

# CHANGES IN RICE HARVESTING SYSTEMS IN THE PHILIPPINES AND INDONESIA: VILLAGE STRUCTURE AND CHOICE OF CONTRACTUAL ARRANGEMENTS

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**T**YPICALLY, the labor required for harvesting and threshing rice in Asia is nearly 30 per cent of total labor and 50 per cent of total hired labor in rice production. As a result, harvesting and threshing represent major employment opportunities for rural landless workers and small farmers. Therefore, choice of contractual arrangements with respect to the use of labor for rice harvesting is a critical determinant of the income and well-beings of the rural poor.

Facing to a rapid population increase and technological changes in rice farming, traditional rice harvesting systems have been reported to experience major changes in many areas in South and Southeast Asia. For example, in Java, the traditional *bawon* system in which all community members can participate in rice harvesting with *ani-ani* ("hand knives") and receive a certain share of output has been replaced by the *tebasan* system in which farmers sell standing crops to middlemen who employ a crew of harvesting workers with sickles at fixed wage rate [5] [6]. Similarly, in the Philippines, the traditional *hununan* system which is similar to the *bawon* system in Java has been replaced by the *gama* system in which employment for harvesting is limited to the workers who do weeding of the field without receiving wages [1]. In Bangladesh, a shift from the traditional output-sharing contracts among villagers to the fixed daily-wage contracts with migrant workers has been reported in a number of villages [4]. Thus, the traditional rice harvesting systems of output-sharing have been replaced by new systems in many parts of South and Southeast Asia.

These changes in rice harvesting systems are said to be induced by growing population pressure against limited land resources and technological changes in rice farming. In earlier days, when the rice yield was low and static and labor was scarcer, the traditional share of output for harvesters (typically one-sixth) would have been fairly close to the marginal productivity of labor for harvesting work. However, as the labor supply became more abundant due to population increase and/or land productivity increased due to technological

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changes, the traditional share could have become substantially higher than the marginal productivity of labor. The gap thus created between the harvesters' share and their marginal productivity would have induced new harvesting systems to restore a new equilibrium.

The new equilibrium, however, could be restored in many different ways. Since the seminal study on share tenancy by Cheung [2] [3], it has been understood that there exists a multiple of contractual arrangements to achieve a social optimum. As shown in the examples above, the changes in harvesting systems actually take different forms in different areas in Asia. The choice of a contractual arrangement among alternatives would heavily depend on the social and institutional environments of the village community.

In this paper, we compare changes in harvesting systems in four villages in Southeast Asia and try to identify the factors that induced the changes.

### I. VILLAGES STUDIED

Two villages in the Philippines and two in Indonesia were selected for our study.<sup>1</sup> The Philippine villages (Village A and Village B) are located in Laguna Province in the southern edge of the Central Luzon plain and the Indonesian villages (Village C and Village D) are located in Subang Regency in West Java (Figure 1). These villages are located in rice monoculture area characterized by rice double-cropping in well-irrigated paddy fields. All of them are relatively self-contained and not exposed directly to urban influence but not too isolated either.

Although they are similar in the degree of urban influence, commercialization, and off-farm employment opportunity, the Philippine villages are highly different from the Indonesian villages in other characteristics such as land tenure and man/land ratio. The Philippine villages are tenant villages where most or all farmers are leaseholders and all paddy fields are owned by absentee landowners, while the Indonesian villages are basically owner-operator villages where most of paddy fields are owned by cultivators themselves or landowners living in the same villages (Table I). Typical of rice growing areas in Java, the Indonesian villages have higher man/land ratios than the Philippine villages, though the ratios seem to be increasing rapidly in the Philippine villages too (Table II). The four villages can be classified into two groups in terms of history of settlement and village structure. Village A in Laguna and Village C in Subang are relatively older villages settled by migrants from neighboring villages in the latter half of the nineteenth century. The settlement and subsequent growth of the villages proceeded gradually mainly based on kinship relationship. Although class stratification among villagers has been in progress to a certain extent due to population increase, the village structure is relatively homogeneous and cohesive.

