

**REPORT ON FEASIBILITY SURVEY
FOR
RICE MILL CONSTRUCTION
IN
LAMPUNG PROVINCE, INDONESIA**

DECEMBER, 1971

OVERSEAS TECHNICAL COOPERATION AGENCY

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CHAPTER I OUTLINE OF SURVEY

Section 1: Contents of the Financial Aid

As a result of the aid negotiations for 1971/1972 between the Governments of Indonesia and Japan, it was agreed that Japan would offer its financial aid for implementing Rice Processing and Storage Project (Project No. A-18 in IGGI List) in Lampung. As is clear in Annex No. 1, this project is intended for improving the milling facilities in Indonesia. As regards the actual execution of this project, the General Bureau of Agriculture, Ministry of Agriculture of Indonesian Government expressed the hope that in view of the fact that Lampung's milling capacity has already come to excess, the three million dollar aid would be appropriated, as shown in the project description for Item A-18, for improvement of milling facilities in other provinces such as Atjeh, South Kalimantan, West Sumatra and Lombok, or for improvement of winnowing and preparing facilities of sugarcane, pepper, coffee and tapioca in Lampung, and further requested that the aid be offered as a credit to cover the rehabilitation of existing facilities. ¹⁾ This latter request, however, was neither supported by BAPPENAS nor was considered practicable due to the nature of the proposed project aid. As a consequence, it was agreed that the aid would be extended for the following purpose.

1. Construction of a rice milling unit ²⁾ in 18 village units ³⁾ in the paddy field area of Lampung under the current aid plan and in 47 village units ultimately (See Table 1).

The milling unit should have a capacity of 500 kg/hr and be provided with the function to purchase stalk paddy and market processed rice.

2. Construction of rice milling plants ⁴⁾ in Punggur and Bandardjaja districts where paddy field reclamation work is in progress.

The optimum capacity of a milling plant agreed upon is 2 tons/hr.

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- 1) See Annex Nos. 1, 2 and 3.
 - 2) Though called "huller" in the aid request, the term "rice milling unit" will be employed in this report because it equals a small mill in performance and should therefore be discriminated from the existing hullers.
 - 3) A unit covering about 1,000 ha of paddy field; formed by integrating a number of désas for extension and guidance activity for intensified paddy cultivation.
 - 4) The new, high efficiency mills will be called "milling plants" to avoid confusion with the existing mills.

In consideration of the above-mentioned progress of negotiations and the duties to which it is assigned, the party took due note of the necessity of introducing new milling facilities for the improvement of agriculture and elevating the economic footing of farmers in Lampung. To be precise, Japanese government considered it essential to make a systematic approach to its future agricultural cooperation to Indonesia and attached importance to the need for integrating and synthesizing financial and technical aid projects. The party was therefore requested to carry out the feasibility study under the current financial aid with due regard given to its relationship to Rice Intensification Programme which was requested for 1971/1972 under IGGI List No. ATA-9.

From this viewpoint, the party considered that the plan proposed by the Indonesian government, which is intended for establishing 18 milling units and 2 milling plants in the paddy field area in and around Lampung Tengah, is not only closely related to the said Rice Intensification Programme but also conducive to the elevation of farmers' economic footing ensuing from the improvement of rice marketing mechanism, and carried out its activity to select the locations of the new milling facilities accordingly.

Section 2: Summary of Survey Results

The survey activities comprised the study of data and actual reconnaissance survey. Results of the survey are summarized below.

1. Lampung Province is situated in La. 4-5 S and belongs to the tropics. There is little fluctuation of the climate throughout the year. The wet season is presumed to last from December to March and the dry season from August to October. Rainfalls are mainly showers and the duration of sunshine is quite long even during the rainy season. Rainfalls are also quite frequent even in the dry season. Annual fluctuation of the climate is great.
2. The total rice production in Lampung Province is approximately 400,000 tons (in terms of stalk paddy) and land reclaiming to paddy field is in smooth progress. Yet, about 50% of the total supply of rice still depends on upland paddy, (rice production) is standstill and subject to a large annual fluctuation.

Meanwhile, the population of Lampung Province is increasing rapidly at an annual rate of 5.0% and as a result, rice production per capita is below 80 kg creating a shortage of rice in the province.

3. Introduction of high yield varieties such as PB*5 has brought about many changes on the traditional practice in harvesting and drying paddy. However, there is tendency on the part of the farmers to ship fresh paddy in bulk because of easy falling. This makes the handling of paddy by human hand more difficult and as a result, dealing of rice at low price becomes more prominent.
4. In Lampung Province there are not many large cities that are worth mentioning except TANDJUNG KARANG/TELUKBETONG (with a population of about 200,000) and for this reason, consumers markets are small in scale and are widely distributed.

5. In Lampung Province, there are approximately 50 mills and 800 hullers, which are small in scale and widely distributed.

The rate of total milling capacity of existing milling facilities against rice production is about 120%, which is considered rather high compared to the rate in other provinces. Domestic rice milling by farmers is seldom seen in the rice production area. The yield of milled rice for hullers and rice mills is close to the national standard, but quality of rice is below the minimum requirement set by BULOG. No positive attitude toward introduction of machinery with high efficiency is recognized.

6. Introduction of rice milling facilities with high efficiency by the Lampung Provincial Government with the loan is expected to bring about many benefits such as; (a) Increased supply of milled rice as a result of an increase in the yield of milled rice + broken rice by about 4% (Approximately 700 tons under the project); (b) Elimination of difficulties in preparing high yield varieties; and (c) Contribution to the promotion of farmers' organization.
7. As for the competition with the existing rice mills, establishment of all the 47 Milling Units under the project is not considered to impair the payability except for the lowering the rate of operation on the part of the existing hullers. However, if the Milling Unit is to handle only rice available within respective Village Unit, there will be a shortage of rice intensive competition cannot be avoided.
8. As for the number of rice milling facilities to be constructed with the loan, it is considered appropriate to provide a 0.5 t/hr Milling Unit in 16 locations out of the 18 locations originally requested and 2 sets of Milling Plant in one of the two districts requested in view of the preparedness of the site, competition with the existing facilities and road condition.
9. Rice Milling Unit is to be equipped with one threshers (1 ton/hr), one thermal dryer (2-3 ton with a drying capacity of 1%/hr), one dry gabah storage tank (45 ton), one rice milling unit (0.5 ton/hr), one truck (3.5 ton), one landrover (1 ton) and 2 motor bikes (90 cc). In addition, such facilities as machine room (260 m²), storage for stalk paddy (80 m²), office room (40 m²), drying yard (200 m²) garage (50 m²) and employees' housings (50 m²) are to be provided.
10. Rice Milling Plant is to be equipped with two threshers (2.5 ton/hr), four thermal dryers (2-3 ton with a drying capacity of 1%/hr), one dry gabah storage tank (200 ton), one rice milling unit (2 ton/hr), one truck scale (10 ton), two trucks (5 ton), two landrovers (1 ton) and five motor bikes (90 cc).

Besides, such facilities as machine room (680 m²), storage for stalk paddy (560 m²), office room (50 m²), paddy drying yard (1,075 m²), garage (100 m²) and employees' housings (100 m²) are to be provided. The total investment for these facilities is estimated at 133,332,314 RP.
11. The total capital investment required for the project including 16 Rice Milling Units and 2 Rice Milling Plants amounts to 880,113,485 RP. Of this, the yen credit amounts to Yen 582,317,640 accounting for 76.3% and the local currency amounts to 208,830,650 RP accounting for 23.7%.

12. The internal rate of return of the project is 17.2% and the dependency decreases in the order of price of milled rice, purchase price of paddy and the rate of operation.
13. Under the plan of the Provincial Government for the operating entity, the Milling Unit is to be placed under direct management of the Provincial Government (to be transferred to farmers' organization after 3 years) and the Milling Plant is to be managed by "Wahana Rahardja", a public corporation under the Provincial Government. For the efficient management of the facilities, however, it is advisable to assign a full-time coordinator within the Provincial Government and set up a committee comprising members from various government agencies to provide centralized management.
14. It is desired that the working funds (122,005,912 RP in total) and construction capital (880,113,485 RP in total) be provided at 12% year interest in view of the nature of this project which serves to the interests of the public.
15. Operating profit derived from the facilities should be used for internal reserves, payment of bonus to employees, distribution to farmers and reinvestment in local community especially encouragement of farmer's organization.
16. Contract rice milling by the facilities for the farmers will deal a hard blow at the existing hullers and deteriorate the payability of the facilities at the same time. However, the contract rice milling to a certain extent will be helpful in preventing the hullers from making excessive profit and in increasing farmers' share at the same time.
17. For the training of mill personnel, the first two Milling Units are to be designated as training facilities and necessary equipment and materials must be adequately provided. As for the substance of training, emphasis should be placed on practical work and it is advisable that the construction of facilities and installation of machinery are included in the training subjects.
18. It is very probable that the guidance on the management following the completion of the facilities and the training of mill personnel are covered by the technical assistance program when so requested.

As described above, the feasibility of the proposed plan was confirmed. However, considering the existing state and future prospect of individual districts in which new milling facilities are to be constructed, it does not follow that all the new facilities will enjoy smooth management and efficient operation.

As regards the existing milling facilities in Lampung which are not necessarily in a satisfactory state, hullers are generally noted to have a higher rate of operation than mills. This is considered assignable to the fact that the paddy cultivation in the province is intended rather for self-sustenance than otherwise and that the activity of mills is limited by the poor road condition. It is, therefore, expected that the expanded paddy consumption and increase in rice marketing on a small scale, which will result from the progress of the intensified paddy cultivation planned for the immediate future, will demand the existing hullers of a larger capacity.

However, since such improvement naturally depends on the improvement of paddy cultivation techniques and expansion of irrigation facilities, it will not necessarily give a promotional effect on all the milling units and milling plants. If no consideration is given to the existing hullers, introduction of new milling facilities is liable to invite unnecessary competition and social confusion. Construction of new milling facilities should, therefore, be carried out with regard given to the future elevation of their management capability and to the sequence and time of their introduction so that their operation will pave the way to establishing farmers' organizations in future.

CHAPTER 2 EXISTING STATE OF PRODUCTION AND
CONSUMPTION OF RICE IN LAMPUNG

Section 1 : Rice Production in Lampung

As shown in Table 2, annual rice production in Lampung (dry stalk paddy ¹⁾ averaged a little less than 417 thousand tons during the six year period from 1965 to 1970. Though a peak of 502 thousand tons was recorded in 1966, rice production of the province has always been subjected to a large variation coefficient, with no upward trend observed over the past years. This is believed to be attributable, among others, to the fact that upland paddy accounts for 47% of the province's total rice production. Compared with upland paddy, lowland paddy has maintained a stable production level since 1968 though it is also subjected to a high fluctuation rate of 6.5%.

Paddy production in each of the three kabupatens of the province is as described below.

Lampung Selatan occupies about 50% of the province's total paddy production, and lowland paddy accounts for about 70% of its paddy production. The kabupaten enjoys a very stable production level relative to the other two kabupatens, with the rate of its annual production fluctuation held at a low level of 5.7% for lowland paddy and 14.6% for upland paddy.

Lampung Tengah produces a little less than 30% of the total paddy production of the province. Percentage of its lowland paddy production pursued a gradual upward trend, increasing from 40% recorded around 1965 to about 60% in 1970. However, its paddy production, lowland and upland paddy combined, is subject to a large fluctuation rate of nearly 25%, and is most unstabilized in the province.

Production of Lampung Utara accounts for a little more than 20% of the province's total. Production of lowland paddy is increasing to an extent, but upland paddy is still dominant in this kabupaten.

As regards the harvesting area and yield of lowland paddy, which are the factors determining production, about 50% of the province's total harvesting area is found in Lampung Selatan, 40% in Lampung Tengah and 10% in Lampung Utara. (See Table 3). Over the past five years, the province's harvesting area increased by about 140 thousand ha, of which 9,500 ha is in Lampung Tengah and 2,600 ha in Lampung Utara, and Lampung Selatan, recorded an increase of only 1,700 ha in 1970. Lampung Selatan, however, recorded a high and stabilized average yield of 4.1 tons/ha over the past six years with a low variation coefficient of 6.5%. In contrast with this, both Lampung Tengah and Lampung Utara marked a low yield level of 2.4 tons/ha during the same period, and Lampung Tengah has shown an extremely unstable production trend as manifested by its high variation coefficient of 12.3%.

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1) In Lampung, paddy production is expressed in terms of dry stalk paddy. Unless otherwise specified, therefore, paddy production given in this report is expressed in weight of dry stalk paddy.

Harvesting area and yield of upland paddy are shown in Table 4. The total harvesting area of the province in 1970 is 140 thousand ha, or twice as large as that of lowland paddy. 24% of this area is found in Lampung Selatan, while the other two kabupatens each occupy 38%. Over the past five years, the harvesting area of upland paddy in the entire province recorded an increase of a little more than 100 thousand ha. While Lampung Utara showed an increase of 9,600 ha, and Lampung Selatan 4,400 ha. Lampung Tengah has followed a dwindling trend through some ups and downs until its harvesting area is now reduced by 3,700 ha. As for the average yield over the past six years, Lampung Selatan retained a high level of 1.9 tons/ha at a variation coefficient of 12.9%. Lampung Tengah suffered a poor and unstabilized yield level of only 1.0 tons/ha with a high variation coefficient of 26.7%, and Lampung Utara registered a medium and stabilized yield of 1.4 tons/ha with the lowest coefficient of variation of 12.0%. Viewed from the secular change in paddy production, a downward trend is observed in all the three kabupatens.

The description given above may be summarized as follows for each kabupaten.

(a) Kabupaten Selatan

This kabupaten produces 50% of the province's total paddy production, and occupies 50% of lowland paddy harvesting area and 24% of upland paddy harvesting area of the entire province. The increase rate of its paddy harvesting area, however, is small. This kabupaten enjoys the highest and most stabilized yield of both lowland paddy and upland paddy in the province. This may be attributed, on the one hand, to favourable climatic and soil conditions, and may have resulted, on the other, from the fact that the development of the kabupaten initiated by pre-war settlers has reached its limit and entered the technically stable stage.

(b) Kabupaten Tengah

Paddy production in this kabupaten accounts for about 30% of the province's total, with its harvesting area occupying 40% for lowland paddy and 38% for upland paddy of the whole Lampung. The kabupaten's lowland paddy harvesting area is expanding at a rapid pace, but its upland paddy harvesting area has slightly decreased in recent years. The yield is low and unstabilized for both lowland paddy and upland paddy, showing a high variation coefficient which is twice the value observed in Kabupaten Selatan. This poor and fluctuating paddy production is caused, for one thing, by the infrastructural instability incidental to the paddy field reclamation currently carried out, and for another, by the large fluctuation of climatic conditions, particularly that of rainfall, which is suspected to be conducive to the far larger fluctuation of upland paddy yield than is noted in Kabupaten Selatan. Table 5 shows the yield rates of milled rice as calculated on the basis of data of rice mills. This table suggests that lowland paddy produced in this kabupaten is extremely low in both yield rate and percentage of ripened grains.

(c) Kabupaten Utara

This kabupaten occupies only 20% in paddy production and 10% in lowland paddy harvesting area of the province's total, and is heavily dependent on upland paddy cultivation. Its harvesting area, however, is rapidly expanding. The yield is on a somewhat higher and more stabilized level than in Kabupaten Tengah, and this is considered ascribable to the deficient progress of development and the resultant selection of stabilized areas for paddy cultivation.

Section 2: Rice Consumption in Lampung

The annual growth rate of population in Lampung, as calculated from the figures for 1965 and 1970 shown in Table 6, is as high as 5.0%. Area-wise, however, the growth rate varies largely, with Kabupaten Selatan marking 4.5%, Kabupaten Tengah 8.5%, Kabupaten Utara 1.0%, and Tandjung Karang 12.5%. Thus, Kabupaten Tengah recorded most conspicuous population increase which, however, cannot be totally attributed to natural growth because the settlement of many Javanese farmers must have largely contributed to it.

Needless to say, supply of rice decreases if paddy production becomes stagnated while population keeps on growing. Per capita consumption of milled rice in the entire province was about 100 kg in 1965; in 1970, the consumption dropped to less than 80 kg. Kabupaten-wise, Lampung Selatan showed a decrease from 130 kg to 100 kg during the said period, and Kabupaten Tengah's per capita consumption also dropped to 60 kg due to its sharp population growth. Kabupaten Utara, however, has maintained a per capita consumption of about 100 kg because of the low rate of its population increase. The fairly high per capita consumption in Kabupaten Utara is only about of 180 kg/year which the government is striving to attain in its accelerated paddy production programme. Apparently, rice production in Lampung is short of demand, and this is particularly so in Lampung Tengah where the team encountered many farmers who stated that they mix tapioca and other crops with rice. In Lampung Selatan, all farmers interviewed by the team stated that their staple food consists only of rice. In 1970, Lampung exported no rice to other parts of the country or to foreign countries, and BULOG¹⁾ was forced to import about 8,000 tons of milled rice into the province during the off-crop season for the purpose of price control.

The fact that Lampung suffers absolute shortage of rice supply and that it has no large rice consuming centres excepting Tandjung Karang/Telukbetong (population : approx. 250 thousand) bears closely on the operation of rice mills in the province.

Section 3: Existing State of Rice Mills in Lampung

(1) Classification of Rice Mills

Rice mills in Lampung can be classified into two types, i. e., Penggilingan Padi and Huller Gabah.

a) Penggilingan Padi possesses threshers and its activity, for which the government approval is required, centers on the purchase and milling of stalk paddy (padi). It corresponds to the conventional rice mill unit appearing in the Central Government's statistice shown in Annex No. 5. As it is commonly called "mill",

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1) An organ under the direct control of the President. It procures rice for supply to public service personnel as their allowance in kind, and also carries out indirect measures intended for controlling rice price. Its activities are similar to those of the Food Agency in Japan.

it will be called by this name in the following pages. Most of the mills employ machines of Schule type, and some are using Engelberg type polishers. The majority of them have an annual milling capacity of 1,500 tons in milled rice, but some of them are much smaller in scale with their capacity limited to 180 tons a year (See Table 7). On an average, they have a capacity of 1,020 tons/year which is smaller than the average capacity of 870 kg/hr (1,220 tons/year) shown in the Central Government's statistics.

b) Huller Gaban mills paddy using, in general one Engelberg type polisher and a winnower combined into a set. Some of them, however, employ Pelita type equipment composed of a rubber roll type huller and a polisher or Kokuyo type equipment in which an impact type huller is included. They correspond to Engelberg huller units and Japanese rice mill units shown in Annex No. 5. They have a capacity of about 280 tons/year, and their operation, for which the approval of the kabupaten authorities is required, is chiefly intended for milling paddy brought in by customers against receipt of payment.

(2) Relationship between Rice Mills and Paddy Production

Lampung has about 50 mills and 800 hullers (accurate numbers of mills and hullers cannot be obtained from the existing statistical data. In some of ketjamatans covered by the survey, the team discovered twice as many hullers as shown in the statistics. See Table 8).

Mills cover less than 20% of the province's total milling capacity. They are concentrated in Lampung Selatan where development is advanced, and not a single mill is found in Lampung Utara. Most of them were established more than 20 years ago. In Lampung Selatan, the team found a mill whose establishment goes back to as early as 1921. Since their operation resorts to old machines which demand frequent repairs, mills are generally low in capacity and many of the owners are rather reluctant to take any progressive measures in management.

Hullers, on the other hand, cover about 80% of the province's milling capacity and are scattered in all the three kabupatens. In paddy field areas, each desa has one or two hullers. Further, in cities like Bandardjaja, Sukaradja Nuban where local markets are established, hullers are found in large numbers. Most of them were established after 1969. In the paddy field areas of Lampung Selatan, hullers have been steadily increasing in number since 1964. Hullers in Lampung are small in capacity and scattered all over the province, and this is considered to reflect the situation peculiar to this province, i. e., no large cities are found and the province itself forms a rice consuming market. (This creates a sharp contrast to the rapid increase of large mills observed recently in Kabupaten Krawang of West Java near Djakarta.)

In all the three kabupatens, the milling capacity surpasses paddy production, showing a rate of 109 to 128%. It may therefore be said that the number of rice mills is in excess of demand in the province. Table 9 shows the programme for accelerated paddy production and rice mill construction for entire Indonesia under the Five Year Economic Development Plan ending in 1973/1974. The table indicates that rice mills had only 21.7% of the demanded capacity in 1968 when the Plan was not yet put in practice, and that they are expected to display only half the required capacity even upon completion of the Plan in 1973/1974. Compared with these values there is no doubt that Lampung

has an overwhelming high milling capacity. It is to be noted, however, the expansion of the milling capacity observed in Lampung was brought about by the rapid increase of hullers which took place after the Five Year Plan was put into execution, and this trend is noticeable in every part of the country. Annex No. 5 shows province-wise statistics of rice mills and warehouses at the end of 1970/1971. The total rice processing capacity of the country shown in this annex is as high as 5.9 million tons/year, and this is 1.5 times the value planned for 1970/1971, or 3.9 million tons/year (See Table 9). This suggests that the nation's total rice milling capacity has grown remarkably while paddy production has been continuously on a stagnant level. It can therefore be said that the Five Year Plan has already been accomplished fully and beyond its goal insofar as rice mills alone are concerned. The phenomenal increase of rice mills can be explained by the simple fact that the milling business is quite profitable if it is run by a capable owner with necessary working fund.

(3) Mills in Lampung

During its stay in Lampung, the team conducted a survey on two mills each in Lampung Selatan and Lampung Tengah by interview method, and also held a meeting with about 30 representatives of other mills.

The general condition of the four mills surveyed is as shown in Table 10.

Mills are generally not very progressive in their management. This is ascribable, for one thing, to the fact they are now deprived of the chance to make profit from the rice market operation because BULOG imports rice into the province during the off-crop season when the rice price would otherwise soar up, and for the other, to the high interest on the working fund borrowed for purchasing paddy. The party learned that a fund amounting of Rp 40 million is required for operating a 1 ton/hr capacity mill for 200 days. One of the reasons for the lack of volition for improvement may be found in the existing situation of milling business in which mills are no longer allowed to enjoy a monopoly of the business by the pressure of ever increasing numbers of hullers. The two mills surveyed in Lampung Tengah presented a typical example of mills placed under the pressure of hullers, and the party learned that they operate only two to three months throughout the year. Both of the two mills are equipped with old and shabby looking machines of which depreciation was completed many years ago, and are operating on a subsistent level. The owners appeared to be satisfied if only they can earn enough to make living.

Competition for existence is now in progress among the mills in Lampung Selatan. In Wonosobo, two of the three mills have gone out of existence, and in Pringsewu, all the five mills have stopped operation. The two mills surveyed by the party, which have survived the competition, have a large number of working days, and both purchase high quality rice such as Padi Bulu and ship it to Tandjung Karang/Telukbetong, the only large consuming centre in the province. Though both mills deserve commendation for their forward-looking management, they are using old machines which produces a low yield rate and poor quality (mixture of broken rice) (See Table 12).

It is to be added that another reason for the present stagnated state of mills is that they receive no orders at all from BULOG for processing stalk paddy.

The 7 tons/hr capacity mill located in Kabupaten Krawang of West Java, whose operating condition is shown for reference in Table 12, is run directly by the 12th

Division of Indonesian Army. As this mill is operated with the working fund provided by the army and its product can be sold in Djakarta or to the army on good terms, it is in full load operation.

(4) Hullers in Lampung

During its survey in Lampung, the team visited eight hullers, of which four attracted the team's attention for their characteristic operation. Outline of these four hullers is shown in Table

Most hullers are operating on the orders of farmers (and BULOG or brokers in exceptional cases) at a charge which is as high as 10% (or 15% in some districts) of the milled rice. This high rate of processing charge allows for quick recovery of capital and fixed expenses excluding personnel cost and other variable costs. In the case of the huller in Purbolinggo, for example, 40% of the initially invested capital was recovered in a matter of a year though this huller's operation rate is no larger than 42% which is sufficient for processing only 100 tons annually. It is likely that hullers in Trimurudjo and Seputih Raman will recover the total capital invested in a year.

Operation of a huller requires simple machines and facilities for which an initial capital investment of Rp 500 to 800 thousand only is required, and once a huller is established and operated for year, it brings about a large profit which is sufficient to build a new house. This explains why hullers increased so rapidly over the past years.

Hullers operating at a charge on the request of customers require no highly efficient and costly machines. To put in more detail, if a huller raises its milling yield by 10%, its commission rises only by 1% because the charge is set at 10% of the milled rice. Further, since it is the common practice that the huller takes rice bran, a by-product of rice milling. The poorer the performance of machines, the higher the income from rice bran. As things stand now, therefore, there is little possibility that hullers will introduce highly efficient milling machines though it will naturally be to the advantage of farmers as described later.

The team noted that the huller in Raman Utara purchases paddy. In this case, the processing charge as calculated from the sales and purchase prices and from the yield is about 8% of milled rice. Hence, hullers gain more by operating on the orders of farmers.

(5) Milling Yield and Quality of Milled Rice

The milling yield of mills and hullers in Lampung is as shown in Tables 10 and 11. In the province, the milling yield ranges from 43 to 50% if dry stalk paddy is processed into milled rice and from 52.5 to 61% if dry paddy is processed into milled rice. These values are close to the country's average since the milling yield in processing stalk paddy into milled rice shown in the all Indonesia statistics is 52% (See the note to Table 9). The milling yield attainable by Japanese type plants is 60% if stalk paddy is processed into milled rice and 70% if paddy is processed into milled rice (See Tables 7 and 8). It follows, therefore, that the above-mentioned values of milling yield in Lampung must be considered much lower than the world level.

Table 12 shows the result of quality inspection conducted on paddy and milled rice provided by mills and hullers during the survey.

Material paddy included only a small percentage of completely broken rice. On two occasions, however, the team noted that the material paddy included more than 30% of heavily cracked grains which are produced in the process of winnowing conducted. Paddy is spread on a concrete floor for solar drying and is stored in an open yard exposed to rain, and this gives rise to the development of cracking. Padi Bulu observed at the mill in Gedontataen was completely free from immoderate cracking. This mill has a large warehouse of paddy (See Table 10) and does not store stalk paddy in an outside yard. Since Padi Bulu is considered to have the highest quality of all varieties grown in the country, the team felt that the complete absence of immoderate cracking at the said mill was perhaps due to its high anti-cracking property.

