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CHANGES IN COMMUNITY INSTITUTIONS AND INCOME DISTRIBUTION IN A WEST JAVA VILLAGE

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CHANGES IN COMMUNITY INSTITUTIONS AND INCOME DISTRIBUTION IN A WEST JAVA VILLAGE[1]

ABSTRACT

Recent changes in rice harvesting in Java have attracted the attention of economists and sociologists who are concerned about income distribution in the rural sector. The changes have been attributed mainly to population pressure and new technology.

This study focuses on the evolution of rice harvesting systems and its impact on the income distribution in the village community, based on an intensive survey of a typical rice village in West Java. The village studied is characterized by rice farming with stagnated technology and by heavy population pressure on limited land. The real wage rate in rice farming has declined. Rice harvesting systems have experienced major changes, from open and generous arrangements to more restrictive and less generous arrangements. Income distribution skew has increased. Class differentiation among villagers has, thus, progressed.

The basic factor underlying these changes is identified as the decreasing return to labor relative to land due to the growing population pressure under a *stagnated technology*.

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CHANGES IN COMMUNITY INSTITUTIONS AND INCOME DISTRIBUTION IN A WEST JAVA VILLAGE

Java is characterized by an extremely high population density (650 people/km^2) and population pressure on land has become especially serious. Since the beginning of this century when it was said that Java *filled up*, population in Java and Madura has increased more than two and a half times.

Population growth, on one hand, should increase the demand for food products, providing an incentive for the expansion of cultivation frontiers into more marginal areas. On the other hand, an increase in rural labor force should increase competition for rights to cultivate the limited land area. Altogether, it seems reasonable to expect that the economic rent, or the economic return to the service of land, should increase sharply whereas the return to labor should decline relatively or even absolutely.

In general, an increase in the rate of return to land relative to that of labor promotes more unequal distributions of income and assets. If there is any differential in landholdings among people, the higher return to land implies a widening gap in income between large and small holders. In addition, the higher return to land provides a strong incentive for the rich to accumulate land, especially in an underdeveloped capital market, because alternative investment opportunities, such as corporate stock and securities, are not easily available. The concentration of landholdings induced by the higher rate of land rental makes the income distribution more skewed, which promotes the further concentration of land -- a vicious cycle toward polarization of peasant communities into large commercial farmers and landless workers, as envisioned by Marx and Lenin (Marx 1925, Lenin 1960).

In Java, despite the high population pressure and increased commercialization, such a polarization process is not clearly visible. It appears that all villagers share poverty relatively equally. According to Geertz (1970), relatively homogeneous peasant communities were preserved in Java despite the high population pressure because of the great labor-absorption capacity of wetland rice culture using highly labor-intensive technology, such as rice harvesting by *ani ani* (hand knife), that enabled the successive intensification of labor application for a unit of land without resulting in major decline in the marginal productivity of labor. The process was supported by the community principles of work and income sharing, which impeded the introduction of labor-saving technology. Thus, Javanese agriculture *involuted* with an almost constant productivity of labor and rural population continued to share poverty (Geertz 1970).

Geertz's perspective has recently been challenged by rural sociologists and agricultural economists. Collier (1978), for example, criticized the Geertz thesis on the ground that a significant class differentiation or even a polarization has been in progress in rural Java, even though large farmers in the Java context are small in the world standard, and that the large farmers try to increase profit by introducing labor-saving technologies without observing traditional income-sharing practices in the village community.

Our study identifies the extent to which class differentiation or stratification has progressed in a village community, corresponding to population pressure, and investigates how village institutions such as land-tenure and labor-contract arrangements have been induced to change, with significant effects on income distribution.

DATA COLLECTION

To identify changes in village institutions and income distribution, we conducted a census survey during January 1979 in a hamlet (*kampung*) of a village (*desa*) in Regency (*Kabupaten*) Subang, about 120 km east of Jakarta and 40 km northeast of Bandung (Fig. 1). Our survey was based on interviews with the heads and wives of the households. Of the 113 households, 3 were excluded from our survey because of inability of either the head or the wife to respond because of old age and mental disorder.

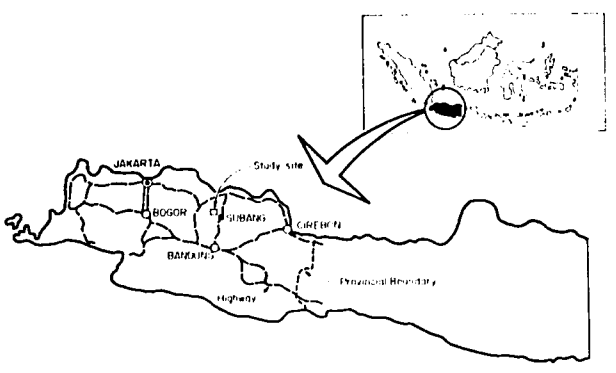

Fig. 1. Map of West Java.

The desa was one of those covered by the Rice Intensification Survey (IPS) conducted by the Agro-Economic Survey from the 1968-69 wet season to the 1972-73 wet season. The data from the IPS Survey provided the benchmark information with which historical changes were ascertained.

POPULATION PRESSURE AND CLASS DIFFERENTIATION

The kampung, one of six of the desa, is characterized by irrigated rice monoculture. In almost all fields rice is double cropped in the wet (November-April) and the dry (May-October) seasons. There has been virtually no expansion in cultivated area and no significant improvement in irrigation systems in the past few decades. The kampung is within the 5,000 ha of service area of the Leuwinangka, a national irrigation system. Its dam was constructed in the 1930s. Almost all paddy fields in this system have been double cropped since the major rehabilitation works of the canal systems in 1950.

