most important general idea used to support industrialization was the idea of the 'big push' (Rosenstein Rodan). This idea was later refined as 'balanced growth' (Nurkse) and by W. A. Lewis' notion of unlimited supplies of labor in agriculture. Implicit in these hopes was a generalization drawn from the experience of Western Europe and, more recently, Japan. In the 75 years between the Meiji restoration and the mid 1950s, when the size of the labor force in agriculture first began to decline rapidly, Japan managed to absorb the total increase in population into non-agricultural employment. The success of Japan cannot, however, be very usefully generalized to include Java or the other major poor and overpopulated areas of today's Asia.\*

\* See G. Myrdal (1968). See, in particular, ch. 14: "Differences in Initial Conditions."

Table 36. JAPANESE LABOR FORCE BY KEY SECTORS, 1880-1940  
Number of people, millions

	1880	1900	1920	1940
1. Agriculture, Mining and Fishing	16.1	17.5	15.2	15.0
Agriculture	n.a.	n.a.	14.8	14.4 <sup>a</sup>
2. Manufacturing and Construction	1.3	3.3	5.1	8.1
3. Other	12.6	16.0	24.4	28.9
TOTAL	19.9	25.3	27.3	34.2

Source: (Lockwood: -1955, pp. 462, 465).

Note: a. There were 15.1 million people in agriculture in 1951.

The poor performance of industrialization programs in many countries - especially programs based on import substitution - has caused many theorists and policy-makers to come to favor a strategy of economic growth which better reflects present comparative advantage. More recent development policies have emphasized the growth of resource- and labor-intensive activities in agriculture and in the extractive industries.\*

Some writers have also pointed out how small a contribution to total employment even quite rapid rates of growth in the industrial - principally manufacturing - sector can make in the early stages.\*\* Johnston draws some lessons from the Japanese experience. He shows that where the agricultural sector employs 80 percent of the population, a 3 percent growth rate in non-agricultural employment over a fifty year period would still leave the agricultural population growing at 1.5 percent (Johnston: 1966, pp. 269, 271). His base figure of 80 percent of people in agriculture is somewhat higher than for Indonesia, Java or Yogyakarta today: however, the higher percentage figures for non-agricultural employment recorded in the 1930, 1961 and 1971 censuses do not appear to reflect any vigorous growth in industrial employment (12.8 percent of all employment in Java in 1930; 7.0 percent in 1961, and 8.9 percent in 1971) but rather the economic attractiveness of such sectors as trade and government service. Part of the attractiveness of the latter sectors, the trade sector in particular, has been due to their ability to absorb people forced out of agriculture due to population pressure on the land.

\* Indonesia's own experience provides a good example of problems that arise when attempts are made to stimulate industrial growth by crash programs. A lack of capital and of technical skill and a discouraging economic climate all contributed to the failure of the "benteng" policy of the early 1950s. See Sumitro Djojohadikusumo (1954).

\*\* See especially G. Myrdal (1968, Vol. II, p. 1174) and B. Johnston (1966, pp. 267, 274).

Japan's experience is useful because it demonstrates well some of the specific local and international conditions which prevailed at the time when she began to industrialize. Many of these are no longer relevant for most of the less developed and overpopulated regions of today's Asia. Two of the factors which distinguish Japan's population dynamics from present trends in Java are: First, from 1880 the rate of population increase in Japan was low and appreciably lower than in Java today. From 1880 to 1900 it was less than one percent; between 1900-1915 it rose to 1.35 percent, and it fluctuated around one percent thereafter (Tachi and Ozacaki: 1966, pp. 167-169). It would have taken Japan at least 75 years to reach the turning point in agricultural population had the total population been growing at the same rate as it has in Indonesia over the past 40 years, i.e., at the rate of 2 percent per year or a little more (see Johnston: 1966, p. 272). Second, a major proportion of increases in output in the first 50 years of Japanese economic growth after 1870 was in labor-intensive industries, especially in leather, weaving and spinning (Johnston: 1966, p. 276).

By contrast, much of the post 1965 industrial growth in Indonesia has been in relatively capital-intensive industries. For governments which stress economic growth as against, say, a more equitable distribution of income, capital-intensive technology is frequently the best choice.\* It is the choice which is likely to be made in a relatively free market economy open, like Indonesia's, to foreign capital and technology. And advanced industrial technologies are much more capital-intensive today than they were in 1880. Empirical studies suggest, moreover, that there is remarkably little factor reversibility between market-orientated developed economies and the less developed economies (See Lary: 1968).\*\* If we assume that these results apply to Indonesia also, then with the exception of textiles, the major industrial production increases in the past few years have all been in capital-intensive industries - tires and tubes, motor car assembly, paper, white cigarettes and fertilizer (see Table 37). Moreover, the fact that many of these industries are dominated by foreign capital further explains why they do not reflect factor availabilities in Java.\*\*\*

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\* Baer and Herve conclude from a study of industrialization and employment in less developed economies: "The lack of labor absorption in the manufacturing sector of developing countries is not necessarily due to conscious or wrong choices" - quoted in Johnston (1966: p. 275).

\*\* That is, the same industries in both types of countries will show similar factor intensities. For example, the textile industries of India, Japan and the United States are all labor-intensive whereas the steel industries of all three countries are capital-intensive. Among the lower-income countries studied by Lary were India and Brazil.

\*\*\* Given the high costs of developing new technology Johnson concludes that it is quite rational for foreign firms to "...transplant an already known technology to a different environment to which it is not entirely appropriate, paying some extra cost in terms of inferior efficiency, than to develop a new technology more appropriate to the environment." (H. G. Johnson: 1971, p. 89).

Table 37. CAPITAL INTENSITY OF FASTEST GROWING INDUSTRIES IN INDONESIA 1969-70

Industry	Production increase percent	Index of capital intensity <sup>a</sup>
Tires and tubes	335	137
Radio sets	220	90
Batteries	75	n.a.
Toothpaste	68	n.a.
Motor car assembly	45	153
Textile cloth/yarn	33/22	64
Paper	26	105
Cigarettes (white)	24	289
Fertilizer	21	193

Sources: (Arndt: 1971) and (Lary: 1968, pp. 24-27).

Note: a. Average level of capital intensity = 100 = \$13,152 value added per employee.

It is also important to remember that the Japanese industrialization pattern of "walking on two legs," that is, the creation of a dual structure, with both capital- and labor-intensive industries in the early stages, cannot be attributed to the operation of market forces alone. The first development plan, stressed the promotion of small scale industry. Even more important was the fostering of new techniques suitable for Japanese conditions through government guidance and technical assistance. Factories were discouraged from employing big machines (Johnston: 1966, p. 276).

Other differences between Indonesia and Japan might also be mentioned. For example, Japan's growth took place at a time when world trade was expanding rapidly and was still relatively free. In addition, the Japan of the 1880s had much lower population densities and much less poverty than Java has today. Japan also then espoused an ideology which gave little weight to the need to promote general social and economic welfare. In Indonesia today an important aim is to promote the economic welfare of the mass of the people.\*

These additional points of difference support further our main contention that industrialization will not have spectacular effects on Indonesia's population

\* Myrdal contrasts the present situation in Asian countries and Western Europe on this last factor (1968: pp. 741-742). In Japan, as in the west, rapid growth was accompanied by only slow gains in the social and economic welfare of the majority of the population.

problem. Moreover, if it is to have any impact at all on poverty in communities like Sriharjo, policies must be designed, it seems to us, with the specific intention of stimulating employment in such areas. Otherwise the bulk of new investment in manufacturing will continue to be of the capital-intensive sort.\* Governmental action in the fields of credit, in the provision of technical know-how, and market and other research, including research designed to find technologies that would provide a better fit to the factor proportions of Sriharjo, would help to encourage the growth of income and employment in small-scale industry. So would measures designed to reduce "backwash effects" from imports and from the products of the large, modern factories in Indonesia itself.

A recent study of the potential for industrialization in Central and East Java and Yogyakarta provides additional support for our general conclusion (Boediono et al.: 1970). The authors of this study suggest that only two of the 15 industries surveyed had reasonable market prospects.\*\* Both of these, however, are industries which require over Rp 100,000 capital investment per worker and may be regarded as capital-intensive industries. Of the four relatively labor-intensive industries only the coconut sugar, bicycle tire, ATBM (hand weaving) and rubber processing industries were seen as having even fair marketing prospects (Boediono et al.: 1970, pp. 78-84). But shortage of land for extension of rubber production, and under-utilization of capacity in ATBM, by far the largest employer of industrial labor in the region, indicate that there are yet other constraints upon the expansion of industry. ATBM employs some 63,100 people (out of a 1970 regional workforce of 30.3 million persons). Its products face a great deal of competition from the more mechanized sectors of the industry (Boediono et al.: 1970, pp. 45-48). The people who work in the industry are, moreover, poorly paid. In Wonosari (Gunung Kidul) a worker can make 5 meters of cloth a day for which she is paid Rp 2 1/2 a meter. She also gets a meal. The factory manager said: "We feel that the main purpose of the factory is to help stave off hunger oedema."\*\*\* The study also suggests that there will be considerable problems in merely absorbing the increase in population in the region over the next decade.

With the exception of the manufacture of coconut sugar, itself very low paid, there was little handicraft or other small scale industrial activity in Sriharjo. In Miri, for example, only two women - both born outside the hamlet - engage in handicraft work. Despite the high levels of unemployment, however, the people feel that they could not learn to undertake a major new activity without

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\* Of the South and South-East Asian countries, India has probably given the greatest emphasis to the support and development of small-scale and cottage industry. This has probably been due to the continuing influence of the Gandhian philosophy with respect to developing traditional industries (Myrdal: 1968, Ch. 25)

\*\* Only two gained an overall score of over 50 percent for markets. Scores were given for competitiveness with supplies from other sources; whether the market was a buyers' or a sellers' market, whether the market for the product was primarily local, national or international.

\*\*\* Singarimbun, field notes.

outside help. Their lack of skill is the major impediment to earning an income in a new field.

These observations by no means paint a comprehensive picture of industrialization prospects and problems. But with the small amount of information available to us we feel that new policies would need to be devised to begin to absorb the under-utilized labor in areas like Sriharjo. Industrialization is no panacea and cannot by itself make a significant impact on the population problem. If the people in Sriharjo are ever to have higher incomes then policies which aim directly at creating employment, and other income-earning opportunities will need to be formulated. We do not see much evidence of increased welfare coming from "the great trickle down" (believed to result from policies aimed purely at increasing aggregate production) and, like the people of Sriharjo, place little hope in it.\*

(d) Transmigration. Industrialization, family planning, and the programs of agricultural intensification will all help to alleviate the population problem, and the present government is pursuing such programs with much more vigor and purpose than the previous (Soekarno) government. It is doubtful, however, whether these programs are yet of sufficient size to produce the results that are needed.

People leave Sriharjo now to seek employment elsewhere, most of them to swell the ranks of the laborers, petty traders and becak drivers in the cities. A few have left to become farmers in other parts of Indonesia where land is still in abundant supply. Some of these few (8 families in 1971, 10 families in 1970) went under the government's transmigration scheme, and the remainder went "spontaneously," i.e., financed their own migration and the establishment of new farms.\*\*

There are many people in Sriharjo who could afford to finance their own migration. A man with 0.1 hectares of pekarangan could sell it for Rp 300,000, enough to pay all his transfer costs, to buy four hectares of dry-land suitable for rubber or for planting the pekarangan crops with which he is already familiar in a district close to major markets, and still have enough left over to build a simple house and to cover all living expenses until the first harvest of dry-land food crops.\*\*\* It is not, however, the people with the very small areas who migrate to become farmers in Sumatra or elsewhere. It is rather the men who are much better off than the Sriharjo average.

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\* The themes of this section are taken up again in Appendix 4.

\*\* Mantera shows that the government transmigrated 0.1 percent of the total population in the Yogyakarta region in the period 1958-67. This is about 5 percent of the natural increase (Mantera: 1971, p. 14).

\*\*\* Near Tebing Tinggi in East Sumatra the price of unimproved dry-land is Rp 40,000 per hectare.

If families from the "very poor" category (i.e., the landless) do migrate to the new agricultural areas they come primarily as laborers; and if this happens the cycle of poverty reappears in the new area.\* The very poor could not finance their own migration and establish a new farm elsewhere. They have all the labor needed to establish and operate a farm that would make them cukupan, but they lack the capital, even, in many cases, the Rp 5,000 (\$13) needed just to make the one-way journey from Sriharjo to Lampung (S. Sumatra).