At the aforementioned mill in Kabupaten Krawang of West Java, the team noticed that the material paddy included a higher percentage of broken rice than in Lampung. This is believed to be the effect of the lower relative humidity in Kabupaten Krawang since there is a difference of about 1% in milled rice water content between the two places.

As regards the rate of broken rice mixed in milled rice, BULOG has established a standard shown in Table 13. All the rice mills observed in Lampung failed to meet the said standard, with the lowest admixture rate of rice broken to a size smaller than half the original grain size being as high as 33.2%. During its survey in Kabupaten Krawang, on the other hand, the team inspected the performance of Japanese type machines and noted that they generally satisfied Grade A standard of BULOG despite of the poor quality of material rice.

Due to the absolute shortage of rice and absence of large consuming centres, there is lack of volition for improving quality in Lampung and this presents itself as a most likely reason for the poor quality of milled rice noted by the team.

Section 4: Climate in Lampung

Though Lampung is situated in a tropical zone, lying between Lat. 4° S and Lat. 6° S, its climate is mild and not subjected to the strike of typhoons.

Table 14 shows the record of meteorological observations carried out from July 1969 to September 1970 at Mitsugoro Farm in Sribhawono. Mitsugoro Farm is located on the east coast of Lampung and somewhat far from the construction sites of rice mills. The table, however, will serve to provide general climatic condition in the vicinity of the sites.

Temperatures: Annual average of maximum temperature is 31.4°C, and ten-day average of lowest temperature, on the other hand, is 23.1°C, and ten-day average is within the range of 1.2°C higher or lower than this value.

Rainfall: Annual rainfall exceeds 3,000 mm, with peaks recorded during the January - maintains a level 2.5°C higher or lower than this value. Annual average June season. The wet season in Lampung lasts from October to March, but this does not necessarily coincide with the actual trend of rainfall.

As is clear from Table 15, rainfall at three different places of the province is larger than 2,000 mm, though the value observed at Metro in Lampung Tengah is somewhat smaller. The table presents a noteworthy fact that a rainfall exceeding the 100 mm level is recorded in many months during the dry season. Area-wise, rainfall not reaching the 100 mm level is recorded only in one month at Kotabumi in Lampung Utara, whereas values higher than 100 mm are observed in as many as five months during the April - October period at Metro in Lampung Tengah. At Kedondong in Lampung Selatan, rainfall smaller than 100 mm is recorded during the four month period from June to September. It is to be noted that during the said four months, rainfall at this place is particularly small relative to other months of the year.

Number of rainy days (1 mm or more) observed at Mitsugoro Farm is 165 days a year, and during the December - June period, rain falls on more than 15 days a month. At the same farm, no rainfall for a period of 15 days or more in succession was observed three times in the past, i. e., in September 1969 (15 days), October 1969 (17 days) and August 1970 (20 days).

Duration of Sunshine: Annual duration of sunshine at Mitsugoro Farm is 1,226.8 hours. With the shortest duration of sunshine averaging 1.5 hours a day during the months with abundant rainfall, the farm is favoured with a substantial amount of solar radiation even in the wet season. Annual number of cloudy days with less than 1.0 hours of sunshine duration is 90 which is much smaller than the annual number of rainy days. Monthly number of cloudy days is little more than 10 during the January - June period.

Relative Humidity: Annual average of lowest relative humidity at Mitsugoro Farm is 54%, and 10-day average is on a level 10% higher or lower than this value. Annual average of highest relative humidity, on the hand, is 86%, with ten-day average being 5% higher or lower than that. Only 11 days of the year register a minimum humidity of 70% or more, and 12 days register a minimum humidity of 40% or less. Maximum humidity of 90% or more is observed on five days throughout the year.

The climate of Lampung described above may be summarized as follows.

- a) Temperature fluctuation is small throughout the year, but is large between days and nights.
- b) Rain falls abundantly, but since it showers and not drizzles, substantially large amount of solar radiation can be expected even in the wet season.
- c) The minimum humidity is not too low, and the maximum humidity is rather low.
- d) It may be said that frequent and large rainfalls are observed during the December-March period, and small rainfalls are observed at long intervals during the October-August period.

Under the above-mentioned climatic condition, it is liable that paddy becomes wet by rain and then exposed to sunlight in its drying and storage process. Since this

gives rise to the development of cracked rice grains, care must be taken in the drying and storing process. As for the water content of milled rice, it is considered that equilibrium state is reached at about 14%.

Section 5: Harvesting, Drying and Winnowing of Paddy in Lampung

(1) Cropping Season of Paddy

The cropping season of paddy in Lampung is as shown in Table 16. The cropping season of lowland paddy is determined by the transplanting period. The dry season paddy is harvested in the wet season, while the wet season paddy is reaped in the dry season. In Lampung, however, there is no clear distinction between the wet and dry seasons, and rainfall is quite large even in the dry season. There is a time lag of about one to two months between the cropping seasons of Lampung Tengah and those of Lampung Selatan, with the latter leading the former.

Upland paddy, planted only for wet season cropping, is sown in the beginning of the wet season and harvested towards the end of it.

(2) High Yielding Varieties

The party was impressed by the fact that the farmers' attitude towards introducing improved and high yielding varieties like PB-5 varied by the desas visited.

In desas where the cultivation of PB-5 or other improved varieties is carried out only on a small scale, farmers stated that the high yielding varieties "provide no larger yield than the local varieties" and "are poor in quality". The team felt, however, that their reluctance has also resulted from their established relations with the mills which handle stalk paddy (this was noted in Sekampong, Gedonotataan and other places).

Conversely, in desas where farmers stated that local varieties will be shifted to PB-5 or other high yielding varieties in future, "increased yield" was given as an incentive factor. It appeared, however, that the readiness on the part of farmers to introduce improved varieties is backed up by their relations with hullers (this was observed in Purbolingo, Worosoba and other places).

High yielding varieties including PB-5 are short-statured, tolerable for heavy dosage of fertilizer application, early maturing, and can be readily threshed. Consequently, they call for some changes to be effected in the harvesting, drying and winnowing methods.

Since they are short-statured, spike harvesting by means of an ani-ani demands the farmers to work in an unnatural posture. For this reason, some desas are introducing the stubble harvesting methods.

Further, as they can be threshed without difficulty, there arose a trend for threshing on the field, whereby the threshing on the farmer's level became practicable. Though undried rice bundles of these varieties can be readily threshed by stepping on them, threshed and unhulled rice grains cannot be handled easily particularly if they are to be handled by farmers themselves. Farmers spread unhulled rice grains on

a bamboo-made mat to dry them. If rice mills are to dry large quantities of rice grains of improved varieties, they must install conveyors and drying machines; and this is probably the main reason for the preference given to local varieties by rice mills over PB-5. It is to be added that the easy threshability invites increased loss during harvesting and transportation. Easy threshability must naturally be assured to a certain extent so long as the threshing work resorts to human power. Considering, however, the fact that in one of the reports published recently, it is stated that the loss of rice grains in the field and in the course of transportation to the farm household was discovered to be as large as 15%¹⁾, closer attention will have to be directed to the improvement of threshability in the future breeding of varieties.

As the high yielding varieties are also characterized by their early maturing, the transplanting period must be altered if they are planted in an extensive area for wet season cropping because they would otherwise be matured for harvesting during the wet season. It appears that the harvested coarse paddy grains of improved varieties, which cannot be easily handled by hand, are further handicapped by their high water content which makes the drying work very troublesome. It is therefore necessary to shift their cropping season and delay their planting time so that harvesting can be done in the dry season.

(3) Harvesting Method

Paddy cultivation practices in Lampung are similar to those of Java because many Javanese have settled in the province over the past years. Spike harvesting resorting to an ani-ani prevails, but the team was informed that spike harvesting using a sickle accounts for 5% of all harvesting work in Batanghari and 30% in Raman Utara.

Wages of ani-ani (farm labourers who engage in harvesting work and the Indonesian harvesting implement are both called "ani-ani") are paid under a share system. The team learned through interviews that the share offered to the labourers in payment of their harvesting work ranges from 1/5 to 1/8 of the harvested crop and mostly 1/6. The team also learned that the share varies by the demand-supply condition of labour force. These values are high compared to the share in Java which ranges from 1/5 to 1/12, and suggest that recruitment of sufficient labour force is rather difficult in Lampung.

The harvesting efficiency of ani-ani is said to be about 50 labourers per ha. Assuming that the yield per ha is two tons and the sales price of stalk paddy Rp 14/kg, an ani-ani labour gets Rp 70 to 112 per day, and this is approximately the same as the daily wages of female labourers during the transplanting season (Rp 75 - 100).

Regarding the practice of ani-ani, the team heard many opinions which can be considered to represent two different viewpoints. People supporting one of the two viewpoints maintain that the spike harvesting is conducted by the ani-ani on a number of time because of the lack of uniformity in paddy maturation and is therefore a rational practice. People holding a contrary view to this assert that great loss is incurred by this practice since many ani-ani labourers strive to harvest better spikes than others and liable to stump on unharvested spikes.

1) Sumisho Kapin Agricultural Development Co. : Annual Report on Rice Cultivation Project in Krawang, Dry Season of 1969 - Wet Season of 1969/1970.

In case of improved varieties like PB-5, wages of farm labourers are paid in coarse and undried paddy grains after threshing. Higher efficiency seems to be attained in the harvesting of these varieties, with a manpower of 32 persons required per ha.

(4) Threshing and Drying

Harvested and undried paddy spikes of PB-5 and other readily threshable improved varieties are threshed in the field or farmhouse yard by stepping on them or with a wooden pounder (Tumbok), and then dried on a mat. In case of local varieties which cannot be easily threshed, harvested stalk paddy grains are dried at first and then threshed with a mortar and a pounder. Threshing efficiency of local varieties is 100 kg per labourer per day, for which Rp 100 is paid. Wages paid for threshing work is therefore Rp 1/kg.

Because of the peak load duration of hullers, a period of one to two months is required for the threshing and drying of harvested paddy.

Stalk paddy sold to mills is delivered in the harvesting season in dry or half dry state or after drying. Since the paddy supplied to mills loses 15% of its original weight after it is dried for about five hours on a concrete floor, paddy is sold at a water content of 27% (wet base). During its stay in Lampung, the team was not able to find any mills or hullers employing a dryer.

(5) Husking and Milling

Husking and Milling are carried out simultaneously. Though these two operations can be performed by farmers with a mortar and a pounder, there are virtually no farmhouses in the paddy field area of Lampung that husk and mill coarse paddy grains for themselves. Insofar as the team learned through interviews, farm households in Puger where very few hullers are found mill 75% of rice for their own consumption, but farm households in all other parts of the province leave the husking and milling work to hullers. It is probable that in upland field areas where hullers are limited in number, a certain quantity of rice which farmers reserve for their own consumption are milled on their own, but with the expansion of paddy field area and resulting increased establishment of hullers, they eventually give up milling rice for themselves. Husking and milling work is a heavy labour imposed on female family members, and is liable to invite a very large percentage of broken rice as shown in Table 12. For farm households, therefore, leaving this work to hullers against payment of a certain fixed charge is quite advantageous.

Section 6: Marketing Rate and Price of Rice in Lampung

(1) Rates of Self-consumption and Marketing

Table 17 shows the result of survey conducted on the rates of self-consumption and marketing of rice.

Farmers sell part of wet stalk paddy to mills in the harvesting season. The marketing rate of rice varies by place and cropping season, but generally stands at about 30% of the total rice crop. Of the remaining 70% which is reserved by farmers, about 30%

is sold again to mills after drying or threshing, or milled at hullers for marketing. The finally remaining 40% is for farmers' own consumption.

The rate of self-consumption is high in upland field areas such as Sukadana, Septih Raman and Gunung Sugih. The rate is higher for dry season cropping since its planted area is small and for upland paddy since it tastes good and preferred for self-consumption. In Lampung, tenant farmers generally occupy a small percentage in the entire agricultural population (though the percentage is as high as 50% in Gedontataan of Lampung Selatan which was developed in the earliest period in the province). It is considered that the low marketing rate of rice observed in the harvesting season is ascribable to the limited number of mills and their sluggish purchase activity. Officials of the Central Government stated that the estimated rate of self-consumption is 70 to 75%, but the team found, through its interviews with farmers, that the rate is far lower than the government estimate and generally stands at 40%.

(2) Sales Price of Rice

Tables 18-1 and 18-2 show the prices of stalk paddy, paddy and milled rice as disclosed by interviews conducted at various places of the province.

Through the said interviews, the team discovered that there is a wide gap in the price at which stalk paddy is sold by farmers to mills. The sales price ranges from the lowest of Rp 8/kg to the highest of Rp 21/kg. It was noted that PB-5 is sold at a price cheaper by about Rp 1/kg than other varieties, and that wet paddy produced in Lampung Tengah is cheaper by Rp 2-5/kg than that grown in other parts of the province because of its low rate of milling yield.

The sales price in the harvesting season ranges from 60 to 80% of the price offered in the off-crop season. This, however, is not very low considering the fact that the paddy marketed in the harvesting season has so high a water content that it loses 15% of its weight after drying and a drying cost of Rp 0.1 - 0.25/kg is incurred on mills. This can also be substantiated by converting the BULOG's floor price to the harvesting season price. The floor price of stalk paddy established by BULOG is Rp 16/kg which, if adjusted on the basis of weight loss and drying cost, would be reduced to Rp 13.5/kg.

The price gap mentioned above for stalk paddy is still wider in case of paddy, ranging from the lowest of Rp 9/kg to the highest of Rp 25/kg. It deserves attention that like stalk paddy, paddy of PB-5 and wet paddy of Lampung Tengah is purchased at a low price which ranges from 40 to 80% of the ceiling price. It appears that PB-5 in particular is beaten down to a low price in the harvesting season.

It is said that the yield rate of coarse paddy grains attainable by the threshing of stalk paddy is 75% if conducted by farmers themselves. Assuming, therefore, that a threshing cost of Rp 1/kg is required, the floor price of Rp 1/kg set by BULOG for stalk paddy would be Rp 22.4/kg in coarse paddy. The actual sales price of paddy is lower than this value and was noticed to generally stand at Rp 20.5/kg. Thus, the threshing work conducted by farmers does not even pay for their labour.

The sales price of milled rice varies largely by whether it is marketed in urban or rural districts, and ranges from the lowest of Rp 30/kg to the highest of Rp 55/kg. PB-5 is cheaper by Rp 2-10/kg than other varieties, and this price gap appears to become

widened particularly in the off-crop season throughout the province except in Bandardjaja. The gap between the floor price (lowest price in the harvesting season) and the ceiling price (highest price in the off-crop season) also varies largely by place. At some places the gap is as small as Rp 1-2/kg and at some other places, it is as large Rp 10/kg. Hullers provide a milling yield of 60% in processing paddy into milled rice at a charge of 10% of the milled rice. Consequently, if farmers wish to market harvested paddy on the basis of the said dry stalk paddy price of BULOG (Rp 16/kg) after having it processed at a huller, they would have to sell the milled rice at Rp 41.5/kg, and this means that they must sell the milled rice in the off-crop season to carry on rice production on a paying basis.

CHAPTER 3. INTRODUCTION OF JAPANESE MILLING UNITS IN LAMPUNG - Its Significance and Locations of Units -

Section 1: Significance of Introducing Japanese Milling Units

With a milling capacity of 120% provided by the existing rice mills against total rice production, farmers in Lampung are now almost completely free from the labour of milling work. Considered from the capacity of existing mills, construction of new rice mills can well be dispensed with in the province and priority for new rice mill construction should be given to other districts than Lampung where the milling capacity is still deficient (such as Atjeh, Sough Kalimantan, West Sumatra, Lombok, etc.).

It is to be noted, however, that mills in Lampung are invariably equipped with superannuated machines and hullers have a poor milling capacity. Both have a low milling yield, and poor quality is inherent to the rice polished at them. The poor quality of milled rice is invited by the fact that rice is mostly consumed within the province. Though there may not be need to provide high quality rice, it leaves no doubt that remedy should be brought to the prevailing low rate of milling yield, in other words, high extract rate of rice bran, to minimize the loss of rice whose supply is already deficient. (Both demand and price of rice bran are low in Lampung).

Table 19 shows a yield rate comparison of the existing mills and Japanese mills. As is clear in this table, Japanese mills are higher by 6% in milling yield and 4% in the total quantity of milled rice including broken rice. Considered from a macromatic viewpoint, this means that the introduction of Japanese mills will serve to increase the supply of milled rice, cut down the import of foreign rice, and further enables farmers to receive more milled rice from hullers by which the greater part of milling work is performed in Lampung. In the face of lack in willingness on the part of mills and hullers to improve their milling yield, the team believes that the introduction of highly efficient milling machines by the government can be fully justified for the augmented milled rice production (improvement of yield rate) and for the increased farmers' income.

In its request for Japan's aid, the Indonesian Government presented a programme in which a good number of milling units are required to be established in village units formed by integrating a number of desas. The village unit forming plan, however, is still in the initial stage of progress. During its stay in Lampung, the team noted that the plan had progressed only to the extent of determining its organization and appointing staffs, and surveys conducted in various desas failed to disclose the details of the organization. Success of the plan therefore depends on how it is carried out in future. The team also noted that the village unit itself involves problems of regional organization since it constitutes part of BIMAS Project and is planned to be formed by integrating favourably conditioned desas in paddy field areas without giving regard to desas where agricultural production centers on upland crops.

Notwithstanding all these drawbacks, the planned integration of desas into larger village units is considered to be a prerequisite to accelerated development of the existing self-sustaining economy into a commercial economy and to the extension of techniques and production increase. With local autonomous bodies provided with extremely limited capability and competence and virtually no farmers' organizations existing at present, it is to be hoped that the village unit forming plan will make a smooth progress and provide a break through for future development.

It is not anticipated, for reasons described later, that the milling unit will come to be owned and operated by the village unit in the immediate future. It is quite conceivable, however, that part of its profit will be reinvested in the locality it is established to provide financial support to terminal administrative organs. Hence, if considered in relation to the Tani Makmur Technical Assistance Project which will be implemented in Lampung in the coming years, the milling unit may as well play the role of a base of the project. Provided that milling units are operated on a sound management basis, the rice mill construction project and the said technical assistance project will produce a combined accelerating effect on the agricultural development of Lampung.

At present, PB-5 and other improved varieties which are expected to play a major role in the accelerated paddy production for their high yielding capacity are threshed before drying because of their good threshability, but the existing mills shy away from purchasing them because their handling is not easy. If a large thermal dryer is introduced in the milling unit, it will serve for expanding the planting area of these improved varieties.

In constructing milling units of milling plants, however, due consideration should be given to the existing mills and hullers. If the request of the Indonesian Government is fully met with respect to the number of milling units to be newly established, the rate of operation of the existing mills, which is already quite low, will be further cut down by more 10%, inviting server competition than ever.

It is to be noted that many hullers have not yet completed depreciation since they were mostly constructed a year or two ago. If the newly established milling units are to carry out the milling operation at a charge, then a yield rate of 70% or more can be expected from polishing paddy. Assuming that the milling units receive orders for milling work at a rate of 10% currently charged by hullers, then farmers bringing in 100 kg of paddy can expect to receive 63 kg of milled rice ($100 \text{ kg} \times 0.7 \times 0.9 = 63 \text{ kg}$). This value can never be expected of the existing hullers even if they offer milling service at no charge at all because their milling yield is held at a low level of 60%. If the new milling units offer millint service, therefore, they will be receiving rushing orders from farmers while the existing hullers will be deprived of their customers and find it difficult to keep on operating on a paying basis. Hence it is an imperative that the construction of milling units should be accompanied as will be described later, by some effectual measures for supporting the commercial operation of the existing hullers.

Compared with the existing mills, the milling units will excel in both milling yield and admixture rate of broken rice. It is probable that the milling units will soon stand at advantage over the existing mills now engaged in the marketing of milled rice to consuming areas if the former start selling rice at the same price charged by the latter.

As a relief measure for the existing mills and hullers, it will be necessary to assign their owners and engineers for suitable posts in the new milling units and milling plants after giving them necessary training and education. Further, the new milling units and plants, if equipped with dryers, will exhibit their managerial advantage in the processing of PB-5 and raise its sales price in the harvesting season and will also be enabled to reinvest part of profit in the localities where they are established.

Section 2: Criteria for Selecting Locations of Milling Units

In selecting the locations of milling units, consideration should be given to the following four points.

(a) Preparations on Indonesian Side

The first phase construction of milling units is considered for the 18 village units as requested by the provincial government of Lampung. It is to be added, however, that account seems to be taken by the provincial government of the total amount of aid and of trial introduction of the milling units. All individuals interviewed in different ketjamatans and desas expressed the unanimous and strong hope that the milling unit will be established in all village units.

A period of at least one year will be required before the milling units constructed with the first phase appropriation of financial aid are put in operation, and it is likely that by that time, there will be formed substantially large numbers of village units which are well organized to the extent of promising smooth operation of milling units, and this should be taken into due consideration in selecting the locations.

(b) Competition with Existing Mills and Hullers

It entails difficulty to predict the possible competition with mills since their paddy collecting activity is conducted on the kabupaten level. Hullers, however, will be directly involved in competition with the new milling units since they collect paddy in the area they are located and from neighbouring desas.

(c) Management after Construction, Technical Guidance and Supply of Parts

It is to be borne in mind that a milling unit constructed at a place which is isolated and difficult of access is liable to encounter inconvenience and difficulty in the management after construction, technical guidance and supply of parts.

(d) Road Condition

During the survey, rain prevented access by car to not a few desas where milling units are planned to be established. Poor road condition is detrimental not just to smooth collecting and shipping activity of milling units; it is a great restrictive factor in the transport of machines and equipment required for mill construction. Construction of milling units should therefore be preceded by the improvement of roads.

Section 3: Locations of Milling Units in Lampung Tengah

Table 20 shows the existing state of ketjamatan-wise paddy production.

Village units are expected to be organized in ketjamatan Nos. 1 to 8 shown in the said table. These ketjamatans, constituting the 15,000 ha paddy field area of Metro district, produce 80% of the kabupaten's total lowland paddy production and enjoy a

relatively high unit yield with more than 40% of total planted area being cultivated for double cropping. Further, the rate of upland paddy cultivation is low in all these ketjamatans excepting Sukardja Nuban. In the total paddy production of the kabupaten, however, these ketjamatans occupy only 64%.

The first half of Table 21 shows the paddy consumption by farmers. This table was prepared from the data obtained by interviews and therefore includes many unknown values. Nevertheless, it indicates that in the eight ketjamatans where village units are to be formed, the rate of self-consumption of rice ranges from 30 to 70% and the per capita milled rice consumption is low varying from 55 to 130 kg, whereas in other ketjamatans, the rate of self-consumption of rice is rather high, ranging from 25 to 100% and the per capita milled rice consumption is held at a low level of 47 kg or less.

The latter half of Table 21 shows the present distribution and operation rate of hullers and mills and index values for estimating the competition which will arise from the construction of all the planned number of milling units.

The "present rate of operation" averages 89% in ketjamatan Nos. 1 to 8 and 91% in the entire kabupaten. Ketjamatan-wise, Raman Utara has a high rate of 146% which indicates shortage of rice mills, and Sukaradja Nuban has an exceedingly low rate of 40%. (It is to be noted that the operation rate of mills, shown ketjamatan-wise in Table 21, was calculated for convenience's sake, though such calculation method cannot be fully justified because mills collect paddy on the kabupaten level).

The "rate of operation after constructing all the 24 milling units in the kabupaten", as calculated on the basis of the present situation mentioned just above, declines to an average of 64% in the eight ketjamatans and 75% in the whole kabupaten. Viewed ketjamatan-wise, the operation rate dwindles more with the increased construction of milling units, and this trend is conspicuous in Raman Utara. Farmers in the eight ketjamatans shown in the first half of Table 21 consume half of harvested paddy for themselves and sell the other half. Assuming that 50% of paddy harvested in these ketjamatans (which is for farmers' own consumption) goes to hullers and the other 50% (which is for marketing) is collected by the existing mills and new milling units with the understanding that farmers in this district do not carry out milling work on their own, calculation shows that the rate of operation of hullers in all the eight ketjamatans averages 57% and reaches a value of more than 45% if Sukaradja Nuban is excluded. A huller is assumed to have a processing capacity of 280 tons/year in this calculation, and the said rate of 45% assures an average processing capacity of 126 tons/year for hullers. Table 11 indicates that a huller having a processing capacity of 100 tons/year succeeded in recovering 40% of its initial capital investment in a matter of year, and this is good evidence to show that hullers can be managed on a good paying basis at an operation rate of 45%. As for mills and milling units, the rate of operation in all the eight ketjamatans averages 72%. Assuming that paddy is collected on the kabupaten-level with 20% of paddy production in other ketjamatans considered to be brought into these ketjamatans, the rate of operation can be calculated to be 89%. Viewed ketjamatan-wise, the rate will rise to 100% or more in Sekampung and Purbolinggo where no mills are existent at present, but could be as low as 45% where mills are already in operation.

However, as will be clear from Table 10, both of the two mills surveyed in Lampung Tengah are sluggish in their activity, and their rate of operation is as low as 33%. Since other mills in the kabupaten are just as sluggish as these two mills, it cannot possibly be considered, insofar as is indicated by calculations, that the construction of milling units will produce any fatal effect on the management of mills.

If 33% is taken as the rate of operation of the existing mills, milling units will be operated at a rate of more than 100% as shown in the following calculation upon completion of all 24 of them.

$37,314 \times 0.5 = 18,657$ (tons)	Quantity of paddy collected by mills and milling units from the eight ketjamatans (in terms of milled rice).
$31,597 \times 0.2 = 6,319$ (tons)	. . Quantity of paddy collected from other ketjamatans.
$11,200 \times 0.33 = 3,696$ (tons)	. . Quantity of paddy processed by mills operating at a rate of 33%
$18,657 + 6,319 - 3,696 = 21,280$ tons	. . . Quantity of paddy collected by milling units
$21,280 \div (700 \times 24) \times 100 = 126$ (%)	. . . . Rate of operation of milling units

To be brief, calculation shows that co-existence can be guaranteed by reducing the profit rate of hullers even if all the new milling units are constructed. It is to be added, however, that the above calculation also shows that the rate of operation of hullers will be reduced extremely in Sukaradja Nuban.