At the time of the survey, the total population of the kampung was 419. There are no data to estimate population growth rates directly. However, judging from the population pyramid in Figure 2, it appears that a significant deceleration has occurred in the past 3 to 4 decades. The average number of children per mother has declined dramatically (Table 1). If we assume that the average reproductive period of women is 30 years (15-45 years old), we can estimate that the natural reproduction rate would have declined from 3%/year to less than 1% during the past 40 years.

Such deceleration in the population growth rate in the kampung could be typical of the area. Data from the Kabupaten Office of Subang reveal that the population growth rate of the kabupaten declined from 2.1%/year for 1961-70 to 0.7% for 1970-76.

Although a birth control program was introduced in the kampung in 1975 birth rate declined much earlier. Many wives had practiced indigenous birth control methods (such as abortion) that were harmful to the health. That suggests that population density in the 1950s was already so high and the income-earning opportunities so scarce that villagers were compelled to reduce family sizes even before the introduction of formal family planning.

Even though the population growth decelerated, the labor force should have continued to increase rather rapidly because of a continued increase in the population of an economically active age. It appears, however, that the growth of the labor force will begin to decelerate.

Table 2 shows that there has been no expansion in the cultivated land area. There was no report of land acquisition by present cultivators through opening new land. Before 1970, all the irrigated rice (*sawah*) plots were acquired by the farmers either through inheritance or purchase. In earlier years inheritance was the dominant source of land acquisition; purchase became a significant source after 1960. Land acquisition through rental or pawning arrangements was reported after 1970.

As in most villages in Java, owner farming was the dominant form of land tenure. About 83% of the sawah plots and 89% of the sawah area were cultivated by the owners (Table 3). Eighty-one percent of the farmers were owner operators and only 2% were pure landless tenants (Table 4). However, as the data in Table 2 show, landlordism has developed rather rapidly in recent years. It appears reasonable to hypothesize that population pressure on limited land resources and the corresponding increase in return to land relative to return to labor have reached a stage where the stratification of the hitherto homogeneous peasant community into landlord and tenant classes has begun to emerge significantly.

Table 1. Average number of surviving children per mother by mother's age, and estimates of population growth rate.

Mother's age[a]	No. of mothers	Av no. of children (n)	Population[b] growth rate (r) (%)
80 years or older	24	4.80	3.0
60-79	14	3.93	2.3
50-69	33	3.49	1.9
46-59	21	3.14	1.5
40-49	17	2.71	1.0
36-45	21	2.48	0.7
30-39	43	1.95	-
26-35	31	1.84	-
20-29	32	0.84	-
25 or less	42	0.71	-
Below 20	12	0.50	-

[a]Some age classes are overlapped to provide as many samples as possible. [b]Calculated by the formula: $2(1 + r)^{30} = n$ where r = growth rate, and n = number of children.

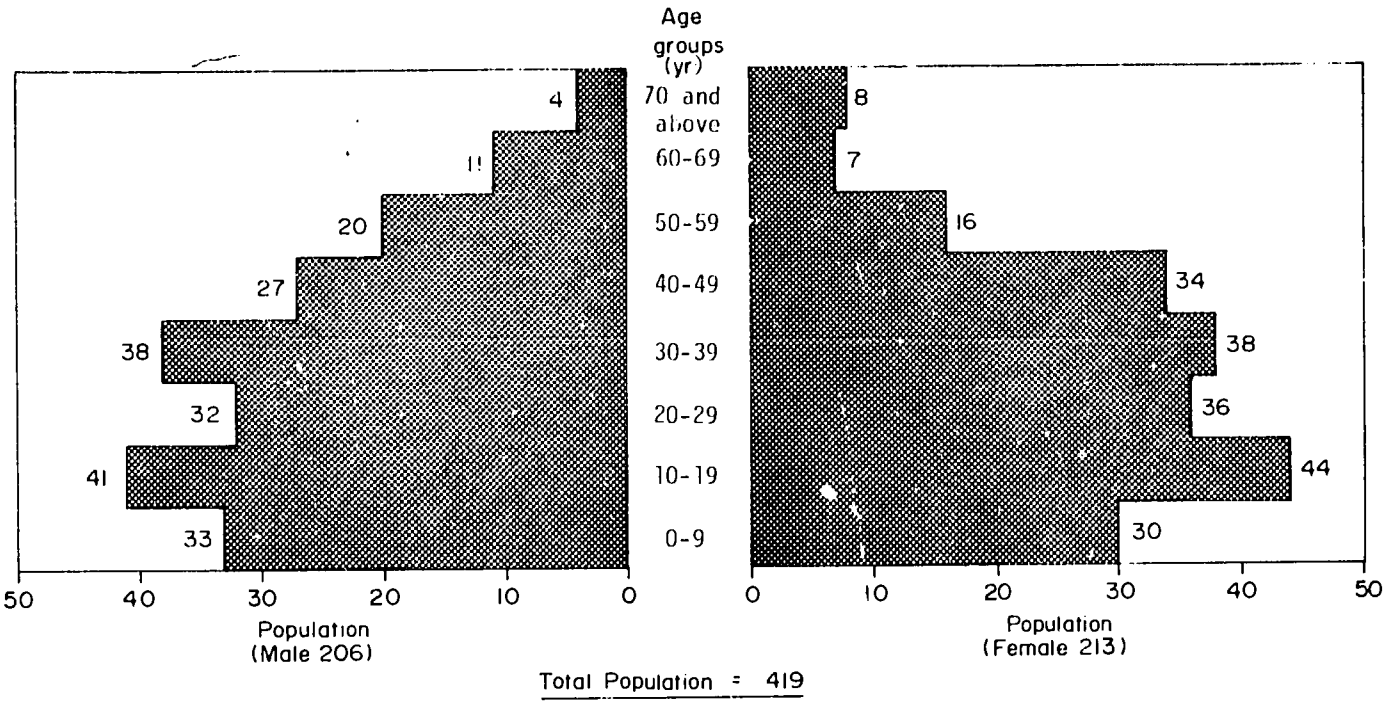

Fig. 2. Age distribution of population in a West Java village, January 1979.

