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Agricultural Production Trends and  
Problems in Indonesia

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Indonesia is basically an agricultural economy. About four-fifths of its 87 million inhabitants are dependent on agriculture for their livelihood. Approximately 55 per cent of gross national product originates in the agricultural sector. Since prewar the agricultural component of total exports has been falling and the mineral component rising, but in 1958 agriculture still accounted for 56 per cent of total exports.

Agricultural production trends

A comparison of Indonesian agricultural production with that in other Asian countries reveals only an average performance. In terms of prewar production (1934-38), Indonesian output in the five-year period 1953-57 had risen only 18 per cent. Table 1 below indicates the changes for other Asian countries.

Table 1

Agricultural Production in Selected Asian Countries in 1953-57  
1934-38 = 100

Thailand	171
Ceylon	152
Philippines	140
Malaya	135
Taiwan	125
Indonesia	118
India	117 <sup>1/</sup>
Japan	115
Pakistan	111 <sup>1/</sup>
S. Korea	105 <sup>2/</sup>
Burma	90

1/ 1936-38 = 100

2/ 1930, 1934, 1936 = 100

Source: Yearbook of Food and Agricultural Statistics, Food and Agricultural Organization of the United Nations, Rome.

While agricultural output in 1953-57 in India, Japan and Korea had not increased as much in relation to prewar levels as in Indonesia, these three countries since 1953 have been increasing their output more rapidly than Indonesia. The average annual increase in agricultural output in Indonesia in 1953-57 was 1.7 per cent which was just about equal to the increase in population. The increases in India and Japan for the same period, however, were 3.6 and 3.1 per cent, respectively.

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Of Indonesia's twenty-one main agricultural commodities, production of twelve in 1958 were still below the prewar level. (See Appendix A). This poor performance does not merely reflect a slow recovery from wartime and early postwar declines because production of nine of the twelve items has actually been declining since 1954 or 1955.<sup>1/</sup>

Table 2

Agricultural Output in 1958  
1935-39 = 100

<u>Declining production<sup>1/</sup></u>		<u>Rising production</u>		<u>Steady</u>	
Rubber	184	Sweet potatoes	245	White potatoes	143
Peanuts, shelled	131	Cassava	129	Cacao	50
Soybeans	124	Meat	123		
Copra	95	Rice	121		
Sugar	90	Tea	90		
Corn	89	Kapok	45		
Palm kernel	88				
Palm oil	76				
Coffee	76				
Tobacco	59				
Spices	37				
Sisal	34				

<sup>1/</sup> In general, declines have been since 1954 or 1955.

Source: Appendix A.

These twelve commodities include some of Indonesia's most important prewar exports: copra, sugar, palm oil, coffee, tobacco and spices. In 1934-38, the export value of these items totaled \$483 million equivalent to 27 per cent of Indonesia's total exports.

Of Indonesia's currently important agricultural exports, only rubber is substantially above the prewar output level. In 1958, rubber production was 84 per cent above the 1935-39 average. Over the same period, Malayan rubber production rose 60 per cent and Ceylonese production 81 per cent. In 1958, however, Indonesia accounted for only 32.3 per cent of total world rubber production compared to 35.5 per cent in 1935-39. Indonesia's reduced share in world output despite higher postwar production is due to significant postwar increases in various other countries such as Thailand, Nigeria and the Belgian Congo.

Since 1954, rubber production in Indonesia has been declining. Production in 1958 was 17 per cent below the 1954 level. In Malaya, on the other hand, production has been rising since 1956 and in 1958 it surpassed Indonesian output for the first time since 1949.

<sup>1/</sup> Sisal production has been declining since 1956.

The drop in the production of export crops compared to prewar levels has been partly offset, however, by increased output of food for domestic consumption. In 1958, the output of potatoes, cassava, meat, peanuts, soybeans and rice was above the prewar level, with potatoes showing the largest rise. On an aggregate basis, however, food production has not kept pace with population growth. While total food output in 1958 was 15 per cent higher than in 1935-39, there has been a 10 per cent decline in food output since 1935-39 on a per capita basis.<sup>1/</sup>

The above data reveal that agricultural output in Indonesia in the postwar years has been far from satisfactory. What are the important factors accounting for this poor showing?