(The above calculation was worked out with the milling yield attainable from processing stalk paddy to milled rice set at the nation's average of 52%. Since wet paddy produced in Lampung Tengah is known to provide a poor rate of milling yield, actual implementation of the project will entail greater difficulty than suggested by the calculation.)

Table 22 shows the paddy production by village unit and the stability of the milling unit in each village unit. In preparing this table, hullers were assumed to collect 50% of total paddy production as in the calculation of operation rate since their number could not be obtained, and mills were disregarded since they collect paddy on the kabupaten level. Calculation disclosed that in order to assure that a milling unit is put in full load operation with paddy collected within the village unit in which it is established, that village unit should produce more than twice the processing capacity of the milling unit, or 2,700 tons in stalk paddy. This calculation was worked out with the milling yield rate set at 52%. Since milling units can be expected to exhibit a yield rate of 60%, it is considered that milling units in those village units capable of supplying 2,300 tons or more of paddy can enjoy "fairly stabilized" operation.

In Table 23, village units are classified into three groups according to the said stability standard. Account must be taken of the fact that of all the village units comprising two groups, the one included in the first phase milling unit construction plan and the other in which the remaining number of milling units should be constructed, 60% are not capable of ensuring concurrent operation of hullers and milling units, unless paddy is supplied from other village units. Such village units, whose paddy production is deficient for the construction and operation of a milling unit, are mostly found in Purbolinggo, Raman Utara, Sukaradja Nuban which are situated on the periphery of the paddy field area and where the paddy field reclamation started not long ago and no severe competition with the existing mills is expected to take place.

Stability problems of the four village units in which milling units are desired to be constructed in the immediate future are as described below.

Adiredjo in Ket. Pekalongan - A milling unit is planned to be constructed in Tulusredjo in the same ketjamatan, and there is little probability that the instability problem can be brought to a solution by paddy supply from the surrounding areas. Establishment of a milling unit in this village unit is not therefore considered reasonable.

Taman Negeri and Tegal Ombo in Ket. Purbolinggo - Paddy production in either village unit is deficient to make the milling unit operation stabilized. It is advisable to integrate the two into a new village unit.

Sukaradja Nuban - This village unit is not only deficient in paddy production but also has many hullers. Establishment of a milling unit may become a possibility if it is integrated with the adjoining desa unit, Raman Utara, for which no request is made for milling unit introduction.

Section 4: Locations of Milling Units in Lampung Selatan

Table 24 and 25 show, in the same ketjamatan-wise manner as adopted for Lampung Tengah, the paddy production, farmers' rice consumption, distribution and operation rate of existing hullers and mills, and index values for estimating the situation after constructing milling units.

Milling units are requested to be constructed in ketjamatan Nos. 1 to 9. Of these nine ketjamatans, Nos. 1 to 9 are lying along the road stretching westwards from Tandjung Karang, and Nos. 2 to 8 form the paddy field area extending in the upstream area of the Way Sekampung.

These nine ketjamatans combined cover 78% and 85% of the kabupaten's total paddy production and lowland paddy production respectively. With the exception of Penengahan, the rate of dependence on upland paddy cultivation is lower than 37% in this district, but compared with the eight corresponding ketjamatans in Lampung Tengah, the dependency rate is higher in a number ketjamatans. This can be assigned to the fact that the district, being situated in an upstream area of a river, is composed of both paddy fields and upland fields. BIMAS Project includes only those desas having favourably conditioned paddy field areas, and village units do not embrace all desas. The unit yield in the district is higher than in Lampung Tengah, but the rate of double cropping is lower.

In the nine ketjamatans where village units are to be organized, rice consumption by farmers stands at about the same rate as in Lampung Tengah, i. e., about 50%, but the per capita milled rice consumption is higher, ranging from 50 to 166 kg. Interviews disclosed that farmers eat only rice as staple food.

The average rate of operation of rice mills in the nine ketjamatans and in the entire kabupaten is 79%, which is higher than the value observed in Lampung Tengah.

When all the milling units are constructed, the rate of operation is expected to drop to an average of 72% in the whole kabupaten and 70% in the nine ketjamatans, but these values are higher than those estimated for Lampung Tengah.

The lowest operation rate of hullers, calculated on the assumption that 50% of total paddy production in the district goes to hullers and the other 50% to mills and milling units, is 43%, but this is a rate estimated only for one of the nine ketjamatans. Consequently, construction of milling units is not expected to invite any hazardous effect on hullers though their profit rate may decline to an extent. The average rate of operation of mills and milling units could be as low as 41% in one of the ketjamatans, but if paddy is collected on the kabupaten level, the rate can be estimated to be as high as 94%. Table 10 indicates that both of the two mills in Lampung Selatan have a high rate of operation. However, since many of mills shown in the statistics are known to have given up the milling business, it is considered that coexistence with the existing hullers and mills can be ensured even if all the milling units are constructed as requested.

As regards the stability standard of the milling unit within each village unit, production of wet season paddy was first calculated from the ketjamatan-wise unit yield and planted area of wet season crop because the area of paddy field was the only statistical data obtained for each village unit; then a paddy production of 2,200 tons or more was adopted as the stability standard (the said 2,200 tons of paddy production is 80% of 2,700 tons which includes the production of dry season paddy and upland paddy). Table 26 showing the result of the above calculation indicates that the stability is high in all village units excepting Baturadja of Ketjamatan Kedondong.

Section 5: Location of Milling Unit in Lampung Utara

In Lampung Utara eventual construction of five Milling Units has been requested. However, in consideration of the fact that the need is not so urgent and that difficulties are anticipated in providing technical assistance and supplying parts following the completion of the facilities due to the geography of the proposed sites which are widely distributed and located far from other proposed sites, it was concluded that it would be more appropriate to postpone construction until some other time and for this reason, field investigation survey and data collection were not conducted.

Table 27 has been prepared on the basis of available data the same way as for other Kabupaten.

Section 6: Location of Rice Milling Plant

Both Banderdjaja and Punggur districts, for which construction of Rice Milling Plant has been requested, are paddy field reclamation areas. In these paddy field reclamation areas an increase of rice production is evident because of the shift from upland paddy cultivation to lowland paddy cultivation and further to double rice cropping. Accordingly, there is an increasing need for the construction of new rice mills in these areas.

(1) Bandardjaja District

The irrigation project which covers an area of 25,000 ha in the Bandarjaja district by Way Seputi and financed by loans from the World Bank is already in progress and the completion of the primary and the secondary canals (government project) is expected for 1974. The paddy field reclamation project is expected to be completed in 1980, and the annual program is as shown in Table 28.

In Indonesia construction of terminal canals and paddy field reclamation work are left in the hands of cooperative work of farmers (Gotong Rojong) and it is said that the achievement of only half of the program is acceptable to the government. For this reason, it is expected that an area of approximately 5,000 ha will be under cultivation for the rainy season cropping of 1973 when the Rice Milling Plant under the current financial assistance program is expected to start operation. Of the total 2,000 ha in which planting was made for the dry season cropping of 1971, 1,200 ha belong to eight desas in Terburiggibesar and the remaining 800 ha belong to Padang-ratu and Gunungsugih. There already exist ten hullers and farmers sell their rice in the town of Bandardjaja, 15 km from their desas after transporting it by bicycle or other means. The rate of double cropping for lowland paddy is 100% at present. Although the yield is such low as 0.8 ton/ha (0.45 ton/ha for upland paddy), the experiment culture of PB-5 attained the yield rate of 4.8 ton/ha and the yield is expected to increase in the future with the improvement of farming techniques. Incidentally, the rate of paddy sale by the farmers is 60% at present.

Assuming that the rate of double cropping of lowland paddy is 50% and that the yield is 2 ton/ha, rice production in this district in 1973 is expected to be:

$$2 \text{ (ton)} \times 5,000 \text{ (ha)} + 2 \text{ (ton)} \times 5,000 \times 1/2 = 15,000 \text{ (ton)}$$

On the other hand, as the annual capacity of Rice Milling Plant in processing stalk paddy is : $2 \text{ (ton)} \times 7 \text{ (ha)} \times 200 \text{ (day)} + 0.60 = 4,700 \text{ (ton)}$, the number of the 2 ton/ha plant required will be 1.6 even when 1/2 of the total production is booked to the new Milling Plant.

Since this district produces a considerably large quantity of upland paddy, construction of 2 sets of Milling Plant is justified. However, in view of the fact that road condition in this district is extremely poor and that the road construction project for Terburggibesar, the main construction site of new plant, is scheduled to start in 1973 or 1974, improvement of roads cannot be expected before the start of plant construction. As the improved road is a precondition for efficient operation of the plant, there is no alternative but to postpone construction of new plants in this district under the present circumstance.

In this paddy field reclamation area extending to approximately 40 km from the east to the west and 10 km from the north to the south, the Telukbetong - Kotabumi road runs almost at the center of the area from north to south and there is the town of Bandardjaja.

A railway line also runs on the western edge of the area and the proposed route of New Sumatra Highway is also close to this area. As for the construction site of new plants, distribution of plants to various parts of the paddy field reclamation area is conceivable. However, when the convenience of transportation is taken into account, it will be more appropriate to select site with a view of construct-

ing a large central rice milling plant (a capacity of about 20 ton/ha will be required at the end of paddy field reclamation work in 1980) in Bandardjaja or along the railway line.

(2) Punggur District

This district is part of the Way Sekampung Irrigation Project which calls for irrigation of Punggur Utara by diverting water from Trimurdjo. The primary and the secondary canals which will irrigate an area of 25,000 ha are expected to be completed in 1973 when the first 5 year project comes to an end. Though the paddy field reclamation program by year is as shown in Table 28, the actual progress is only 30% of the planned figure and the progress is considered very slow. If the progress is the same for the rainy season cropping of 1973 when the Rice Milling Plant starts operation, the area of cultivation will be in the order of 7,000 ha. In Desa Punggur where paddy field reclamation is now in progress and where approximately 7,000 ha of land is expected to be converted to paddy field by 1974 a yield of 0.8 ton/ha is expected for 250 ha in the rainy season cropping of 70 - 71 and a yield of 1.3 ton/ha is expected for 535 ha in the dry season cropping of 1971 (a yield of upland paddy is 4 ton/ha). Such a low yield is attributed to insufficient flow of water due to poor canal condition immediately after the completion of land reclamation. When improvements are made on this point, it was estimated that the yield will increase to 3.3 ton/ha for PB-5. The existing hullers are relatively few numbering only four and the rate of rice sale by the farmers is 50 - 60%. Approximately 75% of rice for home consumption are milled domestically.

Assuming that the rate of double cropping of lowland paddy is 50% and the yield is 2 ton/ha, rice production in 1973 will be:

$$2 \text{ (ton)} \times 7,000 \text{ (ha)} + 2 \text{ (ton)} \times 7,000 \text{ (ha)} \times 1/2 = 21,000 \text{ (ton)}$$

If 1/2 of this amount is to be processed in the new Rice Milling Plant (4,700 ton stalk paddy/year), the production requirement will be 2.2 sets of plant. However, in view of the fact that there are very few upland field left in and around, that the upland paddy will be replaced by the lowland paddy for the most part in the future and that there still is persistent practice of domestic rice milling among farmers, it is appropriate to consider the construction of 2 sets of 2 ton/ha plant.

Although Punggur is only 8 km from the Metro, its road condition is not satisfactory, while the 6 km road between Punggur and Kotagaja running almost parallel to the canal is completely paved and is considered appropriate for the construction of a plant.

Section 7: Conclusions

(1) Milling Unit (500 kg/hr)

Concerning the request for the construction of Milling Unit in Village Unit which is being planned by BIMAS, it is advisable to construct the Milling Unit in 16 locations out of the 18 locations for which the request has been made for construction under the current project.

In Lampung Tengah 11 Milling Units are to be provided. The Village Units in which the Milling Units are to be provided are shown in Table 30.

In Lampung Selatan 5 Milling Units are to be provided. However, among the Village Units, Sanggi of Wonosobo is not considered appropriate because of poor road condition and possible transportation problems. Therefore, the change of site to some other Village Unit in Wonosobo after consultations with the Provincial Government is conceivable.

No Milling Unit is to be provided in Lampung Utara for the time being.

As for the remaining two proposed sites under the current project, rice production in the Village Unit is small and stable operation of the Milling Unit in the Village Unit while co-existing with the existing hullers is considered difficult.

CHAPTER 4 SPECIFICATIONS OF MILLING UNITS AND MILLING PLANTS

Section 1: Design Criteria

The following conditions are established in consideration of the natural conditions, rice processing practices and marketing situation in the province, with the specifications of machines and equipment set to meet such conditions.

(1) Basic Conditions

1) Paddy to be supplied to the milling units and milling plants will be stalk paddy (padi) and paddy (gabah) and will have a water content of 20% or more if delivered in the harvesting season.

2) Preparatory drying of stalk paddy will be carried out in a solar drying yard to reduce the water content to about 18%. Stalk paddy will be temporarily stored in a stalk paddy storehouse depending on the daily amount of delivery and weather condition. (The following conditions are established with consideration given primarily to the harvesting season of wet season crop (April and May) when the paddy supply is large).

3) Stalk paddy dried by solar drying will be threshed by means of a thresher capable of covering the full load capacity of the milling machine.

4) Dried coarse paddy grains having a water content of about 18% will be dried by a circulation type thermal drier to reduce the water content to 14%.

5) Paddy supply is expected to surpass the milling capacity in the harvesting season of wet season crop (April and May). A bin capable of storing paddy (gabah) for 6 to 7 days' milling work of milling machine will therefore be installed for temporary storage of coarse paddy grains processed by the drier.

6) A minimum number of trucks required for the collection and shipment of paddy and a number of autobicycles for communication purposes will be provided. Further, a garage for housing trucks and autobicycles, a warehouse to store various parts of the milling facilities, and a simple repairshop will be constructed.

7) To provide satisfactory working and living environments for the staffs and workers, an office building, road, well and dormitory building will be constructed.

8) Sufficient stock and supply of spare parts will be assured.

(2) Calculation Basis of Required Mill Capacity

The annual operating hours of milling unit and milling plant will be 1,470 hours [7 hours/day x 210 days (7 months)]. From the survey of paddy conducted in the province, it is planned that the threshing extraction rate (dry padi → dry gabah) will be 85% and the milling extraction rate (dry gabah → milled rice) 71% in weight percentage.

Calculation Basis for Milling Unit:

1) Annual Processing Capacity

Milled rice	$0.5 \times 1,470 = 735$ tons/year
Dry gabah	$735 \times 1/0.71 = 1,035$ tons/year
Dry padi	$1,035 \times 1/0.85 = 1,218$ tons/year

2) Daily Paddy Supply in Harvesting Season

The above-mentioned annual dry stalk paddy processing capacity of 1,218 tons is not based on a balanced and even monthly supply of paddy. Rather, it is estimated that the greater part of the said capacity will be required in the harvesting season, particularly that of wet season crop which is planted in a wider area than other crops. The milling facilities should therefore be capable of meeting such requirement.

If the rate of double cropping is 50%, the paddy supply will comprise 812 tons of wet season crop and 406 tons of dry season crop. Assuming that 60% of this paddy supply will concentrate in the harvesting season (two months), the daily supply of respective crops will be as follows.

Daily supply of wet season crop during the harvesting season:

$$\begin{aligned} 812 \times 0.6 \times 1/60 &\doteq 8.1 \text{ tons (dry padi)} \\ 8.1 \times 0.85 &\doteq 7.0 \text{ tons (dry gabah)} \end{aligned}$$

Daily supply of dry season crop during the harvesting season:

$$\begin{aligned} 406 \times 0.6 \times 1/60 &\doteq 4.1 \text{ tons (dry padi)} \\ 4.1 \times 0.85 &\doteq 3.5 \text{ tons (dry gabah)} \end{aligned}$$

3) Capacity of Thresher

$$7.0 \times 1/7 \doteq 1 \text{ ton/hr}$$

4) Capacity of Drier

Assuming that the drier has a capacity of 0.8%/hr, about five hours will be required to reduce the 18% water content of semi-dried paddy to 14%. If the drier is to be perform three drying operations a day, it will be required to be charged with 2.3 tons of paddy for each operation as calculated below.

$$7.0 \times 1/3 \doteq 2.3 \text{ tons}$$

If undried paddy having a water content of 22% is to be processed by the drier at the above-mentioned charging capacity. 10 hours will be required. This means that 4.6 tons of undried paddy can be processed each day by two drying operations. In this case, dry paddy may be finished by solar drying and stockpiled.

5) Dry Gabah Storage Tank

For the purpose of cooling off thermally dried paddy grains and maintaining the balance between the threshing and drying capacity and the milling capacity, a dry gabah storage tank will be constructed. The tank will have a storage capacity of 45 tons which is equivalent to about six days' supply of paddy during the harvesting season of wet season crop.

Calculation Basis for Milling Plant:

1) Annual Processing Capacity

Milled rice	$1,470 \times 2 = 2,940$ tons/year
Dry gabah	$2,940 \times 1/0.71 = 4,141$ tons/year
Dry padi	$4,141 \times 1/0.85 = 4,872$ tons/year

2) Daily Paddy Supply in Harvesting Season

Daily supply of wet season crop during the harvesting season:

32.4 tons	(dry padi)
27.5 tons	(dry gabah)

Daily supply of dry season crop during the harvesting season:

16.2 tons	(dry padi)
13.8 tons	(dry gabah)

(The following calculations relate to the wet season paddy.)

3) Capacity of Thresher

$$27.5 \times 1/7 \approx 4 \text{ tons/hr}$$

4) Capacity of Drier

$$\text{Charging capacity} = 27.5 \times 1/3 = 9.2 \text{ tons}$$

(Daily capacity of drying undried paddy will be about 18 tons.)

5) Dry Gabah Storage Tank

A 200 ton storage tank will be constructed.

Section 2: Machines and Facilities of Milling Unit

(1) Description and Estimated Cost of Mechanical Facilities

1) Machines and Equipment

			(C & F Price)
1	Thresher (1 ton/hr, engine inclusive)	1 set	¥390,240 (Rp 449,860)
2	Drying Facilities (charging port, pre-cleaner, drier of 2 - 3 ton)	1 set	¥2,100,240 (Rp 2,421,110)

		(C & F Price)
3	Dry Gabah Storage Tank (wooden, 45 ton)	1 set ¥1,000,080 (Rp 1,152,870)
4	Milling Facilities (cleaner, huller, separator, milling machine of 0.5 ton/hr capacity, etc.)	1 set ¥3,500,280 (Rp 4,035,045)
5	Diesel Engine for Milling Facilities	1 set ¥400,320 (Rp 461,480)
6	Diesel Power Generator and Wiring Materials for Lighting Equipment	1 set ¥2,400,120 (Rp 2,766,805)
7	Spare Parts (rubber rolls, etc.)	1 lot ¥800,280 (Rp 922,544)
8	Inspection Instrument (water content detector, tachometer, etc.)	1 lot ¥1,000,080 (Rp 1,152,870)
9	Platform Weighing Machine	2 sets ¥300,240 (Rp 346,110)
Sub-total		¥11,891,880 (Rp 13,708,694)
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10	Installation Cost	¥396,000 Rp 345,833
Sub-total	Payment in foreign currency	-
	Payment in local currency	-
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2)	Automobiles	
1	Trucks (3.5 ton)	1 ¥1,476,000 (Rp 1,701,499)
2	Jeep-trucks (p ton)	1 ¥1,200,240 (Rp 1,383,609)
3	Autobicycle	3 ¥270,000 (Rp 311,250)
Sub-total		¥2,946,240 (Rp 3,396,358)
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Inland transport fee for Items 1) and 2) above (C & F price x 11%)		Rp 1,881,610

(2) Description and Estimated Cost of Buildings and Structures

1) Plant Construction Materials (300 m ²)	¥7,800,120 (Rp 8,991,805)
Inland transport fee (C & F x 11%)	Rp 988,945
2) Materials and Equipment to be Locally Procured	
1 Stalk Paddy Storehouse (5 m x 16 m)	Rp 800,000
2 Garage (5 m x 10 m)	Rp 500,000
3 Dormitory (5 m x 10 m)	Rp 1,000,000
4 Roads within the Plant Premises	Rp 625,000
5 Pump and Well	Rp 300,000
6 Solar Drying Yard (10 m x 20 m)	Rp 200,000
7 Fence	Rp 150,000
8 Site Construction Cost	Rp 810,000
9 Local Procurement of Storage Tank Materials	Rp 500,000
Sub-total	Rp 4,885,000

(3) Construction Cost

The construction cost per milling unit is as given below.

1 Machines and Equipment	¥12,287,880	} Rp 2,227,443
2 Automobiles	¥2,946,240	
3 Buildings and Structures	¥7,800,120	Rp 988,945
		Rp 4,885,000
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Total: Foreign currency payment	¥23,034,240	Rp 34,654,748
Local currency payment	Rp 8,101,388	(Rp 38,340,553)

Notes: 1) US\$1 = Rp 415 = ¥360

2) The value given in parentheses is the total construction cost including the fees for consulting service.

Section 3: Machines and Facilities of Milling Plant

(1) Description and Estimated Cost of Mechanical Facilities

1) Machines and Equipment

1	Thresher (2.5 ton/hr, engine inclusive)	2 sets	¥2,749,320 (Rp 3,169,355)
2	Drying Facilities (comprising charging port, precleaner, 2 - 3 ton dryer, and tempering tank)	1 set	¥7,200,000 (Rp 8,300,000)
3	Dry Cabah Storage Facilities (wooden, 200 ton, incl. condense tank)	1 set	¥2,500,200 (Rp 2,882,175)
4	Milling Facilities (cleaner, huller, separator, 2 t/hr milling machine, grader, etc.)	1 set	¥12,900,240 (Rp 14,871,109)
5	Diesel Power Generator and Wiring Materials and Equipment for Milling Plant	1 set	¥16,750,440 (Rp 19,309,200)
6	Spare Parts (rubber rolls, etc.)	1 set	¥1,500,120 (Rp 1,729,305)
7	Inspection Instrument (water content detector, crack detector, tachometer, huller for inspection, polisher for inspection, etc.)	1 set	¥1,500,120 (Rp 1,729,305)
8	Truck Scale (10 ton)	1 set	¥3,180,240 (Rp 3,666,408)
Sub-total:			¥48,280,680 (Rp 55,656,857)

9	Installation Cost		¥396,000 (Rp 345,833)
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Sub-total: Payment in foreign currency	-	¥48,676,680
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Payment in local currency	-	Rp 345,833
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2) Automobiles

1	Truck (5 ton)	2 sets	¥3,456,000 (Rp 3,984,000)
2	Jeep-truck (1 ton)	2 sets	¥2,400,120 (Rp 2,766,805)
3	Autobicycle	5 sets	¥450,000 (Rp 518,750)

Sub-total:		¥6,306,120 (Rp 7,269,555)
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Inland transport fee for Items 1) and 2) above (C & F Price x 11%)	Rp 6,922,200
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(2) Description and Estimated Cost of Buildings and Structures

1) Plant Construction Materials (530 m ²)	¥19,600,200 (Rp 22,594,675)
Inland fee (C & F x 11%)	Rp 2,485,435
2) Materials and Equipment to be Locally Procured	
1 Stalk paddy Storehouse (40 m x 8 m)	Rp 6,000,000
" (48 m x 5 m)	Rp 3,600,000
2 Garage (5 m x 20 m)	Rp 1,500,000
3 Dormitory (5 m x 20 m)	Rp 2,000,000
4 Roads within Plant Premises (3 m x 48 m)	Rp 115,000
5 Solar Drying Yard (43 m x 25 m)	Rp 1,716,000
6 Stalk Paddy Delivery Yard (25 m x 5 m)	Rp 1,875,000
7 Pump and Well	Rp 400,000
8 Guards' Room	Rp 152,000
9 Fence	Rp 250,000
10 Site Construction Cost	Rp 3,750,000
11 Local Procurement of Storage Tank Materials	Rp 1,500,000
Sub-total:	Rp 22,858,000

(3) Construction Cost

The construction cost per milling plant is as given below.

1 Machines and Equipment	¥48,676,680	} Rp 7,268,033
2 Automobiles	¥6,306,120	
3 Buildings and Structures	¥19,600,200	Rp 2,485,435
		Rp 22,858,000
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Total: Foreign currency payment	¥74,583,000	
Local currency payment	Rp 32,611,468	Rp 118,589,093 (Rp 133,332,314)

Note: The value given between parentheses is the total construction cost including the fees for consulting service.

Section 4: Fees for Consulting Service

The following are the rough estimates of expenses required for the dispatch of experts who will undertake the design and construction administration of milling units and milling plants as well as the training of staffs.