Those who theoretically could finance their own migration are reluctant to do so. They do not know the land market in this or that distant place they have never seen. (About 90 percent of the men have never been further from their homes than Yogyakarta, 10 miles away). They are not familiar with the problems that arise when food crops are grown under dry-land conditions; they fear they may be cheated by "brokers" and others while they are en route; they cannot be sure of the welcome they will receive if they go to settle in a new area; they cannot be sure either whether they will receive secure rights in land.\*\* Even though their capital may be sufficient to finance migration, they are no doubt also deterred because their incomes are so low. For this group such problems loom large in their thinking, and deter most of them from taking the plunge even though they have a full awareness of the desperate economic situation they are in. They are to some extent aware of the dilemma, but rationalize their reluctance to migrate by saying "Mangan ora mangan janji bisa kumpul" . . . "It does not matter whether we are able to eat or not so long as all of us can be together with our relatives and our friends."

This reluctance to migrate could no doubt be reduced to some extent if the department of agrarian affairs would initiate a policy of declaring that certain areas suitable for agriculture were open for homesteading, much as has been done in the Philippines and the United States. Once this essential step has been taken, a further way of reducing the many uncertainties that exist in the minds of potential migrants could be to subsidize (one hundred percent) a visit to places in the outer islands where suitable land is available by small (2-3 man) delegations from the villages where there is known to be a problem of severe land shortage, and where there are a number of people who have indicated that they would be willing to migrate if the aforementioned uncertainties could be reduced. Such delegations could consist of one or two representatives from the

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\* A good description of what tends to happen in many transmigration areas will be found in Sajogyo's essay (1968). Iso has also written about what has been called the problem of "They tend to bring their poverty with them" (Iso: 1970). For other writings on the same general topic see Pelzer (1945), Cunningham (1958) and Soedarwono (1970). (We should stress that none of these writers has overlooked the settlements that succeed; and each gives useful hints for the successful establishment of new agricultural settlements.) This general issue is further discussed in Appendix 4 below.

\*\* Some of these problems are discussed at greater length in the writings of Cunningham (1958) and Sajogyo (1968, 1970).

put into practice some of the underlying principles. Science and technology still have substantial contributions to make towards increasing agricultural production, though greater production may for a while

- \* We are grateful to Professor Iso for the last-mentioned suggestions.
- \*\* Mr. Westenberg was the recipient of the 1972 Magsaysay Award for community leadership. Also in 1972, the ownership of the land at Kebun Jeruk was transferred to a foundation whose aim it is to support and to expand the work that has already been done.

group of potential migrants, plus one member of the village leadership. The last-mentioned may have no intention of migrating, but he, too, is concerned about the problem of over-population, and he is also someone who is influential in the village and could later play an important role in persuading people to make the move. The information brought back to the village by such people could be of crucial importance when decisions to migrate are being made: For one thing, such men will be able to assess the situation in the new area from the viewpoint of a farmer; for another, the members of the delegation will be people whom the other villagers know well and whose judgment they can trust, or at the very least evaluate. If, moreover, the report of such a delegation has been favorable, and quite a number of people in a particular village decide to migrate to a particular region in Sumatra, or elsewhere, consideration might be given to providing each member of the group so formed with an initial capital grant of, say, \$80-100. Such a grant would be sufficient to cover the living costs of a migrant and his family until his first crop, and would also allow him to buy the few simple tools he needs. It would probably be most effective administratively if the grant were made after the migrant had arrived in the new area. This would mean that the migrant would have to finance his own removal, but, as we have said, there are many who are able to do so but who are currently deterred from migrating because of all the other uncertainties.

Consideration might perhaps also be given to financing return visits by successful migrants to their home villages: such men can be very effective recruiting agents.

We favor anything that can be done to make 'spontaneous migration' easier, not only because it represents a lesser strain on the government's scarce capital resources, but also because this is the way that has proven so effective in the past: most of Indonesia's agricultural land was opened up in this way. There is every likelihood that once the prospective migrants get assured access to a sufficient area of arable land they will tackle effectively the hard task of land clearing and development, as has happened so often before.

If, on the other hand, it is decided to rely on a government-financed program the capital cost would be much higher, at least \$1,000 per family. This is the sum needed to establish migrants on farms where they would be at least cukupan in land, with 1 1/2 to 2 hectares in all. The rate of natural increase in population in Sriharjo is at least one percent a year: it would therefore cost at least \$20,000 a year just to provide more land in a new area to these 20 or so families. Even this level of expenditure would make but a small contribution towards a solution of the problems of farm size and unemployment within Sriharjo itself. Should the government decide to change its transmigration policy - it has been suggested that the new farms should be bigger than they have been in the past and that processing facilities and other infrastructure should be provided, as in the Federal Land Development Authority Schemes in Malaysia - then the capital required to resettle each family would be about \$2,500.\*

\* S. C. Lim (Lim: in preparation) has almost completed a comprehensive study of the economics of the various land settlement schemes in Malaysia.

To reduce the pressure of population on the land in Sriharjo to the point where all remaining families would be (at least) cukupan in land would require measures that would reduce the present population to about a quarter of its present level. Even to reduce the pressure to the point where every family dependent on agriculture for a living could be cukupan in income would require that every such family be given access to the whole product from at least 0.25 hectares of land (sawah and pekarangan combined). Even if population stopped growing immediately it would still be necessary to transmigrate, or to provide other employment opportunities outside Sriharjo, for at least a quarter of the present population, or 400 families.\* To reach this modest goal would also require that all the land so released fell into the hands of those who now control less than 0.25 ha of land. In the (unlikely) event of a radical land reform there would still be a need for the government or the people themselves to finance a certain amount of transmigration, and/or agricultural intensification, and/or family planning, and/or job creation in industry in order to ensure that every family currently living in Sriharjo would be able to become cukupan. We will leave it to the reader to calculate how much capital - and time - would be required to reduce the pressure of population on the land in Sriharjo to this point.

Summary: Agricultural intensification, family planning, industrialization and transmigration are the four main policy instruments for attacking the problem of poverty in Sriharjo. We believe that truly effective policies can be framed only in a full awareness of the plight of the people in Sriharjo and of the other communities like it. As a corollary, we believe that policies drawn up with the prime aims of "achieving the most efficient allocation of resources, and growth," will be unlikely to meet the needs of the communities suffering a population problem. It is our hope that this discussion of the policy alternatives will encourage further the considerable efforts already under way to devise the sorts of macro-economic policies that will be the most effective so that the very great problems of rural poverty in Java can be overcome in the shortest possible time.

\* See chapter 2, table 4 in particular, for the data used to make this calculation. In making it we have also assumed that any further improvement in agricultural methods will in fact be offset by increased population. If, however, the rate of natural increase in Sriharjo drops to zero the minimum amount of land each family would require in order to become cukupan would fall in line with any improvement in agricultural methods.

## 6. SUMMARY AND CONCLUSIONS

Indonesian peasants, the Javanese peasants in particular, have long possessed a technology that allows them to produce enough food and income to meet all family needs and a surplus for sale, or taxes, if only they have enough land. With this technology, which is both labor intensive and pre-modern, 0.7 hectares of rain-fed sawah plus another 0.3 hectares or so of dry-land is enough to provide enough work and enough income for them. As long as empty land was still available in Java it did not matter if population increased. All that had to be done to meet the needs of the increased population was to establish new farms on the empty land. With a few minor exceptions the last such land on Java was already taken up by the beginning of the 20th Century. Since then the population has increased almost threefold. Population densities have become very high indeed in the fertile well-watered areas (4,000 persons per square mile, and more), and the hillsides have been cleared for farming by those who could not find land or work in the irrigated areas.

The peasants are themselves aware that the increase in population has led to declining farm sizes, to a decline in work opportunities, and to a decline in incomes per head. Human populations increase slowly from year to year, but a man of 50 can easily remember what things were like when he was a young man, when the population was about half what it is today. Older men can also remember when the nearby hills were still covered with forest.

It was at the beginning of the 20th Century that the Dutch colonial government first became aware that a population and poverty problem had arisen on Java. The first solutions attempted were through transmigration, education and irrigation. Agricultural extension services were added not long after. Industrialization was first encouraged in the 1930s. Following Indonesia's independence in 1945 great stress was laid on formal schooling to build a "just and prosperous

society." Following the change of government in 1966 family planning was added to the list (1969).\*

In the 70 years that have passed, the population has increased almost three-fold: in Sriharjo the average amount of land per family has fallen to less than a quarter of a hectare and some two-thirds of its people have insufficient income to be able to afford to eat rice, the national food, all the year round.

If there is a population problem in a district you will find no ripe fruit on the trees (Ochse, et al.: 1934, p. 401). In Sriharjo, according to a village official, "there are people who harvest no rice because they have cut and eaten it all before it is ripe."

As the pressure of population on the land has risen the people of Sriharjo have done what they could to maintain their incomes. A few have decreased the area sown to rice in order to plant more coconut trees. More and more of their coconut trees are used as a source of sugar rather than of fruit. Nearly all of them have adopted, quite rapidly, the various modern methods - fertilizer and improved seeds in particular - that have been recommended by the agricultural extension service to increase rice production; and it seems that the poorer among them are more willing to abstain from sexual intercourse following the birth of a child in order better to limit the size of their families. They have also, through their demand for fuel (for the manufacture of coconut sugar), contributed to the deforestation of the nearby hills and to its inevitable and disastrous consequence, erosion.

A population problem anywhere has many dimensions - nutritional, medical, economic, social and many more. Throughout this paper we have used the definition that the peasants of Sriharjo themselves use: "Not enough land."

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\* In what we have just written we have emphasized the continuities in policy between the colonial and the independence periods. We did so because we wished to stress that there are a limited number of policy instruments that can be used to tackle the problems of poverty and over-population, and that most of these instruments had already been used to a degree by the colonial government. However, we would be remiss if we did not point out some deficiencies in the ways such instruments were applied by the colonial government. For example, in the field of food agriculture fertilizer was rarely used (despite the recommendation of agronomists such as Ochse) except in a few areas (e.g., North Tapanuli) owing to the unwillingness of the colonial government to permit the price of rice to rise. The colonial government persisted with a low-price policy for rice, in part because it meant a lower "cost" of government, and because it meant that the plantation companies could continue to get cheap labor. The situation in the field of industrialization was similar: Dutch capitalists in the Indies and the Indonesian people would have benefited had industrialization been allowed to develop freely, but the Dutch government discouraged it because it was felt that it would result in too much competition for manufacturing firms based in the Netherlands.

They know they could live well, according to their needs, if they had enough land. They know, too, that the opportunities for improving their economic lot have become very slender as population has increased. But they have used, and used well, most of the few new opportunities that have come their way since the first public awareness of the existence of the problem . . . 70 years ago. They act, moreover, in an economically efficient way (for the most part); they are willing to work hard (sometimes for very low returns indeed); and there is no waste . . . except of human labor, and human hopes.

Our general assessment, then, is much different from that of the foreign visitor whom we quoted in the very first paragraph. But we would be wrong to end on this note for it is clear that there have already been substantial changes for the better in government policy with regard to the problem of over-population and in the overall economic situation of the people of Sriharjo since the Suharto government came to power in 1966. If we have appeared somewhat pessimistic at times it is not because we feel that the problem is insoluble - rather has our concern been with the continued inability of many observers, foreign and national, to comprehend the size and seriousness of the problem that still exists.

The common view during the Soekarno era (1945-66) was that nothing need be feared from population growth, indeed that such growth was a pre-requisite to the achievement of national greatness. In that period it was felt that a "just and prosperous society" could be built at the same time as the population was increasing rapidly. One of the main legacies of the Soekarno era, then, was a problem of over-population that was larger and more serious than it had been in 1945. A further legacy has been a persistence (in some quarters) of attitudes inimical to clear thinking about the problem of over-population. It is primarily to these people that this essay has been addressed.

The present government has repudiated the views that held sway during the Soekarno period. See, in particular, President Suharto's statement (p. 1) about the crucial role of family planning. But the Soekarno era also left an economy that was run down and a budgetary situation that made it next to impossible for the government to contemplate a program of economic development.

Both the economy and the budgetary situation are much better today (1972) than they were in 1966. Such improvements will nonetheless need to be sustained and expanded further before the problem of over-population and poverty (in places like Sriharjo) can be solved. The magnitude of the task ahead can perhaps be best illustrated with reference to planned expenditures for family planning. The average expenditure per head over the plan period was set at Rp 10 per head. In 1971/72 the government planned to spend Rp 1.4 billion (approx., or about Rp 12 per head), and this amount was to be supplemented by a further Rp 1.6 billion from foreign sources (Population Council, 1971, pp. 44-46), or about Rp 25 per head in all. This can be contrasted with the expenditures planned for India for the same period: India will spend, from its own resources, about three times as much per head as Indonesia from all sources.