Table 2. Acquisition of sawah by present cultivators.[a]

	Inherited		Purchased-ownership title		Rented in		Pawned-in-ownership title		Total	
Before 1949										
No. of plots	18	(90)	2	(10)					20	(100)
Area (ha)	4.90	(96)	0.21	(4)					5.11	(100)
1950-1959										
No. of plots	18	(95)	1	(5)					19	(100)
Area (ha)	3.70	(96)	0.14	(4)					3.84	(100)
1960-1969										
No. of plots	16	(73)	6	(27)					22	(100)
Area (ha)	4.06	(77)	1.19	(23)					5.25	(100)
1970-1974										
No. of plots	17	(65)	7	(27)	1	(4)	1	(4)	26	(100)
Area (ha)	4.01	(72)	1.36	(24)	0.14	(3)	0.07	(1)	5.58	(100)
1975-1979										
No. of plots	10	(30)	8[b]	(25)	10[c]	(30)	5	(15)	33	(100)
Area (ha)	1.42	(29)	0.99[b]	(20)	2.06[c]	(41)	0.48	(10)	4.95	(100)
Total										
No. of plots	79	(66)	24	(20)	11	(9)	6	(5)	120	(100)
Area (ha)	18.09	(73)	3.89	(16)	2.20	(9)	0.55	(2)	24.73	(100)

[a]Figures inside parentheses are percentages. [b]Includes 1 case in which a servant of a large farmer was given 0.14 ha by the master as grant. [c]Includes 2 subrenting cases with 0.36 ha.

Table 3. Distribution of sawah land plots by tenure status, 1979.

Tenure status	Plots No.	Plots %	Area Ha	Area %	Av area per plot (ha)
Owned	80	83.3	21.98	88.9	0.27
Rented:					
Share tenancy	8	8.3	1.56	6.3	0.19
Leasehold tenancy	1	1.1	0.28	1.1	0.28
Pawned	5	5.2	0.55	2.2	0.11
Subrented	2	2.1	0.36	1.5	0.18
Total	96	100.0	24.73	100.0	0.26

Table 4. Distribution of farms by tenure status, 1979.

Tenure status	Farms No.	Farms %	Area Ha	Area %	Av area per farm (ha)
Owner operator	67	81	19.00	77	0.28
Owner/share[a]	9	11	2.98	12	0.33
Owner/lease	1	1	1.00	4	1.00
Owner/pawn	3	4	1.13	5	0.38
Share-tenant	1	1	0.29	1	0.29
Pawn in	2	2	0.33	1	0.16
Total	83	100	24.73	100	0.30

[a]Includes two cases of subrenting under share arrangement.

Table 5. Size distributions of sawah land ownership and operational landholdings, 1979.

Size of landholding	Ownership holdings: Owners No.	Owners %	Area Ha	Area %	Operational holdings: Households No.	Households %	Area Ha	Area %
1.00 ha or more	5	4	6.21	25	4	4	4.72	19
0.60-0.99 ha	4	4	3.23	13	4	4	3.30	13
0.30-0.59 ha	14	13	6.23	25	17	15	7.44	30
0.10-0.29 ha	41	37	7.85	32	41	37	8.17	33
0.01-0.10 ha	21	19	1.34	5	17	15	1.10	5
0	25	23	0	0	27	25	0	0
Total	110	100	24.86	100	110	100	24.73	100
Av area (ha) per household			0.23				0.22	

Class differentiation in terms of sawah land ownership has progressed to a high degree. Of 110 households interviewed, 25 owned no land and 21 owned only less than 0.1 ha (Table 5). Class differentiation has also been pronounced in terms of operational landholdings. Forty-four households had operational landholdings less than 0.1 ha and earned their livelihood primarily from hired farm work. The size distribution of land ownership and operational landholdings was highly skewed even though the largest holding was only 1.5 ha. The size distribution of income was equally skewed as judged from comparisons in Lorenz curves and Gini coefficients (λ) in Figure 3.

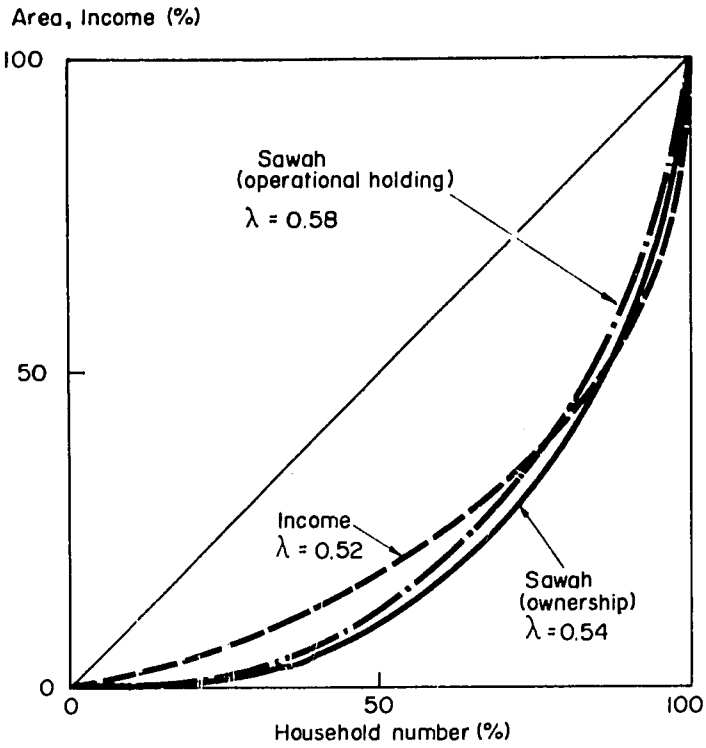

Fig. 3. Lorenz curves in the distribution of income and landholdings (λ = Gini coefficient).