1)	Remuneration for Experts	
	a) Design Work	
	Machines and Equipment	¥396,000 x 1 expert x 3 months = ¥1,188,000
	Buildings and Structures	¥396,000 x 1 expert x 3 months = ¥1,188,000
	Seed Inspector	¥432,000 x 1 expert x 6 months = ¥2,592,000
	b) Training Work	
	Management	¥540,000 (2 experts) x 6 months = ¥3,240,000
	Machine Operation	¥396,000 (2 experts) x 12 months = ¥4,752,000
	c) Construction Administration Service	
	Machines and Equipment	¥396,000 (2 experts) x 11 months = ¥4,356,000
	Buildings and Structures	¥396,000 (2 experts) x 9 months = ¥3,564,000
	Sub-total:	¥20,880,000 (Rp 24,070,000)
2)	Overhead Expenses	
	(100% of remuneration for experts)	¥20,880,000 (Rp 24,070,000)
3)	Technical Expenses	
	(25% of Items 1) and 2) above)	¥10,440,000 (Rp 12,035,000)
4)	Staying Expenses	
	(Rp 6,225 x 30 days x 50 man-months)	Rp 9,337,500
5)	Travelling and Communication Expenses in Indonesia	
	(Rp 332,000 x 14 months)	Rp 4,648,000
6)	Travelling Expenses to and from Indonesia	
	¥225,144 x 12 return trips = ¥2,701,800	
	¥72,000 (travelling allowance) x 12 persons = ¥864,000	
	¥72,000 (freight of personal belongings) x 12 persons = ¥864,000	
	Total:	¥4,429,800 (Rp 5,106,575)

7)	Cost of Survey Equipment	¥2,520,000 (Rp 2,905,000)
8)	Cost for Preparing Report	
	¥36,000 (printing and binding cost) x 50 copies	¥1,800,000 (Rp 4,212,250)
9)	Contingencies	
	5% of Items 1) to 8)	¥3,654,000 (Rp 4,212,250)
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Total:	Rp 88,459,325	Foreign currency - ¥64,603,800 Local currency - Rp 13,985,500
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Fees for Consulting Service per Milling Unit:

$$\text{Rp } 88,459,325 \times 1/24 = \text{Rp } 3,685,805$$

Fees for Consulting Service per Milling Plant:

$$\text{Rp } 88,459,325 \times 4/24 = \text{Rp } 14,743,221$$

Section 5: Construction Cost

Total cost of construction and consulting service required for 16 milling units and 2 milling plants is as given below.

1) 16 Milling Units

1	Machines and Equipment	¥196,608,000	} Rp 35,639,014
2	Automobiles	¥47,139,840	
3	Buildings and Structures	¥164,002,320	Rp 15,823,120
			Rp 78,160,000

2) 2 Milling Plants

1	Machines and Equipment	¥97,353,360	} Rp 14,536,066
2	Automobiles	¥12,612,240	
3	Buildings and Structures	¥39,200,400	Rp 4,970,870
			Rp 45,716,000

3) Consulting Fees for 18 Milling Facilities

Foreign currency -	¥64,603,800	Total:	Rp 88,459,325
Local currency -	Rp 13,985,580		

4) Total Cost

1	Machines and Equipment	¥293,959,440 (Rp 7,128,000)	} Rp 50,175,080 (Rp 6,225,000)
2	Automobiles	¥59,752,080	
3	Buildings and Structures	¥164,002,320	Rp 144,669,990
4	Consulting Fees	¥64,603,800	Rp 13,985,580
<hr/>			
Total: Foreign currency -		¥582,317,640	Rp 880,113,485
Local currency -		Rp 208,830,650	
<hr/>			

Note: The value given between parentheses in Item 4) is the installation cost of machines and equipment calculated as follows.

Total man-days required for construction of 18 new facilities -

8 persons x 2,5 months = 20 man-months = 600 man-days

Cost in foreign currency -

Installation cost ¥18,000 x 600 man-days = ¥5,400,000

Air passenger fare ¥216,000 x 8 persons = ¥1,728,000

Total: ¥7,128,000
(¥396,000 per place)

Cost in local currency -

Staying expenses Rp 10,375 x 600 man-days = Rp 6,225,000
(Rp 345,833 per place)

CHAPTER 5 PAYABILITY CALCULATION FOR MILLING UNITS AND MILLING PLANS

Section 1: Calculation Criteria

The following conditions are established in working out the payability calculation for milling unit and milling plant.

(1) Operating Condition

Both milling units and milling plants will be operated for 210 days (7 months) in a year on a seven hours-a-day operating basis.

(2) Purchase and Sales Prices

From the results of survey including interviews, the purchase price of material paddy and sales price of products are set as follows.

- | | |
|-----------------------------------|--------------------------|
| 1) Purchase price of stalk paddy: | Rp 14/kg |
| 2) Sales Price of products: | Milled rice - Rp 41/kg |
| | Broken rice - Rp 17.5/kg |
| | Rice-bran - Rp 3/kg |

(3) Product Yield Rate (in weight percentage)

- | | | |
|--------------|---|-------------------|
| 1) Dry padi | → | Dry gabah: 85% |
| 2) Dry gabah | → | Milled rice: 71% |
| " | → | Broken rice: 2.5% |
| " | → | Rice Bran: 8.5% |

(4) Expenditures

- | | |
|--------------------------------|---|
| 1) Personnel Cost | Milling unit - Rp 76,000/month for 6 staffs and 7 workers
Milling plant - Rp 144,000/month for 10 staffs and 18 workers
[See the table given in Item (5)] |
| 2) Repairing Expenses | 5% of the cost of machines and automobiles |
| 3) General Management Expenses | 2% of the sales proceeds |
| 4) Interest Rate | 12% per annum |
| 5) Depreciation | Depreciation of machines, automobiles, buildings and structures will be completed in 10 years leaving a residual value of 10% |

(5) Working Fund

The working fund will be 1/4 of the annual plant operating expenses (cost of material paddy and annual plant operating expenses).

Composition and Monthly Wages of Personnel

(Milling Unit)			(Milling Plant)		
Job Classification	No.	Monthly Wages Rp	Job Classification	No.	Monthly Wages Rp
Plant manager	1	15,000	Plant manager	1	18,000
Chief accountant	1	10,000	Chief accountant	1	12,000
Chief operator	1	10,000	Operation manager	1	10,000
Operator	1	8,000	Chief operator	1	10,000
Driver	2	12,000	Operator	2	16,000
Labourer	7	21,000	Driver	4	24,000
			Labourer	18	54,000
Total:	6 staffs 7 labourers	Rp 76,000		10 staffs 18 labourers	Rp 144,000

Section 2: Payability of Milling Unit Operation

(1) Sales Proceeds of Products

Production of milled rice, broken rice and rice-bran will be as follows.

Milled rice	$500 \times 7 \times 210 = 735,000$ kg
Broken rice	$735,000 \times 0.035 = 25,725$ kg
Rice-bran	$735,000 \times 0.12 = 88,200$ kg

Accordingly, the sales proceed of these products will be as follows.

Milled rice	$735,000 \times 41 =$ Rp 30,135,000
Broken rice	$25,725 \times 17.5 =$ Rp 450,187
Rice bran	$88,200 \times 3 =$ Rp 264,600
Total:	Approx. Rp 30,849,000

(2) Cost of Material Paddy

Purchase cost of stalk paddy $1,220,000 \times 14 =$ Rp 17,080,000

(3) Annual Plant Operating Expenses

a) Personnel cost	Rp 912,000 (76,000 x 12 months)
b) Cost of jute bags	Rp 478,000
c) Fuel cost	Rp 450,000
d) Repairing cost	Rp 950,000 (18,986,665 x 0.05)
e) General management cost	Rp 617,000 (30,849,787 x 0.02)

Sub-total: Rp 3,407,000

f) Interest on loans Rp 615,000 [See Item (7) below]

Total: Rp 4,022,000

(4) Profit before Depreciation

Rp 9,747,000

(5) Depreciation Expense

Rp 38,388,000 (plant construction cost) x 1/10 = Rp 3,840,000

(6) Interest on loan for Mill Construction after Each Amortization

(Year)	(Remainder after Amortization)	(Interest)
Initial Year	Rp 38,400,000	Rp 4,608,000
2nd Year	38,400,000 x 9/10	4,147,000
3rd Year	38,400,000 x 8/10	3,686,000
4th Year	38,400,000 x 7/10	3,225,000
5th Year	38,400,000 x 6/10	2,764,000
6th Year	38,400,000 x 5/10	2,304,000
7th Year	38,400,000 x 4/10	1,843,200
8th Year	38,400,000 x 3/10	1,382,400
9th Year	38,400,000 x 2/10	921,600
10th Year	38,400,000 x 1/10	480,800

(7) Interest on Loan for Working Fund

Plant operating expenses

Rp 17,080,000 + Rp 3,407,000 = Rp 20,487,000

Working fund

Rp 20,487,000 x 1/4 = Rp 5,122,037

Annual interest

Rp 5,122,037 x 0.12 = Rp 615,000

(8) Gross Profit in the Initial Year before Tax

$$\text{Rp } 30,849,000 - (17,080,000 + 3,407,000 + 3,840,000 + 4,608,000 + 615,000) = \text{Rp } 1,299,000$$

(9) Gross Profit in the Second and Subsequent Years before Tax

Since the remainder of the loan for plant construction decreases from the second year on, the resultant difference in the interest, amounting to Rp 457,200, will add to the gross profit for the second and subsequent years.

(Year)	(Gross Profit for Each Year)	(Cumulative Total of Gross Profit)
2nd Year	Rp 1,755,837	Rp 3,054,474
3rd Year	2,213,037	5,267,511
4th Year	2,670,237	7,937,748
5th Year	3,127,437	11,065,185
6th Year	3,584,637	14,649,822
7th Year	4,041,837	18,691,659
8th Year	4,499,037	23,190,696
9th Year	4,956,237	28,146,933
10th Year	5,413,437	33,560,370

Section 3: Payability of Milling Plant Operation

The payability of milling plant operation, studied on the same calculation basis as adopted for milling unit, is as given below.

(1) Sales Proceeds of Products

Milled rice	2,940,000 x 41 =	Rp 120,540,000
Broken rice	103,000 x 17.5 =	Rp 1,802,500
Rice-bran	353,000 x 3 =	Rp 1,059,000
Total:	Approx.	Rp 123,402,000

(2) Cost of Material Paddy

$$\text{Purchase cost of stalk paddy} \quad 4,880,400 \times 14 \frac{1}{4} = \text{Rp } 68,326,000$$

(3) Annual Plant Operating Expenses

a) Personnel cost	Rp 1,728,000
b) Cost of jute bags	Rp 1,911,000
c) Fuel cost	Rp 1,800,000
d) Repairing cost	Rp 3,874,000
e) General management cost	Rp 2,468,000
Sub-total:	Rp 11,781,000

f) Interest on loans	Rp 2, 403, 000 (See Item (7) below]
Total:	Rp 14, 184, 000

(4) Profit before Depreciation

Rp 40, 892, 000

(5) Depreciation Expense

Rp 133, 330, 080 (plant construction cost) x 1/10 = Rp 13, 340, 000

(6) Interest on Loan for Mill Construction after Each Amortization

(Year)	(Remainder after Amortization)	(Interest)
Initial Year	Rp 133, 340, 000	Rp 16, 000, 800
2nd Year	133, 340, 000 x 9/10	14, 400, 720
3rd Year	133, 340, 000 x 8/10	12, 800, 640
4th Year	133, 340, 000 x 7/10	11, 200, 560
5th Year	133, 340, 000 x 6/10	9, 600, 480
6th Year	133, 340, 000 x 5/10	8, 000, 400
7th Year	133, 340, 000 x 4/10	6, 400, 320
8th Year	133, 340, 000 x 3/10	4, 800, 240
9th Year	133, 340, 000 x 2/10	3, 200, 160
10th Year	133, 340, 000 x 1/10	1, 600, 080

(7) Interest on Loan for Working Fund

Plant operating expenses

Rp 68, 326, 000 + 11, 781, 000 = Rp 80, 107, 000

Working Fund

Rp 80, 107, 000 x 1/4 = Rp 20, 026, 656

Annual interest

Rp 20, 026, 656 x 0. 12 = Rp 2, 403, 000

(8) Gross Profit in the Initial Year before Tax

Rp 123, 402, 000 - (68, 326, 000 + 11, 781, 000 + 13, 340, 000 + 160, 001, 000 + 2, 403, 000) = Rp 11, 551, 000

(9) Gross Profit in the Second and Subsequent Years before Tax

Since the remainder of the loan for plant construction decreases from the second year on, the resultant difference in the interest, amounting to Rp 1,600,080, will be added to the gross profit for the second and subsequent years.

(Year)	(Gross Profit for Each Year)	(Cumulated Total of Gross Profit)
2nd Year	Rp 13,150,944	Rp 24,701,808
3rd Year	14,751,024	39,452,832
4th Year	16,351,104	55,803,936
5th Year	17,951,184	73,755,120
6th Year	19,551,264	93,306,384
7th Year	21,151,344	114,457,728
8th Year	22,751,424	137,209,152
9th Year	24,351,504	161,560,656
10th Year	25,951,584	187,512,240

Section 4: Required Working Fund

Total working fund required for the project is as given below.

(1) Working Fund for Milling Units

$$\text{Rp } 5,122,037 \times 16 \text{ milling units} = \text{Rp } 81,952,600$$

(2) Working Fund for Milling Plants

$$\text{Rp } 20,026,656 \times 2 \text{ milling plants} = \text{Rp } 40,053,312$$

(3) Total Working Fund Required for the Project

$$\text{Total of Items (1) and (2) above} \dots \text{Rp } 122,005,912$$

Section 5: Internal Rate of Return

The internal rate of return obtainable from the project will be as calculated below.

(1) Profit before Depreciation

a) Milling Unit

Normal years	Rp 9,747,000
Initial year	Rp 8,123,000 (for 10-month operation)
6th year	Rp 5,977,000 (purchase cost of new automobiles deducted)

b) Milling Plant

Normal years	Rp 40,892,000
Initial year	Rp 34,077,000 (for 10-month operation)
6th year	Rp 32,823,000 (purchase cost of new automobiles deducted)

(2) Capital Input (I)

a) Milling Unit	Plant construction cost	- Rp 34,654,000
	Consulting cost	- Rp 3,685,000
	Total:	Rp 38,339,000
b) Milling Plant	Plant construction cost	- Rp 118,589,000
	Consulting cost	- Rp 14,743,000
	Total:	Rp 133,332,000

(3) Profit of Entire Project before Depreciation

Initial year (a ₁)	8,123,000 x 16 + 34,077,000 x 2 = Rp 198,122,000
Normal year (a ₂ - a ₅ , a ₇ - a ₁₀)	9,747,000 x 16 + 40,892,000 x 2 = Rp 237,736,000
6th year (a ₆)	5,977,000 x 16 + 32,823,000 x 2 = Rp 167,262,000

(4) Total Capital Input in the Project (A)

$$38,339,000 \times 16 + 133,332,000 \times 2 = \text{Rp } 880,088,000$$

(5) Durable Years (N)

10 years

(6) Other Conditions

Each new plant will be commissioned in the third month of the initial year, and there will be an interval of one year between the investment period and the initial year.

(7) Internal Rate of Return (i)

$$\begin{aligned}
 A(1+i) &= \sum_{n=1}^{10} a_n(1+i)^{-n} \\
 &= a_1(1+i)^{-1} + a_2\{(1+i)^{-2} + \dots + (1+i)^{-5} + (1+i)^{-7} + \dots \\
 &\quad \dots + (1+i)^{-10}\} + a_6(1+i)^{-6}
 \end{aligned}$$

The table below shows the values of x , x_1 and x_6 as obtained by rearranging the above equation as follows.

$$(I) = AX = a_1x_1 + ax + a_6x_6 (= R)$$

i	AX (I)	x_1	x	x_6
8%	950,473	0.926	5.153	0.630
10	968,075	0.909	4.671	0.564
12	985,676	0.893	4.251	0.507
14	1,003,278	0.877	3.884	0.456
16	1,020,879	0.862	3.561	0.410
18	1,038,480	0.847	3.276	0.370
20	1,056,082	0.833	3.025	0.335
22	1,037,683	0.820	2.801	0.303
24	1,091,284	0.806	2.599	0.278
26	1,108,886	0.794	2.421	0.250

When $i = 16$,

$$I = 1,020,879$$

$$R = 1,085,936 (= 198,122 \times 0.862 + 237,736 \times 3.561 + 167,262 \times 0.410)$$

$$R/I = 1.064$$

When $i=18$

$$I=1,056,082$$

$$R=1,008,519 (=198,122 \times 0.847 + 237,736 \times 3.276 + 167,262 \times 0.370)$$

$$R/I=0.955$$

Therefore, when $R/I=1$. $i=17.2$

The internal rate of return will vary as tabulated below with the fluctuation of the sales price of milled rice, purchase price of stalk paddy and rate of operation within a range of $\pm 10\%$ and $\pm 5\%$.

Rate of Fluctuation \ Factor	-10%	-5%	0	+5%	+10%
Sales Price of Milled Rice	9.5	13.5	17.2	20.5	23.6
Purchase Price of Stalk Paddy	21.3	19.3	17.2	15.1	13.0
Rate of Operation	14.4	15.7	17.2	18.6	19.9

CHAPTER 6 OPERATING ENTITY AND MANAGEMENT, WORKING FUNDS

Section 1: Operating Entity and Organization

The Lampung Provincial Government has the following plan for the operating entity of the facilities.

- (a) Milling Unit established in the Village Unit is to be placed under direct management of the provincial government and reorganized into a farmers' organization after three years.
- (b) For the Milling Plant established in the paddy field reclamation area, "Wahana Rahardja", a public corporation under the provincial government, is to be its operating entity.

Such a plan of the provincial government for the operating entity of the Milling Unit and Milling Plant to be established under the current financial assistance program is considered appropriate. It would be more desirable, however, if the provincial government provides overall guidance on the management on the following points by appointing a full-time coordinator within the provincial government instead of giving each Milling Unit and Milling Plant a free hand in its operation.

- a) Coordination with local organizations such as Village Unit, which are responsible for the purchase of raw materials and distribution of profit.
- b) Coordination with the market for the sale of products and manipulation of market price (When the Milling Unit and Milling Plant are put in full operation, the amount of milled rice will increase to approximately 17,000 tons accounting for nearly 20% of the total quantity of milled rice marketed in Lampung Province).
- c) Coordination with the bank (BRI) for the procurement of working funds and redemption of construction capital.
- d) Training of personnel on management techniques of Milling Unit and Milling Plant
- e) Supply of spare parts for machinery and training of personnel on operation and maintenance of facilities

For the effective implementation of the above, it is essential to set up a committee comprising members from parties concerned such as BIMAS, BULOG and BRI.

Section 2: Working Fund

For the efficient operation of rice mills, sufficient working funds with low interest must be provided.

BRI (Bank Rakyat Indonesia) is to open its branch office in each Village Unit and to provide farmers with loans at such low interest rate as 1%/month for the purchase of

supplies such as fertilizers and agricultural chemicals. As the farmers are to repay the principal of the loan with the proceeds from agricultural products, the flow of capital will follow this pattern; BRI → Farmers → Milling Unit → BRI.

Purchase of supplies by the Milling Unit serves for BRI as a collector of a loan provided by BRI. In addition, the Milling Unit, because of its nature to serve for the public interests, redistributes profit to local communities. From this point of view, it is advisable that the working funds provided by BRI carry low interest rate of 1%/month, the same rate as offered to the farmers. (Prevailing interest rate of 2.5%/month will not make the Milling Unit commercially payable).

As the Milling Plant is to be constructed in the paddy field reclamation area where no organization of BIMAS exists (even though such an organization will be required eventually), the same treatment as that offered to the Milling Unit is conceivable.

According to a trial calculation shown in the preceding chapter, the working funds required by each Milling Unit amounts to 5.12 million Rp and that by each Milling Plant is 20.03 million Rp, with a total requirement under the project amounting to 122 million Rp.

Section 3: Distribution of Profit

According to a trial calculation made in the previous chapter, the operating profit of the Milling Unit is estimated at approximately one million Rp and that of the Milling Plant is estimated at 10 million Rp. (As the operating profit varies from year to year and reduction has to be made for various taxes, only the estimated figures were used). These profits must be distributed impartially in view of the nature of the facilities to serve public interests. An example of tentative plans is given below.

(1) Milling Unit

(a) 30% or 300,000 Rp/year to the farmers

Each Milling Unit purchases 1,220 tons of dry stalk paddy as raw material and the price paid to the farmers for 100 kg of dry stalk paddy is equivalent to 25 Rp. This does not amount to a rise of the price, but it is equivalent to the commission for the broker and can be distributed to the farmers as shipping charges.

(b) 25% or 250,000 Rp/year to the local communities

If this amount is used as personnel expenses, two extension workers can be employed for a monthly allowance of 8,000 Rp for providing technical trainings. If it is used for building account, it will be sufficient to build a fairly good office room. When used for the purchase of materials for the pavement of roads, a considerably large quantity of materials can be purchased on condition that labor is supplied by Gotong Rojong.

(c) 20% or 200,000 Rp/year to the personnel

As the employees' salaries including extra pay amount to 76,000 Rp/month, it is equivalent to a 2.64 month's bonus.

- (d) 25% or 250,000 Rp/year to internal reserves

Setting aside this amount as a reserve for five years will save a considerable amount for use in renewing such equipment as vehicles, etc.

(2) Milling Plant

Though the capacity of the Milling Plant is four times greater than that of the Milling Unit, its profit rate is far greater than this ratio. In order to maintain proper balance with the Milling Unit, the following is applicable to the distribution of profit.

- (a) 24% or 2.4 million Rp/year to the farmers

The Milling Plant purchases 4,880 tons of dry stalk paddy as raw material. As the range of purchases is wide and extensive, the shipping charge is to be 50 Rp per 100 kg of dry stalk paddy, twice that paid by the Milling Unit.

- (b) 20% or 2 million Rp/year to the communities

The rate of distribution per 100 kg of dry stalk paddy is twice that by the Milling Unit.

- (c) 4% or 400,000 Rp/year to the employees

The amount of the bonus that can be paid to the employees is about the same (2.78 month's pay) as that paid by the Milling Unit.

- (d) 20% or 2 million Rp/year to internal reserves

The rate of reserves for the capacity of the plant is twice that for the Milling Unit.

- (e) 32% or 3.2 million Rp/year to reinvestment in public sector

This amount is to be appropriated mainly for the paddy field reclamation project and local road improvement projects by Gotong Rojong.

Section 4: Purchase Area and Purchase Price

Purchase of paddy by the Milling Unit should be limited to respective Village Unit in principle and the Milling Plant should also have its purchase area designated so that unnecessary competition may be avoided. However, as the amount of production varies with each Village Unit, coordination between the Milling Unit and the Milling Plant is essential.

In the previous chapter the purchase price of stalk paddy was estimated at 14 Rp per kg. This seems to be unreasonably low, but this price was determined by taking into account the high water content of stalk paddy immediately after harvesting, as calculated in Section 6, Chapter 2. Although the Milling Plant is designed to have capabilities of treating coarse paddy with high water content, processing paddy with high

Water content, will result in the decrease of drying capacity and as a result, high rate of operation can not be expected from the plant.

As for purchase price of rice, no tentative plan will be given here, but it is of great importance that a strict price classification system is established according to the type of paddy, unthreshed or unhulled, or water content or ripeness while taking into account the cost of drying and threshing. In order to avoid the purchase of wet paddy which has been exposed to rain, the establishment of a purchase price structure which would encourage the farmers to ship their rice after brief drying is desirable.

Section 5: Contract Rice Milling

Contract rice milling by the Milling Unit for the farmers will deal a hard blow at the existing hullers. Yet, the use of facilities of the Milling Unit by the hullers on commission basis to a certain extent to make the best of high yield rate of milled rice possible by the Milling Unit will prevent the hullers from making excessive profits and will contribute to the interests of the farmers at the same time.

As the rice milling percentage from paddy is about 70% for the Milling Unit while it is 60% for the existing hullers, the following is considered possible.

Milling Unit: 100 kg of paddy → 70 kg of milled rice → 57 kg for the farmers and 13 kg for the Milling Unit (18.6%).

Huller : 100 kg of paddy → 60 kg of milled rice → 57 kg for the farmers and 3 kg for the huller (5%).

This is a 50% reduction in the contract rice milling cost for the huller and an increase of share for the farmers by more than 5%. To the Milling Unit, contract rice milling for the hullers to a certain extent during the off-season period means an increase of the rate of operation. However, the gross earnings of the Milling Unit when the facilities are fully used for contract rice milling at a commission of 18.6% will be as follows:

$$41 \text{ Rp} \times 735,000 \times 0.186 = \text{Rp } 5,600,000$$

This is only 40% of the estimated 13.87 million Rp expected to be earned by the Milling Unit. This low earning rate is due to the idling of threshing and drying facilities. For this reason, the Milling Unit must not engage in contract rice milling for its main business activities.

Section 6: Sales Price and Marketing

In the previous chapter the sales price of milled rice was set at 41 Rp. This price was determined by taking into account the low content of broken rice and it is regarded rather high compared with the prevailing prices in Lampung Province.

As the consumption of rice in Lampung Province is greater in small local markets than in the city area, the rice milled by the Milling Unit and the Milling Plant must be sold mainly at small local markets. For that purpose, low-priced rice will be preferred to high quality rice. It is also important to make a further study on the small-lot selling system.

CHAPTER 7 TRAINING OF PERSONNEL AND TECHNICAL GUIDANCE

As the Milling Unit and the Milling Plant are new to Lampung Province, a modern accounting system must be employed for their management. In particular, the abilities of the manager, together with the availability of sufficient working funds with low interest and efficient machinery, will decide the success or failure in the management of the facilities. For the efficient management of the Milling Unit and the Milling Plant, therefore, adequate training must be provided even when experienced and capable personnel are assigned from the existing mills or hullers.

For training purpose, the first two Milling Units are to be designated as training facilities. In the training facilities all the equipment and materials required for the training are to be provided. It is advisable that the cost of training is shared by all the facilities or covered by loans under the technical assistance program. Training should be planned by placing emphasis on practical aspect rather than theoretical one and construction of facilities and installation of machinery should also be included in training. (Training of mill personnel is scheduled to be provided by OTCA's Tjihea Team, which will be helpful to the personnel). Guidance on the operation of the facilities is also necessary even after the initial operation and for this reason, it is advisable that one Japanese technician is assigned to the provincial organization to provide instruction on technical matters for a period of three years. It is advisable that the training of mill personnel and the assignment of experts for providing guidance on the management are implemented under the technical assistance program.

CHAPTER 8 RECOMMENDATIONS TO CONSULTANTS

(1) Finalization of Site for Construction of Rice Milling Unit and Rice Milling Plant

During the recent survey the team was often prevented from visiting the desas where construction is proposed because of poor road condition and other reasons. It is recommended that the finalization of construction site be made by giving due consideration to the layout of the desa from the standpoint of shipment and road condition.

(2) Design of Rice Milling Unit and Rice Milling Plant

In this report only a basic plan has been mentioned. In order to obtain required performance of the facilities, a careful and detailed study must be made. It is hoped that sound and well designed facilities be constructed to meet the expectation of the parties concerned.