### Estate production

Causes of the decline in agricultural output can be found partly in the postwar policies toward the large commercial estates which were mainly foreign owned until late 1957. In the immediate prewar period, total estate area was 7,260,000 acres compared to 5,500,000 acres in July 1958 -- a decline of 23 per cent. Table 3 below indicates the decreased importance, except in the case of tea, of recent estate production, compared to the prewar situation.

Table 3

### Production of Leading Export Crops<sup>1/</sup> (In thousands of metric tons)

	Period	Estates	%	Smallholder	%	Total
Rubber	1934-38	185.8	53	167.8	47	353.6
	1954-57	269.4	37	453.4	63	722.8
Coffee	1934-38	55.6	45	68.1	55	123.7
	1954-57	14.6	24	50.3	76	65.4
Tea	1938	68.3	85	12.2 <sup>2/</sup>	15	80.5
	1955-57	40.5	91	4.0 <sup>2/</sup>	9	44.5
Tobacco	1934-38	44.3	40	66.9	60	111.2
	1954-57	7.1	11	59.0	89	66.1
Sugar <sup>3/</sup>	1938 <sup>4/</sup>	1,260.0 <sup>5/</sup>	90	140.0 <sup>5/</sup>	10	1,400.0
	1954-57	796.0	75	267.8	25	1,063.8

<sup>1/</sup> Average annual production for indicated years.

<sup>2/</sup> Production purchased from farmers.

<sup>3/</sup> Milled sugar.

<sup>4/</sup> Java and Madura

<sup>5/</sup> Estate-smallholder shares estimated on basis of data on output of raw sugar cane.

Sources: Report for the Year, Bank Indonesia, Djakarta; and Yearbook of Food and Agricultural Statistics: Production, Food and Agricultural Organization, United Nations, Rome.

<sup>1/</sup> "Indexes of Agricultural Production for the Far East and South Asia", U. S. Department of Agriculture, (mimeograph), November 1958.

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There are three main factors which basically determine the productivity of estates in Indonesia: (1) the productiveness of the labor force, (2) the quality of the management, and (3) the rate of investment in replanting operations, machinery, fertilizers, pesticides, etc. Other less basic factors which also affect productivity are security conditions (including disruption from squatters), government decrees and actions, and the influence of world prices, low prices discouraging smallholder production. Indonesian policies since independence in 1949 have adversely affected all three of the above factors.

Labor output has been reduced due to new laws and regulations, strikes, and general labor unrest. In 1950, a seven hour work day and forty hour work week was declared applicable to all of Indonesia. This involved a net reduction in working hours which was not compensated by a corresponding increase in labor productivity.<sup>1/</sup> As left-oriented labor unions increased their strength, worker discipline declined and absenteeism increased. While adequate data are not available on changes in estate worker output, it has been stated that "per capita labor productivity...is considerably below that of prewar years."<sup>2/</sup> In discussing the estate situation, a recent student of Indonesia confirms the lag in productivity behind wage increases. "In direct contrast to the process that took place in other countries during their period of rapid economic advance, growing strength of the labor organization and consequent increases in wage rates are preceding, instead of following, increases in labor productivity."<sup>3/</sup>

These relative changes in wages and worker output have seriously reduced the profitability of estate operations. In addition, the official exchange rate since 1952 has been significantly overvalued, which has meant an additional squeeze on profits of estates producing for export. During 1952-56, for example, the official rate was 11.4 rupiah to the dollar, but the average curb rate in Djakarta for the same period was about 32 rupiah to the dollar. Since then, the curb rate has generally been two to three times the official export rate. World prices for Indonesian products have not risen sufficiently to compensate for the squeezing of estate profits engendered by higher costs (including labor costs) and overvaluation of the rupiah.

There appears little doubt that this profit squeeze has left very little return, if any, for estate investment. An additional disincentive to estate investment has been the attitude and actions of the Government toward the foreign-owned estates. Since early 1958, the Government has taken over all of the 673 Dutch estates which constituted half of the total estate area in mid-1958, and has notified some British and American estate operators that their leases will not be renewed. Naturally uncertainty as to renewal of estate leases has upset estate planning and impeded reinvestment.