We were unable to collect data to ascertain how the size distributions of income and landholdings have changed over time. It is our basic hypothesis that the income and asset distributions have become more unequal due to the growing population pressure on land. We subject this hypothesis to empirical test in the following sections.

Changes in rice farming

Concurrence of increasing population pressure and growing inequality, even if supported by data, does not represent evidence for the causal relation. It has often been argued that new technology such as modern rice and wheat varieties is the major factor promoting polarization of rural communities and greater misery of the poor (Frankel 1971, Griffin 1974, Palmer 1976). For testing our hypothesis, it was critical to identify the changes that have occurred in rice farming technology during the analysis.

Production costs and returns. Rice production in the kampung is characterized by the high yield level per hectare, which corresponds to the high application of modern inputs (Table 6). Average yield for the 1978 dry season was almost 3 t/ha in dry *gabah* (paddy). The level of fertilizer application was very high -- the average nitrogen input was as high as 90 kg/ha. The fertilizer-paddy rice price ratio was relatively favorable. On the average, farmers could barter 2.35 kg of dry paddy for 1 kg nitrogen. No significant difference in rice yield and application of fertilizers and chemicals between the large and small farmers was observed.

Varieties and fertilizers. Despite the high fertilizer application rate, modern semidwarf varieties such as the IR-varieties and Pelita have not been commonly used. The modern varieties (MV) were introduced in the late 1960s but many farmers shifted back to traditional varieties because the MV were highly susceptible to insects and pests. Although as much as 83% of the farmers had once tried MV, at the time of our survey, only 14% of farmers were raising MV. The rest were using traditional varieties such as Gembar and Sagon.

Fertilizer application increased from about 180 kg in 1968 to 230 kg in 1978 (Table 7). It appears that this increase was induced by the sharp decline in the fertilizer-paddy price ratio, which was largely a result of the government subsidy on fertilizer under the *Bimbingan Massal* (*Bimas*) Program or mass guidance for intensive rice farming.

The average paddy yield increased from about 2,600 kg/ha in 1968-71 to 2,944 kg/ha in 1978. It is difficult to ascertain from our data how significant the yield increase was, because the yields were subject to weather fluctuations. However, if we assume that our yield data reflect the real yield increase, it must have resulted mainly from the increase in fertilizer application.

Labor input. Average labor requirement per hectare in the 1978 dry season was 1,252 hours (156 days, assuming an 8-hour work day). Land preparation used the largest share of labor, followed by harvesting, weeding, and transplanting, in that order (Table 8). These tasks, which require large shares of labor input for rice production, are characterized by high dependence on hired labor. There were large differences in the composition of family and hired labor between large and small farmers. On the average, large farmers depended on hired labor for nearly 80% of the total labor for rice production; small farmers depended on hired labor for only 40% of the total labor. We can infer that land preparation, transplanting, weeding, and harvesting of large farmers provide the major employment opportunities for landless workers and small farmers.

Average labor input for rice production per hectare was estimated to increase by 18% from 1968-71 to 1978 (Table 9). The increase was especially large for weeding, reflecting the intensification of crop care. The increase in labor use for land preparation reflects the substitution of hand hoeing for animal plowing and harrowing due to the decrease in manual wage

rate relative to the rental rate of draft animals (cattle and carabao). The real wage rate of manual labor for land preparation decreased by about 10%, whereas the real rental rate of draft animals increased by about 50% (Table 10).

Changes in labor-contract relations

Growth in labor force and the resulting decline in the real wage rate have had pervasive impacts on employment relations among villagers. Changes in labor contracts and their effects on income distribution have been expressed most dramatically in the changes in rice harvesting systems.

Rice harvesting represents the most important occasion in the village economy at which the output is shared among various resource contributors, such as landlords, farmers, and laborers. Thereby traditional institutions, based on the principles of mutual help and income sharing, had governed labor-employment relations for harvesting works. These traditional institutions have been induced to change by changes in relative factor endowments and technology.

Changes in rice harvesting systems

Recent changes in rice harvesting in Java have attracted attention of economists and sociologists who are concerned about the income distribution problem in the rural sector. The traditional *bawon* system that allowed wide sharing of output among community members has been replaced by those that limit participation in harvesting and reduce harvesters' share. The change has been attributed mainly to population pressure and new technology.

Table 6. Rice yield and current input per hectare, gross value added ratio, and prices[a] of rice and fertilizer, 1978 dry season.

Item	Large farmer[b]	Small farmer[c]	Av
Rice yield[d] (kg/ha)	3,031	2,775	2,944
Current inputs:			
Seed (kg/ha)	40	49	43
Urea (kg/ha)	197	199	198
(Nitrogen)[e] (kg/ha)	(89)	(90)	(89)
T.S.P (kg/ha)	37	20	31
Chemical (Rp/ha)	546	504	532
Gross value added ratio (%)	90.3	89.4	90.0

Prices:	
(1) Rice price	Rp65/kg
Urea price	Rp69/kg
(2) (Nitrogen prices)[e]	(Rp153/kg)
T.S.P	Rp69/kg
(2)/(1)	2.35

[a]US$1 = Rp627.25 (As of January 1980). [b]Operational holdings of 0.3 ha or more. [c]Operational holdings less than 0.3 ha. [d]Dry *gabah*. [e]Assume 45% of nitrogen for urea.