Viewed from this angle Indonesia still has far to go, but if we compare the present economic and budgetary situation with that prevailing six, ten and more years ago it is clear that Indonesia has already gone a long way, and that a start has indeed been made towards solving the problem of over-population in Java.

D. H. Penny  
M. Singarimbun  
(December 1972)

## APPENDIX I

The Information we have used - Sources, Coverage, Measures, AccuracyA. The Main data: sources and coverage.

1. Introduction and Acknowledgments.
2. Information used - details.
3. Deficiencies in the data.

B. Measures Used.

1. Measures of land: Owned, operated and controlled.
2. Land and population in Bantul.
3. Production estimates, for rice and for coconut sugar.

C. Some implications for further research.A. The main data: sources and coverage.

1. Introduction and acknowledgments: Geertz once said "I went to Indonesia to study the religion of Java, but I had not known before I went just how serious the population problem was. Once I realized its seriousness I felt I had to study it and write about it even though I had no special training in this field."\* The authors of this report are in a similar situation. Our own special fields of study - social anthropology and agricultural development - do not give us the special qualifications needed for a proper study of the population problem. To study it in all its ramifications one would need to possess the skills of practitioners in the fields of human nutrition, of medical science, of agricultural science, of demography, and of economics, politics, sociology, anthropology and psychology, i.e., of all the social and behavioral sciences. But, like Geertz, our studies in rural Java have led us to an awareness of the severity of the problem and to a decision to write about it. In making this decision we have been much encouraged by advice and guidance from the late Professor Iso of Yogyakarta.

Even though Penny is currently supervising a study of the economics of the housegarden (in Sriharjo) his first-hand experience of Java's rural situation is slight compared with Singarimbun's. The latter lived in Sriharjo with his wife and family for 12 months in 1969-70. While he was there he trained seven assistants, all local people, to help him. The data presented here are only a small fraction of all the information he collected.

\* Geertz (1960). Geertz did, of course, finish his study of the Religion of Java (Geertz: 1960), but he wrote even more about the population problem (Geertz: 1956, 1963).

In his main report (in preparation) Singarimbun will be presenting the results of an analysis of data collected in five rounds of interviewing from all 770 of the ever-married women, from 4 hamlets in Sriharjo. In addition, husbands were interviewed once, and a small survey of men's employment was also made. It is Singarimbun's study that is the main source of the information used in this paper.

Another source has been the information collected at Sriharjo over a two month period in 1970 by John Kolff, a research student at the A.N.U., during the course of his study of the fertilizer distribution system in Indonesia. In this work Mr. Kolff had the assistance of one of the interviewers trained by Singarimbun.

**Acknowledgments:** The general topic about which we have written is one that has stirred controversy for a long time, at least ever since Douwes Dekker (Multatuli) wrote his "Max Havelaar" well over a century ago. A major cause of the controversy that surrounds the topic is that it is not at all easy to make a sound estimate of the seriousness of the population problem (in Sriharjo, or anywhere else): in his paper "Some Consequences of Population Growth in Java" (Singarimbun: 1972, pp. 8-9) has shown that he had at first underestimated the seriousness of the population-and-poverty problem in Sriharjo and that it took quite a few weeks of residence in the village before he was able to revise the picture he had originally drawn. Thus, to ensure that the data and our interpretation thereof were the soundest possible we decided early that our work would need to be checked, and re-checked, by others. Some forty people were kind enough to respond in writing, sometimes more than once, to our request. They were Professor H. W. Arndt, H. W. Beers, Boediono, Anne Booth, Nevin Bryant, Dr. Colin Clark, Ruth Daroesman, Dihyo Prabowo, Professor H. Feith, E. K. Fisk, Dick Franke, Professor C. Geertz, Irlan Soejono, (the late) Professor Iso ReksHADiprodjo, Professor Johannes, John Kolff, Paul Luev, Peter McCawley, Angus McIntyre, Chris Manning, H. C. Molster, A. T. Mosher, Mubyarto, Professor Gunnar Myrdal, Atje Partadiredja, H. B. Penny, Sujono Prijosusilo, A. J. S. Reid, Hazel Richter, Professor Sajogyo, Professor B. F. Stanton, Alan Strout, Soedarwono HardjosoeDirio, Supomo, Sukadji Ranuwihardjo, Tan Hong Tong, Nancy Viviani, Dr. E. de Vries, Dodi Wachartin, Pa'H. Westenberg, and Richard Wood. We are indeed grateful for all the assistance you have given us.

2. Information Used, Details: Study A. In Study A we have used part of the information collected from the women's and men's surveys conducted in just one of the hamlets, Miri. We chose Miri because of the four hamlets it has the best irrigation, and thus the best likelihood of benefiting from the rice intensification program of the government.

There are 164 families in Miri, and complete demographic, and much other, information was collected from them in the course of the women's surveys. The information about farming and related economic matters

was, however, collected only from husbands, 116 of them. But, as we pointed out in the text (p. 12), the lack of full coverage will likely not much affect the general picture because both those who have been included and those who have been excluded have access to exactly the same amount of land on average (0.043 Ha per head). It is abundantly clear that it is the man-land ratio that is of the ultimate importance ... a study of a population problem in a rural area.

Study B. The information collected in Study B (the labor survey) came from all men in a 10 percent random sample drawn from the 750-household list. Ten of the 75 households had no males of working age (15 years and over), and in eight more the information collected from the 12 men concerned could be used only in part, e.g., because the household contained no husband (see note for Study A). Most of the tables that give study B as the source contain information from 82 men from 57 households.

Study C was information collected by John Kolff. The universe from which his sample of 30 was drawn consisted of the 260 ricegrowers from two adjacent hamlets in Sriharjo, Miri and Pelemadu. Of the 260 ricegrowers, 17 were classified as "large," from which a sample of 10 was randomly drawn; a random sample of 20 was drawn from the list of the remaining 243.

Since the sampling universe consisted of rice-growers it therefore excludes the totally landless and all those who have house-compounds but no access to rice-land. It also excludes the very few residents of the two hamlets who do not depend in any way on agriculture for their livelihood.

3. Deficiencies in the data. We are aware of many deficiencies and gaps in our data. First and foremost - and this seems to be a difficulty faced by most students of rural problems in Indonesia - we "lost" quite a few of the people. We have noted above the extent of these losses for studies A and B. Like most other studies of agricultural production done by economists (such as the studies currently being undertaken by the Agro-Economic Survey - see p. 12 above), study C excluded, and lost, quite a few of the people, viz., the landless and the near landless, because, in this case, the study was concerned with fertilizer use and the sample was therefore drawn from a universe of rice-growers. Other deficiencies of which we are aware include the following:

- (1) We lack detailed information on the actual amounts of rent, interest and wages that were both paid and received. We do know, however, that there has been a secular decline in the level of real wages, and also in the level of share wages; and that rents have tended to rise.

We also lack information on the special wage, interest and rental arrangements that are made when the transactions are between kin. These tend to be on better terms than the market rates.

- (2) We have no concrete information on the total incomes earned by any one family, nor on how these incomes were used. In this case we feel that the index of economic welfare is an adequate substitute until such time as a study of income from all sources can be made. To our knowledge the last such full study (in an area where the pekarangan is an important source of income) was done in 1933 (Ochse et al.: 1934).
- (3) We found it very difficult to sort out the data on land-holdings. The records kept by the village government are to some extent incomplete, as they seem to be in many other villages as well. Further, there is a wide variety of rental arrangements about which we were not able to obtain full information. To study this aspect fully would require a joint study by an anthropologist and an economist. We are confident, however, that we have "lost" neither land nor people in the full study A: the difficulty here is that we cannot be completely sure whether we have been able to calculate correctly the exact amount of land available to each family.
- (4) The lack of specific information on production from each farm gives rise to a number of additional weaknesses. For example, other studies in the same region have shown that, in general, higher yields of paddy per hectare are obtained from the smaller holdings. It would have been interesting to know if this applied in Sriharjo, and if so, to what extent. The absence of information on the incomes actually earned from such occupations as bicycle repair and petty trading means that it was just not possible for us to analyze income distribution in other than a very general way, via the index of economic welfare.
- (5) We also lack information on many issues that are closely related to the population problem and to its possible solution. Such information would include data on health, the demographic situation, nutrition, the operation of government technical and social services, and norms and values.\*

To conclude: we have listed the major deficiencies and gaps in our information in the hope that readers will let us know of additional information that could perhaps serve to correct and fill out the picture we have drawn.

## B. Measures Used.

### 1. Measures of land: Owned, Operated and Controlled.

Land is the crucial variable in any study of rural over-population. It is important in two ways: The man-land ratio tells us something very

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\* Some of the gaps will be filled, at least to an extent, with the publication of the results of Singarimbun's main study.

general about its availability, and the distribution of user rights indicates the extent to which the people who depend on agriculture for their livelihood are affected by the population problem.

Land Owned. The figures we have given for owned land include the areas that have been allocated to village officials, both active and retired. We have done this because, from the viewpoints of economics and farm management, decisions on how such land will be used are made on the same basis as for owned land (tanah milik). Tables 1 and 2 show the distribution of user rights in tanah pelungguh and tanah peng-arem2.

Table 1. SRIHARJO: LAND ALLOCATED TO ACTIVE VILLAGE OFFICIALS<sup>a</sup> - (Tanah Pelungguh)  
1969

Area of <u>sawah</u> hectare	Number of persons	Average allocation <sup>b</sup>		
		<u>Sawah</u>	Dryland	Total
		hectare		
> 1	10	1.58	0.79	2.37
0.5 - 1	16	0.67	0.55	1.22
< 0.5	5	0.11	0	0.11
All village officials	31	0.87	0.54	1.41

Source: Village records.

Notes: a. Village officials are all residents of the village; they are paid no salary but are reimbursed for their services by being given land-use rights to part of the land owned by the village. All active village officials obtain rights in wet-rice land (sawah); and 10 of the 31 who possess such rights also have rights to dryland (legal).

b. The largest single allocation of sawah is 2.33 ha.

Table 2. SRIHARJO: LAND FOR RETIRED VILLAGE OFFICIALS<sup>a</sup>  
(Tanah Peng-arem2)  
1969

Area of <u>sawah</u> hectare	Numbers of persons	Average allocation		
		<u>sawah</u>	dryland	total
		hectare		
> 0.5	2	0.78	0.37	1.15
< 0.5	20	0.17	0.04	0.21
All retired village officials	22	0.22	0.07	0.29

Source: Village records.

Note: a. At least one of the currently active village officials already possesses rights in tanah peng-arem2.

The data in table 2 show that even retired village officials are allocated more land than the village average. The data in table 1 show that the village officials in active service are allocated use-rights to several times as much land as is available to the average villager (cf. text table 1).\*

We have not made a great deal of direct use of the information on areas of land owned (including information on the distribution of rights to tanah pelungguh, etc.) even though we recognize that the fondest hope of the majority is to own "enough land." We have not done so because we realize that this goal cannot possibly be achieved in Sriharjo in the foreseeable future.

Land operated: Data on land operated are of greatest importance when the major analytical purpose is to elucidate intensity and efficiency of resource use. Such data may be obtained directly, but it is usually safer to lead up to questions on this matter by first asking each respondent how much land he owns, how much he rented to others (in which case he does not operate it), and how much he rented from others.\*\* The resulting sum is the area of land operated. The figures so obtained can then be related to information on labor inputs, fertilizer use, etc.

The weakness of this measure in a study of the population problem is that it omits the people who depend on agriculture for a livelihood, and who work in the rice-fields, but have no land to operate.

Land controlled. We feel that this is a more useful measure than either land owned or land operated in a study of the population problem. As explained on page 9 the figure for land controlled by each family was calculated by adding to the figure for land owned half the area of land rented or share cropped from others, and subtracting half the area of owned land rented or share cropped to others. If he owns the land and works it himself he gets income from both labor and land; if he rents it to others he gets only a return to land (estimated at 50 percent of output); and if he works on land he has rented from others he will get only a return to labor (again about 50 percent of output). The final figure then represents the total area of land from which the family concerned may earn an income, and is therefore the best single measure of access to land.

The following two examples show the differences between the three measures: Farmer A owns 0.411 hectares of sawah and 0.087 hectares of pekarangan, or 0.498 hectares in all. He rents out 0.330 hectares of sawah, thus he operates 0.168 hectares in all, 0.081 hectares of sawah and 0.087 hectares of pekarangan. The area of land controlled is 0.333 hectares,

\* Village officials are elected, but most are drawn from the ranks of the larger landowners in the village. The situation in Sriharjo is, moreover, little different in these respects to the situation in all other kelurahan in kabupaten Bantul.