(3) Training of Mill Personnel

It is hoped that adequate trainings be provided on the basis of sound and well planned training program

(4) Construction Supervision

It is hoped that adequate supervision be provided during construction of the facilities and that the training of mill personnel be given due consideration during construction.

COMMENT BY THE TEAM

1. It must be added that a question was raised as to the advisability of constructing 0.5 ton/hr Milling Unit during the internal discussion of the survey team. The payability of the Milling Unit is evidently much lower than that of the Milling Plant. On this point there was an opinion that it would be more reasonable to construct a Milling Plant in Ketjamatan than to establish a Milling Unit in the Village Unit. The 0.5 t/hr mill is only halfway in both capacity and performance. If the planning of this project can be started with a clean slate, a recommendation will certainly be made to provide a 0.5 t/hr huller (without a dryer but with a mobile thresher) for contract rice milling for the farmers in each desa and to construct a 2.0 t/hr mill in Ketjamatan. In reality, however, there are a number of hullers and mills and their existence cannot be ignored. The judgement that top priority should be given to the political objective of the Indonesian Government to facilitate distribution of commodities by introducing the Village Unit system also led to the adoption of the plan for the construction of the Milling Unit.

2. There were also conflicting views among party members as to the number of facilities to be provided. It may safely be said that this report is a compromise plan. The total amount of the yen credit mentioned in this report is about half of US\$3 million agreed upon by the Japanese and Indonesian Governments. The reason for adopting a compromising plan as conclusions of the survey team was that it was considered appropriate to invest half of the capital first as a trial and then invest the remaining half when a more appropriate way is found in the future instead of investing the total amount at one time. Another contributing factor was that the Indonesian Government is attempting to maintain the balance between each province, the importance of which cannot be ignored.

Table 1. List of 47 Village Units for Milling Unit Construction, including 18 Village Units (marked with a double circle) selected for Immediate Milling Unit Construction

(Drafter name Tempat Unit Desa Dalam Daerah Lampung)

No.	Kabupaten	Ketjamatan	Unit Desa ¹⁾
1	Lampung Selatan (South Lampung)	Wonosobo	⊙ Sānggi
2	"	"	Bandar Kedjadian
3	"	"	Wonosobo
4	"	Kotaagung	Kotaagung
5	"	Talangpadang	⊙ Summersari
6	"	"	Bandjar Negeri
7	"	Pagelaran	Panutan
8	"	"	⊙ Rantau Tidjang
9	"	Pringsewu	⊙ Pringsewu
10	"	"	Sukohardjo
11	"	Gading Redjo	⊙ Gading Redjo
12	"	"	Bulokerto
13	"	Gedong Tataan	Bagelen
14	"	Kedongdong	Wargomulja
15	"	"	Baturadja
16	"	"	Kedongdong
17	"	"	Kota Dalam
18	"	Penengahan	Penengahan
19	Lampung Tengah (Central Lampung)	Metro	⊙ Bandjarsari
20	"	"	⊙ Redjo Mulijo
21	"	"	⊙ Josodadi
22	"	"	⊙ Karang Redjo
23	"	Trimurdjo	⊙ Tempuran
24	"	"	Sumber Waringin
25	"	"	Liman Benawi
26	"	"	Pudjo Dadi
27	"	Pekalongan	⊙ Adiredjo
28	"	"	⊙ Tulusredjo
29	"	Batang Hari	Batang Hardjo
30	"	"	Seloredjo
31	"	"	⊙ Sumberredjo
32	"	"	Adi Warno

Tab. No. 1 (cont'd)

No.	Kabupaten	Ketjamatan	Unit Desa ¹⁾
33	Lampung Tengah (Central Lampung)	Sekampung	Gr. Klopo Muljo
34	"	"	⊙ Sumber Sari
35	"	Sukaradja Nuban	⊙ Sukaradja Nuban
36	"	Raman Utara	Raman Adji
37	"	"	Redjo Birangun
38	"	"	Ratna Daja
39	"	"	Raman Endra
40	"	Purbolinggo	⊙ Tegal Ombo
41	"	"	⊙ Toto Prodjo
42	"	"	⊙ Taman Negeri
43	"	Bandardjaja	Meliput Daerah ²⁾
44	"	"	Pengairan Way Seputih ²⁾
45	Lampung Utara (North Lampung)	Bukit Kemuning	Bukit Kemuning
46	"	Liwa	Liwa
47	"	Sumberdjaja	Sumberdjaja
48	"	Pss. Tengah Krui	Pasar Krui
49	"	"	Way Saral

Tandjung Karang, 30 Agustus 1971.-

Badan Pembina Bimas Propinsi Lampung
Sekretaris

Note: 1) Immediate construction of milling units is requested for the 18 village units marked with a double circle. (Names of these village units were indicated to the team as Daftar Nama Tempat Unit Desa Di Kabupaten MT MT 71/72!)

2) These unit desas are situated in one of the two Ketjamatans designated for milling plant construction.

Table 2. Production of Lowland Paddy and Upland Paddy in Lampung (1965-1970)

Kind of paddy Year	Total Lampung		Lampung Selatan		Lampung Tengah		Lampung Utara					
	Lowland paddy	Upland paddy	Lowland paddy	Upland paddy	Lowland paddy	Upland paddy	Lowland paddy	Upland paddy				
	Th. ton	Th. ton	Th. ton	Th. ton	Th. ton	Th. ton	Th. ton	Th. ton				
1965	209.5 (51)	202.4 (49)	411.9	149.2 (69)	65.4 (31)	214.6	44.0 (40)	67.5 (60)	111.5	16.3 (19)	69.5 (81)	85.8
1966	233.7 (47)	267.8 (53)	501.5	156.1 (67)	75.7 (33)	231.8	59.5 (35)	111.8 (65)	171.3	18.1 (18)	80.4 (82)	98.5
1967	198.7 (55)	159.2 (45)	357.9	137.2 (69)	62.2 (31)	199.4	44.4 (52)	40.9 (48)	85.3	17.1 (23)	56.1 (77)	73.2
1968	235.5 (52)	219.8 (48)	455.3	158.0 (70)	66.3 (30)	224.3	59.2 (46)	68.4 (54)	127.6	18.2 (18)	85.1 (82)	103.3
1969	222.8 (61)	144.1 (39)	366.9	143.6 (75)	48.6 (23)	192.2	62.9 (61)	40.5 (39)	103.4	16.3 (23)	55.0 (77)	71.3
1970	225.4 (55)	180.4 (45)	405.8	140.7 (71)	57.2 (29)	197.9	62.6 (57)	47.8 (43)	110.4	22.2 (28)	75.4 (77)	97.6
Average	220.9 (53)	195.6 (47)	416.6	147.5 (70)	62.6 (30)	210.0	55.4 (47)	62.8 (53)	118.3	18.0 (20)	70.3 (80)	88.3
Coefficient of Variation (%)	6.5	22.9	13.0	5.7	14.6	7.6	15.9	43.0	24.8	12.2	17.8	15.5

Note: Prepared from "Report on Agricultural Development Survey in South Sumatra, June 1971"
International Cooperation Division, Ministry of Agriculture and Forestry, Japanese Government

Table 3 Harvesting Area and Yield of Lowland Paddy in Lampung (1965 - 1970)

Item Area Year	Harvesting Area (1,000 ha)				Dry stalk paddy (ton/ha)			
	Lampung Selatan	Lampung Tengah	Lampung Utara	Total Lampung	Lampung Selatan	Lampung Tengah	Lampung Utara	Total Lampung
1965	35.5	19.7	6.5	61.7	4.2	2.2	2.5	3.4
1966	35.9	20.9	6.7	63.5	4.3	2.9	2.7	3.7
1967	35.3	20.1	7.7	63.1	3.9	2.2	2.2	3.1
1968	35.9	24.4	7.5	67.7	4.4	2.4	2.4	3.5
1969	35.9	27.6	7.1	70.5	4.0	2.3	2.3	3.2
1970	37.6	29.2	9.1	75.9	3.7	2.1	2.5	3.0
Average	36.0	23.6	7.4	67.1	4.1	2.4	2.4	3.3
Coefficient of variation (%)	2.3	17.3	12.5	8.1	6.5	12.3	7.2	8.0

Note: Prepared from "Report on Agricultural Development Survey in South Sumatra, June 1971", International Cooperation Division, Ministry of Agriculture and Forestry, Japanese Government.

Table 4. Harvesting Area and Yield of Upland Paddy in Lampung (1965 - 1970)

Item Area Year	Harvesting Area (1,000 ha)				Yield in dry stalk paddy (ton/ha)			
	Lampung Selatan	Lampung Tengah	Lampung Utara	Total Lampung	Lampung Selatan	Lampung Tengah	Lampung Utara	Total Lampung
1965	29.8	56.5	43.1	129.4	2.2	1.2	1.6	1.6
1966	34.8	77.7	49.0	161.5	2.2	1.4	1.6	1.7
1967	33.2	66.0	43.3	142.4	1.9	0.6	1.3	1.1
1968	33.9	72.0	64.6	170.4	2.0	1.0	1.3	1.3
1969	31.2	42.6	45.2	118.9	1.6	1.0	1.2	1.2
1970	34.2	52.8	52.7	139.8	1.7	0.9	1.4	1.3
Average	32.9	61.2	49.6	143.7	1.9	1.0	1.4	1.4
Coefficient of Variation (%)	5.9	21.3	16.6	13.4	12.9	26.7	12.0	17.1

Note: Prepared from "Report on Agricultural Development Survey in South Sumatra, June 1971", International Cooperation Division, Ministry of Agriculture and Forestry, Japanese Government

Table 5. Rate of Milling Yield of Penggilingan Padi in Lampung

	Lowland paddy (Sawah)		Upland paddy (Ladang)	
	Average value %	No. of sample	Average value %	No. of sample
Lampung Selatan	50.6	(39)	46.6	(7)
Lampung Tengah	39.6	(5)	47.3	(9)

Calculation based on the statistics of the Central Government, DAFTAR: Perusahaan Penggilingan Padi dalam Daerah Propinsi Lampung Tahun 1970.

Table 6. Trend of Population Increase and Per Capita Milled Rice Consumption

Area Item Year	Total Lampung			Lampung Selatan			Lampung Tengah			Lampung Utara		
	Popu- lation	Rice Pro- duction	Per Capita Rice Con- sumption	Popu- lation	Rice Pro- duction	Per Capita Rice Con- sumption	Popu- lation	Rice Pro- duction	Per Capita Rice Con- sumption	Popu- lation	Rice Pro- duction	Per Capita Rice Con- sumption
	1,000	Th.ton	kg	1,000	Th.ton	kg	1,000	Th.ton	kg	1,000	Th.ton	kg
1965	2099	214.2	102	860	111.6	130	637	58.0	91	433	44.6	103
1966	2203	260.8	118	893	120.5	135	691	89.1	129	437	51.2	117
1967	2312	186.1	80	935	103.7	111	750	44.4	59	442	38.1	86
1968	2427	236.8	98	978	116.6	119	814	66.4	82	446	53.7	120
1969	2547	190.8	75	1024	99.9	98	883	53.8	61	451	37.1	82
1970	2673	211.0	79	1071	102.9	96	959	57.4	60	456	50.8	111

Note: Population was calculated on the basis of the figures for 1965 and 1970 appearing in the statistics of the Central Government, with the growth rate as the multiplier.

Population of whole Lampung includes that of Tanjung Karang (187,718 in 1970).

Rice production was calculated with the milling extraction rate (dry stalk paddy → milled rice) set at 52% from the figures given in Table 2.

Table 7. Capacity of Mills in Lampung

Capacity (Milled rice)		No.	Average HP
/year ton	/hour ton		
1,500	1.07	19	91
1,350	0.97	2	80
1,200	0.86	6	64
1,050	0.75	1	47
1,000	0.72	3	58
900	0.64	2	43
750	0.54	1	38
600	0.43	6	32
450	0.32	5	27
400	0.35	2	26
300	0.21	4	26
180	0.08	1	15

Note: Prepared from the statistics of the Central Government, "Daftar: Perusahaan Pengilangan Padi Propinsi Lampung".

Hourly capacity was assumed to be 1/1,400 of annual capacity on the basis of 7 operating hours a day and 200 operating days a year.

Table 8. Comparison of Paddy Production and Milling Capacity in Lampung

	Paddy Production (in milled rice) Th.ton	Huller		Mill		(Cap/ No.)	Total Cap. Th.ton	Milling Cap.
		No.	Cap.	No.	Cap.			Production
			Th.ton		Th.ton			%
Lampung Selatan	102.5	310	86.8	43	42.1	(980)	128.9	126
Lampung Tengah	68.9	229	64.1	9	11.2	(1240)	75.3	109
Lampung Utara	50.9	233	65.2	0	-	-	65.2	128
Total Lampung	222.3	772	216.1	52	53.3	(1020)	269.4	121

Note: Prepared from table 21, 25 and 27, with the capacity of hullers set at 280 tons/year in milled rice.

Table 9. Accelerated Paddy Production and Rice Mill Construction Programme under the

Year	Rice Production (Stalk paddy) M.ton	(Capacity (Milled rice))			% of Rice Production %
		Rice Mill (Mill)	Huller	Total	
		M.ton	M.ton	M.ton	
1968/69	19.5	0.7	1.5	2.2	22
1969/70	20.6	0.8	2.2	3.0	29
1970/71	22.0	0.94	2.96	3.9	34
1971/72	22.3	1.22	3.78	5.0	43
1972/73	25.8	1.78	4.42	6.2	46
1973/74	29.6	2.90	4.80	7.7	50

Note: Extracted from the statistics of Indonesian Government for 1971, A-18, milling extraction rate (Stalk paddy → milled rice) is assumed to be 52% in the calculation of figures shown.

Table 10 General Condition of Mills Surveyed by Interviews

Ketjamatan	Trimurdjo (Lampung Tengah)	Pekalongan (Lampung Tengah)	Talangpadang (Lampung Selatan)	Gedongtataan (Lampung Selatan)	Rengasdengklok (Krawang)
Type and Capacity of Machine	Schule 1 ton/hr	Schule 1 ton/hr	Schule 1 ton/hr	Schule 0.8 ton/hr	Yanmar 6 ton/hr Schule 1 ton/hr
Year of Establishment	1950	1950	....	1928	1967
Area of Mill Compounds	4 ha	3 ha	....	1.6 ha	7.4 ha
Facili-Mill Building	96 m ² (80 x 12)	96 m ² (60 x 16)	....	480 m ² (20 x 24)	2920 m ²
Warehouse for paddy	720 m ² (30 x 12 x 2)	300 m ²	....	1189 m ² (440 + 261 + 488)	1770 m ²
Drying yard	180 m ² (30 x 60)	400 m ² (20 x 20)	....	448 m ² (32 x 14)	11000 m ²
Annual Processing Quantity	500 t	too t	2000 t	...	12000 t
No. of operating Days	2 months	2-3 months	10 months	7 months	300 days
Milling Ex-traction Rate	Padi (upland) 52%, (low-land) 40%, Gabah 59%	Padi (upland) 55%, (Low-land) 47%, Gabah 60%	4%	Padi bulu 57% Gumbila 52%	Padi → 56% Gabah → 60 - 62%
Personnel Cost	Manager 1 7000 Rp/month Office 3 5000+70k/mon. Worker Machine 1 5000+70k/mon. Warehouse 1 5000+70k/mon. Truck for collecting paddy approx. 30km 1-2 Rp/kg	Manager 1 Office 3 Rp 10,000 Workers Machine Operator 4 " 6,000 Driver 1 " 5,000 +4 Daily Labourer 2 " 150/B Payment for Contract Work: Unloading of trucks 25 Rp/ton Drying work 25 Rp/100 kg Warehouse - Milled rice 15 Rp/100 kg Selection - Trucks, etc. 10 Rp/100 kg	Manager 1 Rp9,000 + 60k Office Worker 2 "5,000 + 75k (average) Machine Operator 1 "3,500 + 50k Permanent Employee 6 " 150Rp/day Payment for Contract Work: (Pr-300/ton) Loading of Trucks 100Rp/ton Loading of Paddy 50Rp/ton Drying Work 100Rp/ton Transport of Milled rice 50Rp/ton	Manager 1 Rp20,000 or more Office Worker 6 Rp 7,500+40k/month Machine Operator 7 Rp 3,500 Permanent Employee 53 Rp150/day for male worker. Daily Labourer 40 Rp40+1k/day for female worker Contract Worker 10 Broker Approx.40 in No.	
Fuel and others	...	...	...	Fuel 18 l/hr 15Rp/1 Oil 3 l/day 85Rp/1 Bags for rice 85Rp Repair cost 120,000Rp/year Trucks 10	...
Purchasing Activity	Upland paddy is purchased in lots of 5 tons through brokers from desas approximately 30 km from the mill.	Sekampung, Purbolinggo Djepara, etc. About 30-40% is purchased in paddy.	Padi bulu alone is purchased on the Kabupaten level at a price of Rp 18-21/kg	Padi bulu is purchased mostly on the Kabupaten level	Purchased from all parts of the Kabupaten at an average price of Rp 18/kg
Market	Tandjung Karang, Metro	Tandjung Karang	Tandjung Karang	Tandjung Karang, Telukbetong	Djakarta BULOG 70% 40Rp/kg General 30% 42Rp/kg

Table 11 General Condition of Hullers Surveyed by Interviews

Ketjamatan	Trimurdjo (Lampung Tengah)	Purbolinggo (Lampung Tengah)	Raman Utara (Lampung Tengah)	Seputih Raman (Lampung Tengah)	
Management and Year of Establishment	BULDG 1969	Private enterprise run by two owners 1969	Army 1971	Private enterprise run by two owners 1971	
Type and Capacity of Machine	PELITA 300 kg/hr	Engerberg 240 kg/hr	ISEKI 400 kg/hr	KOKUYO 250 kg/hr	
Facilities	Huller Building	40 m ² (8 x 5)	54 m ² (6 x 9)	200 m ² (30 x 20)	140 m ² (20 x 7)
	Solar Drying Yard	400 m ² (20 x 20)	...	400 m ² (20 x 20)	440 m ² (22 x 20)
Operating Condition	Annual Processing Quantity	240 t	100 t	600 t (planned)	360 ton (planned)
	No. of Operating Days	12 months	6~7 months	3 months (planned)	12 months (planned)
	Milling Extraction Rate	gabah 61%	gabah 60%	gabah 60%	gabah 52.5%
Management Method	Milling service offered at a charge of 10% of milled rice	Milling service offered at a charge of 10% of milled rice	Gabah is purchased for marking (Milling charge is approx. 8% of milled rice since gabah purchased at Rp21-22/kg is processed into milled rice and sold at Rp38-40/kg.	Milling service offered at a charge of 10% of milled rice	
Initial investment in equipment and facilities		Building Rp100 thousand Equipment Rp438 "		Equipment Rp780 thousand	
Fuel and Others	Supplied by BULDG	Rp300 for 16.5 lit. of gasoline per ton of milled rice Rp30 for oil per ton of milled rice		Fuel Rp4000/month Oil Rp3000/month Rubber Rp6000/month Required for production of 30 ton/mon.	
Personnel Cost	Manager 2000 Rp+190k =9600/mon. Laborer 100 Rp+0.5k =120Rp/day	Labour 3 20% of (income operating expenses) Manager 1 40% of the remainder	4 workers 2500+12 k =3000/month	5 workers Rp4000/month	
Profit Calculation	Incom: 40Rpx24,000 = =Rp960,000/year Expenditure: Personnel cost = Rp202,000/year Fuel cost = Rp104,000/year (Kokuyo's basis adopted) Profit:Rp654,000/year	Income: 40Rpx10000 = = Rp400,000/year Expenditure: Personnel cost = Rp156,000/year Fuel cost = Rp33,000/year Profit: Rp211,000/year	Expenditure: Rp12,000/month	Income: Rp40x3000 = = Rp120th/month Expenditure: Personnel cost =Rp20th/month Fuel and Other Costs = Rp13th/month Profit: Rp87th/month	

Table 12. Quality of Material Paddy and Milled Rice (Disclosed by Inspection at Mills and Hullers)

Sample Place	Lampung Tengah		Lampung Selatan		Krawang		
	Pekalongan mill	Sekampung huller	Gedontataan mill	Wonosobo mill	Rengasdeng-mill	Rengasdeng-mill	
Type of Machine or Implement	Schule	Giantic	Schule	Giantic	Yanmar	Yanmar	Huller
Variety	PBS	Klemas	Padi Bulu	Gundil	Bengawan	Bengawan	Pelita
Paddy	Broken rice	0 %	0 %	0 %	8	18 %	0 %
	Heavily cracked grain	16	0	32	22	6	8
	Moderately cracked grain	8	18	28	4	4	10
Milled rice	Water content	14.1	14.8	14.4	13.7	13.5	12.6
	Full size grain	34.5	36.0	55.7	24.7	66.3	69.0
	Grains with more than half full size	21.0	18.3	11.0	11.4	21.5	17.5
Weight per 1000 grains	Paddy	27.35	28.0	30.45	---	27.1	24.80
	Milled rice	21.35	20.25	21.5	23.2	20.45	18.35
Weight per 1000 grains of milled paddy rice	73	72	72	71	76	82	74
Remarks					Paddy contain noticeable quantities of brown rice & other varieties.	Paddy contain noticeable quantities of brown rice & broken rice.	

Table 13. BULOG/s Quality Ranking Standard of Milled Rice

	Purchase Price	Admixture Rate of Broken Rice with less than half the full grain size	
		Present admixture rate	Admixture rate planned for 1972 and subsequent years
		PR/kg	%
A	38	22.5	15
B	37	27.0	25
C	36	32.5	30

Table 14. Record of Meteorological Observations at Mitsugoro Farm, Sribhawono (July 1969 to September 1970)

Item	Month		Year												Annual average or total	
	1	2	3	4	5	6	7	8	9	10	11	12				
Temperature	max (°C)	'69							31.6	31.7	32.0	32.1	32.5	32.0	331.4	
		'70	31.6	32.3	31.5	31.4	30.2	29.8	29.6	30.3	30.1					
	min (°C)	'69								22.1	22.4	22.7	22.9	23.4		23.1
		'70	22.2	23.2	23.0	23.2	23.7	23.2	22.8	22.8	23.4					
Rainfall (mm)	'69							111.4	60.6	104.3	(96.1) ¹⁾	170.5	144.2	3066.0		
	'70	503.6	262.9	506.9	437.5	278.9	253.5	146.6	262.8	(38.0) ¹⁾						
No. of Days with more than 1 mm of Rainfall (days)	'69							7	5	6	(7) ¹⁾	8	17	165		
	'70	21	17	18	15	21	16	11	6	(9) ¹⁾						
Duration of Sunshine (hr)	'69									146.1	(150.1) ²⁾	154.1	98.1	1226.8		
	'70	73.0	42.0	49.4	74.0	91.6	57.7	129.9	158.1	151.4						
No. of Days with less than 1 hour of Sunshine	'69									2	(3) ²⁾	4	5	90		
	'70	11	11	16	9	10	12	3	4	2						
Relative Humidity (%)	max (%)	'69							88	87	84	85	87	86		
		'70	86	85	88	88	86	85	86	86	82					
	min (%)	'69								52	50	48	50		54	
		'70	55	52	55	59	59	59	55	52	45					
No. of Days Recording more than 70% of Lowest Humidity	'69								2	0	0	1	0	11		
	'70	0	0	0	3	2	2	1	2	0						
No. of Days Recording less than 40% of Lowest Humidity	'69								1	0	3	4	0	12		
	'70	0	0	0	0	0	0	1	2	5						

Note: 1) Converted to daily value because of the lack of measurement record.
 2) Average value for September and October supplemented because of the lack of measurement record.
 3) Prepared from the data of Mitsugoro Farm.

Table 15. Rainfall in Lampung (mm)

	Annual Rainfall	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Kotabumi	2623	339	278	322	266	191	147	135	85	138	143	259	320
Metro	2077	392	257	291	99	99	89	117	134	69	84	145	231
Kedondong	2277	247	242	247	173	121	87	65	49	66	102	149	207

Source: "Outline and Basic Survey for Agricultural Development in Lampung (Shimokawa)"

Note: Kotabumi - Lampung Utara, El. 32 m; Metro - Lampung Tengah, El. 58 m; Kedondong - Lampung Selatan, El 100 m

Table 16. Cropping Season of Paddy in Lampung

Ketjamatan		Transplanting Season	Harvesting Season	Delivery Period to Hullers
(Lampung Tengah)				
Perbolingo	Wet Season	January	April - May	July - August
	Dry Season	July - August	November	December - January
Bandardjaja	Wet Season	January - February	May - June	
	Dry Season	July - August	November - December	
	Upland paddy	October	March - April	
(Lampung Selatan)				
Pringgsewu	Wet Season	November - December	March - April	
	Dry Season	May - June	September - October	
Wonosobo	Wet Season	November	March	
	Dry Season	May	October	

Note: The wet season is from October to March.