Table 7. Prices[a] of paddy and fertilizer, and fertilizer inputs per hectare, 1968, 1970, and 1978.

	Paddy price (Rp/kg)	Fertilizer[b] price (Rp/kg)	Fertilizer/paddy price ratio (Rp)	Fertilizer[c] inputs per hectare (kg/ha)
1968	15.0	31.3	2.09	178
1970	20.0	26.6	1.33	203
1978	65.0	69.0	1.06	229

[a]US$1 = Rp627.25 (As of January 1980). [b]Urea and T.S.P. [c]Total of urea and T.S.P.

In many places the bawon system has been replaced by a new system called *tebasan* (Collier et al 1973, 1974; Utami and Ihalauw 1973; Sinaga and Collier 1975; Hayami and Hafid 1979) where farmers sell their standing crops to middlemen called *penebas* sometime before the harvest. The penebas, who are free from the traditional obligations of the village community, close the harvest to a majority of the villagers and employ fewer regular workers to harvest their purchased crops. A major factor underlying the shift from bawon to tebasan is said to be population pressure. As the number of workers who want to participate in harvesting increases beyond a point, as happens in the bawon system, significant losses occur from physical damage, such as trampled crops, and from cheating and stealing. The tebasan system reduces such losses. The introduction of MV could also have facilitated the development of the system because the short-stalked MV made the use of the sickle more efficient, thus reducing the number of workers needed for rice harvesting. The welfare implication of the tebasan system is that the rich (farmers and penebas) gain at the expense of the poor (laborers), which promotes unequal income distribution.

Table 8. Labor inputs for rice production per hectare by task, 1978 dry season.[a]

Activity	Large farmer hours/ha		Large farmer %	Small farmer hours/ha		Small farmer %	Total hours/ha		Total %
Land preparation:									
Family	111		22	309		67	179		36
Hired	398	[4]	78	153		33	315	[3]	64
Total	509		100	462		100	494		100
Transplanting:									
Family	23		16	55		36	34		23
Hired	121	[119]	84	96	[90]	64	112	[109]	77
Total	144		100	151		100	146		100
Weeding:									
Family	67		33	202		80	113		52
Hired	133	[81]	67	50	[21]	20	105	[61]	48
Total	200		100	252		100	218		100
Harvesting and threshing:									
Family	10		3	74		24	31		10
Hired	327	[327]	97	233	[225]	76	293	[292]	90
Total	337		100	307		100	324		100
Others:									
Family	53		88	88		99	65		93
Hired	7		12	1		1	5		7
Total	60		100	89		100	70		100
Total:									
Family	264		21	728		58	422		34
Hired	986	[531]	79	533	[336]	42	830	[465]	66
Total	1250		100	1261		100	1252		100

[a]Figures inside brackets are labor hours worked by ceblokan workers.

Table 9. Changes in labor input per hectare for rice production, 1968-71 to 1978.

Activity	1968-71 (h)	1978 (h)	% change: 1968-71 to 1978
Land preparation	420	494	18
Transplanting, weeding, and other crop care	316	434	37
Harvesting	324[a]	324	0
Total	1,060	1,252	18

[a]Assumes same labor requirements as for 1978, because no data on labor inputs in harvesting are available in the IPS Survey.

Table 10. Changes in costs[a] of manual and animal plowing and in inputs of manual labor and animal work.

Item	1968-71	1978	1978/1968-71
Nominal costs (Rp/day):			
Manual wage rate:			
Cash	100	350	3.5
Meal	84	200	2.3
Total	184	550	3.0
Animal rental rate	120	620	5.2
Paddy price (Rp/kg)	19.4	65.0	3.4
Real costs (RP/ha):[b]			
Manual wage rate	184	162	0.9
Animal rental rate	120	182	1.5
Input:			
Manual (labor-days/ha)[c]	52.5	61.8	1.2
Animal (animal days/ha)	16.4	9.2	0.6

[a]US$1 = Rp627.25 (as of January 1980). [b]Deflated by the paddy-price index. [c]Assume 8 hours work/day.

The tebasan system had not been introduced in the kampung we surveyed, nor had it in the neighboring kampungs and desas. However, the traditional bawon system has been replaced by the *ceblokan* system, also known as *kedokan* and *ngepak-nnedok*. That system, first adopted in 1954 by seven farmers in the kampung, limits participation in harvesting to workers who performed extra services (e.g. transplanting and weeding) without pay. The system reduces the real wage rate of harvesters because the same share of output (*bawon*) is paid for larger amount of work.

Although the system was introduced in the Subang area recently, it has been long practiced in other areas, especially in the northeast corner of West Java such as Kabupatens Cirebon and Majalenka. The system has been recorded in Java since the 19th century (Van den Kolff 1936). The regional distribution of the system was discussed by Hayami and Hafid (1979).

The ceblokan system replaced the bawon system very rapidly; by 1978, more than 95% of the farmers had adopted it. However, even before the introduction of the system not all the farmers practiced purely open bawon, a system that allowed everyone to participate in harvesting. Some made harvesting a communal activity allowing only the villagers of the same village to participate in harvesting. Another system placed a further limit on the maximum number allowed to participate. A more severe system was that which limited participants to those who received specific invitations from farmers.