\*\* In Miri only the sawah is subject to rental agreements.

0.087 hectares of pekarangan, plus the 0.081 hectares of sawah he operates, plus half the 0.330 hectares he rented to others. In terms of land owned, farmer A is in the top 15 percent in the village. He is in the top 40 percent in terms of land operated, and is in the top 20 percent in terms of land controlled, only a little below his position in terms of land owned.

Farmer B owns no sawah, and only 0.015 hectares of pekarangan, i.e., 0.015 hectares in all. He rents in 0.300 hectares of sawah, and thus operates 0.315 hectares in all, or about twice as much as farmer A. But the area of land controlled is only 0.165 hectares (about half that of farmer A), and is made up 0.015 hectares of pekarangan, and half the 0.300 hectares of sawah he has rented. Thus the contribution of the land to B's income is about half what it is for A even though B operates about twice as much land. A classifies himself as a farmer whereas B regards himself as being a farmer-laborer. Most of A's income is a return to capital, and most of B's a return to labor.

## 2. Land and Population in Bantul.

Village governments in Java collect much data on various aspects of village life, including the village economy. Many of these data are transmitted up the administrative hierarchy, and are aggregated at the kecamatan, kabupaten, and other levels. The following simple analysis of the relationship between land and population in kabupaten Bantul, of which Sriharjo is one of 73 kelurahan, is based on some of these data.

The data on population here are for 1961 and 1969. The data on land show the total area for each village tract, and the breakdown into land types, whether land for rice (sawah), dry open fields (tegal), house compounds (pekarangan), or other. We hypothesized that the rate of population increase would be greatest in the villages that had the greatest areas of sawah; and that the rate would be least in the villages that depended primarily on the tegal as the source for basic foodstuffs (rice, other cereals, or root crops). The results of our analysis are given in table 3 (page 80).

The aggregated data presented in the first four lines of the body of the table indicate a general relationship between the proportion of the land area that consists of sawah, or tegal, and both population density and the rate of increase in population over the eight year period, 1961-69. However, the data are uncertain in a number of important, perhaps crucial, ways, and thus do not provide a sound basis for the drawing of more than very general conclusions: For one thing, no information is provided in the original source about the availability of irrigation facilities; for another, there is no information on soil type, or land quality, within each of the large and heterogeneous categories of sawah, pekarangan and tegal. The analytical difficulties are illustrated by the data for Sriharjo and Miri (last two lines of the table). Sriharjo falls into the group of "next to most tegal," but it differs quite substantially from the means on each characteristic, even though it is not at the extreme on any one of them; and Miri

with its fertile, well irrigated soils has a higher population density than the average for the group "most sawah," even though it should be noted that its population density is nonetheless below that of several villages in this particular category.

Table 3. BANTUL: LAND TYPES, POPULATION DENSITIES (1969),  
AND RATES OF POPULATION INCREASE (1961-69)  
72 Villages<sup>a</sup>

Proportion of sawah and <u>tegal</u> groups of 10 villages	Proportion of arable land			Population density pers./sq. km.	Increase in population percent
	<u>Sawah</u> percent	<u>Pekarangan</u> percent	<u>Tegal</u> percent		
Most <u>sawah</u>	62.1	37.8	0.1	1794	14.9
Next to most <u>sawah</u>	61.9	37.9	0.2	1769	13.9
Next to most <u>tegal</u>	30.4	50.2	19.4	980	11.3
Most <u>tegal</u>	14.5	33.8	51.7	612	10.0
<u>Sriharjo</u>	39.2	28.0	32.8	1303	8.7
<u>Miri</u>	64.1	35.9	0	2350	n.a.

Source: Official records. We are indebted to Nevin Bryant for compiling the information on which this table is based.

Notes: a. Information on the most urbanized kelurahan (Kota Gede) has been omitted. Its population density was over three times as high as the village with the next highest density of population.

b. Of all land.

The general relationship is nonetheless suggestive. Thus, if we assume that birth rates are everywhere equal then the slower rates of population increase in the villages with "much tegal" are likely due to a higher death rate and/or a greater rate of outmigration. It is well known that it is more difficult to maintain or to raise soil fertility on unirrigated lands in the tropics than it is on the sawah, and the government's agricultural programs have in any case been directed mostly at raising rice production from the sawah.

### 3. Production Estimates - for Rice and for Coconut Sugar.

General: Both Bailey and M. Trimmer wrote their major works on the population problem in the Yogyakarta region from data collected in the years up to, and including, 1960. The official statistics show that the food situation in that year was better than it was in 1969, nine years later. See Table 4.

Table 4. PER CAPITA PRODUCTION OF BASIC FOODS  
Yogyakarta Special Region  
1951-1969

Year	Milled Rice Kg/head per year	Protein gm/ hd per day	Calories per head per day from basic foods <sup>a</sup>
1951	62.1	22.7	1,345
1955	63.8	20.1	1,303
1960	68.5	21.4	1,284
1964-65 (Av.)	54.7	16.2	1,015
1968-69 (Av.)	74.0	19.2	1,130

Source: Mubyarto (1970: pp. 15 and 16).

Note: a. The five basic foods, are rice, maize, cassava, peanuts and soybeans. The first three are starchy staples and, of these, rice is the most highly preferred. The other two are produced in small quantities, and are relatively good sources of vegetable protein. A good general book on nutritional requirements, basic foods, starchy staples, the relationship between real income and the composition of diet, and the difficulties of interpreting data on food availability is M. K. Bennett's "The World's Food" (Bennett: 1954).

Whilst the food production situation in the Yogyakarta region was worse in 1968-69 than in 1960, 1955 or 1951, it was better than in 1964-65. The data in this table also provide useful confirmation of the data given in text table 33.

Data on the Rice Enterprise: The production data given in tables 17 and 18 are estimates which over- rather than under-state the actual situation.

The farmers of Sriharjo measure output in terms of undried paddy (padi basah), whereas the government data are in terms of dried paddy (padi kering panen). In making our own production estimates we preferred to convert the figures to the common basis, milled rice. The conversion rates used were:

Undried paddy to milled rice	41%
Dried paddy to milled rice	52%

Data from the office of the Agricultural Extension Service at Imogiri sub-district in which Sriharjo is situated show that the trend in rice yield per hectare of irrigated land was as follows:

	Milled rice/Ha
1957-67 Av.	1.24 tons
1968	1.44
1969	1.80

The data for the Yogyakarta region as a whole over the same period were:

1959-67 Av.	1.58
1968	1.86
1969	2.07*

Source: Department of Agriculture, Yogyakarta Special Region, cited in (Biro Statistik DIJ: 1969 and 1970).

The per hectare yield figures for rice grown under irrigated conditions are for harvested areas.\*\*

Per hectare yields of rice tend to be higher in the dry-season; and the information we have from Sriharjo indicates that this is indeed the case.

The following figures were used to make the estimate of gross output used in the text. The yields of the main varieties grown in the wet season were assumed to range between 1.8 and 2.0 tons per hectare if fertilizer was not used, and from 2.3 to 2.5 tons if fertilizer was used at recommended rates.

The dry season yields were assumed to range from 2.1 to 2.5 tons per hectare if no fertilizer was used, and from 2.7 to 3.6 tons with fertilizer. The overall weighted average was calculated to be just over 2.2 tons per hectare harvested, i.e., somewhat higher than the figures given for the Imogiri sub-district or for the Yogyakarta region as a whole.

Earlier, it was mentioned that the production figures given in the text probably over-state slightly the true situation. One reason is that we have not taken into account the admittedly small areas planted to the low-yielding glutinous varieties (pulut) and to other low-yielding varieties grown to meet special consumption needs. Figures of greater accuracy would not change the overall picture in any essential way, and almost certainly would

\* However, total production in 1969 was 92 percent of 1968 production. The decline was due largely to a decline in the area planted. The irrigation of 16,000 Ha of sawah was affected by the eruption of Mt. Merapi in August 1969 (Mulyarto: 1970, pp. 16 and 17).

\*\* There are 65,240 Ha of sawah in the Yogyakarta region. In 1969 rice was harvested from 82,280 Ha, thus giving an index of double-cropping with rice of at least 126. (cf. the figures given for Sriharjo in table 19).

not make it more favorable. Rice production per head would still be insufficient to meet the consumption needs of the village population.

Other points: As mentioned in the text we have almost certainly underestimated the costs of seeds, fertilizers and other inputs. We have probably also overestimated the rupiah value of the crop. Mubyarto (1970: p. 24) has shown that prices for all basic commodities are much more variable in the city of Yogyakarta than in Jakarta, the national capital. Prices in the Sriharjo market are, in turn, subject to even greater instability than are prices in Yogyakarta. Of particular significance here is that the price of rice was at its lowest (Rp 32 per Kg) at the time of the main harvest, i.e., when the vast majority of sales of rice take place. At the same time, the price of rice in Yogyakarta was Rp 37 per Kg, or Rp 5 per Kg more, whereas the price discrepancy between Yogyakarta and Sriharjo at most times is only Rp 1 per Kg.\* By using the figure Rp 38 - a simple unweighted average of weekly prices - we have therefore overstated the value of the contribution of rice to Sriharjo's "national income."

Data on the Coconut Sugar Enterprise. These data are much less certain than those we have been able to provide for rice. Soedarwono (1971) has shown that the daily average yield in the Purwokerto area is about 0.24 Kg. per tree in tapping. In Sriharjo it is said that the average daily yield is 0.2 Kg per tree used for sugar; but we do not know the proportion of trees that are ngendat (i.e., "resting," and not producing sugar at any one time). In Purwokerto 15 percent of the trees were ngendat.\*\*

On Soedarwono's figures it requires 1.2 hours of labor on average to produce a kilogram of coconut sugar. In making our calculations of incomes earned per hour worked and per day we have used the following figures for total labor input per Kg of sugar produced: for 5 trees or less, 1.3 hours; 6-9 trees 1.1 hours; 10-14 trees 1 hour; 15 and more trees 0.9 hours.\*\*\*

For tapping alone a man in Sriharjo will get 1 Kg of milled rice per tree per month, i.e., he will earn Rp 1.3 per tree per day (and if he taps the average number, 8.6, he will earn about Rp 11 per day).

The cost of firewood was estimated to be Rp 15 per Kg of coconut sugar. We are by no means sure of the accuracy of this estimate. Data from Sriharjo indicate that the cost of firewood per kilo of coconut sugar ranged between Rp 25 and Rp 10, and Soedarwono reported an even greater range, with a slightly lower average, in the Purwokerto study.

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\* Source: field notes for pekarangan study.

\*\* The Purwokerto study was done in 10 villages, in one of which coconut sugar was not made. The village averages of output per tree in tapping ranged from 0.13 Kg to 0.35 Kg per day.

\*\*\* These figures probably under-state the true situation.

The production of fruit was estimated at 6 nuts per month per mature tree on average at an average price of Rp 12 1/2 per nut.\* No deduction for the costs of collection was made.

We hope to be able to provide much more accurate information on this crucial enterprise once the pekarangan study has been completed.

To conclude: It is by no means easy to obtain accurate data on production, costs and incomes. But we feel that the information we have given in the text is accurate enough, given the purposes of the study. With 0.1 hectares of sawah a farmer will never be able to produce very much rice, whatever new miracles the agricultural scientists may come up with and whatever the farmer's willingness to put the miracles to work on his own land. At least 0.25 hectares of pekarangan are still required to enable a tapper to work to capacity (30 trees).

### C. Some Implications for further Research.

Of the authors cited only Iso and Soedarsono (1960), Geertz (1963) and Napitupulu (1968) have attempted to give any indication of the geographical extent of the problem and thus of the number of people who are, in varying degrees of severity, affected by it. Our own study, like those of Timmer (1960), Bailey (1962) and Soedarwono (1971), has been primarily concerned with showing how the problem affects the lives of people in a relatively small locality.

As we have indicated in the last two parts of the text, planning for economic development, at the national, regional and local levels, is likely to be more effective if all plans are drawn up in an awareness of the extent and severity of the population problem. We do not recommend that any major, nation-wide study be undertaken in order to ascertain more precisely the magnitude of the problem. Such a study would likely cost too much, in terms of capital and time. It would almost certainly delay the taking of urgently needed action, and there is in any case much that can be done now to improve development planning from what is already known of the magnitude of the problem.

There are three main ways of finding out whether there is a population problem in any given area and, if there is, how extensive and serious it is. One can look and see; one can talk to people in the area; one can read the results of field studies, and the story contained in the usually quite comprehensive official statistics.