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1/ See Report for the Financial Year 1951-52, Java Bank, Djakarta, p. 126.  
2/ Investment in Indonesia, U. S. Department of Commerce, p. 98.  
3/ Higgins, Benjamin, Indonesia's Economic Stabilization and Development, Institute of Pacific Relations, 1957, p. 66.

These actions were to some extent foreshadowed by the attitude of the Government in recent years and there has been a strong tendency for foreigners to disinvest rather than put more money into Indonesian agriculture. The shortfall in rubber replanting compared to Malaya offers some substantiation of this. While the Indonesian Government's ten-year program (1956-65) calls for the replanting of 26,000 hectares a year in new high-yielding rubber trees, by mid-1958 only 19,000 hectares had been replanted, an average of only 7,600 hectares a year. This contrasts with the results achieved in Malaya where smallholders alone replanted 14,000 hectares a year in new high-yielding strains from 1953-57. Estates in Malaya replanted an average of 25,000 hectares a year in 1954-57.

Following the takeover of the Dutch estates, most of the experienced Dutch managerial personnel left the country. This affected 1958 estate production, however, it may have been offset to some extent by the Government ban against strikes.

Lastly, lawlessness has posed a serious problem for the estates. Parts or all of some estates are not safe for conducting operations and this has reduced output. Squatters have disrupted normal estate operations by hindering accessibility to estate products and large-scale thievery has been a serious problem. Thievery does not necessarily reduce output directly, but thefts have reduced the profitability of estate operations and have added to the reluctance to invest to either maintain or expand output.

The combination of these factors has resulted in a serious lag in the recovery of estate production as indicated in table 4.

Table 4

Estate Agricultural Production<sup>1/</sup>  
(In thousands of metric tons)

	<u>1938</u>	<u>1950</u>	<u>1953</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Rubber	175	178	309	267	258	243
Coffee	46	11	22	13	15	13
Tea	81	35	37	43	48	46
Tobacco	442 <sup>2/</sup>	8	8	7	n.a.	n.a.
Palm products	275	157	203	206	200	183
Sugar	1,260 <sup>3/</sup>	277	620	786	829	769

1/ Data are not available on copra estate production.

2/ 1934-38.

3/ Estimated.

Sources: Report for the Year, Bank Indonesia, Djakarta; Statistik Konjunktur, Djakarta; and F.A.O. Yearbook: Production, Rome.

Smallholder production

Most domestically consumed food crops in Indonesia are grown by peasants cultivating relatively small plots of land. The size of the average farm in Java is about two acres, while in the outer islands the average is only slightly larger.

Except in the case of tea, smallholders have been increasing their share of the total production of crops for export. (See table 3). In the prewar years, smallholders produced about 40 per cent of Indonesia's commercial crops, but recently more than half of these crops have been produced by smallholders. Increased rubber output by smallholders accounts for the bulk of this shift in commercial production. Indonesian smallholders as a whole, now devote about 20 per cent of their production to cash crops compared to 10 per cent in the early postwar years.

Though smallholders now produce a larger share of Indonesia's commercial crops, they have been more successful with rubber and sugar than with coffee, tea, or tobacco. Data in table 5 below indicate that smallholder rubber production in 1957 was about triple prewar output and sugar production was quite high relative to prewar output. Production of coffee, tea and tobacco in 1957, however, were still below the prewar average and only the production of coffee has increased steadily.

Table 5

Indonesian Smallholders Production  
(In thousands of metric tons)

	Rubber	Coffee	Tea	Tobacco	Sugar
Average 1934-38	167.8	68.1	12.2	66.9	140.0 <sup>1/</sup>
Average 1948-50	377.9	20.8 <sup>2/</sup>	9.2	n.a.	n.a.
1951	601.4	n.a.	12.5	50.8	n.a.
1952	463.3	33.6	6.7	75.7	n.a.
1953	396.6	39.9	5.7	n.a.	51.3
1954	463.5	43.4	8.2	60.7	117.8
1955	479.7	47.6	5.5	50.2	n.a.
1956	430.7	48.3	3.3	60.2	n.a.
1957	471.2	50.3	3.5	64.7	273.4
1958	n.a.	n.a.	3.9	n.a.	288.7

<sup>1/</sup> 1938, estimated.