The ceblokan system itself includes a spectrum of arrangements in terms of harvesters' share and obligatory works. Originally, ceblokan harvesters received a traditional share of one-sixth for the additional service of rice transplanting without pay (usually meals were served even though cash wages were not paid). Later, their share was reduced to one-seventh, and weeding and harrowing were added in the list of obligatory work required to establish the harvesting right. Changes in harvesting systems as summarized in Table 11 show successive shifts from more open and more generous arrangements to more restrictive and less generous arrangements. Underlying this process was the decline in the return to labor relative to the return to land and capital due to the growth of labor force against limited land resources.

By 1978 the shift from bawon to ceblokan was almost complete. The amounts of labor employed and wages earned under the ceblokan system became dominant in total hired employment and wage income of laborers. During the 1978 dry season, labor employed under the system was about 60% of the total hired-labor time and income from the ceblokan works was about 50% of the total wage earnings (Table 12).

Employer-employee relations

In the shifts from the more open and generous arrangements to the less open and less generous ones, large farmers usually took the lead and small farmers followed. As a result, the larger the farmers were, the less generous were their arrangements in the employment of harvesters (upper case of Table 13). On the other hand, arrangements with which landless workers and nearly landless farmers (those with landholdings less than 0.1 ha) were employed tended to be less generous than those for the medium-scale farmers (those with areas from 0.1 to 0.59 ha) (lower case of Table 13).

These data suggest the relations in which the rich (large farmers) employed the poor (landless workers and nearly landless farmers), whereas the middle class people (medium-scale farmers) employed people from among themselves. Such relations are confirmed by the matrix that relates employers to employees for different farm-size classes (Table 14). The data show that, while landless workers and nearly landless farmers with landholdings below 0.1 ha depended most heavily on large farms (0.6 ha or more) for their employment opportunities, medium-scale farmers (those with areas from 0.1 to 0.59 ha) found the largest employment opportunities in the farms of their own size classes. Therefore, the employment relations among

medium-scale farmers were, by nature, equivalent to labor exchange. In contrast, the patron-client relation characterized the employment of landless workers by large farmers.

Role of ceblokan

The ceblokan system can be considered an institutional innovation for the employer farmers to reduce the wage rate for harvesting to a level equal to the market wage rate. In earlier days, when labor was scarcer and rice yield was lower, the one-sixth share of output under the traditional bawon system might have been equivalent to the market wage rate close to the marginal product of harvesters' labor. However, as the labor supply became more abundant and rice yield increased, one-sixth of the output would have become substantially larger than the market wage rate.

Table 11. Changes in rice harvesting system (% of farmer adoptors).

Period	Bawon[a]				Ceblokan[b]					Total
	PO	OV	OM	LI	1/6(T)	1/7(T)	1/7(T+W)	1/7(H+T)	1/7(H+T+W)	
1978				4		72	19	1	4	100
1976-77				4	7	67	18	2	2	100
1974-75				7	15	67	10	1		100
1972-73				8	17	67	8			100
1970-71			2	10	33	51	4			100
1968-69	1	4	6	19	44	24	2			100
1966-67	3	10	8	27	52					100
1964-65	9	16	16	32	27					100
1962-63	16	34	33	17						100
1960-61	29	31	21	19						100
1950s	35	29	18	18						100

[a]*Bawon* system: PO = purely open, OV = open for villagers only, OM = open with maximum limit, LI = limited to invitees. [b]*Ceblokan* system: 1/6, 1/7 = harvester's share; T, W, H = obligatory works to establish the harvesting right (T = transplanting, W = weeding, H = harrowing).

Table 12. Average hired labor time and wage earning per household employed in rice production, 1978 dry season.[a]

	Labor-hours employed		Labor-days employed		Wage earned[b]	
	No.	%	No.	%	Rp	%
Land preparation						
Daily wage[c]	89.3	35	12.3	32	6,542	44
Ceblokan	2.9	1	0.6	2	86	1
Total	92.2	36	12.9	34	6,628	45
Transplanting						
Ceblokan	31.7	13	5.9	15	670	4
Weeding						
Daily wage	12.7	5	2.3	6	650	4
Ceblokan	23.1	9	4.4	11	566	4
Total	35.8	14	6.7	17	1,216	8
Harvesting and threshing						
Ceblokan	89.2	35	12.2	32	6,260	42
Bawon	1.5	1	0.2	1	83	0
Total	90.7	36	12.4	33	6,343	42
Others						
Daily wage	2.6	1	0.5	1	104	1
Total						
Daily wage	104.6	41	15.1	39	7,296	49
Ceblokan	146.9	58	23.1	60	7,582	51
Bawon	1.5	1	0.2	1	83	0.5
Total	253.0	100	38.4	100	14,961	100

[a]Av for 54 small farmer households and 23 landless worker households. [b]Includes meal. US$1 = Rp627.25.
[c]Includes wage payments according to area-rate contracts.

Table 13. Distribution of employers and employees in rice harvesting by type of contract and size of operational holding, 1978 dry season.[a]

Farm-size class (ha)		Family only	Bawon (1/7)	Ceblokan (1/7)	Ceblokan 1/7 (T+W) or 1/7 (T+H)	Ceblokan 1/7 (T+W+H)	Total
Employer							
Below 0.1	(no.)	6		11			17
	(%)	35		65			100
0.1 to 0.29	(no.)	1	2	34	4		41
	(%)	2	5	83	10		100
0.3 to 0.59	(no.)			10	6	1	17
	(%)			59	35	6	100
0.6 and above	(no.)			1	6	1	8
	(%)			13	74	13	100
Employee							
0	(no.)			7	18		25
	(%)			28	72		100
0.01 to 0.1	(no.)			6	10	1	17
	(%)			35	59	6	100
0.1 to 0.29	(no.)		1	22	9	4	36
	(%)		3	61	25	11	100
0.3 to 0.59	(no.)			10	1		11
	(%)			91	9		100

[a] 1/7 = harvesters' share; T, W ,H, = obligatory works to establish the harvesting right (T = transplanting, W = weeding, and H = harrowing).