Just looking can tell us a lot. Are the hillsides bare? If they are then it is likely that there is a population problem in the area. The same is true if we see steep, unterraced hillsides being used to grow annual crops. In Japan

\* These figures probably over-state the true situation.

a visitor to the countryside can see a lot of long grass on the bunds and by the roadside. There is rarely any long grass to be found in the densely populated areas of Java, unlike the less densely populated regions of the Outer Islands. Are the houses solidly built, and do they have floors of timber or cement? If most of the houses are made from plaited bamboo and have dirt floors the majority of people in that area are very poor. Is only unripe fruit to be found on the fruit trees in the pekara'agan during the harvest season? Are coconuts grown only for fruit or are many of the trees tapped for sugar? A good question to ask in many areas is "How long is it since coconut sugar making became an important source of livelihood in the village?" Another sign is whether cassava or gaplek is widely sold in the local food market.\*

In the text we have given a number of examples of what can be learned about the extent of the population problem from talking to farmers and village officials. Other good sources are rural doctors and village schoolteachers.

Nor is it difficult to draw quite sound inferences from the statistics collected by the village administration, and readily available at the village office. How many radios are there? (In Sriharjo 10 percent of the families have a radio). What is the man-land ratio? How many children are in Grade 1 of the primary school - and how many are in Grade 6? Has the number of buffalo or other workstock increased, remained stationary, or declined in the past 5 years? How many registered owners of sawah are there compared with the number of families living in the village. (There are 106 registered owners in Miri, or 65 percent of all families.) What is the rate of increase in population? A low rate, ceteris paribus, is likely to be a good indicator of a severe population problem.

Similar sorts of calculations can be made with data that have been aggregated to kecamatan (sub-district), kabupaten (district) or province level. Bennett (1961) suggests that the three best indicators are food production per head (see, for example, Appendix 1, table 4), the man-land ratio, and labor availability and utilization. The first two of these can be calculated easily from aggregated data.\*\* A good proxy for the third is to ask about wage rates. Casual labor is paid Rp 250 a day near Medan in North Sumatra, but only Rp 30 at Sriharjo, and even less in areas that have a greater pressure

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\* All these are simple indicators, but de Langen (in Ochsé et. al. 1934, pp. 401-2) has suggested what may also be seen by someone who has a trained medical eye. The first signs of oedemata are a pastiness of face and slack skin over the ankles. Severe poverty is indicated if the skin is dry and leg ulcers are common.

\*\* Some caution must be used when interpreting the information on food availability. The East Coast area of North Sumatra is a net importer of rice (food) but it is also one of the most prosperous regions in the whole country owing to its large production of export crops.

of population on resources.\* Near Medan, too, a harvester is still paid the traditional 20 percent share, whereas in Sriharjo this has now fallen to 5 percent.

Extra research that may be worth doing: We are reluctant to suggest topics for further research into the problem of poverty in those areas where it is most severe because we are convinced that only a very few steps towards a solution of the population problem may usefully be taken in those areas. However, research on the following topics may give useful results:

In which village, or district, has the birth rate fallen most rapidly, and why?

In which village, or district, have the farmers been most responsive to agricultural extension work, and why?

From which village, or district, has there been the largest amount of "spontaneous migration" to Sumatra or Kalimantan, and why?

In which village in a hilly area has there been a successful reforestation program, and why? (A successful program would be one where the people do not begin to cut down the trees before they are mature.)

In which village, or district, have there been public works projects using labor-intensive methods, e.g., padat karya, which have benefit-cost ratios of 2 or more?

In which villages have non-agricultural activities like handicrafts and small-scale industry come to contribute significantly more to income in recent years, and why?

In which village, or district, has there been a trend towards ensuring that the pekarangan land is used in the most economically efficient way?

Another and very simple piece of research that may provide useful results is to ask the "Sudden Wealth question" to a cross-section of people in any given village. The "sudden wealth question" is hypothetical and involves asking people what they would do with sums of money - small (e.g., Rp 1,000), medium (e.g., Rp 5,000) or large (e.g., Rp 50,000) - that might come to them, e.g., following a lottery win. This question can be asked conversationally, and is in no way seen as being offensive.\*\* The answers to it can be very

\* A farmer who is just cukupan will earn the rice equivalent of 1200 kg per year, or about 3 1/2 kg per day (every day of the year). The rice equivalent if Rp 30 is 0.8 kg. It should also be noted that it is far more difficult to get work in the areas where wages are low: this means that the differences in annual incomes will be even greater than the differences in wage rates.

\*\* It is part of the "kit" of social researchers in almost every culture.

revealing indeed. They show, *inter alia*, the extent to which rural people are accustomed to using capital in production, their preferences for consumption as against investment, their scale of economic values, and the strength of their hopes for a better economic future. Answers to the question "how would you spend this money in agriculture?" are usually revealing. A farmer who answers "to buy buffalo," or "to buy land" is indicating that he is not yet fully committed to modern commercial agriculture.

Where many farmers are very poor, as they are in Sriharjo, it is difficult to get them to give any answer to the question about the "largest" sum of money mentioned. Singarimbun reports asking a villager to buy him Rp 75 worth of any sort of side-dishes, to go with rice, from the local food market. The man returned empty-handed, and said "all of them were too expensive."

Concluding Notes: What we have written here will be nothing new to the people who have long been aware of the population problem and of its severity. We have, however, felt impelled to include it because, as we said on page 1, many still seem to overlook the problem or, if they are aware of it, do not yet regard it as serious. Economists in particular seem to be in this category.\* We have puzzled why this should be so and can conclude only that the majority of economists have felt compelled to concentrate on the solution of such problems as the rate of inflation, disequilibria in markets for foreign exchange, and control over the money supply. They seem to have been largely unaware of the extent to which people, like those in Sriharjo, have been denied opportunities for earning a living (and thus to participate in the process of modernization) because such people have lacked, do lack and will likely continue to lack access to the resources needed in order to become more productive. We will be touching on this last problem again in appendix 4 where we discuss the nature of the market in Indonesia.

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\* See, for example, the very few contributions by economists in the literature - Singarimbun's bibliography (Singarimbun: 1969) gives a complete listing of writings since 1930.

## APPENDIX 2

Kutowinangun (1933) and Sriharjo (1970); and Some Other Comparisons.

The study done at Kutowinangun by Ochse, *et. al.*, in 1932 and 1933 is probably the most detailed that has ever been undertaken in rural Java. It is, as Widjojo has said, the classic study of rural poverty in Java (Widjojo: 1956).

Since it is a detailed study and contains many tables it seemed to us that it would not be difficult to retabulate the original data in such a way as to make possible useful comparisons between the situation in the Kutowinangun of 1933 and that of Sriharjo today. However, we found that it was not as easy as we had thought, or hoped, to find "comparable data" even though the economic and other information collected in the course of the Kutowinangun study is much more detailed and comprehensive than we have for Sriharjo. The reason for our difficulty is simply stated: our Sriharjo data derive from a census (or near census) whereas the Kutowinangun study data were derived from samples which were, unfortunately, unrepresentative.

The Kutowinangun study was carried out in 1932 and 1933 and involved three samples - a 15 farmer sample (1932); a second 15 farmer sample, selected on a different basis (1933); and a sample of five laboring families (1933). The 1932 farmer sample consisted of 5 "large," 5 "medium," and 5 "small" farmers; and the average landholdings in each group were 2.95, 1.08 and 0.23 hectares of "arable land"\* respectively, or 1.42 hectares per farm for the sample as a whole. As noted by the authors the 1932 sample was clearly unrepresentative because, in the district as a whole, land availability was no more than 0.077 hectares of arable land per head, or some 0.44 hectares per family. The 1933 farmer sample is much more representative - average farm size for the sample is 0.81 hectares of arable land - but even if the land of the 5 family laborer sample is included (0.15 hectares per family) the amount of arable land per head in the combined sample still exceeds by a substantial margin the then land availability in the district as a whole. It was 0.104 hectare per head for the combined sample and 0.077 hectare per head for the district as a whole. In short, the aggregated information from the 1933 samples will likely overstate to some extent the average income of families in the district, and understate the extent of the poverty. The data are nonetheless a magnificent source of information on many important aspects of the village economy of Java, and they also make possible a number of useful comparisons with the present-day situation in Sriharjo.

Eight of the fifteen farmers in the 1933 sample ate more rice than they produced, i.e., were not self-sufficient in rice. The levels of rice consumption per head varied, as one might expect, with the size of the farm:

\* Arable land is sawah, plus pekarangan, plus tegal (at the rate of 40 percent).

“large” (1.39 ha arable land per farm)	130 kg rice p.a.
“medium” (0.69 ha)	109
“small” (0.39 ha)*	<u>101</u>
overall	112

It was only in the “large” group that rice consumption per head matched that in the new settlements in North Sumatra; the rice consumption for the whole group greatly exceeds that for people in the Yogyakarta Special Region today (see table 4, Appendix 1). These data also suggest that the income elasticity of demand for rice (often regarded as the basic food) was positive, and quite high, though it would not be as high as for the Yogyakarta region where Mubyarto and Fletcher (1966: p. 39) report that the income elasticities of demand for rice ranged from 0.44 to an incredible 2.39 for various kabupaten in 1959.\*\* The data in the table, when combined with those of Mubyarto and Fletcher, provide evidence both of poverty, defined here as the earning of an income which is insufficient to allow people to eat as much of their basic food as they would like, and of the decline in income that must have occurred between 1933 and 1959: in 1959 the income elasticity of demand for rice was higher than it had been 26 years earlier. It should also be recalled that the data in table 4 of appendix 1 also indicate that food availability in 1969-70 in the Yogyakarta region was below what it was in 1959.

The authors note that the Kutowinangun district had already been suffering from pressure of population - the population fell by 1 percent between 1920 and 1930, in large part due to out-migration - so it is not surprising to find that rice yields per hectare exceed those found in the new settlements in North Sumatra where they are about 1.25 tons of milled rice equivalent per hectare per year. In the 15 farm sample the average productivity of the sawah was 1.61 tons of milled rice equivalent, or 29 percent more than in the new settlements, and there were only three farmers who produced at less than the 1.25 tons per hectare rate. On a per annum basis the rate in Sriharjo today would be about 3.5 tons, or just over twice as high as for the Kutowinangun farmer sample in 1933, but in the Kutowinangun sample sawah per head was then 0.072 hectares, or nearly three times as much as it is in Sriharjo today (0.026 hectares sawah “controlled” per head - Miri).

Three of the fifteen families had family incomes of less than 1200 kg milled rice equivalent. None had less than 1,000. If family incomes are measured on a per head basis, eight of the families earned less than 240 kg per head per year, and four earned less than 200 kg.\*\*\* The range in per family incomes was not great, from 2,676 kg rice equivalent to 1,008 kg; and they ranged from 690 to

\* No farm in the “small” group had less than 0.30 hectares.

\*\* The 0.44 figure was for Yogyakarta city.

\*\*\* See text, p. 3, where it is shown that the minimum level of living that can be earned by a family of five, which is cukup in land and which uses traditional tools and methods, is 1,200 kilograms of milled rice equivalent, or 240 kg per head.

160 kg on a per head basis. A "range" between highest and lowest of 2 1/2 or 4 times, respectively, contrasts both with the situation in the "new settlements," where the range is less, and with the current situation in the Yogyakarta region where the range is much more due to the growing inequality of income. Deuster's figures for 1968 (table 31) are not strictly comparable, inasmuch as he only gives data for the median incomes for farmers classified into the three groups, "large," "medium" and "small." Nevertheless, the differences between the two sets of figures are suggestive. In 1968 the median family income of small farmers was 266 kg, whereas the median family income of large farmers was 1,411 kg, or more than 5 times as great. In 1959 the range was only 3 1/2 fold, indicating a substantially lesser degree of economic differentiation in 1959 than in 1968.

One of the most interesting features of the village economy of Kutowinangun is the very high proportion of income used for food: in fact no family used less than 52 percent of its income for food. Indeed, two families, which had given a large number of slametans (ritual meals) during the year, had figures for the value of food consumption that exceeded their family incomes.\* These figures, too, can be compared with those from the results of the Yogyakarta consumption survey done in 1959 (Sukanto: 1962). Even when family incomes were as high as 2320 kg or 5620 kg rice equivalent per year (income categories 8 and 10 from table 29) food took 54.5 percent and 44 percent of the total respectively. When income earners were classified by occupation, no such group used less than 54 percent of its income for food. The highest income group was the pegawai, i.e., white collar workers. The family income in this group averaged 1970 kg rice equivalent, of which food was 1064 kg rice equivalent, or 54 percent. It is not possible here, nor are the data adequate, to provide a full explanation of these extraordinarily high propensities to consume food, and not only rice. One possible explanation, however, is that food is close to being a "superior good" over a very wide range of income, and it is indeed the case that the Javanese cuisine becomes more nutritious, varied, and tasty as well as income increases. By contrast, in Tiga Nderket, a Karo Batak village in North Sumatra food consumption was only 29 percent of an average income of 3500 kg rice equivalent per family (Penny and Singarimbun: 1967, p. 46). The Karo have both a monotonous diet and a high marginal propensity to save out of increased income, and it is therefore not surprising to find that their propensity to consume food is much lower, at a given level of income, than in the Yogyakarta region. It is also perhaps of interest to note that there does not seem to have been any change in Java in this very high propensity to consume food, at all levels of income, in the intervening 35 years.