In contrast, Village B and Village D are new villages settled only after the 1920s. The settlement began late because it was more difficult to open land

<sup>1</sup> For detailed description of the villages studied, see Kikuchi et al. [9] [10] [11] [12].

Fig. 1. Location of Villages Studied

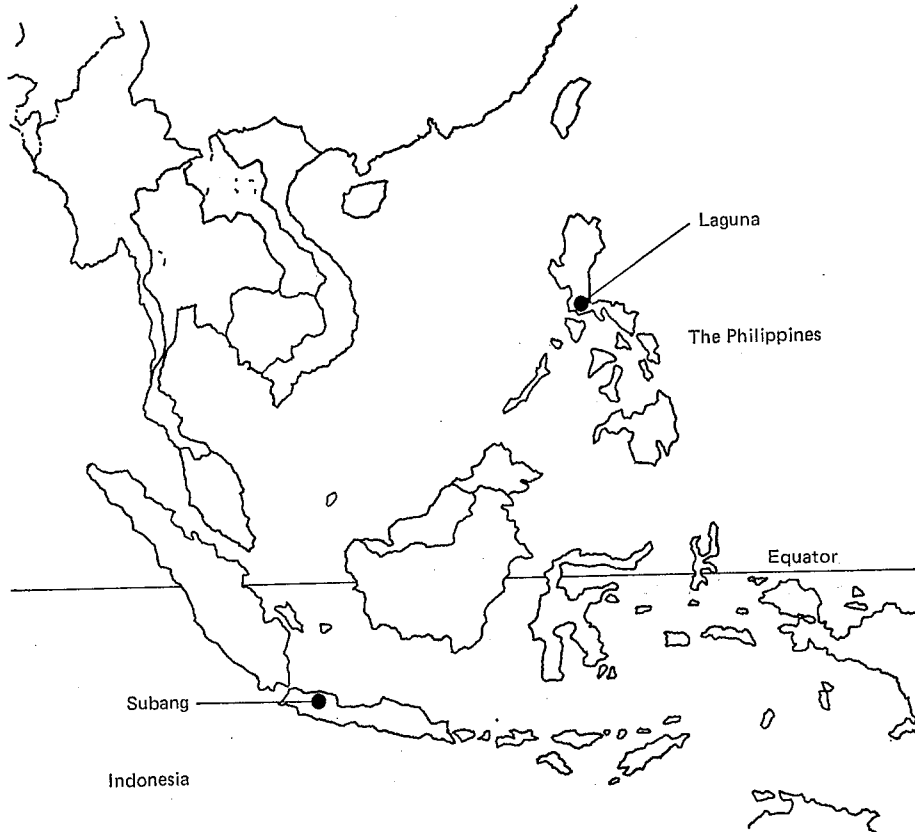


TABLE I  
DISTRIBUTION OF PADDY FIELDS OPERATED BY VILLAGERS BY TENURE STATUS  
IN SAMPLE VILLAGES

	Laguna, Philippines				Subang, Indonesia			
	Village A (1976)		Village B (1977)		Village C (1979)		Village D (1979)	
	Ha	%	Ha	%	Ha	%	Ha	%
Owned	2	2	0	0	22.0	88	37.4	56
Rented:								
Share tenancy	30	27	0	0	1.6	7	22.9	34
Leasehold tenancy	67	63	186	89	0.3	1	1.4	2
Pawned	0	0	0	0	0.6	2	5.2	8
Sub-rented	9	8	10	5	0.4	2	0	0
Total	108	100	195	100	24.9	100	66.4	100

and install irrigation infrastructure in these villages. Village B was opened as a hacienda barrio with tenants recruited from many different places after the hacienda owners had cleared wild land and built irrigation systems. In the