<sup>2/</sup> Assumed equivalent to smallholder production. Reported as "production purchased from farmers."

Source: Production Yearbook, F.A.O.; Statistik Konjunktur; and Report for the Year, Bank Indonesia; and reports of U. S. Department of Agriculture.

While cultivated estate area has declined about one-fourth since prewar, the total area cultivated by smallholders now is probably larger than prewar, and has apparently been increasing since 1951. The total area

cultivated by smallholders prewar is not known, but for six major crops, there was an eight per cent increase in cultivated area in 1951-57 as indicated in table 6 below. Only corn failed to show a steady increase.

Table 6

Harvested Area of Major Crops of Smallholders in Indonesia  
(In thousands of hectares)

	Rice			Corn	Cassava and Cassava Products	Sweet Potatoes	Ground Nuts	Soya Beans	Total
	Irrig- ated	Non-Irrig- ated	Total						
1951	5,186	1,051	6,237	2,581	851	163	290	396	10,518
1952	5,272	1,072	6,344	2,232	927	335	277	417	10,532
1953	5,380	1,085	6,465	1,969	1,042	325	292	457	10,550
1954	5,468	1,114	6,612	2,518	1,071	284	324	526	11,335
1955	5,517	1,053	6,570	2,042	1,078	298	298	515	10,782
1956	5,690	1,001	6,691	2,232	1,125	317	317	503	11,252
1957	5,778	1,052	6,830	2,097	1,192	337	337	503	11,354

Source: Report for the Year, Bank Indonesia, Djakarta.

While the total prewar harvested area for all crops is not known, the harvested area for rice in 1937 was 6,230,000 hectares. The 6,830,000 hectares of harvested area for rice in 1957 represents a 10 per cent increase. This suggests that the total area cultivated by the smallholder is above the prewar level. Further evidence is provided by the 28 per cent increase in population in 1938-58 and the distribution of part of the estate areas to peasant cultivators, other parts being taken over by squatters.<sup>1/</sup>

Causes of low productivity -- Relatively poor output trends for Indonesian smallholders can be attributed partly to overpopulation on arable land in Java and Madura, and to land fragmentation. A third factor has been the failure to cultivate the land already in use more intensively.

Java and Madura, which comprise only 7 per cent of Indonesia's total land area, have over three-fifths of the country's population. It is not generally realized that Indonesia still has large areas of uncultivated land that could be brought into production.<sup>2/</sup> Of a total land area of 148 million hectares, only 12 per cent is currently cultivated. The large amounts of unused, arable land are in Sumatra, Sulawesi, Kalimantan and other outlying islands.<sup>3/</sup>

<sup>1/</sup> Investment in Indonesia, U. S. Department of Commerce, 1956, p. 22.

<sup>2/</sup> Much of this cultivable land, however, contains soils of relatively limited fertility. Nevertheless, these soils can be productive if the land is properly cleared and appropriate cultivation techniques are applied. See Pendleton, Robert L., "Agricultural and Forestry Potentialities of the Tropics," Agronomy Journal, March 1950, p. 115.

<sup>3/</sup> Sulawesi was formerly known as the Celebes and Kalimantan as Dutch Borneo.

In spite of the crowding, relatively little has been done to relieve the population pressure in Java and Madura by migration to the other islands. It is estimated that at least 400,000 Javanese would have to migrate each year in order to significantly affect the rate of population growth in Java. The results of the Government's transmigration program have been almost negligible in relation to the estimate above. During 1950-56 only about 7,500 persons were transferred annually.

One major obstacle in the relocation program is the strong attachment of the Javanese to his village. Even though the Government provides free transportation and enough financial assistance to give him a start in Sumatra or Kalimantan, the number of volunteers has been very low. Pioneer farming in these areas is not easy. Hard work and a willingness to run risks is required. One major risk is the possibility that the newly cleared land will quickly lose its fertility, leaving the cultivator in serious straits. This has been particularly true in Sumatra where the soil nutrients tend to leach out quickly.