The Kutowinangun study provides useful information on a number of other aspects as well, and these will be summarized briefly. In Sriharjo there are about 10 coconut trees per family; the farmers in the Kutowinangun sample owned 51 on average. In Sriharjo rice harvesters get a five percent share. The share paid in Kutowinangun was 10 percent, or twice as much. The traditional

\* To do this they had had to dis-save, and to borrow.

share is twenty percent: it is still the rate paid in the new settlements in North Sumatra, as it also was in Java until the ever-growing numbers of people forced to earn a supplementary income at this time of the year led to a decline in the rate of pay for the job. If the rate is 20 percent a harvester will earn about 7 kg milled rice equivalent for a day's work; if the rate is 10 percent, as in Kutowinangun, he will earn 3.5 kg; and if it is 5 percent, as in Sriharjo, he will earn but 1.75 kg. It is no doubt safe to assume that the incomes of harvest laborers (from this source) will have fallen even more because the increase in the supply of such labor will have led to a decrease in the length of the harvest period, and thus in the days of work per harvest. Writing of a village in Krawang, Budhisantoso (1971: p. 19) has said: "Because of the abundant labor force and the limited number of jobs, a harvester can work only for 3 hours a day," for which he earns about 2 kg of rice.\* There are so many harvesters that a hectare of rice field can be harvested in less than half an hour.

The decline in harvest wages is paralleled by the decline - or the difference between, because we are comparing the situation at two different places - in the daily wage rate. This was an average of 15 guilder cents (f 0.15, or 3 kg rice) in Kutowinangun in 1933, and is now Rp 30 (or 0.8 kg rice) in Sriharjo. The Kutowinangun report also notes that a small trader would earn about 3 kg rice a day, or several times what can be earned today in Sriharjo.

The report shows that, in normal years, the incomes from the pekarangan would be about 50 percent higher on a per hectare basis than those from the sawah.\*\* A similar situation is found today in Sriharjo (see above, p. 36). As in Sriharjo, too, the pekarangan enterprises were more highly commercialized than the sawah enterprises. Sixty-seven percent of the output of the pekarangan was sold and only 49 percent of the sawah output. What is perhaps surprising is that it was the farmers in the smallest size category in Kutowinangun who sold the highest proportion of the output of their house compounds (75 percent). This particular pattern of economic behavior is perhaps analogous to that of the "very small" rice farmers of Sriharjo when it comes to buying and using fertilizer (see above, p. 33). And, in Kutowinangun, as in Sriharjo, the "small" farmer produced much more per hectare of pekarangan than the "large" farmer, about 1.8 times as much in Kutowinangun, a figure that can be compared with the data in text table 28 above.

What we have done so far here is analytically inadequate in a number of perhaps important ways. For one thing, Kutowinangun is not Sriharjo, and conditions in the two places may in fact be very different, even though both lie in the

\* The harvest share wage rate there is still high, 20 percent and more (Adiratma: 1969, pp. 122-123).

\*\* They were actually lower (f 50 as against f 79 for the sawah) in 1933, the worst year of the great depression: "Rice prices are normally 2 1/2 times as high; and the prices of coconuts (and coconut products) 6 times." The "normal ratio" at that time indicated that one kg of rice would buy about 2.6 coconuts - in Sriharjo today one kg of rice will buy about 3 coconuts.

same culture area, both have a similar resource base, both were - and still are - subject to population pressure, and the village people in both places live and work in very similar social, economic and institutional "environments." For another, the methods of data collection and data coverage do differ, as we have said. We nonetheless feel confident that the comparisons we have made are suggestive, at least, if for no other reason than that the patterns of economic activity are so similar, even after a lapse of nearly 40 years, and because the direction of economic change has been in the expected direction (i.e., deterioration) given the great increase in population that has occurred in the meantime.

Results from other studies: Two other well-known studies of Java's rural economy are Adiratma's 1964 study of rice-farming in Krawang on the north coast of West Java (Adiratma: 1969), and Burger's 1928 study of the village economy in the Pekalongan district of the north coast of Central Java (Burger: 1971). Adiratma's study is important for research on the population problem on Java because he shows that the family incomes of people in the low (though not the lowest) income groups in Krawang are several times higher than they would be for the people in the same category (pure tenants) in Sriharjo or in the Yogyakarta region as a whole. Adiratma also shows that even though the distribution of incomes is quite unequal in Krawang, the incomes of the poorest people are quite high. The relatively high average incomes in Krawang (even in 1964, before the Jatiluhur dam was completed) can be simply explained by the fact that the Krawang area was not opened for agriculture until 1930, and the man-land ratio there is still much lower than it is in Kutowinangun or Sriharjo. In Kutagandok there were only 810 people per sq. km. of sawah and fully 80 percent of this land was double-cropped (Adiratma: 1969, p. 49).

Adiratma's careful and comprehensive study is a strong reminder that there is considerable heterogeneity in Java's village economy, and that Java's population problem is by no means equally serious everywhere. It also reminds us of the important point that there is more to the creation of a smoothly functioning market economy than the abolition of controls (e.g., price control, the monopolization of fertilizer distribution, or the restrictions on the establishment of new rice mills), the attainment of a satisfactory relationship between the prices of, say, fertilizer and rice, or the achievement of economic stabilization, because, as Adiratma's study shows, there are large and persistent differences in man-land ratios and incomes per head within Java itself. Such differences are due to continued serious imperfections in the markets for agricultural land, labor and capital. It is likely that these imperfections, which much impede the mobility of factors - essential to the creation of a smoothly functioning market economy - will only be reduced slowly and with difficulty.\*

\* It is for reasons such as these that we recommend in Appendix 1C that the "extent" of the population problem in each province and district (kabupaten) be ascertained, by the methods we suggest or by others that are deemed to be more suitable, whenever development plans (for any level of the economy) are being drawn up.

Burger's study is particularly valuable in that he is able to show what has happened to the economy of one village over a long period of time, (1868-1928). Population problems in rural areas evolve slowly, even insidiously, and Burger's account of the changes that took place in Pekalongan illustrates well what must have happened in Sriharjo. In 1868 the population of the village of Pekalongan (kabupaten Pati) was 507 and farmers typically operated 0.7 to 1.1 hectares of sawah each. At that time harvest share wages were 20 percent, and 33 percent for kin. By 1928 the population had risen to 1268, and the area of sawah operated by each farmer had fallen to 0.56 hectares on average. As it may safely be assumed that output per hectare rose little during the period, output per head must also have fallen. The rate of payment for harvest labor had fallen to 12 1/2 - 16 percent (20 percent for kin)\* The sawah area had also declined, by about 9 percent, due to the need for more house compound land. As in Sriharjo, too, the distribution of use rights in land became much more unequal over the period.

Another and more recent study that contains much useful comparative data is that of Utami and Ilahauw (1972). Their study was done in three villages in kabupaten Klaten, no more than 30 kilometers from Sriharjo. The population densities in these three villages were 1830, 1780 and 1480 persons per square kilometer of arable land respectively (Utami and Ilahauw: 1972, p. 2), or not much different from the situation in Sriharjo. The authors go on to say that, in all three villages, "the number who own no rice fields is greater than the number of those who do." (p. 2) "There is also an increasing tendency towards landlessness, and thus an increasing dependency of the landless on the land-owners." (p. 3) "As a consequence the tenure arrangements become more beneficial to the owners. The mrapat (means to divide into four equal parts) system has now become the most common in the villages. Under this system the tenant provides only the labor to cultivate the land, while all inputs are given by the owner. At harvest time the tenant, who acts more like a contracted farm laborer, gets only one-fourth of the yield." (p. 9).\*\* The authors then give a series of figures to show the strikingly different returns that can be earned by owner-operators as compared with people who rent land. Their figures relate to a single harvest from a plot of 0.12 hectares.\*\*\* They assume that total production was 290 kg of rice, after all harvesting costs had been paid. They assume, too, that the cost of bought inputs (fertilizer, etc.) was 22 kg of rice; that the value of hired labor was 30 kg; and also that these disbursements did not change as tenancy arrangements changed. The incomes that could be earned from this plot under the different tenancy arrangements are as follows:\*\*\*\*

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\* In nearby villages it had already fallen in some cases to as low as 8 percent.

\*\* The quotations have been slightly paraphrased.

\*\*\* In Sriharjo, 0.12 ha would be a median size.

\*\*\*\* In the original these incomes are given in terms of dollars.

		Index
owner operator	238 kg	100
renter ( <u>maro</u> ) <sup>a</sup>	93 kg	39
renter ( <u>mrapat</u> )	43 kg	18

Note: a. The authors of the study state that the maro system applies these days only to close kin of the land-owner.

The results of the Kutowinangun, Krawang, Pekalongan, Sriharjo and other studies done in Java can also be compared with those of studies done elsewhere in Asia. One such is Epstein's recent re-study of two agricultural villages in Mysore, India (Epstein: in press). Her original study was done in 1954-56, and the re-study in 1970. Her data show that population densities in Wangala, a rice-growing village with good irrigation, were much lower than in Sriharjo.

Population density of	Wangala		Sriharjo
	1955 persons per sq. km.	1970 persons per sq. km.	1970 persons per sq. km.
All land	140	231	1290
"Arable land" <sup>a</sup>	402	478	1870
<u>Sawah</u> only	670	596 <sup>b</sup>	3840

Notes: a. Sawah equivalent.

b. The area of sawah increased by 44 percent between 1955 and 1970.

Her data also show that Wangala suffers from the same general problems as Sriharjo. Unemployment is growing and incomes are becoming more unequal even though, in Wangala, average have risen substantially during the period. Perhaps most important for our own study is that the incomes of all groups, both rich and poor, are higher in Wangala than they are in Sriharjo. On a per family basis these were:

	family income, in rice equivalents	
	1955 kg	1970 kg
magnate (i.e., very rich)	7,580	30,300
middle peasant	3,100	5,270
resident untouchable	2,410	1,490
migrant untouchable (i.e., very poor)	n.a.	660

## APPENDIX 3

Self Sufficiency in Rice: Some Economic Arithmetic

Self-Sufficiency in rice has long been a major policy goal. It has been defined in physical and quasi-economic terms. For many years it was thought that self-sufficiency could be attained if the national production of rice rose to the point where it would allow a consumption level of 100 Kg per head per year (the physical criterion); the other criterion was that the whole of the domestic demand for rice (at the level of 100 Kg per head) be met from domestic production. However, when the first five year development plan (1969-74) was drawn up the physical target was revised, to 15.4 million tons at the end of the plan period. The achievement of this target would have permitted a higher level of rice consumption per head (125 Kg in 1974), imports would no longer have been necessary, and it was thought that supply and demand in the domestic market would have been in balance at a reasonable level of prices. In mid-1972, however, the target for 1973/74 was scaled down, to 14.8 million tons (117 Kg per head). In making this announcement President Suharto said "If rice production is above people's needs, it can be estimated that the market price of rice will drop below the level the farmers deserve. ... [The achievement of the revised target] figure will ensure self-sufficiency in food while farmers' incomes are expected to continue to rise." (Suharto: 1972).

No-one can know whether the new target can indeed be achieved by 1973/74 because climatic conditions remain a major determinant of the level of production. The drought in 1972 affected severely the off-season crop in Java, and rice prices rose quite sharply.

The economic model implied in these several definitions of the self-sufficiency goal is a simple one. In the economic analysis that follows we will show that a more complex model would appear to be more appropriate, and that the achievement of any one of the present goals would still leave many people far from being able to acquire a sufficiency of rice.

To simplify the argument we have assumed that rice is the preferred basic food of all Indonesians and that the preferred food consumption pattern is similar to that found in Java, even though we know that some people in East Indonesia have long preferred sago, and that people in yet other parts of the country customarily eat much more rice than the maximum amount normally eaten by Javanese.