Table 17. Rates of Domestic Consumption and Marketing of Rice

Ketjamatan	Wet Season			Dry Season			Upland Paddy			Rate of Self-consumption-Sale
	Self-Consumption	Sale Harvesting Season	Other Season	Self-Consumption	Sale Harvesting Season	Other Season	Self-Consumption	Sale Harvesting Season	Other Season	
(Lampung Tengah)										
Metro										70-30
Trimurdjo										
Batanghari	65	25	10	50	30	20	85	15	-	50-50
Sekampong	50	30	20	50	30	20	30	30	40	30-50
Purbolinggo	60	-	40	75	-	20	80	-	20	
Purbelinggo	40	30	30	40	30	30	70	30	-	40-60
Raman Utara	60	40								
Punggur	25	40	35				25	40	35	40-60
Sukadana	90	10								
Seputih Raman	100									
Gunung Sugih	75	25								
Terbangibesar										40-60
(Lampung Selatan)										
Pringgsewu	40	20	40	60	-	40	30	-	70	
Wonosobo	30	35	35				100	-	-	

Table 18-1 Sales Price of Rice in Lampung Tengah

Ketjamatan	Interviewed Place	Stalk Paddy		Paddy		Milled Rice		Broken Rice	Rice Bran
		Sales Price of Farmers	Purchase Price of Mills	Sales Price of Farmers	Purchase Price of Mills	Sales Price of Farmers and Mills	Purchase Price of General Consumers		
Trimurdjo	Mill		13			40			
	"		Lowland paddy 13 Upland paddy 18			36-37		12-12.5	3
	Huller Ketj.		13		Lowland paddy 15 Upland paddy 20 Undried 18 Dried 19	Rural 32.5 Urban 38 PB 30-40 Local 32.5-45	Rural 39 Urban 41	-	2.5
Metro	Ketj.	PB 14-19 Local 25-25							
Batanghari	Ketj.	Local 14		PB 15-23					
	Ketj.	Lowland paddy 13 Upland paddy 15-17 (Water content 20%)		17		33			
Sekampung	Ketj. Desa	8-11		12.5-20					
Pekalongan	Ketj.					PB 35-45 Local 39-55			
"	Mill		Lowland paddy 16.5-17 Upland paddy 18-19		20-21	38		12.5-15	4
Purbolinggo	Ketj. Desa			12-26 20		Sukadana 36-38	Sukadana 41-42		
Raman Utra	Ketj. Huller			PB 9-23 C-4 19 PB 21 Gunbila 22		PB 38 Gunbila 40			5
Punggur	Ketj. Desa			PB 14-18 Local 16-21 Lowland paddy 13-19 Upland paddy 14-21		32-45			
Bandardjaja	Ketj.			20		35-40			
Sukadana	Ketj.	C-4 13-14							

Table 18-2. Sales Price of Rice in Lampung Selatan

Ketjamatan	Interviewed Price	Stalk Sales Price of Farmers	Paddy Purchase Price of Mills	Paddy		Milled Rice		Broken Rice	Rice Bran
				Sales Price of Farmers	Purchase Price of Mills	Sales Price of Farmers and Mills	Purchase Price of General Consumers		
Wonosobo	Ketj.	14-18				32-36			
Talangpadang	Mill		Padi Bulu 18-21						
Prangsewu	Ketj.	15 15-20		20-25		Rural 35-37.5	Rural 42.5		
Gedongtataan	Ketj.	Local 15-20					35-45		
	Mill	Local 15-20				3.4 month 7.8 42 1.2 50	35-37	22	4 5

Note: BULOG controls the rice price by purchasing rice if its price drops below the floor price of Rp 16 for stalk paddy and Rp20.5 for paddy.

It also purchases milled rice at a price varying from Rp36 to 38 according to the admixture rate of broken rice so as to stabilize the price level.

Pairs of values shown in the table with a hyphen in between indicate the floor price (the harvesting season) and the ceiling price.

Table 19. Milling Extraction Rate of Existing Mills and Japanese Mills (Paddy = 100%)

	Existing Mills %	Japanese Mills %
Rate of Milling Extraction	62	68
Rate of Broken Rice	4.5	2.5
Total	66.5	70.5
Rate of Rice Bran	11	8.5

Source: "Performance Comparison of Existing Old Milling Machines and Japanese-made Modern Milling Machines in Indonesia, May 27, 1970" (Tomosuke Yanagida)

Table 20. Ketjamatan-wise Production of Paddy in Lampung Tengah (1970). Milling unit construction is requested for Ketjamatan Nos. 1 to 8 shown in this table.

Ketjamatan	Wet Season (Sawah)		Unit Yield (ton/ha)	Dry Season (Gadu)		Rate of Double Cropping (Double cropping area in %)	Upland Paddy (Ladang)		Share of Each Crop in Total Production		
	Area (ha)	Production (ton)		Area (ha)	Production (ton)		Area (ha)	Production (ton)	Wet Season %	Dry Season %	Upland Paddy %
1. Metro (4-4)	2890	8647	3.0	1697	4293	67	214	13154	65	33	
2. Trimurdjo (1-4)	2888	9345	3.2	1623	2584	42	65	11994	78	22	
3. Patenghari (1-4)	2973	8176	2.8	1760	5377	72	244	13797	59	39	
4. Sekampung (1-2)	1332	3457	2.6	747	2092	45	700	6638	52	32	
5. Pekalongan (2-2)	987	3478	3.5	845	1085	67	427	5030	69	22	
6. Purbolingo (3-3)	2232	8767	3.9	1300	3066	55	245	12340	71	25	
7. Raman Utara (0-4)	1354	4485	3.3	406	2123	55	1248	7097	64	30	
8. Sukaradja Nuban (1-1)	..	499	...	..	363	67	845	1707	29	21
Total of Ketjamatens ³⁾ 1 to 8	..	46854	..	..	20983	..	3920	71757	65	29
9. Punggur	250	264	1.1	118	15	12	2100	4321	6	0	
10. Terbangibesar	..	633	..	..	92	15	..	4756	12	1
11. Gunungagung	871	1496	1.7	250	142	17	7275	2267	38	4	
12. Padangratu	..	1742	..	..	80	2	..	2865	37	2
13. Bangunredjo	..	1238	..	..	56	8	..	1146	51	2
14. Kalireadjo	..	4756	..	..	695	8	..	4489	48	7
15. Sukadana	490	897	1.8	98	130	20	3200	4898	15	2	
16. May Djepara	..	768	..	..	256	10	..	735	44	14
17. Djabung	..	0	..	..	0	..	..	5921	0	0
18. Labuhan Maringgai	..	1245	..	..	388	12	..	4513	20	6
19. Seputih Raman	250	579	2.3	15	6	5	..	2167	21	0	
20. Seputih Banjak	..	612	..	..	11	5	..	2817	18	0
21. Seputih Mataram	..	259	..	..	0	0	..	2284	10	0
22. Rumbia	..	513	..	..	15	3	..	697	42	1
Total of Ketjamatens ³⁾ 9 to 22	..	15002	..	..	1886	..	..	43876	25	3
Grand Total	..	61856	..	..	22869	..	..	132521	47	17
											36

Note: 1) Obtained from the statistical data of the Provincial Government.

2) Figures in parentheses, such as (4-4), which are given after each of Ketjamatan Nos. 1 to 8 are intended to indicate the "Number of Milling units desired to be constructed in the immediate future" and the "total number of milling units requested to be constructed".

3) Crossed figures are originally entered figures which were corrected for the purpose of calculation since they do not represent the total of the values given in respective columns. It is probable, however, that these crossed figures represent correct total values and some of individual values were misprinted. Both crossed and corrected total value will be presented in the following tables since it is reasonable to consider the difference as error.

4) Obtained by interviews in Ketjamatans.

5) Percentage of double cropping area does not show conformity to the acreage of planted area since the latter was obtained by interviews.

6) This value is too high. Another interview disclosed a value of 2.0.

Table 22. 1970 Paddy Production and Estimated Operation Stability of Milling Unit in Each Village Unit in Lampung Tengah

Ketjamatan Village Unit	2)	Paddy Production 1)			Total ton	Estimated 3) Stability of Milling Unit
		Wet Season ton	Dry Season ton	Upland Paddy ton		
1. Metro						
Josodadi	•	2,163	870	0	3,033	⊙
Karangredjo	•	2,288	1,015	0	3,303	⊙
Redjomuljo	•	1,818	1,291	214	3,323	⊙
Bandjarsari	•	2,378	1,117	0	3,495	⊙
2. Trimurdjo						
Limanbenawi	○	3,139	1,134	0	4,273	⊙
Tempuran	•	2,347	1,160	0	3,507	⊙
Pudjodadi	○	885	0	65	950	x
Simbarwaringin	○	2,974	290	0	3,264	⊙
3. Batanghari						
Pandjaredjo	○	2,335	1,450	0	3,785	⊙
Baleredjo	○	2,680	1,401	94	4,175	⊙
Telogoradjo	•	1,395	1,308	150	2,853	⊙
Seloredjo	○	1,766	1,218	0	2,984	⊙
4. Sekampung						
Giriklopomuljo	○	1,993	1,198	363	3,554	⊙
Sumbersari	•	1,464	894	726	3,084	⊙
5. Pekalongan						
Adiredjo	•	1,695	328	0	2,023	x
Tulusredjo	•	1,783	757	467	3,007	⊙
6. Purbolinggo						
Tamanbogo		3,681	881	25	4,587	⊙
Taman Endah		1,767	845	50	2,662	○
Totoharjdo	•	1,517	763	50	2,330	○
Tambahluhur (Taman Negeri)	•	1,145	455	150	1,750	x
Tegalombo	○	657	122	232	1,011	x
7. Raman Utara						
Raman Adji	○	1,233	509	0	1,742	x
Redjobimangun	○	1,322	508	0	1,830	x
Rantau Daja	○	1,274	763	0	2,037	x
Raman Endra	○	656	343	489	1,488	x
8. (Sukadana)						
Sukaradja Nuban	•	499	363	845	1,707	x

1) Obtained from the data of the Provincial Government.

2) • indicates village units in which milling units are requested to be constructed in the immediate future; ○ indicates village units requested to be ultimately covered by the milling units construction plan; a map was used to check and confirm the names of village units since some of them differed from those shown in Table 1.

3) Assuming that a milling unit collects half of the production, it is estimated that its operation can be stabilized (as marked by a double circle in the table) if the village unit supplies 2,700 tons or more of paddy (700 tons x 2 + 0.52), fairly stabilized (as marked by a circle in the table) if the village unit supplies 2,300 tons or more of paddy (700 tons x 2 + 0.61), and not stabilized (marked by an X) if the paddy supply is smaller than 2,300 tons. The village extraction rate of 0.52 employed in the above calculation is the country's average value obtainable from Japanese milling machines.

Table 23. Stability Standard of Milling Unit Operation in Village Units

	Stabilized ton	Fairly Stabilized ton	Not Stabilized ton
Paddy Production of Village Unit	> 2700	> 2300	< 2300
Number of Milling Units Requested to be Constructed in the Immediate Future (13)	8	1	4
Total Number of Milling Units Requested to be Constructed (24)	14	1	9

Note: Milling units for immediate construction are included in the total number to be constructed.

Table 24. Ketjamatan-wise Production of Paddy in Lampung Selatan (1970)
(Milling unit construction is requested for Ketjamatan Nos. 1 to 9 shown in this table.)

Ketjamatan	2)	Wet Season Paddy (Sawah)		Dry Season Paddy (Gadu)		Rate of Double Cropping (Double 5) (Cropping Area in %)	Upland Paddy (Ladang)		Total Production		Share of Each Crop in Total Production		
		Acreage of Planted Area ha	1) Production ton	Unit Yield ton/ha	Acreage of Planted Area ha		1) Production ton	Unit Yield ton/ha	1) Production ton	Unit Yield ton/ha	Wet Season %	Dry Season %	Upland Paddy %
1. Wonosobo	(1-3)	4,000	16,957	4.3	900	2.0	750	450	0.6	19,207	88	9	3
2. Kotaagung	(0-1)	2,280	8,577	3.8	1,240	4.0	400	469	1.2	14,010	61	35	4
3. Talangpadang	(1-2)	3,000	11,400	3.8	1,498	3.4	3,435	7,253	2.1	23,735	48	21	31
4. Pagelaran	(1-2)	2,253	8,966	4.0	889	2.0	2,100	2,450	1.2	13,194	68	13	19
5. Pringsewu	(1-2)	3,065	11,341	3.7	1,010	2.5	1,200	515	0.4	14,383	79	18	3
6. Gadingredjo	(1-2)	2,298	8,645	3.8	197	3.4	-	-	-	9,304	93	7	0
7. Kedondong	(0-4)	5,975	24,762	4.1	699.25	4.1	600	1,200	2.0	28,790	86	10	4
8. Gedungataan	(0-1)	2,784	9,688	3.5	525	2.9	3,753	6,662	1.8	17,866	54	9	37
9. Penengahan	(0-1)	1,270	5,080	4.0	205	2.6	2,835	6,620	2.3	12,241	42	4	54
Sub-total [1-9]	(5-18)	26,925	105,416	3.9	7,163.25	3.0	15,073	25,619	1.6	152,730	69	14	17
10. Kalianda		400	1,480	3.7	60	2.0	9,856	11,460	1.2	13,060	11	1	88
11. Telukbetung		250	750	3.0	9	3.0	900	1,000	1.1	1,777	42	2	56
12. Padangtjermen		1,400	5,600	4.0	111	3.4	3,700	8,350	2.5	14,332	39	3	58
13. Kedaton		943	2,800	3.0	127	2.4	2,850	6,040	2.1	9,140	31	3	66
14. Natar		575	2,019	3.5	40	1.2	2,408	3,971	1.6	6,038	33	1	66
(Pandjang) (Tjukubalak)													
Total	[1-14] (5-18)	30,493	118,065	3.9	4,510.25	3.1	34,898	56,440	1.7	197,075	60	11	29

Note: 1) Prepared from the data of the Provincial Government, "Daftar: Keadaan Penduduk Tan: dan Produksi Kabupaten Lampung Selatan the 1970"

2) Refer to table 20

Table 25. Self-consumption, Existing State of Rice Mills, and Estimated Situation after Introduction of Milling Units in Lampung Selatan

Kerjamatan	4) Total Rice Production	1) Rate of Self-consumption	1) Farmer's Population	Per Capita Milled Rice Consumption of Farmers	Huller		M i l l i		6) Present Rate of Operation	Milling Unit		Rate of 7) Operation upon Completion of all Milling Units	Rate of Operation with Hullers assumed to Process Half of Paddy	
					3) Number	5) Capacity	3) Number	3) Capacity		Total Capacity	Total No. of Milling Units to be Established			Capacity
1. Monosobo (1-3)	9,988	40	24,000	166	22	6,160	2	2,100	121	3	2,100	96	81	119
2. Kotaagung (0-1)	7,285	40	50,000	58	21	5,880	5	4,600	70	1	700	65	62	69
3. Talanpadang (1-2)	12,342	50	124,125	50	43	12,040	5	5,800	69	2	1,400	64	51	86
4. Pagelaran (1-2)	6,861	40	52,381	52	22	6,160	2	1,000	96	2	1,400	80	56	143
5. Pringsewu (1-2)	7,479	50	34,625	108	30	8,400	7	6,300	51	2	1,400	46	45	49
6. Gadingredjo (1-2)	4,838	60	38,915	75	20	5,600	0	-	86	2	1,400	69	43	173
7. Kedondong (0-4)	14,971	40	56,700	106	42	11,760	9	6,930	80	4	2,800	70	64	77
8. Gedungtataan (0-1)	9,290	60	84,006	66	10	2,800	8	10,650	69	1	700	66	166	41
9. Penengahan (0-1)	6,365	60	34,000	112	9	2,520	1	1,500	158	1	700	135	126	145
Sub-total [1 9](5-18)	79,420	48	498,752	76	219	61,320	39	38,880	79	18	12,600	70	65	77
10. Kalianda	6,791	50	68,066	50	14	3,920	0	-	173	-	-	-	-	-
11. Telukbetung	924	50	60,306	8	-	-	2	2,200	42	-	-	-	-	-
12. Padangtjermen	7,453	60	35,170	127	9	2,520	1	300	264	-	-	-	-	-
13. Kedaton	4,753	60	70,250	41	27	7,560	1	7550	57	-	-	-	-	-
14. Natar	3,159	60	75,024	25	30	8,400	0	-	37	-	-	-	-	-
(Pandjang)														
(Tjukabalak)														
Total	102,479	50	807,568	63	310	86,800	43	42,130	79	18	12,600	72	59	94

Note: Refer to Table 24 for Rates 1) and 2). 3) Prepared from the data of the Provincial Government. "Daftar: Perusahaan Huller Gabah Daerah Kabupaten Lampung Selatan" and "Perusahaan Penggilingan Padi Propinsi Lampung". Refer to Table 20 for Notes 4) to 9).

Table 26. Acreage of Paddy Field Area and Estimated Operation Stability of Milling Unit in Each Village Unit in Lampung Selatan

Ketjamatan Village Unit	W e t S e a s o n			Estimated 3) Stability of Milling Unit
	Average of 2) planted area ha	Production ton	Unit Yield (ton/ha)	
1 Wonosobo			(4.3)	
Sanggi ●	760	3,260		⊙
Bandar Kedjadian ○	890	3,820		⊙
Wonosobo ○	.950	4,080		⊙
2 Kotaagung			(3.8)	
Kotaagung ○	1,350	5,125		⊙
3 Talangpadang			(3.8)	
Sumbersari ○	1,500	5,700		⊙
Bandajar Negeri ●	1,350	5,125		⊙
4 Pagelaran			(4.0)	
Panutan ○	1,380	5,520		⊙
Rantau Tidjang ●	1,120	4,480		⊙
5 Pringsewu			(3.7)	
Pringsewu ●	1,150	4,260		⊙
Sukohardjo ○	800	2,960		⊙
6 Gadingredjo			(3.8)	
Bulukerto ○	1,150	4,380		⊙
Gadingredjo ●	1,600	6,080		⊙
7 Kedondong			(4.1)	
Wargomuljo ○	970	3,970		⊙
Baturadja ○	430	1,760		x
Kedondong ○	1,170	4,790		⊙
Kota Dalam ○	930	3,810		⊙
8 Gedungtataan			(3.5)	
Bagelen ○	1,000	3,500		⊙
9 Penengahan			(4.0)	
Penengahan ○	600	2,400		⊙

Note: 1) ● indicates village units in which milling units are requested to be constructed in the immediate future and ○ indicates village units requested to be ultimately covered by the milling unit construction plan.

2) Obtained from the data of Lampung Selatan, "Daftar: Tenga Penjuluh Unit Desa Bimas".

3) It is estimated that the operation of a milling unit will be stabilized if it can be supplied with 2,200 tons (80% of 2,700 tons) or more of paddy (as marked by a double circle in the table), and not stabilized if the paddy supply is smaller than that (marked by an X in the table).
(Assuming that hullers collect half of paddy production, a milling unit must be provided with 2,700 tons of stalk paddy or half its processing capacity. The lowest stability level supply is set at 80% of this quantity considering the production of dry season paddy and upland paddy.)

Table 27. Paddy Production and Estimated Condition of Hullers after Introduction of Milling Units

2) Ketjanatan	Wet Season Paddy (Sawah)		Dry Season Paddy (Gadu)		Rate of Double Cropping (Double Cropping area in %) %	Upland Paddy (Ladang)		Total Production ton	Huller		3) Present Rate of Operation %	Rate of 5) Operation upon Completion of all milling Units %	
	Average of planted area 1) ha	1) Production ton	Unit Field (ton/ha)	Average of planted area 1) ha		1) Production ton	Unit Field (ton/ha)		Number 3) Capacity 4) ton/year				
1 Kotabumi	415	1,439	(3.5)	80	242	(3.0)	14,030	25,462.5	(1.8)	60	16,800	84	-
2 Bukit Kemuning (1)	295	885	(3.0)	151	322	(2.1)	4,815	8,591.5	(1.8)	22	6,160	83	74
3. Sumberdaja (1)	1,655	4,515	(2.7)	25	37.5	(1.5)	1,020	816	(0.8)	30	8,400	33	31
4 Ketapang	157	343	(2.2)	20	22	(1.1)	7,520	11,030.4	(1.5)	16	4,480	132	-
5 Blambangan Umpu/Baradatu	295	533.5	(1.8)	4	7	(1.8)	7,621	10,195.5	(1.3)	14	3,120	142	-
6 Kasul	250	812.5	(3.3)	-	-	-	6,000	6,975	(1.2)	22	6,160	66	-
7 Pakuan Ratu	200	300	(1.5)	-	-	-	4,880	2,574.4	(0.5)	5	1,400	107	-
8 Menggaia	325	322	(1.0)	302	302	(1.0)	880	694	(0.8)	3	840	82	-
9 Panaragan	10	20	(2.0)	-	-	-	1,420	586	(0.4)	4	1,120	28	-
10 Mesudji	400	800	(2.0)	-	-	-	500	900	(1.8)	4	1,120	79	-
11 Liwa (Balik Bukit) (1)	1,200	3,680	(3.1)	-	-	-	1,095	3,190	(2.9)	37	10,360	34	32
12 Pas. Tengah Krui (2)	1,240	3,100	(2.5)	660	990	(1.5)	985	1,477.5	(1.5)	12	3,360	86	71
13 Pugung Tampak	630	1,675	(2.7)	-	-	-	788	1,155	(1.5)	-	-	-	-
14 Biha (Pss. Selatan) (Pss. Utara)	780	2,010	(2.6)	-	-	-	1,178	1,919.2	(1.6)	3	840	-	-
Total	7,854	20,435	(2.6)	1,242	1,922.5	(1.5)	52,732	75,567	(1.4)	233	65,240	78	74

Note: 1) Quoted from "Report on Agricultural Development Survey in South Sumatra, June 1971", International Cooperation Division, Ministry of Agriculture and Forestry

2) Figures in parentheses, such as (1), indicate the total number of milling units requested to be constructed.

3) Obtained from the data made available by the Provincial Government.

4) Calculated on the assumption that the milling extraction rate (stalk paddy → milled rice) is 52% and hullers have a capacity of 280 ton/year in milled rice.

Table 28. Way Seputih Paddy Field Reclamation Plan

Year	Aggregate Reclaimed Area	Remarks
1970/71	1,081	Already reclaimed
71	2,055	"
1971/72	4,560	
1972/73	9,130	
1973/74	14,014	
1974/75	18,180	
1975/76	20,959	
1976/77	22,888	
1977/78	23,718	
1978/79	23,968	

Table 29. Punggur Utara Paddy Field Reclamation Plan

Year	Aggregate Reclaimed Area	Remarks
1970/71	6,758	200 ha already reclaimed
1971/72	15,088	
1972/73	21,430	
1973/74	23, 505	
1974/75	26,364	
1975/76	29,066	

Table 30 Village Units Considered Suited for Milling Unit Construction

Kabupaten	Ketjamatan	Number	Village Unit	Remarks
Lampung Selatan	Rice Milling Unit 0.5 ton/hr	(5)		
	Wonosobo	1	Sanggi	Construction in Wonosobo is advisable because of the poor road condition
	Talangpadang	1	Sumbersari	
	Pagelaran	1	Rantau Tidjang	
	Gading Redjo	1	Gading Redjo	
Lampung Tengah		(11)		
	Metro	4	Bandjarsari Redjo Mulijo Josodadi Korang Redjo	
	Trimurdjo	1	Tempuran	
	Pekalongan	1	Tulusredjo	
	Batang Hari	1	Sumberredjo	
	Sekampung	1	Sumber Sari	
	Sukaradja Nuban	1	Sukaradja Nuban	Construction should be planned for operation covering the four village units in Raman Utara.
	Purbolinggo	2	Totoprodjo (Totohardjo) Tegalombo	Construction should be planned for operation covering Taman Negeri (Tambahluhar).
	Rice Milling Plant 2.0 ton/hr.			
	Lampung Tengah	Punggur	2	

ANNEX 1

PROJECT AID
1971 - 1972
(A - 18)

- Name of the Department : Department of Agriculture
- Name of the Project : Rice Processing and Storage
- Location : Throughout Indonesia, particularly in the present and future rice surplus regions, such as Atjoh, North Sumatra, West Sumatra, South Kalimantan, South Sulawesi and Lombok
- Objectives :
- a. To improve rice handling and processing by the bulk method, i. e. through threshing in the ricefield, especially the new high yielding varieties, good drying or by using mechanical driers when the season is not favourable.
 - b. To minimize loss during storage by improving the storage facilities and through pest control.
 - c. To increase the rice-milling extraction rate and quality through rehabilitation and modernization of the milling equipment.
 - d. To improve the marketing efficiency through standardization and grading for the benefit of both producer and consumer.
- Background :
- a. It is stipulated in the Five Year Development Plan that rice production shall be increased from 19.5 million tons in 1968/1969 to 29.6 million tons in 1973/1974.

As a consequence, more manpower is needed in the ricefields, e. g. during harvest time which is seasonal. This brings on much difficulty, particularly outside Java where manpower is short and production increase high.

Harvesting with the use of an "ani-ani" can no longer be practiced for the efficient utilization of manpower. Instead, a sickle and shedding on the spot will give results, especially with the high yielding the best easily shedding varieties.
 - b. The processing of paddy, especially the drying, is not properly done which badly affects the quality of rice. This is due to the shortage of manpower (used for the

following planting season), the steady increase of production, and the use of short-living high yielding varieties, which are harvested before the rainy season is over. Mechanical drying is therefore necessary.

- c. In the rice milling and huller units paddy is mostly stored outside in the open, exposed to rain, heat, attacks from birds and pests, causing much loss and damage, deterioration of extraction rate and quality. The rice can not be kept long; there is practically no pest control and the godowns are in a very bad state.
- d. The rice mills and huller units owned by private enterprises and cooperatives process the paddy to milled rice. In addition, they play an important role in collecting, transporting and marketing, thus wielding great influence on the structure of marketing and the stability of the price of rice.
- e. In 1968, before the Five Year Development Plan, there were about 7000 rice mill units, for the greater part equipped with 30-50 year old machines with a total capacity of 700,000 tons of rice per year or 6.9% of the total production.

There were some 7000 huller units, mainly outside, Java, with a capacity of about 1,500,000 tons of rice or about 14.8% of the production. The annual capacity of the rice mills and hullers was 2,200,000 tons of rice about 21.7% of the 1968 production.

The entire equipment was in a very bad state due to lack of maintenance, and the potential capacity deteriorated more and more. The buildings were equally deplorable.