Since agricultural production in 1953-57 was only 18 per cent above 1934-38 output (see table 1) and population increased by over one-fourth in the same period, it is evident that food production has not kept pace with population growth in Indonesia. If exports had expanded significantly over the same period, this deficiency could have been offset by the country's increased ability to pay for food imports. But export volume in 1958 was only 17 per cent above the volume in 1937.

It would appear that Indonesia has considerable room to profit from better techniques in cultivating the land already in use more intensively. One indication of this is the relatively poor yields per hectare obtained in the production of many Indonesian crops. Table 7 below provides a rough indication of Indonesia's position relative to other Asian countries.

Table 7  
Agricultural Yields in Selected Asian Countries  
(In kilograms per hectare)

	Rice (paddy)		Corn		Sweet Potatoes		Tea	
	1948-52	1957	1948-52	1957	1948-52	1957	1948-52	1957
Indonesia				860		6,700	4,170	4,780
Java & Madura	1,570	1,680	680 <sup>1/</sup>		5,700			
Other islands	1,680	1,730	1,110 <sup>1/</sup>		8,500 <sup>1/</sup>			
Japan	4,000	4,430	1,420	2,020	15,100	18,300 <sup>3/</sup>	14,300	16,089
Taiwan	2,110	2,920	1,410	1,210	9,100	11,800	2,860	3,390
Malaya	1,850	2,190	1,260 <sup>2/</sup>	..	10,000 <sup>3/</sup>	..	..	6,000
Philippines	1,190	1,190	720	500	4,100	4,300	..	..
India	1,110	1,180	650	790	6,000	7,600	8,900	9,548
Pakistan	1,380	1,390	980	1,030	..	..	7,600	6,516
U. S.	2,560	3,590	2,450	2,960	5,900	7,000	..	..

<sup>1/</sup> Average of three years.    <sup>2/</sup> Average of two years.    <sup>3/</sup> 1956.

Source: Yearbook of Food and Agricultural Statistics, Food and Agricultural Organization of the United Nations, Rome.

While Indonesia is not the country with the lowest yields, it is far below those countries with the highest. In 1957, the rice yield in Java and Madura was 62 per cent below Japan's, 42 per cent below Taiwan's, and 22 per cent below Malaya's. The sweet potato yield was 63 per cent below Japan's, and Indonesia produced only three-tenths as much tea per hectare as Japan.

One of the main factors accounting for the lower Indonesian yields is the relatively small use made of fertilizer. Indonesia ranks among the countries that consume the least chemical fertilizer per hectare of arable land. In 1954, consumption of nitrogen, phosphoric acid and potash combined, amounted to only 31,500 metric tons. This was equivalent to 1.78 kilograms per hectare of arable land. Most of this was probably used by the rubber and sugar plantations, relatively little being applied to other crops. Table 8 provides comparable figures for other Asian countries for approximately the same period.

Table 8

Consumption of Chemical Fertilizers in Selected Asian Countries  
(In kilograms per hectare)

Japan	230	Malaya	6.8
Taiwan	137	Philippines	3.6
South Korea	84	India	.9
United States	31	Pakistan	.5
Ceylon	26.6		

Source: Yearbook of Food and Agricultural Statistics, *ibid.*

These figures do not necessarily correlate with the data on yields since in Indonesia, and some of the other countries, chemical fertilizer is used largely for crops other than those referred to earlier and in table 6. The data also do not correlate because significant use is made in some Asian countries of organic fertilizers. However, it is difficult to procure adequate data on consumption of green manure and other organic fertilizers for most Asian countries.

Providing knowledge and incentives for fertilizer use -- Greater use of fertilizer is only one way in which agricultural production can be increased in Indonesia. Almost all techniques for increasing agricultural output involve either heavier investment by the farmer, the learning of new techniques, or more work. While diffusion of information about techniques is important, it is even more important for the cultivator to have the ability and incentive to apply the techniques. It appears that the Indonesian Government has fallen far short in not only diffusing knowledge of agricultural techniques but also in providing suitable incentives for the cultivator to utilize his technical knowledge. The problem of using fertilizer in the cultivation of rice in Indonesia illustrates this point.