Rice production in Indonesia is near 100 kg per head (1970), and rice consumption 4 kg per head more. The difference between supply and demand of 4 percent (1970) is met by imports. However, the income elasticity of demand for rice in Java at present levels of income is still quite high (see Chapter 4 and Appendix 2 above). This suggests that an increase in rice output of 5 percent or

so, which would mean that the self-sufficiency goal (as it had long been defined) had been achieved, would nonetheless still leave many people unable to eat as much rice as they would desire.\* This is certainly the case in Sriharjo where gross output per head is already 100 kg per year, and 125 kg per head in the families that engage in rice production. But, as we have shown, fewer than 40 percent are able to eat rice the year round. It is also clear that the great majority of the people who cannot now eat rice the year round will not be able to do so if output rises by another 5 percent, i.e., by the amount needed to reach the early self-sufficiency goal. Even if the distribution of income remains unchanged (Cf table 31) an increase in production of 5 percent for someone who can now afford to consume 50 kg a year will mean that his consumption will rise to 52.5 kg per year at best. And should it be possible to raise output in Sriharjo by the additional 12 percent implied in the (revised) target for 1973/74, the rice consumption of a man who can now (1970) afford to eat only 50 Kg per year would rise to no more than 59 Kg a year.

The peasants want to feel free to eat as much rice as they like - it is, after all, the preferred basic food for all Indonesians - and they can do so only if their incomes are at the cukupan level or above. Rice consumption rises rapidly when income rises from a low level, and it levels off as the family becomes cukupan. Rice consumption per head then remains stationary, or almost so, as incomes rise further, and rice becomes an inferior good only after quite high levels of income have been attained. As we have shown (p. 47), this level of income had been reached in the U.S. some time before the 1940s. In Japan "absolute per capita consumption of rice began to decrease sharply in 1965" (Hayami: 1972, p. 26); it had been 140 kg per head in 1955 and had fallen to 117 kg by 1969. In Sumatra, where incomes are higher than in Java, it is 140 kg per head, and is likely to remain at or near this level for a long time to come. The consumption pattern of the Javanese is different from that of the Batak, Rejang, Minangkabau or other Sumatran peoples. Side dishes play a very wide role in the Javanese diet, and the income elasticity of demand for rice in Java will therefore approach zero at a lower absolute level of rice consumption (120-125 kg per head per year) than in Sumatra (140 kg per head per year or more).\*\*

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\* We have chosen the earlier, more modest goal as the basis for our analysis because it had already been achieved in Sriharjo at the time of the study, and we wish to draw out some of the implications. However, insofar as the higher goals for rice production set for the later years of the five year plan period are achieved (in Sriharjo) then the problems of which we will be writing will be to that extent lessened. The 1972 drought in Java seems to have kept rice supplies per head in Indonesia as a whole close to the level that prevailed in 1970.

\*\* We have deliberately omitted to consider the role of other carbohydrate or basic foods. In the new settlements in East Sumatra where the Javanese are cukupan in land they eat no bread or potatoes, only very small amounts of sweet potatoes, corn, or cassava, and 125 kg of rice per head per year. Rice is the basis, or the core, of the diet and the other foods mentioned are eaten only as snacks, as vegetables, or to provide variety.

The aggregated data showing the relationship between income and rice consumption for Indonesia, Central Java and the Yogyakarta region in 1964 are as follows:

Family income per month	Rice consumption per family per year		
	All Indonesia	Central Java	Yogyakarta region
Rp	kg	kg	kg
> 5,000	67	64	59
20 - 25,000	465	405	414
40 - 50,000	797	676	621
< 50,000	994	948	842

Source: B. P. S. (1967, 1969) pp. 181 (Tahap Pertama) pp. 172-177 (Tahap Kedua).

The more detailed consumption survey done in the Yogyakarta region in 1959 shows a similar relationship between income and rice consumption. The absolute level of rice consumption per family in the lowest income group was 58 kg per year, it was 414 kg per year per family in the group that had an income of 1455 kg rice equivalent per year (income category 7 from table 29) and it was 850 kg per family per year in the highest income group where the average income was 5617 kg rice equivalent per year (Sukanto: 1962, pp. 363 ff).

The data from these two studies show that rice consumption in Java continues to increase even when household incomes have risen to quite high levels. We regret that we cannot fully reconcile these figures with our own, but the discrepancies can perhaps be explained as follows:

1. The original data are given in value terms, and the quality of rice eaten rises with income.
2. The wealthier families provide more slametans (ritual meals) than the poorer families.
3. The wealthier families have more dependents than the poorer (see also tables 12 and 35).\*

An average of 125 kg of rice (of average quality) per head per year, then, is a conservative estimate of the level of rice consumption that will have to be achieved before the mass of the people of Java will feel that the goal of self-sufficiency, for people of all levels of income, had been attained.

\* Economic analysis of the rice market would be facilitated if the results of surveys included data on individuals, in addition to the data on a per family, or per household, basis.

It is true that the supply of rice will equal demand at a reasonable level of prices, if per capita domestic production reaches the level of 105-110 kg per year (approximately). However, to provide every consumer with at least 125 kg of rice would require two important changes in the present way of looking at things. First, it will need to be recognized that the increase in marketable surplus that has occurred in recent years has not been accompanied by any great increase in the number of people in Sriharjo able to eat rice the year round. The distribution of wealth - land in particular - and of income is so unequal that the bulk of the increases in output has flowed out of the village.\* The total market demand for rice has probably risen in recent years along with the increase in national income, but little of this demand can have come from the people in the low income groups. These people have had to continue to rely on the cheaper foods or in many cases to go hungry.

Second, it should also be realized that the most economic way of expanding both the production and the consumption of rice, i.e., of expanding the size of the market for rice, would be to undertake agricultural programs whose aim it is to increase the incomes of rural people, the rural poor in particular, at the fastest possible rate. If to increase rice production in a particular district, or on a particular farm, would give the greatest return to scarce government resources, and lead also to the greatest increase in farmer income then this of course, is what should be done. But, in Sriharjo, and no doubt in many other places, better results would be obtained if a substantial proportion of the resources now devoted to increasing the production of rice were used in other ways. The national market for rice is limited because the income of many consumers is so low. Even though the various rice production programs that have been carried out since independence will have raised the incomes of farmers to some extent, the incomes will not have risen in proportion to production, in part because of increased expenditures for inputs, and in part because taxes on all agriculture have risen in recent years. It seems, therefore, that the main beneficiaries of the rice production programs have been non-farmers, e.g., urban consumers, and large farmers in the rice-growing areas near to major urban centers. The majority of the rural poor appear to have benefited little, if at all.

Given what we have said in the body of the paper about the seriousness of the population problem we would urge that the goal of self-sufficiency be carefully re-examined. A new definition, satisfactory to economists, would need to take into account the relationship between income and rice consumption in the various regional markets: a sufficiency of rice cannot be said to have been achieved until the income elasticity of demand for it has fallen to low levels, e.g., to 0.1 or below, in each of these markets. If the goal is redefined in this way it will become manifest that a satisfactory level of consumption of rice can be achieved only after the production of rice and national income have increased very substantially indeed beyond present levels. If measures were taken to ensure that

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\* Our argument here is based on theory. But supporting empirical evidence can be obtained from straightforward calculations based on the data in tables 17, and 18 in particular, and also from table 31.

the bulk of any increases in national income went mostly to the poor rather than to the rich then the increase in national income that would be needed would be rather less, but the needed increase in rice production would not change.

We have so far omitted to consider whether it would be more economic from the national viewpoint, and from the viewpoint of the farmers as well, to rely only on domestic production efforts to attain the goal of a sufficiency in rice or whether the goal could be more quickly achieved by using the proceeds from increased exports to finance the import of the balance. Here, too, there is some economic arithmetic that could be undertaken.

We have puzzled why the present goal has been defined in the way it has when it is clear that its attainment would not necessarily permit the achievement of the goal of a sufficiency for all. Perhaps one reason for the logical inconsistency is that many policy makers and economists have assumed that farmers always have enough food (rice) and that if they sell any it is because they have a surplus for sale over and above their consumption needs.\* Moreover a further reason may well be that the rice policy as presently formulated could achieve its stated objectives only in an economic environment, or market, which is different from what actually exists at present. The achievement of purely physical targets, whose aim it is to benefit the mass of the people, is possible only in a land abundant subsistence economy or in a system with perfect rationing.

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\* We have often heard city people say: "Farmers are lucky because they grow their own rice, and therefore always have enough to eat."

## APPENDIX 4

On Economic Rationality, the Market Mechanism, Economic Models and  
Related Matters likely to be of interest mainly to Economists

“If you want to understand the economy of Indonesia,  
study our politics and our culture; if you want to  
understand our politics and our culture study our  
economy.”

Sajogyo (1967)

Indonesia is a land of many cultures, and thus of many modes of solving the problem of efficient resource allocation. Patterns of economic activity vary according to resource availability, as they do elsewhere, but they also vary quite significantly from cultural group to cultural group within the country. Thus, in situations where everyone can be said to have equal access to resources, as they do, for example, in Sumatra's East Coast, the differences in observed economic behavior can be explained only by reference to cultural differences. These cultural differences manifest themselves in the economic sphere in different propensities to save and to invest, in differences in the willingness to assume the risks and uncertainties of economic change, in differences in preferred fields for investment, in differences in the willingness to go into debt, to become someone who works for others, and many more. The cultural differences also manifest themselves in economic institutions, in land tenure systems, in the form taken by employer-employee relationships, in the role played by the family in economic activity, and so on.\*

Indonesian economic studies that ignore the role played by other distinctive, and fundamental, culture factors will give results that are of partial value at best, or that will be positively misleading. In short we are sceptical of general theories that assert that all peasants who are in the same economic circumstances, i.e., who have farms of a given size, and are faced by the same market opportunities, will react in the same way and to the same extent to changes in prices for the things they buy (fertilizer, credit, textiles) or for the things they sell (rice, tobacco, rubber, cassava).\*\*

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\* Selosoemardjan (1962, pp. 326 and 327) provides some comparisons between the approach to economic activity (i.e., attitudes and institutions) of the Javanese with that of the Chinese and the Europeans; and in our 1967 paper “Economic Activity among the Karo Batak” (Penny and Singarimbun: 1967) we show that the economic behavior of the Karo Batak cannot be explained without reference to cultural variables. We also provide a few comparisons with other cultural groups - see, in particular, 1967, pp. 40-46.

\*\* We have specified here only changes in market prices as something to which peasants, in given circumstances, may respond, but this is obviously not the only exogenous behavior. Examples of differential responses to given stimuli will be found in our 1967 paper, and also in Penny (1964).

We do not feel that there is a conflict between our assumption that the people of Sriharjo strive to make the best use of their resources and about the cultural determinants of economic behavior. In Sriharjo resources are so scarce and the need to use them efficiently so great that there is little opportunity for the people to misuse them. While this appendix is not the place to discuss in any detail the roles played by cultural and institutional factors there are nonetheless a few cases where the economic behavior of the people of Sriharjo does not conform fully to the liberal-economic, or market, model.

- (1) A wealthy farmer in the village had sufficient capital to build a small rice mill, and he knew that he could get a good return from his capital. He did not, in the end, build the mill, because he realized that the loss of work and income to the people who now hand-pound the rice would outweigh the profits he would himself reap.\* In short, he thought like an 'economic man' when he made his initial calculations, but he did not act like one because his final decision was based on a social, or group, and not an individual calculus.\*\* When someone puts the economic interest of the community ahead of his own he is said to be acting in a social way. This happens to some extent in all communities in Indonesia even though the ways in which the social considerations affect individual economic behavior differ from community to community.
- (2) Rice harvesting in Sriharjo is done only by women even though the men can harvest more per day, as they do in the new (Javanese) villages in Sumatra. We do not know if this custom helps, or hinders, efficient resource use in Sriharjo as all labor is in abundant supply. We would suspect that excluding the men from harvest work is against the direct economic interests of the family on whose land the rice is grown because it will mean that more female, non-family, labor will need to be employed.
- (3) Farmers in Sriharjo are often reluctant (keberatan) to cut down trees that are non-productive even though these trees use land, water and sunlight (sunlight is the main scarce resource as far as the pekarangan is concerned). There are also gaps in the canopy. The cost of putting the unused sunlight, and land, to productive use would hardly strain the finances of even the very poorest. Another unusual feature of the pekarangan economy is that planting densities increase as the size of the pekarangan declines. Farmers follow sound agronomic principles in the sawah and

\* Singarimbun: field notes.