Table 14. Matrix of employer-employee relations in rice harvesting in terms of paddy area contracted (ha), 1978 dry season.[a]

Employer \ Employee	0 ha (landless)	0.01 to 0.1 ha	0.1 to 0.29 ha	0.30 to 0.59 ha	Outside kampung
Below 0.1 ha	0.13	0.71	0.24	0.02	0
	(2)	(14)	(3)	(18)	(0)
0.1 to 0.29 ha	1.31	1.41	3.26	0.62	0.35
	(20)	(28)	(37)	(31)	(23)
0.3 to 0.59 ha	1.56	1.18	2.50	0.88	0.72
	(24)	(24)	(29)	(43)	(46)
0.6 ha and above	2.96	1.54	2.15	0.36	0.48
	(46)	(31)	(25)	(18)	(31)
Outside kampung	0.52	0.13	0.52	0.14	-
	(8)	(3)	(6)	(7)	
Total	6.48	4.97	8.67	2.02	1.55
	(100)	(100)	(100)	(100)	(100)

[a] Figures in parentheses are percentages.

In such a situation, farmers could increase their income by replacing the bawon system by the labor of daily wage workers. However, the cost arising from resistance to a change in the long-established custom in the village community would have been large. Another possibility was to reduce harvesters' share in the bawon system, which would have been easier and was, in fact, practiced. However, the reduction of the share rate, too, would not have been so consistent with the basic moral principles in the village such as mutual help and income sharing. In terms of the patron-client relations in the village community characterized by the multistranded tie, it would have involved less social frictions to add some additional obligations while maintaining the same share rate.

Table 15. Imputation of wage rates for harvesting works.

Working hours (no.) of ceblokan labor (h/ha):		
(1) Harvesting and threshing		324
(2) Transplanting		111
(3) Weeding		147
Actual share of ceblokan harvester:		
Quantity of paddy (kg/ha)		421
(4) Imputed value of paddy (Rp/ha)[a]		27,365
Imputed wage rate (Rp/h):		
(A) Bawon 1/7	(4)/(1)	84
(B) Ceblokan 1/7 (T)	(4)/[(1)+0.5(2)][b]	72
(C) Ceblokan 1/7 (T+W)	(4)/[(1)+0.5(2)+0.5(3)][b]	60
Market wage rate (Rp/h)		60

[a] Use Rp65/kg for the market price of paddy. US$1=Rp627.25. [b] Assume that the cost of meals served for transplanting and harvesting was one half the market wage rate for those tasks.

Thus, we hypothesize that the ceblokan system was an institutional innovation that entailed the least cost to reduce harvesters' share of output in line with the market wage rate. The same role was played by the *gama* system in the Philippines (Kikuchi and Hayami 1980).

As a test, we imputed the wage rates for alternative harvesting arrangements. In the calculation, meals served for obligatory works such as transplanting and weeding were valued as one half the market wage rate per day (meals were not served for harvesting works). Data in Table 15 indicate that the harvesters' share under the bawon system with the one-seventh share was 40% higher than the market wage rate. By shifting to the ceblokan system with the obligation of transplanting alone, the gap between the harvesters' share and the market wage rate was reduced to 12%. By further adding weeding to the obligation, harvesters' share was equalized to the market wage rate. Such results are highly consistent with our hypothesis.

Another factor underlying the diffusion of ceblokan might be that it helps strengthen the patron-client relations between employers and employees by giving an exclusive right of harvesting to specific laborers. With the tightening of the patron-client bond the patron farmers can economize on the labor enforcement cost to supervise the performance of laborers. From the employees' side, ceblokan might also be preferred because of the stronger patron-client bond as it reduces risks in finding employment.

The shift from bawon to ceblokan represents a shift from mutual help and income sharing within a whole village community to the patron-client and the reciprocity relations in smaller groups. However, the shift does not mean that some members of the community were excluded from employment opportunities. All members were inlaid into the employment matrix in the community, although the employer-employee relations were distinctly different among classes -- the labor-exchange type among medium-class farmers and the patron-client type between large farmers and landless or nearly landless people.

Even the disadvantaged members were included. For example, two large farmers gave the least generous arrangements of the ceblokan system with the obligation of transplanting, weeding, and harrowing. However, widows were exempted from harrowing because land preparation was considered male's task. This example suggests that the community moral principle of mutual help and income sharing has not entirely lost its power and that it entails cost to behave in contradiction with the principle. Ceblokan has not contributed to the development of labor-saving technology. The use of the ani-ani was optional for the harvesters but in the 1978 dry season harvest, almost all fields were harvested by ani-ani.

CHANGES IN INCOME DISTRIBUTION

A dismal picture of the economy of a rural community in West Java has been drawn in previous sections.

- income and asset distributions are highly skewed even though the average income and the average size of landholding are small;
- population pressure had long reached its limit and population growth decelerated but labor force has continued to increase;
- technology has been stagnant because modern varieties effective in the environmental condition of this specific location have not been available;
- fertilizer application has increased not because of new technology but because of subsidized low fertilizer prices;

- gains in rice yields have not been significant;
- the increase in labor force against limited land resources and stagnated technology resulted in a decrease in economic return to labor;
- the real wage rate for land preparation has declined, inducing the substitution of animal plowing and harrowing by hand hoeing; and
- the real wage rate for harvesting works has decreased because of institutional change in the form of the shift from the bawon to the ceblokan system.