Experiments with chemical fertilizers in Indonesia have shown encouraging results.<sup>1/</sup> A close student of the problem estimates that "at least 3.4 million hectares of rice land throughout Java, Bali, Lombok, Sumatra and Sulawesi would react to the application of 100 kilograms per hectare of double superphosphate or ammonium sulphate to produce increased yields of at least 500 kilograms of stalk paddy<sup>2/</sup> per hectare."<sup>3/</sup> This works out to an increase in Indonesia's total rice production of approximately 10 per cent which would just about eliminate the current need to import 800,000 to 900,000 metric tons of rice.

Greater use of organic fertilizers holds some promise of increasing yields, but not as spectacularly as in the case of the inorganic fertilizers. Stable manure is used on only about one-tenth to one-sixth of the upland area owing to shortage of supplies. The Government has had a campaign to foster increased use of green manures, but it has met with only modest success to date. The greatest promise for increasing food production appears to lie in greater use of chemical fertilizers. But how great is the cultivator's incentive to utilize chemical fertilizers?

Using conservative data, based largely on Professor Mears' study,<sup>4/</sup> the use of 100 kilograms of ammonium sulphate fertilizer per hectare of paddy land should result in an increased yield of at least 20 per cent. Taking normal output as 2,000 kilograms of stalk paddy per hectare (equivalent to approximately 1,000 kilograms of milled rice), the use of fertilizer should result in an increased yield of at least 400 kilograms per hectare. At a price of Rp. 1,000 per metric ton of stalk paddy, the increased yield would have a value of Rp. 400.

The farmer's out-of-pocket costs for this additional yield could range from Rp. 266-1/2 to Rp. 350 broken down as follows:

Cost of 100 kilograms of fertilizer	Rp. 210	Rp. 250
Interest on fertilizer loan (48 per cent per year for the 6 months crop season)	50-1/2	60
Transportation and commission charges	6	40
	<u>Rp. 266-1/2</u>	<u>Rp. 350</u>

<sup>1/</sup> See Agriculture in Asia and the Far East, Food and Agriculture Organization, Rome, 1953, p. 94, and "Phosphate Manuring of Rice in Java and Madura," Bull. No. 96, Agricultural Research Station, Buitenzong, Indonesia, 1949.

<sup>2/</sup> Stalk paddy refers to paddy still attached to the shoot. Hulled rice, by weight, is approximately 60 per cent of stalk paddy in Indonesia. Milled rice, by weight, is approximately 50 per cent of the original stalk paddy.

<sup>3/</sup> Mears, Leon A., "The Use of Fertilization," Ekonomi Dan Keuangan Indonesia, Djakarta, September 1957, p. 573.

<sup>4/</sup> "The Use of Fertilization," op. cit., p. 573.

The farmer would therefore have a net profit of Rp. 50 to Rp. 133 if he spread the fertilizer himself and harvested the increased yield. If he hired help for these two tasks, paying a man Rp. 30 over a five day period to spread the fertilizer and Rp. 40 (equivalent value of one-tenth of the increase in yield) for harvesting, he would lose money providing his total cost was above Rp. 330. In addition, there is the risk that the yield might be less than 20 per cent.

Fertilization can be a risky business. If not properly applied, or if the requirements of the soil have not been properly diagnosed the application of fertilizer may not improve yields. The crop may even be harmed if the acidity of the soil is increased. An additional risk in the investment is that bad weather might reduce yields in spite of fertilization.

The cultivator may well feel that the risks far outweigh the possible gains to be derived from the use of what may be to him a completely untried and unfamiliar product. In a society where the village money lender demands 50 or 100 per cent return for the risk of making a loan, the entrepreneur may be expected to seek a similarly high reward for risk-taking. This may be especially true where the entrepreneur is a poor peasant who approaches farming mainly from the point of view of providing food for his family rather than as a commercial operation.