\*\* It was almost impossible for wealthy individuals to consider building rice-mills before 1967, when the very restrictive regulations of the guided economy era were repealed. One beneficial result of the repeal has been that the government has found that there are quite a few village people who are wealthy enough to establish rice-mills or to finance other investments. Previously, the government's policy towards agriculture had been largely based on the assumption that farmers were too poor to be able to finance investments from their own resources. Since 1967 many small rice mills have been established in other, very densely populated villages in the Yogyakarta region (Mubyarto: 1970, p. 17).

will plant rice at the same per hectare rate whether their holdings are large or small: In the pekarangan they act as if these principles no longer apply.\*

- (4) The reluctance of the families that own relatively many coconut trees to allow them to be used for sugar production, even on a rental basis, when their incomes would rise substantially if they did (text, p. 44), suggests that the maximization of returns to factors is not their only goal in the economic field. This particular pattern of economic behavior also suggests a lack of harmony between the economic interests of those with relatively much capital and those with little, because the 'national income' of Sriharjo would rise if more of the coconut trees were used for sugar making.
- (5) The people of Sriharjo can hardly be said to be acting like economic men in determining the size of their families, even though they realize that if there were fewer people then those few would be better off. Yet another example is the acquiescence to social pressure. A man will participate in a ceremonial meal even though he cannot afford to do so and must pawn even his tools to pay the cost.

These examples show that the people of Sriharjo do not always single-mindedly pursue their "best economic interests," individual or family.

The question of cultural attitudes and institutional barriers to economic change is, however, of greater importance when consideration is being given to transmigration. This, as we have said, is likely to play the major role in the efforts being made to solve Java's population problem. Iso has referred to the problem. "They tend to bring their poverty with them" (text p. 65), and Sajogyo has written the natural history of Javanese settlements in Lampung, where he shows that, in a period of 30 years or so, they had largely re-created the unsatisfactory conditions they had left behind them in Java (Sajogyo: 1968, p. 294). Penny has also written of the apparent unwillingness of Javanese peasants in "new settlements," where they are cukupan in land, to make the most economic use of the vastly increased resources at their disposal.

Javanese peasants have what they consider to be sufficient access to other resources when they are able to obtain land in one or other of the new settlements to be found throughout Sumatra and elsewhere in Indonesia. But, as Iso and others (e.g., former vice-president Hatta) have shown, the provision of "enough land" is by itself not sufficient to enable the majority of them to escape from the problems they left behind them in Java.

The peasants in Java have long been "in the market" and thus in the position where they must adjust - whether they like it or not - to whatever surprises,

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\* We do not know the relationship between planting density and production per unit area, but we hope that the pekarangan study now under way will provide the answers.

pleasant or unpleasant, are brought by changes in market forces. They also have a large part of the infrastructure (roads, irrigation facilities, etc.) assumed to be necessary before economic growth can take place. But as we have repeatedly shown, neither the provision of infrastructure nor exposure to market forces has prevented economic decline in Sriharjo. This conclusion must, we feel, lead people to doubt the efficacy of economic development planning that is based on the assumption that the market in Indonesia is somehow the same as it is in rich, Western countries, and that things will turn out all right in the end if only the market is made as perfect as possible.\*

A large part of the reason why reliance on market forces will fail to solve the population problem, including the problem of its transfer to Sumatra and other places, is that the attitudes of the Javanese peasants to the market are poorly understood. Soedarwono has said, that, of all the major social groups, "The villages of Java are the least open of any in Indonesia. The villagers would prefer to be as self-sufficient as possible."\*\* Javanese villages are less open than villages elsewhere in both a physical and a social-psychological sense. Physically the villages are compact, in an "island of coconut trees in a sea of sawah," much more so than in the Sunda region (West Java). The people tend also to be physically immobile (see text p. 65), and thus have less opportunity to "learn from travel." Of greater importance, however, are the difficulties villagers face when they deal with people of a higher social status, such as city-folk, educated people, government officials and the rich. The big majority in Sriharjo are farmers, farmer-laborers, laborers, petty tradesmen or craftsmen, i.e., are all members of a predominantly peasant society, and therefore of rather low social status. As Redfield (1956), Wolf (1966), and many others have shown the peasantry tend to represent a closed group vis a vis the elites.\*\*\*

What Soedarwono has said might appear to be in direct contradiction with what we have ourselves many times said about Sriharjo having long been "in the market." But the contradiction is in fact more apparent than real. It is resolved when we observe the economic behavior of the Javanese once they have obtained "enough land." When they do, they have both "sufficient access to resources," and they are also free of the inequalities that characterize village life in Java. There are no longer any landlords nor is there any problem of debt,

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\* We would agree that many of the changes in economic policy that have occurred since the change in government in 1966 represent steps in the right general direction. It should also be clear from what we have said so far that a reliance on a market economy will be unlikely indeed to lead to a solution of the population problem. The poverty of the many is too severe to allow them to take the necessary steps on their own initiative (to obtain more land in Sumatra, or whatever). The distribution of wealth and power in the villages is such as to prevent the poor people from being able to exploit to the full the few economic opportunities that remain in the villages.

\*\* Soedarwono - private communication.

\*\*\* In this regard see, for example, what Redfield has written about the attitude of village people to city people.

and all the village officials, including the village head, are themselves working farmers on their own land.\* In these new villages the peasants are linked to the market (there are farm to market roads), they are provided with various government services, they are free of the inequalities that hamper economic development in the villages in Java, and they have all the land they need to become cukupan, and more. However, such is their distrust of "the market" that they give the highest priority to the growing of food crops and to being as self-sufficient as possible. They sell surpluses, and do not use their resources in the most efficient way; and there are many unexploited or little exploited development opportunities in the new villages. It is this unwillingness of the Javanese migrants to exploit the full economic potential of the land (when they are cukupan in land) that can lead in time to the re-emergence of the population problem, of rural poverty, and of inequalities in the distribution of wealth.\*\*

The regression described by Iso and Sajogyo is not inevitable. Not all the new settlements are failures, and, as Penny has shown in his dissertation (Penny: 1964) the willingness of Javanese peasants to act in an economically efficient way varies according to the social and cultural environment in which they find themselves.\*\*\* But when the Javanese are in settlements where they are not able to interact freely with people from different cultural backgrounds they tend to build the sorts of villages Soedarwono has talked about. They do so because the wider world in all its manifestations, including the market, has brought them more pain than pleasure over the years. It brought them the culturstelsel (a system of forced cultivation in colonial times), and the exploitation associated with the

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\* There is no tanah pelungguh or tanah peng-arem2 in the new villages in East Sumatra.

\*\* The details of the process whereby the economies of many of the new villages may come in time to regress are found in Penny (1966).

\*\*\* In his dissertation Penny ranked the farmers in eight villages according to the extent to which they had, in general, become development-minded. There were farmers of Javanese origin in three of the eight villages - Namumbelin (No. 3), "Tamiang" (No. 5) and Pematang Johar (No. 6). The economic behavior of the majority resembles what happens in Pematang Johar and not Namumbelin.

Each cultural group has its own way of coping with "the economic problem" (irrespective of resource availability), but what is even more important is that each group has something worthwhile to contribute to the others, and also something to learn from the others. For one such example see the essay on Namumbelin (Penny: 1964). The population problem in Java is Indonesia's problem and it requires an Indonesian solution. The key to the solution probably lies in the establishment of new settlements which are not Javanese, Balinese or Batak, but Indonesian, where people from all parts of the country who need land can mingle together, learn from each other, and help to build a truly Indonesian society.

sugar industry.\* It has also brought them taxes, price fluctuations, inflation, price manipulations (e.g., through the over-valued exchange rate and through the rice-import policy), and much more that they felt they could well do without. However, they can escape, in part at least, if they become cukupan in land, as so many have been able to do in Sumatra and elsewhere. But, as we have shown, their quite understandable desire to avoid the market when they can seems to lead to the reproduction of the very problems that characterize the economy of Sriharjo today - overpopulation, poverty, inequalities in wealth, and lack of hope for the future. In the past, of course, these problems could be alleviated when they arose by opening up new farms on Java itself.

The Javanese peasants have good reason to be sceptical of "the wider world." "The market" in which they find themselves is not the self-equilibrating mechanism of Timmer (C. P.), where the untrammelled pursuit of individual economic self-interest, it is argued, leads to the greatest good for the greatest number. Rather is it a market (an economy, a society) like that described so well by Myrdal in his book "Economic Theory and Under-developed Regions," a market where the gap between the rich and the poor widens as the result of the "free operation of market forces." There is what Myrdal calls a North-South problem in Sriharjo itself, and the form taken by city-country relations suggests that there is a problem at this level, too.\*\*

The North-South problem manifests itself in many ways in Sriharjo. A few have become appreciably wealthier as the majority have become poorer (table 31), and the ownership of land has become more concentrated.\*\*\* In nearby villages (though not, so far, in Sriharjo) wealthy farmers have been able to enrich themselves at the expense of the poor through the establishment of rice mills.

It is not the existence of the North-South problem that is so worrying, but rather the inability of many economists to see that "the market" in Indonesia is not the benign, homogeneous institution so often found in textbooks of micro-economics. It seems to us that the Myrdal model, suitably modified to take the heterogeneity of Indonesia's economy into account, is a more appropriate theoretical framework within which to study Indonesia's economic problems, including its population problem, than the "growth model" that currently enjoys so much favor. Perhaps those brought up in the "market tradition" would become more aware of the greater overall suitability of the Myrdal model if they

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\* The sugar industry, during the colonial period in particular, has an infamous record of exploiting the rural people in East and Central Java (which unfortunately possessed the best conditions for sugar-growing). For two accounts of the impact of the sugar industry on the rural people see Geertz (1963) and Mu'yarso (1968).

\*\* The most important of the North-South problems is the widening gap between rich and poor countries.

\*\*\* Deuster (1971, p. 110) shows for a village in the Yogyakarta region, that between 1959 and 1968 the proportion of farmers owning 0.51 hectares of sawah or more rose from 3.2 percent to 8.9 percent despite the increase in population.

would come to recognize the economic reasons for two economic phenomena that are widely found in overpopulated rural Java. The first of these is the co-existence of widely different technologies, each with very different capital-labor ratios, that perform exactly the same economic function. Goods are carried to market in trucks, in carts (which may be drawn by bullock or by human power), on bicycles or on human backs. Rice is milled in large-scale plants by gleaming modern machinery, in small mills (hullers), in mills where the motive power for the simple machinery is supplied by water, and much of it is still milled by hand.

In the "market economies" of rich countries efficient technologies in time oust the inefficient. But in an economy of poverty, like that in Sriharjo, the trucks cannot displace the human backs nor can the human backs replace the trucks. However, the various technologies can co-exist (with only minor shifts in the margin of advantage between one technology and another, as circumstances change) because, according to the individual economic calculus, the truck is best for me and the human back best for you. A true social calculus on the other hand would recognize that, whereas the truck or the large modern rice mill may be economically efficient and quite profitable to whoever was responsible for providing the capital, the adoption of labor-saving technologies in a situation of labor abundance will inevitably worsen the already bad economic situation of those who provide the same economic services in a labor-intensive way. The poor people who are providing these services will not withdraw from the market because they cannot afford to do so, even though many of the people who carry goods to the market (membakul) earn no more than enough to cover the cost of the food they eat on that day. It will not be possible to say that Indonesia is safely on the road to economic development until this destructive competition between technologies has been sharply reduced or eliminated.

A second way in which economists who have been conventionally trained may come to realize the existence of the North-South problem (in Sriharjo and elsewhere) would be for them to study the operation of the markets for individual commodities with disaggregated data. It is only a few of the farmers in Sriharjo who operate in a truly commercial way and whose economic behavior approximates that of the commercial farmers in rich countries. Some, on the other hand, still act like the farmers in the new settlements; i.e., they produce first to meet their own needs and sell only the surplus. So far, they are little interested in fertilizer and other modern inputs. There are yet others, many of them, who produce rice in an economically efficient way but who are forced, due to shortage of land, to sell rice in order to buy the cheaper foods. If farmers in this last group were ever fortunate enough to become cukupan in land there is a strong likelihood that their economic behavior would come to resemble that of the farmers in the second group. They would concentrate on producing enough rice for themselves and would be content with a surplus for sale, and not worry much whether they used the best modern methods or whether their cropping pattern was the most efficient economically. The marketable surplus of rice in the densely populated areas of Java consists then of three components, and not two as in East Sumatra, or one, as in the United States or Australia. Each of these three components, moreover, follows its own laws of growth, or decline.

It will not be possible to say that the population problem has been solved until all the people who depend on agriculture for a livelihood are able to earn enough to be able to eat rice at the preferred rate (125 kg per head approximately), and until the selling of rice to buy cheaper foods (the third component of the marketable surplus) disappears as a source of rice for "the market." However, as long as the pressure of population continues to increase, the contribution of the farmers operating minute areas to the marketable surplus will continue to increase, thus benefiting consumers in other economic sectors but in no way contributing to a solution of the population problem.

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