- f. The milling extraction rate was very low due to the above-mentioned condition. In addition, the rice was of poor quality much broken and not well cleaned so that it could not be stored a long time. The market price was low and marketing in distant places or islands was consequently difficult.
- g. Grading is different in each region and inaccurately done, much to the disadvantage of the producer and the consumer. There is as yet no standardization and grading of rice, and the marketing is therefore not efficient.
- h. In the Five Year Development Plan it is stipulated that the capacity of the rice mill and huller units shall be increased as follows (in million tons):

Year	Rice mill	Huller	Total	% of rice production
1969/70	0.8	2.2	3.0	28
1970/71	0.94	2.96	3.9	34
1971/72	1.22	3.78	5.0	43
1972/73	1.78	4.42	6.2	46
1973/74	2.90	4.80	7.7	50

- Stage of development :
- a. In 1966 the FAO made a survey on rice processing for one month, followed up with technical assistance on rice processing for 6 months in 1968.
 - b. In 1968 the UK Colombo Plan made a survey on rice milling and storage for 3 weeks.
 - c. In 1970 OTCA (Overseas Technical Cooperation Agency) Japan-made a survey on rice drying for 2 weeks.
 - d. USAID is assisting a survey on rice marketing for 8 months during 1970/71.
 - e. The Kennedy Round Food Aid has given small rice mill units and diesel engines.
 - f. On the recommendation of the UK Colombo Plan team a model rice mill will be established at Sukamandi in 1971.
 - g. In the framework of domestic capital investment a new rice mill and huller unit has been established and rehabilitation and upgrading of the private units have been produced.
- Implementation :
- a. Foreign credit funds are deposited at Bank Indonesia and its utilization is specially arranged for the creditors of the rice processing and storage project.
 - b. The project will be implemented by private enterprises without the interference of the Government.
 - c. A request for investment credit must be submitted to the Government Banks (BNI, BRI, Bank Buri Daja, etc.) in accordance with the regulations in force of the Construction No. 6, 1968.
 - d. The counter value of the foreign currency used for the importation of machineries must be deposited in the Government Bank, where as the remaining credit is used to defray domestic expenses.

Cost
Expenses

A. funds from credit investment

Years	Rice mill 1)				godown 2)		Total	
	Large 2)		small 3)		million : billion		million : billion	
	million: billion US\$ Rp	million: billion US\$ Rp	million: billion US\$ Rp	million: billion US\$ Rp	US\$ Rp	US\$ Rp	US\$ Rp	US\$ Rp
1971	0.75	1.2	0.75	0.6	0.50	0.6	2	2.4
1972	0.25	2.0	1.00	0.8	0.75	0.9	3	3.7
1973	2.00	3.2	1.50	1.2	1.50	1.8	5	6.2
							10	12.3

foreign currency credit US\$ 10 million

Rupiah credit Rp. 12.3 billion

1) ricemill machines when driers are needed, land, buildings, installation of godown, drying and means of transportation

2) capacity of 2-3 tons of rice/hour

3) capacity of 0.3-0.5 tons of rice/hour

4) at the rice centre, at the rice market

B. funds from the Government Budget (DIP)

Year	Technical Assistance	Development	Training		Total	
	Thousand US\$	million Rp	abroad thousand 2)	at home million 3)	Thousand US\$	million Rp
1971	6	10	6	5	12	15
1972	6	15	9	7	15	22
1973	6	25	12	10	18	35

Expenses in foreign currency US\$ 45.000

in Rupiah Rp 72 million

1) US\$30 per person/day

2) US\$15 per person/day

3) Rp 1 million per course of 25 person for 3-4 weeks

Note: This project statement can be altered or supplemented after considering the recommendations of the USAID Survey Team on Rice Marketing, who will finish in August 1971.

ANNEX 2

DEPARTMENT OF AGRICULTURAL
REPUBLIC OF INDONESIA

EXPLANATIONS OF AID PROGRAMME OF
JAPAN FOR LAMPUNG REGION

Regarding the Aid Programme of Japan for Lampung region the Department of Agriculture states the following explanations.

1. Water pump units:

100 units of Water Pump have been decided to be given to Lampung region. But it is necessary to give information on the use of the equipment and accordingly the following additional equipment will be required, namely:

- service car - 3
- truck - 2
- motor cycle - 4
- field test unit - 4
- spare parts and tools.

Expenditure amounting to US\$275,000 will be required and sum of Rp 19,000,000, - should be contributed by the counterpart. Explanatory specifications are attached to the "Pumping Irrigation Project" (A-1).

2. Rice Processing

It is mentioned in the policy on rice processing that the equipment will be given in form of credit which will be received by private enterprises in need of it. Therefore the total amount required will be submitted by the private enterprises concerned. Total paddy millers and hullers presently used in Lampung is sufficient and some are already incapable to work to full capacity.

It is to be noted here that the additional equipments are required for upgrading purposes in order to improve quality and out turn. The role of the Government is to render public service by guide line of better rice processing. Private enterprises are expected to accept these advises and be willing to repair the equipment and use the credit also.

With regard to the aid programme of Japan preliminary discussions should be conducted with the private enterprises which will act as credit recipients. On basis of the study the required amount would be determined.

In respect to the channeling of the rice processing equipment direct contact should be held between Japan (sale agent) and purchaser (private sector).

3. Other possibility of utilization of aid:

Credit of US\$ 3 million meant for Lampung rice processing is considered to be too much. Therefore it is suggested to use it partly for other provinces such as Atjeh, South Kalimantan, West Sumatra, Lombok, etc.

May be it could be used in processing of other estate products in Lampung, e. g.

- 1) Sugar cane small holdings production of 640 tons per year in an area of 790 ha. The farmers need milling unit to prepare 'gula mangkok' (lump). 10 units are required:-

- milling unit with 2-3 sets of reserves
- diesel engine of 6-10 HP
- big pans to boil sugar cane
- space and building of 10-20 m²

Each unit will be given to one sugarcane farmers unit of a certain area and they are supposed to repay through Bank.

- 2) Pepper production per year is estimated at 20,000 tons and it covers an area of 30 thousand ha, 10-15 thousand ha of which is struck by diseases. Eradicating operations and simultaneously are to be effected. The credit will be used to provide:

- "Saval" of high pressure equipment, total of 150 units;
- compound fertilizer (NPK), 2 quintals/ha/year = 6,000 tons per annum;
- processing equipment such as polishing, grading and diesel engine; total of 20 units.

These equipment should be distributed through Pepper Marketing Body which may claim for contribution of Rp 2 per kg as a guarantee of credit repayment.

- 3) Coffee production is estimated at 40,000 tons per year. Processing equipment such as polishing and grading unit is required. The unit may be used either for pepper or coffee. The Coffee Syndicate may be responsible for the settlement of the affair.
- 4) Coconut processing unit is also required in the field of fibre removal at the disposition of home industry; 20-30 units will be needed. Each unit is supposed to render services to coconut farmers. The outcome will be used for credit repayment. Cess fund may be used as guarantee.
- 5) With regard to rosella a project proposal "Rosella Plantation Mechanization" has been submitted. It will be started in 1971/72 covering an area of 200 ha. This pilot project will expand

in 1972/73 to 2,000 ha

1973/74 to 3,000 ha

1974/75 to 5,000 ha

10,000 ha

Required equipment would be consisting of:

- for land cultivation: diesel tractor equipped with plowing, rotavator, seed drill
- for processing/harvesting operation: harvester, ribboner/decorticator central-retting ditch baling press

The project will be implemented within three years:

1972/73	-	an area of 2,000 ha	
1973/74	-	" 3,000 ha	
1974/75	-	" 5,000 ha	
Investment credit in 1972/73	:		Rp 344,720,000
1973/74	:		436,665,000
1974/75	:		780,135,000
Exploitation credit 1972/73	:		Rp 170,699,900
1973/74	:		427,992,500
1974/75	:		845,707,200

Breakdown is shown in Pg. 13-14 and 21 of the proposal papers.

The Government of Indonesia hopes sincerely to derive benefit from the aid planned to be granted by Japan.

ANNEX 3

DEVELOPMENT OF PROCESSING OF AGRICULTURAL PRODUCTION, ESPECIALLY FOOD CROPS

Policy drawn up by Central

1. to increase the potential capacity of paddy millers and hullers including storage, transport, drying floor. It is expected to mill 50% of crops mechanically by the end of Pelita I.
2. to introduce drying machines which can be used for paddy as well as other second crops in order to improve the quality and conservation in case that drying is not practiced.
3. to introduce processing equipment of second crops in order to improve export quality.
4. rehabilitation, upgrading, modernization and new establishment are expected to be handled by private sectors or cooperatives.
5. development cost will be met by investment credit of domestic capital and exploitation credit of Governmental Bank.
6. Directorate General of Agriculture will be in charge of guidance, supervision and technical advices (e. q. Agricultural enterprises Section)

Duties imposed on Lampung Province

1. to carry out rehabilitation, upgrading and modernization activities of paddy, milling and huller; priority should be given to:
 - a. progressive and bonafide company;
 - b. company residing in strategic location;
 - at the rice producing areas (machine's capacity should be in line with production)
 - close to economic roads
 - close to markets
 - c. merging of companies are recommended in order to work more efficiently; small companies should not be neglected; destructive construction should be avoided.
2. to introduce, among others, rubber roll flash type husker in order to upgrade huller into paddy milling unit, dryer for paddy and second crops, other processing units of maize, cassava, nuts.
3. to guide, supervise and give technical advices

Food Processing Project:

1. Since they are going to receive the credit and to bear the risks, the private sectors should be given liberty to choose type of machines, capacity and other things in order to use is as a compliment to the existing units.

Considerations for the region's attentions:

- an area of 700 ha (1 x planting season) should have unit of capacity of 0.5 tons of gabah/hour
- an area of 1400 ha (1 x planting season) should have unit of capacity of 1 ton of gabah/hour
- an area of 2800 ha (1 x planting season) should have unit of capacity of 2 tons of gabah/hour

Unit of capacity of less than 0.5 ton gabah/hour should not be taken since it would be not efficient and strong.

Trade mark of factory which is famous in Japan as well as in other countries is: Yanmar and Satake.

2. Adequate amount of spare parts should be made available and the provision should be guaranteed.
3. After sale service should be rendered.
4. Training of operators, including maintenance technique should be included.
5. Investor having interest in this paddy processing operation should be of Indonesian citizenship; chance is still opened in the field of second crops processing operations.
6. Processing unit of second crops (totally 12 units) in an production areas of 600-1000 ha should comprise:
 - corn cheller, corn cleaner, dryer batch type burner (mobile unit), corn cleaner/ moisture tester, plant form scale, bean thresher godown etc.
7. Godown and silo's should be equipped with continuous dryer, huller and bulk handling facilities at harbour.
8. Second crops processing units will be managed by the private company/ cooperative.
9. Credit aid by Japan is expected to commence by the beginning of 1972 and end in 1974.
10. Within three years period technical assistance will be required from:

- 1 food processing engineer
- 1 food technologist
- 1 export quality control expert

With respect to credit following suggestions should be taken into considerations:

- 1) in view of the investment credit from domestic capital and the burdensome conditions, i. e. grace period of 2-3 years, 5 years term of credit, monthly rate of 1%, investor's contribution by 25% of the total credit, exploitation credit with 2-1/4% monthly interest within 6 months, it is suggested to modify the conditions following the stabilized price situation and low rate of inflation.

For example: investment credit within the term of 10-15 years; counter contribution of investor should be decreased or annualled at all.

exploitation credit within term of 12 months application of interest of 1% like Bimas.

The success of the project will be depending on the credit conditions which should be acceptable to investors in deriving profit from the negotiation. Following the current conditions they hardly achieve progress.

- 2) Credit aid amounting to US\$ 3 million would be too much if it is used only in the field of food processing; therefore it would be of greater profit if it could be given to other 11 provinces too, such as Atjeh, South Kalimantan, West Sumatra, Lombok, etc.

Djakarta, 10 August, 1971
Planning Bureau
Department of Agriculture

ANNEX 4

DEPARTMENT OF AGRICULTURE
BIMAS GUIDANCE BODY
DJAKARTA

No. : 658/1/BPB/70

Djakarta, July 8, 1970

Enclosure:

Subject: Directions of
Village Units Forming

To:

The Governor/KDH/Chairman of
Provincial Bimas Development Body

1. As the follow up of the working session of Bimas at Bina Graha on 26th - 28th May 1970, and with reference to our letter dated June 16, 1970, No. 563/1/BPB/70 we herewith submit you:

"DIRECTIONS OF VILLAGE UNITS FORMING"

2. As mentioned in the Decision Letter of Directors of B. R. I. No. Kep.S-17-30/6/1970 which we have sent to you, the Village Units in East Java, partly in Central Java, Jogjakarta and partly in West Java, their credits are maintained by the B. R. I. Village Units, while for the area outside the above mentioned, their credits are maintained by B. R. I. Mobile Units.
3. Within the preparation of those Village Units it is expected that in every Village Units the following should be ready prepared. Guidance Units, Credit Units, Infrastructure Distribution Units, Rice Mill and Warehouses in accordance with the available facilities.
4. It has been declared by BULOG that in some villages Pilot Project of Tani Makmur Units have been established (which is identic with Bimas Villlage Unit) in which villages facilities of Rice Mill, Warehouses and Offices have been established.

Therefore, we hope that the above Tani Makmur Units could be utilized as Pilot Village Unit, where the B. R. I. Village Unit, P. N. Pertani warehouse or distributor could utilize the above building facilities for the activities within the Planting Season of 1970 or further activities in Planting Season of 1969/1970 mainly in connection with Credits reimbursement.

5. Besides that, the Tani Makmur Units above could be used for the educational activities within the frame of preparation for establishing the Village Unit in other places.
6. The above mentioned Tani Makmur Units is attached herewith. We wish you to pay attention on it.

cc:

1. Dept. of Trade
2. BULOG
3. Dept. of Internal Affairs
4. B. R. I. S. P. N. Pertani

Department of Agriculture,
Bimas Guidance Body
Secretary
(Soegandhi Soerjo Amidharmo)

THE GUIDANCE OF VILLAGE UNITS FORMING

1. The Village Unit is a unity of working within the Bimas execution/Inmas execution, in which stage by stage there will be supporting services to be prepared, needed by the farmers, and small entrepreneurs in the villages, specially the Bimas/inmas executor, which are not available in the village.
2. One Village Unit consists of one or several villages covering the area which might be taken into Bimas/Inmas program of 500 - 1000 ha within a planting season.
3. One Village as an Administration area at the whole will belong to one Village Unit, so that a Village Unit will cover one or several Village Administration area.
4. The services which could be prepared by every village are:
 - preparation of village power to maintain the village irrigation problem. ("Ulu-Ulu", "Djaga tirta")
 - preparation of village power to maintain the agricultural problems in the village ("Pamong Tani Desa"), and to develop the agricultural guidance activities in each village.
 - preparation of warehouses.
5. The service which could not be prepared in each village or the services which are considered economically unable to be prepared in each village will be arranged for each village.

The services to be prepared stage by stage for each Village-Unit are:

- Agriculture Guidance Officer
 - Bank Unit to arrange the Credit for Agriculture and other small activities in the village.
 - Warehouse/distribution shops for Agriculture production infrastructure such as fertilizer, pesticide, agricultural equipments, and best seeds needed by the farmers.
 - The Rice Mill complex where the farmers could obtain services in the field of products processing, warehouse or products marketing.
- The services to be prepared in the Village Unit, if there is possibility viewed from the technical/economic point could be developed further to be prepared for the villages.
6. The intention of forming the Village-Units is to arrange the preparation of services needed by the Bimas/Inmas participated farmers and small entrepreneurs in the stage of village, as close as possible to make it easy for the farmer/entrepreneur concerned.
 7. Besides to make close of the needed services to the farmers/entrepreneurs, it is intended also to make easy the procedure, to avoid the complicated services and waste of time and power.

8. The position of warehouse/shop facilities and paddy/rice mills and other facilities is to be arranged to make easy/shorten the distance for the farmers who need the above services. The above-mentioned facilities should be situated closely, strategic economically and centralized in one village which is easy to be reached by the farmers from the villages united in one Village-Unit.
9. The Heads of Villages as the Chairman of the Village Bimas Execution Body for one Village-Unit discuss together the development of Village-Unit where their villages are associated under the Leadership of "Tjamar"/Head of Bimas Execution Body.

The Agricultural Officer on each stage acts as daily executor of Bimas execution Body of "Ketjamatan"/Village.

In this case, the Bimas Daily Executor of "Ketjamatan" still could not do the coordination duties on his best, therefore the Coordination duties above is to be done by the Bimas Daily Executor of "Kabupaten".

10. Every Unit within the Village Unit (Agriculture Service-Bank Complex and Rice Mill) still to be developed technically by each technical instances while the private/State Enterprise/Company activity as a working unit (Warehouse-Rice Mill complex) will be developed by the Private/State Enterprise/Company who organizes each activity concerned.
11. The efforts of private/State Enterprise/Company within the activity make a co-operation with the Bimas Development/Execution Body to succeed the program of Bimas/Inmas.

BIMAS COMPLETED BY VILLAGE UNIT
(Bimas - Village Unit)
Special Region of Jogjakarta

Preface

Upon the initiative of Bank Indonesia and Bank Rakjat Indonesia supported by Department of Agriculture and approved further by the Deputy Head of Region of Jogjakarta, as from the season in October/March 1969-1970 in the Special Region of Jogjakarta a Pilot Project is made "BIMAS COMPLETED BY VILLAGES UNIT SYSTEM" or abbreviated as Project "Bimas Village Unit".

In general it is known that National Bimas and Gotong Royong Bimas being executed until now, is indeed able to increase paddy production phisically, but there is a doubt that the above Bimas succeeded to increase the farmers stage of life.

In fact, the National and Gotong Royong Bimas gave a big loss to the Government, because the credit extended within the scheme of execution has been re-imbursed very unsmoothly.

This Pilot Project aims to know how far the above mentioned situation could be improved by completing the distribution organization of production infrastructure and credit including its reimbursement, by making intensification of method of guidance and by improving marketing and products processing method.

If the Pilot Project succeeds, the method founded here will be used further to complete the Bimas Execution in other places.

II. BIMAS and Its Problems

The Mass Guidance or abbreviated as Bimas is the activity of Agricultural Guidance on mass basis for the purpose to increase agricultural production intensifically, at the same time to increase the farmers welfare specially and the society in general.

The above guidance is jointly performed by several instances and institutes, towards the farmers society creation by the method of:

- Five Principles of Efforts, Agricultural Products Improvement, Agricultural Products Processing, Products Marketing and Society Development

The above five efforts cannot be done at once, but it should be done stage by stage in accordance with the stage of ability and willingness of the farmers society.

The increase of rice production from 9,8 million tons in 1969 to 15 - 4 million tons in 1973 or an increase of 57.14% within 5 years as stated in the 1st Repelita (Five Years Development Plan), more than 90% is to be achieved by intensification on Bimas method. Gradually the rice fields for Bimas is extended so that at the end of the 1st Repelita it would cover the area of million ha.

The experience has showed that the Bimas execution needs a very big expenses from the Government, mainly the Credits expenses. if for every ha of rice field in Bimas needs a credit amounting to \$40 or Rp 10,000 then for 4 million ha Bimas area it needs \$16 million or + Rp 40 billion. To maintain the continuity of Bimas execution, the smooth credits reimbursement is the urgent condition.

In this connection, the Bimas execution should be arranged so that the above execution could assure to achieve three principles:

1. to increase paddy/rice production physically
2. to increase the farmers stage of life
3. to safeguard the development funds in the form of Bimas credit

If only one or two of the above principles are achieved, Bimas could not be said succeeded. Bimas could be said succeeded, if the three principles are achieved normally.

The experiences of Bimas execution, either National Bimas or Gotong Royong Bimas showed many difficulties which must be overcome.

View from the point of farmer, the National Bimas execution is still unsatisfactory, because the procedure of credits reimbursement is still complicated, its interest still high, its period still too short, while the distribution of the needed production infrastructure always has been delayed, the quantity and quality are not correct.

As the result, the production improving materials which were obtained are beyond what was expected, while the obligation to reimburse the credit is indeed during the big harvest, it made the farmers to sell their products on low price.

The above facts was added by the effect of lower price of rice during the harvest, which caused the farmer unable to pay back the whole credit which was obtained by them.

Though Gotong Royong Bimas in general (with some exceptions) is considered better for its distribution of production infrastructure needed by the farmer (distribution until the villages), but the existing of package of production infrastructure and credits reimbursement which were equalized for the whole area, has been considered as a waste and adding the burden to the farmer and from the view of economic-technically was considered as a pressure not in accordance with the Guidance character.

From the view of Government, Bimas is considered as a failure, because the reimbursement of credit, given within the frame of National Bimas of Gotong Royong Bimas could not be performed smoothly and its amount was far less than it should be.

The production increase as the result of Bimas and area extension by Bimas, is considered by the Government as not according to the plan.

III. The Solving Effort

From the above explanation, a conclusion could be taken, that the problem of Bimas execution mainly occur on the following matters:

1. How to find the method to make the preparation of production infrastructure as close as possible to the farmer, so that they could obtain it easy, cheap and in due time.
2. How to simplify the procedure of credits reimbursement and how to increase the safeguarding of credits reimbursement.
3. How to increase the knowledge, the farmers ability in performing the five principles within their farming efforts by abolishing package system?
4. How to find the method as far as to execute the other Five Activities, specially the management, processing and marketing, so that the farmer will have more ability to pay back their credit and their income positively increased?

Within the pilot project of "Bimas Village Unit" at Jogjakarta the above problems are tried to be solved by the following methods:

1. Simplification of Credit Application
 - a. Credit is to be given directly by Bank Rakjat Indonesia (BRI) to the farmer person in each village.
 - b. Those, who apply it for the first time is enough to submit a letter of bonafidity signed by "BT/Kepala Dukuh", Village Head and by the applicant himself.
 - c. By signing a debt certificate and delivery of evidences and letters of ownership of properties to be guaranteed, without any checking, the Bimas Credit needed could be issued on the same time.
 - d. The checking up of bonafidity of the debtor will be done further by the officer of B. R. I. after the planting season finishes, and make direct approach to the customers.
2. The Preparation of Production Infrastructure
 - a. The Production Infrastructure as fertilizer, medicine etc. , is prepared in the place(warehouse or shop) for each village or for two or more villages close to each other.
 - b. Every farmer is free to nominate the kind and quantity of production infrastructure which will be used.
 - c. The supply is done by P. N. Pertani or by the private or cooperative who intends and able to give the best services.

- d. The Production Infrastructure Credit is arranged by B. R. I. and the collection of Production Infrastructure from the warehouse or shop is done by using a "Giro certificate" issued by B. R. I. which could be exchanged into cash by the warehouse or shop concerned (at the P. N. Pertani overbooking to the central office is made).

3. Safeguarding of Credit Reimbursement

- a. To upgrade the Credits Administration, in the form of forwarding of declaration letter of bonafidity, signing the debt certificate, and delivery of ownership letters of their properties, so that it is expected that the responsibility of the debtor will be bigger.
- b. The existing of B. R. I. officers in the Village Units, the credits collection will be more intensified, while the distinction between the good customer and bad customer could be easy performed.
- c. To the debtor, a "Storage Credit" will be extended by a guarantee of their agricultural products to be delivered to the warehouses which will be appointed.

The above mentioned Storage Credit is mainly used for paying off the Production Credit and other necessities of the debtor.

The above Storage Credit is given amounting to 70% of the value of the goods to be delivered and must be returned 3 months after the delivery.

The goods kept in the warehouse remains as the debtors property, which can be sold when the price of those goods increased, The sale product of the above goods firstly used for the reimbursement of the Storage Credit and the rest is given to the owner.

- d. Besides the Agricultural Production Credit, the B. R. I. can give other credit for other economic activities outside agriculture for instance for the small trade for..... Peoples handicraft and other peoples cottage industry. Therefore, the farmers income outside agriculture could be increased, and in case necessary it can be used to reimburse the Agricultural Credit.

4. Improvement of Guidance Intensity

In order to make the farmer able to choose which one is the best for his efforts, the Guidance is intensified by the followings:

- a. Mass education by making speech, cultural performance, radio broadcasting, radio without waves extended and intensified.
- b. To make available sampling plot in every village ("local trial and demonstration plot") to show and to know some alternatives of using fertilizer and best seeds. This sampling plot besides used as educational material is also a source of data collection for the village planning.

- c. For the above needs, the Agricultural Services add and assign the Guidance Officers on every unit.

5. The Incentive for the Farmer

- a. The preparation of production and credits infrastructure which is easier cheap and in due time, is expected to stimulate the farmer to increase the production.
- b. The preparation of Storage Credit is aimed, besides, safeguarding the credits reimbursement, is also aimed to make possible to the farmer to sell their products when the price is increasing. By this way, the stage of farmers income could be increased, which will stimulate their willingness to increase the production by using the new technology.
- c. From the Central Government it is expected that the policy of fertilizer price and rice price will be made so far to stimulate the farmer to increase the production.

IV. The Executional Organization

1. Village Unit

- a. To upgrade the Guidance activities as mentioned above, what is called Village Unit territory is established. That is, the administration area maximum covering 6 villages laying in one group.
- b. The Guidance Activities, in the form of preparation of production infrastructure, Credit and education, is to be made by a Village Unit within the territory of Village Unit by some Village Units consist of:
 - b.1 A B.R.I. Village Unit, consists of some B.R.I. officers including their equipments, who are given the duty to maintain the credit service needed by the farmer within the territory of Village Unit. The above officers have the duty also to participate in safeguarding the Credits Reimbursement.
 - b.2 A P.N. Pertani Village Unit consists of some officers of P.N. Pertani with its shows, upon the duty to prepare the needed production infrastructure.
 - b.3 One Village Unit guide from the Agricultural Service, who has the duty to teach direct or indirectly the farmers, to form a group of leading farmers, to maintain the trial and sampling of new technology, to create the best seeds viewed from the point of quality and essentiality could be responded.
 - b.4 The above-mentioned B.R.I. Village Unit, Village Units Guidance Office, and one of the Warehouse of P.N. Pertani should be established in one of the villages situated in the central of Village Unit territory or which is easy to be reached by the farmer within the area of the Village Unit.

Within the area of Village Unit there is at least one warehouse of P. N. Pertani and one warehouse (Lumpang for rice) of B. R. I.