This is a paradoxical situation. The value of fertilization for the country is clear. The net return on the investment appears to be high. With the expenditure of about \$10 on fertilizer, delivered to the farmer, combined with a modest amount of additional labor, the country can obtain rice valued at about \$25.00 at world market prices. This indicates that the net return on the investment is excellent, probably well in excess of 100 per cent per annum. There is no question that for this kind of reward, the risk is well worth taking. However, what is clearly a good risk, well rewarded, for the nation, appears to be dangerous and inadequately rewarded for the individual peasant.

The explanation of the paradox is that the peasant, who is asked to bear most of the risk, also has to share the rewards with the money lender who finances him. Various intermediaries between the producer and the ultimate consumer have to have their cut, further reducing the return to the peasant. The peasant operates on such a limited scale, and so close to the margin of subsistence, that his ability to take risks is very limited. Thus the risk devolves upon the man who is least able to bear it and who ultimately receives only a small part of the reward that accrues to the country as a whole.

### Conclusion

From the foregoing it is clear that production trends in Indonesian agriculture have been discouraging. Output of many crops has been declining since 1954 and per capita food output is considerably below the prewar level. The production outlook for both estates and smallholders is far from promising.

Estate production has been adversely affected by declines in the productiveness of the labor force, the quality of the management, and the rate of investment. These are matters which can only be corrected slowly. Ways must be found to increase worker output and improve the quality of management. Investment uncertainties should be resolved and a suitable atmosphere created to encourage both domestic and foreign investment.

While the total area cultivated by smallholders is probably larger than prewar, the increase has not kept pace with population growth. Smallholder cultivation still suffers from problems of overpopulation, land fragmentation, and lack of more intensive cultivation. The Government's transmigration program has not been successful and emigrants to Sumatra and the outer islands face serious problems including the rapid loss of soil fertility. Emigration will continue to remain slow until methods are devised to convert farming in the outer islands into a profitable commercial venture.

Probably the most promising solution to Indonesia's agricultural ills rests in greater use of chemical fertilizers. It has been demonstrated that potentially high returns are possible from greater fertilizer use. The main problem will be to find some way to provide the cultivator with adequate incentives for using the fertilizer without assumption of most of the risk involved.

Until many of these problems are resolved, it is unlikely that per capita agricultural output in Indonesia will improve significantly. Merely achieving an increase in total agricultural output in the future will do little to raise living standards unless the rate of increase exceeds population growth.

Appendix A

Agricultural Production  
(In thousands of metric tons)

	1935-39	1953	1954	1955	1956	1957	1958 <sup>1/</sup>
1. Rice, milled	6,230	7,100	7,313	7,301	7,309	7,443	7,542
2. Corn	2,235	2,540	2,718	1,882	1,965	1,800	2,000
3. White potatoes	53	70	75	74	76	76	76
4. Sweet potatoes	1,182	1,847	1,900	1,800	2,494	2,600	2,900
5. Cassava	8,500	8,300	9,569	9,380	9,131	9,908	11,000
6. Sugar, centrifugal	1,095	620	713	856	786	829	760
7. Sugar, non-centrifugal	73	250	250	298	250	273	288
8. Copra	1,321	880	1,100	1,282	1,100	1,211	1,250
9. Palm kernel	42	42	43	42	41	40	37
10. Palm oil	198	161	169	166	165	160	150
11. Peanuts shelled	175	256	248	207	218	228	230
12. Soybeans	265	295	400	346	357	327	328
13. Kapok	22	8	6	8	7	10	10
14. Sisal	83	25	28	33	36	33	28
15. Tobacco	108	57	96	67	67	73	64
16. Rubber	353	700	751	749	697	696	650
17. Tea	77	40	54	61	57	70	69
18. Coffee	118	66	51	71	93	90	90
19. Cacao	2	1	1	1	1	1	1
20. Spices	65	35	27	34	31	25	24
21. Meat	216	--	--	--	241	250	265

<sup>1/</sup> Estimates.

Source: "Indexes of Agricultural Production for the Far East and South Asia,"  
U. S. Department of Agriculture, (unpublished), November, 1958.