The whole process suggests that income distribution has become more skewed. Data to identify changes over time in the size distributions of income are not available. Therefore, we make inferences based on changes in the shares of income from rice production.

Factor shares of rice output

Changes in the average factor shares of rice output per hectare from 1968-71 to 1978 were estimated (Table 16). The average yield per hectare increased by a little more than 10%. Both the payment for hired labor and the imputed cost of family labor increased very slightly (less than 5%). Operators' surplus (residual) recorded a major increase in the case of owner farmers. In the case of tenant farmers, operators' surplus was almost zero and land rent paid to landlords was equivalent to owner farmers' surplus. These results show clearly that the operators' surplus of owner farmers consisted mainly of the return to their land. Thus, the major gain in owner farmers' surplus implies an increase in the economic rent of land. Altogether, the relative share of labor declined and the relative share of land increased.

What do such estimates imply on the income distribution between farmers and landless laborers? Table 17 attempts to show how the income (value added) from rice production per hectare was distributed between farmers and hired laborers. Farmers' income consisted of operator's surplus and returns to family labor and capital. Their total income in paddy terms increased by 25%, from 1968-71 to 1978, whereas laborers' income increased by only 4%. The wage earnings of laborers from preharvest activities increased, mainly because of larger employment opportunities in land preparation due to the substitution of hand hoeing for animal plowing. But the increase was compensated for, to a large extent, by the decline in the earnings from harvest and post-harvest employment, primarily due to decline in harvesters' share rate. On the other hand, farmers' income increased significantly, primarily due to the increase in return to land in the form of operators' surplus. As a result, farmers' income share increased and laborers' share declined. The data clearly imply that the income distribution became more skewed.

It is most probable that the size distribution of income between farmers and laborers became more skewed than the data in Table 17 show. From 1968-71 to 1978 the number of landless and nearly

Table 16. Changes in factor payments and factor shares in rice production per hectare, 1968-71 to 1978.

	Factor payment (kg/ha)			Factor share (%)		
	1968-71[a]	1978[b]		1978-71	1978	
	Owner	Owner[c]	Tenant[d]	Owner	Owner	Tenant
Rice output	2,600	2,942	3,080	100.0	100.0	100.0
Factor payment[e]						
Current input[f]	380	328	356	14.6	11.1	11.6
Capital[g]	101	90	41	3.9	3.9	1.3
Labor	1,257	1,301	1,341	48.4	44.2	43.5
(Family)	(427)[h]	(438)	(476)	(16.4)	(14.9)	(15.4)
(Hired)	(830)[h]	(863)	(865)	(31.9)	(29.3)	(28.1)
Land	0	0	1,262	0	0	41.0
Operator's surplus	862	1,223	80	33.1	41.6	2.6

[a] Based on the IPS Survey for Phase I to V. [b] Based on our survey. [c] Av of 74 owner farmers cultivating 20.4 ha. [d] Av of 9 tenant operators cultivating 1.8 ha. [e] Factor payments converted to paddy equivalents by the factor-output price ratios. [f] Seeds, fertilizers, chemicals, and irrigation fee. [g] Animal rental for land preparation. [h] Assume the same composition of family and hired labor as for 1978.

landless households must have increased faster than the number of farmers. Therefore, the share of income per landless household would have declined to a greater extent than the share of income per hectare. It is highly likely that the per-household or per-capital income from rice production for the landless and nearly landless households has declined in absolute terms, even though the rice income per hectare has increased slightly.

Economic base for greater inequity

The dismal process of growing poverty and inequity in the kampung approximates the world predicted by classical economists like Ricardo (1951). *As the growth of population presses hard on limited land resources under constant technology, cultivation frontiers are expanded to more marginal land and greater amounts of labor applied per unit of cultivated land; the cost of food production increases and food prices rise; in the long end, laborers' income will decrease to a subsistence minimum barely sufficient to maintain stationary population and all the surplus will be captured by landlords as increased land rent.* This is exactly what has occurred in the kampung.

The decline in the income share of laborers induced institutional change such as the shift from the bawon to the ceblokan system. Such process should have involved struggles among different classes in the community. The process might have been facilitated, to a significant extent, by a relative decline in the bargaining position of the landless class due to the major change in political environment in Indonesia after 1965.

However, because the underlying basic economic factor was the decreasing return to labor relative to land, it would have been difficult to stop the Ricardian process in the absence of effective policies to raise the relative productivity of labor by improving land infrastructure and developing land-saving and labor-using technology. Modern semidwarf varieties were tried but not accepted because they did not represent better technology in the area in the absence of adequate adaptive research and development. Both the data and the economic logic suggest that, contrary to the pervasive presumption, growing inequity resulted not from the introduction of modern technology but from the stagnation of technology.

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Table 17. Changes in shares of income from rice production per hectare, 1968-71 to 1978.[a]

	Income in paddy (kg/ha)		Income share (%)	
	1968-71	1978	1968-71	1978
Value added[b]	2,220	2,614	100.0	100.0
Farmer				
Family labor	427	438	19.2	16.8
Capital	101	90	4.6	3.4
Operator's surplus	862	1,223	38.8	46.8
Total	1,390	1,751	62.6	67.0
Hired laborer				
Preharvest employment	397	443	17.9	16.9
Harvest and postharvest employment	433	420	19.5	16.1
Total	830	863	37.4	33.0

[a] Data rearranged from Table 16. [b] Output value minus current input cost.

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