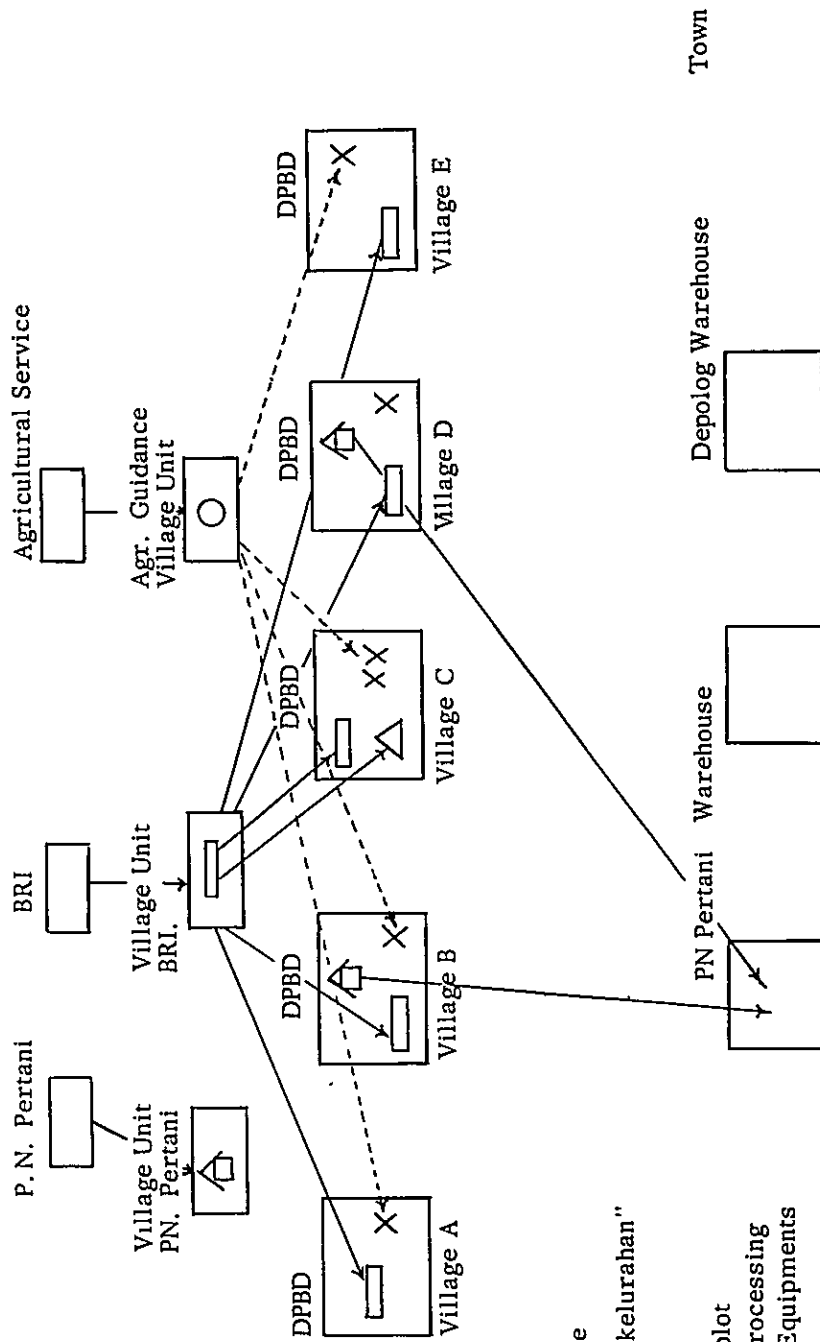
2. The Working Method of Village Unit

- a. The B. R. I. Village Unit principally can give the credit service to the farmer in her village concerned on the fixed days.
- b. The Warehouse of P. N. Pertani is opened on every working day to fulfill the farmers needs of Production Infrastructure, either by cash or by Credit through B. R. I.
- c. By submitting the letter of declaration of bonafidity and signing the debt certificate, the debtor could receive the credit in the form of "Giro Certificate" for the Production Infrastructure credit and in the form of cash money for other credit.
- d. By the "Giro Certificate" valuable as DO (Delivery Order), the debtor may take the Production Infrastructure at the warehouse of P. N. Pertani.
- e. The working method of "Lumpang" (Rice warehouse) including its processing equipment will be stipulated further.

Jogjakarta, March 2, 1970

Soedarsono Hadisapoetro

ORGANIZATION STRUCTURE
OF BIMAS VILLAGE UNIT



Remarks:

- ☐ Fertilizer Warehouse
- ☐ BRI Village Unit of "kelurahan"
- ✕ Leading Farmers
- ∧ Trial and sampling plot
- △ Rice Warehouse & Processing Equipments

D.P.B.D. - Village Bimas Execution Council

Annex 5.

RICE PROCESSING FACILITIES IN INDONESIA

MARCH 1971

BANK mill capacities	P r o v i n c e	Con-ventional Rice mills Units	Engelberg Hullers Units	Japanese Rice mill Units	Small Rice mill Units	Kintjir Water Wheels Units	Potential capacities hour	Number of Drees	Ware Houses	
									Units	Capacity T.
1	West Java	350	1,289	300	1,321	-	1,245	227	76	142,714
2	East Java	206	1,483	148	-	-	740	237	39	151,000
3	North Sumatra	70	1,727	8	-	-	497	27	11	37,500
4	Central Java	137	514	184	-	-	399	143	63	105,050
5	South Sumatra	12	1,488	24	-	-	324	5	26	34,900
6	Lampung	44	587	41	-	-	165	40	10	17,250
7	South Sulawesi	34	1,035	15	-	-	159	36	63	72,900
8	Atjeh	70	363	8	-	-	131	16	11	8,450
9	South Kalimantan	14	431	-	-	-	97	6	24	14,100
10	West Sumatra	-	361	32	-	2,288	82	68	6	8,250
11	Jogjakarta	13	171	-	-	-	68	14	2	5,500
12	West Kalimantan	3	318	-	-	-	66	-	5	4,600
13	Djambi	2	251	-	-	-	52	-	4	8,000
14	C. Kalimantan	-	205	-	-	-	41	-	2	3,000
15	E. Kalimantan	-	109	-	-	-	22	-	10	11,050
16	Bali	-	112	-	-	-	22	-	4	3,050
17	West Nusatenggara/ Lombok	14	4	2	-	-	13	4	10	3,200
18	Riau	2	50	-	-	-	12	-	10	15,650
19	Djakarta	1	21	-	-	-	10	7	34	202,500
20	Others	-	200	-	-	-	40	-	54	114,940
Indonesia		792	10,719	762	1,321	2,288	4,185	830	464	961,604

- Notes: 1. Conventional multi-stage rice mills; average capacity + 870 kg rice/hour
2. Hullers used as one or two pass rice mills average capacity + 220 kgm/hour and huller used as polisher with average capacity + 430 kgm Rice.
3. Average capacity + 330 kgm Rice/hour
4. "Penggilingan baras ketjil" consisting of flash type husker and Engelberg type huller, average capacity + 270 kgm rice/hour
5. Average capacity + 3 kgm/hour (5 drop Wights), classification as home pounded rice.
6. All batch type, very small percentage in actual operations; 635 units are Pelita (Japanese).

Source - Rice Marketing Study

Annex 6. Province-wise Comparison of Paddy Production (1968 - 1969) and Milling Capacity in Entire Indonesia

	Field		Average/Ha		Production		Average Production Th. ton	Total Capacity of Rice Mills		Rate of Milling Capacity against Paddy Production †	Deficiency of Rice Mill Capacity Th. ton White rice
	1968	1969	1968	1969	1968	1969		/hour	/year		
	Th. Qa	Th. Qa	ton	ton	Th.	Th.		ton	Th. ton		
1. West Java	1,396	1,447	2.7	2.8	3,806	3,997	3,901	1,245	1,743	86	285
2. Jakarta DC	18	13	1.6	3.1	29	40	55	10	14	77	4
3. Central Java	1,154	1,225	2.5	2.4	2,864	2,986	2,925	399	559	37	962
4. Jogjakarta DC	85	81	3.0	3.8	258	312	285	68	95	64	53
5. East Java	1,133	1,104	3.0	3.5	4,416	3,891	4,154	740	1,036	48	1,124
6. Atjeh	166	198	3.4	3.8	566	746	656	131	183	54	158
7. North Sumatra	343	551	3.8	3.5	1,293	1,911	1,602	497	696	84	137
8. West Sumatra	236	246	3.0	3.4	703	825	764	82	115	29	282
9. Riau	78	80	3.0	2.2	232	175	203	12	17	16	89
10. Djambi	80	97	3.0	2.5	234	242	238	52	73	59	51
11. South Sumatra	157	170	2.6	2.7	405	466	435	324	454	201	-
12. Bengkulu	41	42	3.6	3.5	145	149	147	(Included in others)			
13. Lampung	68	66	3.5	2.6	235	172	204	165	231	218	-
14. West Kalimantan	172	174	1.6	1.6	270	286	278	66	92	64	53
15. Central Kal.	53	50	1.8	1.5	93	78	86	41	57	127	-
16. South Kal.	198	190	2.3	2.0	456	381	419	97	136	62	82
17. East Kal.	25	25	2.3	2.3	58	58	58	22	31	103	-
18. North Sulawesi	43	36	3.0	3.1	129	112	120	(Included in others)			
19. Central Sul.	43	34	2.3	2.3	98	80	89	(" ")			
20. South Sul.	459	470	2.8	2.7	1,279	1,255	1,267	159	223	34	436
21. South-East Sul.	22	9	2.0	2.0	45	18	31				
22. Bali Is.	129	134	3.7	4.2	475	565	520	22	31	11	239
23. South-East Is.	211	195	2.5	2.4	526	460	493	13	18	7	238
24. Maluku & West Irian	0	1	0	1.0	0	1	1	(Included in others)			
Others	(149)	(122)	(10.9)	(11.9)	(417)	(360)	(387)	40	56	28	145
Indonesia	6,309	6,671	2.8	2.9	18,616	19,206	18,911	4,185	5,860	60	3,974

Note: 1) Upland paddy is not included in the production. The milling capacity therefore rises in those areas of Lampung where the upland paddy production is large.

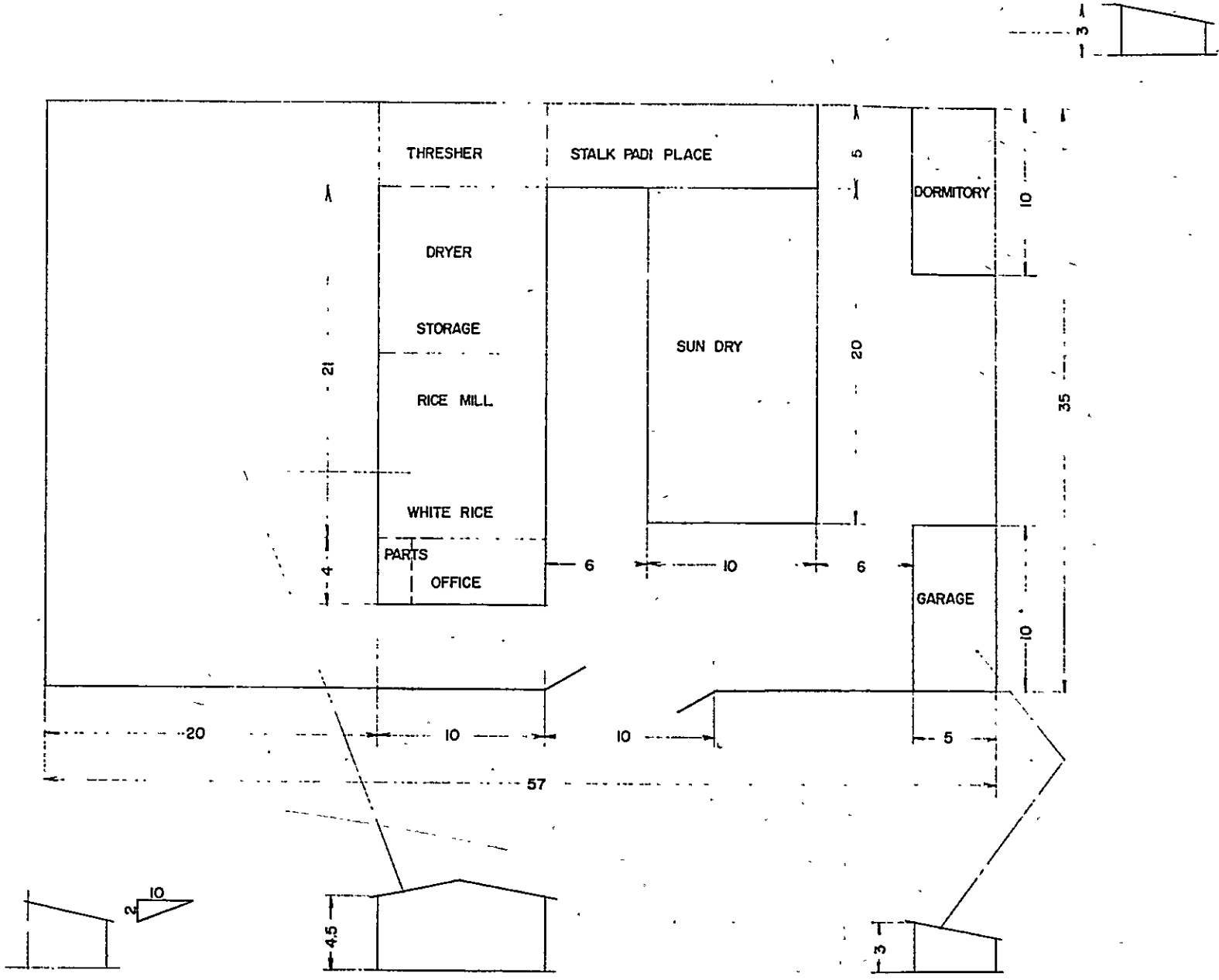
2) Data on paddy production was obtained from "Comparison Table of Paddy Field Area and Paddy Production Quantity on 1968 and 1969 in Indonesia.

2) Data on rice mills was obtained from "Rice Processing Facilities in Indonesia, March 1971" which was also made available by Mr. Sumartno.

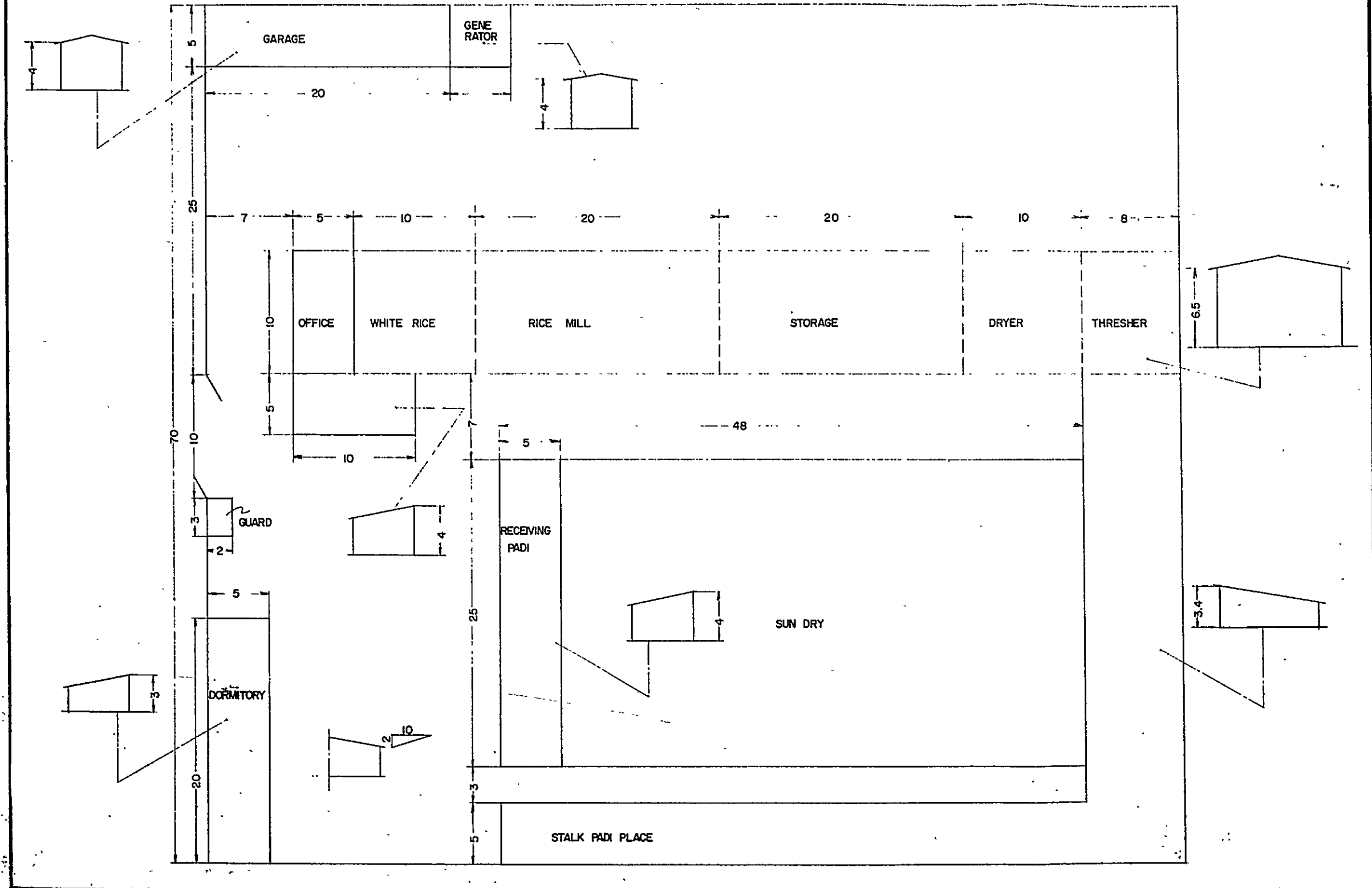
4) The total annual capacity of rice mills was calculated by multiplying the hourly processing capacity by the total annual number of operating (7 hours a day x 200 days).

5) The rate of milling capacity against paddy production is (Total annual capacity of rice mills) (Average paddy production x 0.52) x 100.

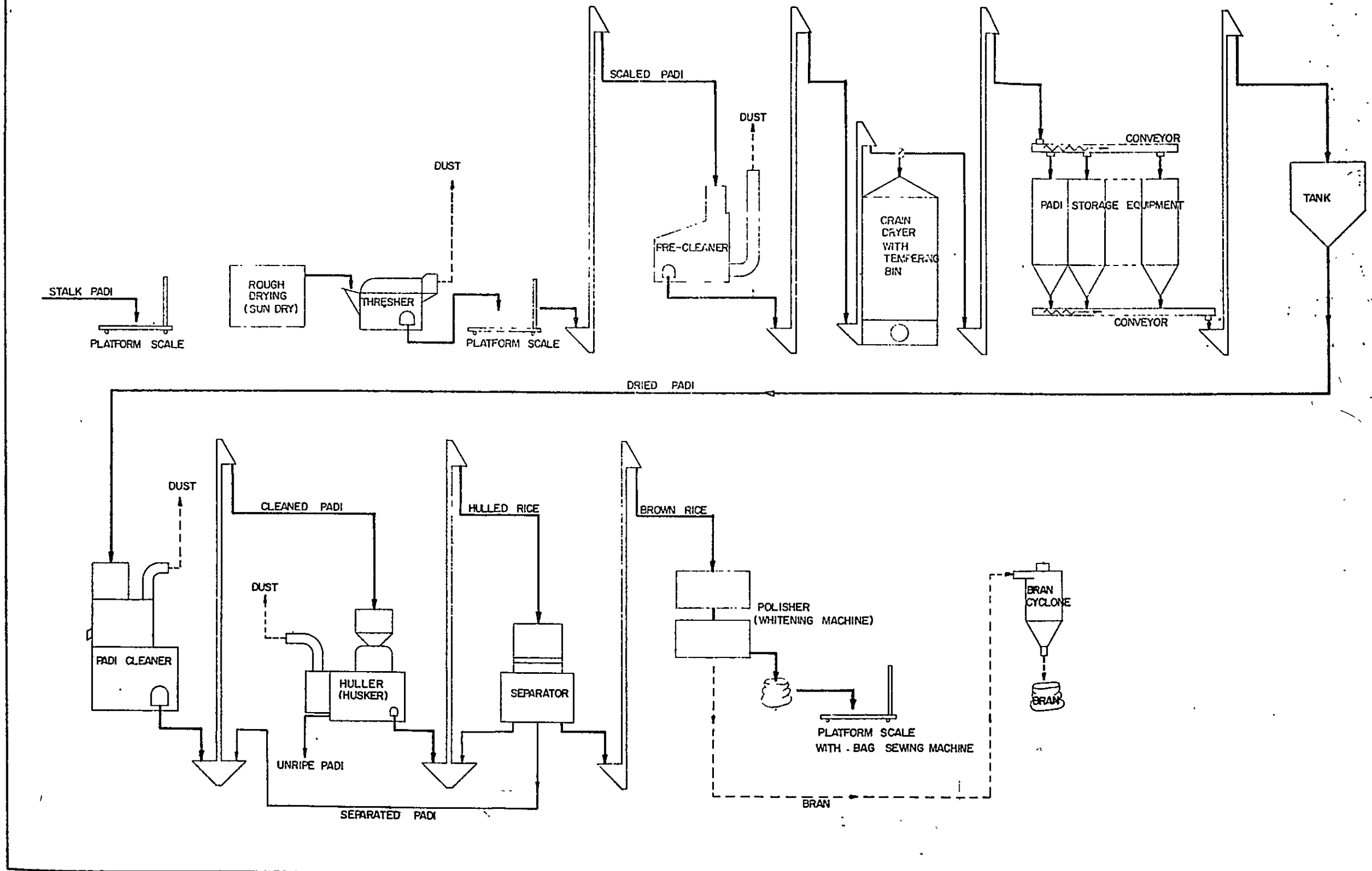
PROPOSED TOTAL LAYOUT OF RICE MILLING UNIT
 (RICE MILLING CAP. 0.5 T/H)



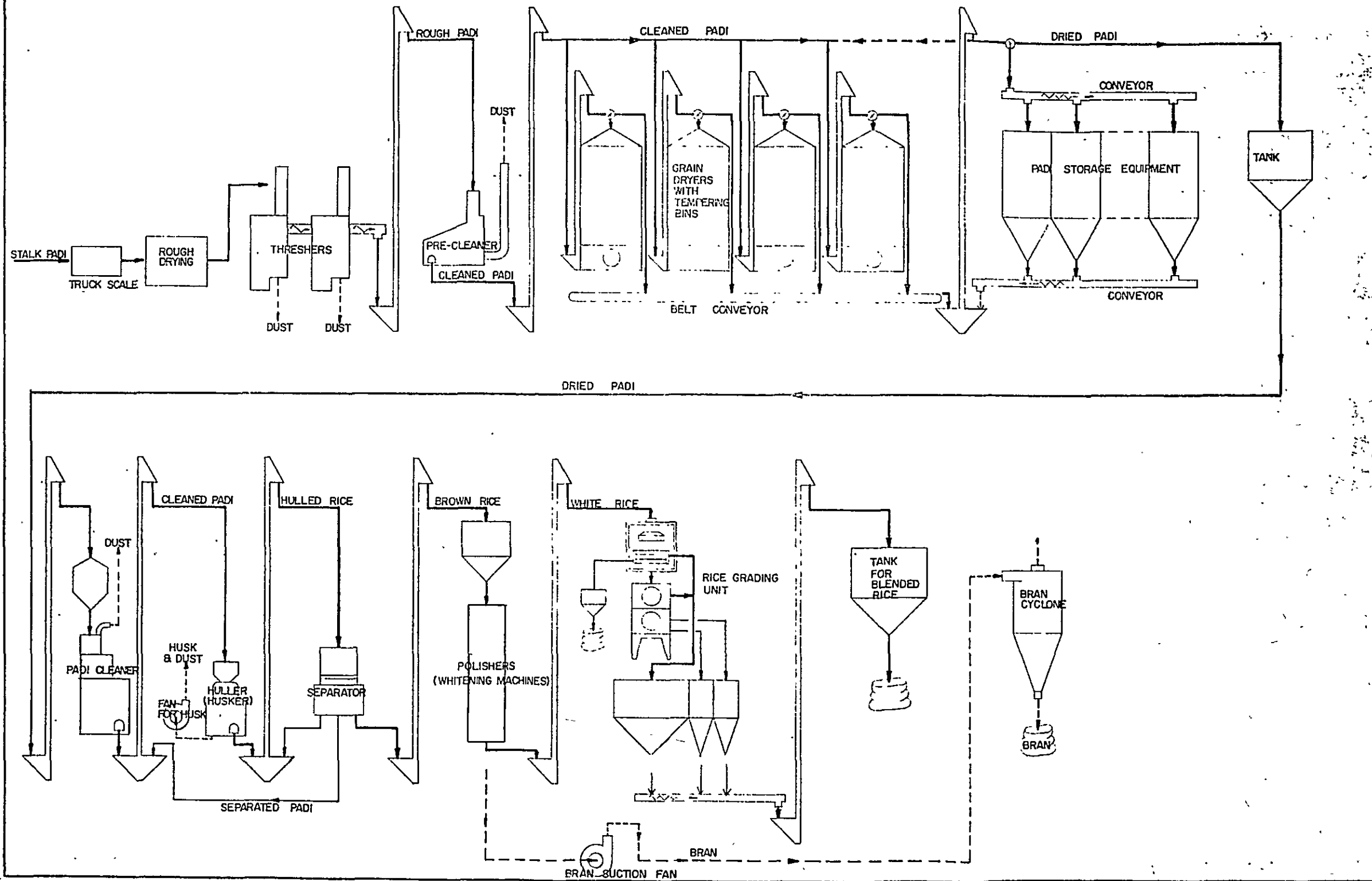
PROPOSED TOTAL LAYOUT OF RICE MILLING PLANT
(RICE MILLING CAP. 2T/H)



FLOW DIAGRAM OF 0.5 T/H MILLING UNIT



FLOW DIAGRAM OF 2 T/H MILLING PLANT



ANNEX 8

Proposed Implementation Schedule

Month

1)		
	)	Appointment of consultant,	
2)		
)	preparation of tender	
3)		
)	specification,	
4)		
)	bidding and award	
5)		
)		
6)		
)		
7)		
)		
8)	Shipment of 2 milling units	
)		
9))
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10)	Construction of 2 milling)
)	units for training)
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11)))
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12)) Training of management)
)) and rice inspection)
13)))
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14))
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15))
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)	Training of operation)
16))

Training of Indonesian officials on management, rice inspection and operation is indispensable as an additional work of consultant.