TABLE II  
POPULATION, CULTIVATED LAND AREA, AND MAN/LAND RATIO  
IN SAMPLE VILLAGES

	Population (Person)	Land Area* (Ha)	Man/Land Ratio (Person/Ha)
Laguna, Philippines			
Village A			
1900	94	52	1.8
1950	281	104	2.7
1970	518	107	4.8
1976	644	108	6.0
Village B			
1977	747	195	3.8
Subang, Indonesia			
Village C			
1900	67	13	5.2
1940	220	25	8.8
1970	387	25	15.5
1978	419	25	16.8
Village D			
1979	774	66	11.7

\* Paddy field area.

course of years, two large tenant farms with eighty hectares and forty-one hectares of cultivating size, have emerged in the village either through transfer of landowner direct-administered areas to the tenants or through purchasing cultivating right from peasants. In the case of Village D, initial settlers opened no man's land and practiced very extensive farming under a rainfed condition. Because the operational holding of about two hectares was required for family's subsistence under a rainfed condition, relatively large-scale holdings in the Javanese standard was established. Corresponding to the intensification of rice farming due to irrigation developments in the 1950s and the late 1960s, a large number of migrants from different locations flowed into this village. At the same time, a few old villagers have accumulated land through money-lending operations. Thus these two are typically polarized villages and their village structure is heterogeneous and less cohesive than the other.

These differences in village structure are, to a certain extent, reflected in the size distribution of paddy fields in the villages (Table III). Gini coefficients are very high for Village B and Village D comparing to those for Village A and Village C.

## II. CHANGES IN RICE FARMING

All villages except Village C in Subang recorded significant increases in rice yield per hectare mainly due to the introduction of modern varieties (MV) and increased use of fertilizers (Table IV). Because the MVs introduced in Village C were highly susceptible to insect and pest in that locality, many farmers who

TABLE III  
SIZE DISTRIBUTION OF PADDY FIELDS IN SAMPLE VILLAGES

	Number of Households		Area		Number of Households		Area	
	No.	%	Ha	%	No.	%	Ha	%
Laguna, Philippines*	Village A (1976)				Village B (1977)			
5 ha and above	2	2	14	13	2	2	121	62
3-5 ha	11	10	41	38	5	4	18	9
2-3 ha	8	7	19	17	11	9	25	13
1-2 ha	20	18	28	26	15	12	20	10
Below 1 ha	13	12	6	6	22	18	11	6
0	55	51	0	0	69	55	0	0
Total	109	100	108	100	124	100	195	100
Average								
per households (ha)	1.0				1.6			
per farm (ha)	2.0				3.5			
Gini coefficient	0.69				0.87			
Subang, Indonesia†	Village C (1978)				Village D (1979)			
3 ha and above	0	0	0	0	2	1	28.0	43
2-3 ha	0	0	0	0	5	3	10.1	16
1-2 ha	5	5	6.2	25	10	5	12.8	20
0.5-1 ha	8	7	5.5	22	13	7	8.0	12
Below 0.5 ha	72	65	13.2	53	23	12	5.5	9
0	25	23	0	0	138	72	0	0
Total	110	100	24.9	100	191	100	64.4	100
Average								
per household (ha)	0.23				0.34			
per owner (ha)	0.29				1.21			
Gini coefficient	0.48				0.89			

\* Size distribution of operational holdings among villagers.

† Size distribution of landownership among villagers.

had tried them shifted back to traditional varieties resulting in almost stagnant rice yield per hectare.

Because of an increase in labor force on limited land area with the stagnant technology, the real wage rates in Village C declined significantly (Table V). In contrast, the declining trend in real wage rates due to population increase was almost or more than cancelled by upward shifts in production functions due to the introduction of MVs in other villages. The increase in real wage rates is most clear in Village D where the irrigation development in the late 1960s that enabled farmers double-cropping of rice increased labor demand in rice farming together with the MV introduction.

### III. CHANGES IN RICE HARVESTING SYSTEMS

As in other areas in Asia, rice harvesting in the sample villages was traditionally

TABLE IV  
CHANGES IN RICE YIELD PER HECTARE AND MV ADOPTION  
IN SAMPLE VILLAGES

	Rice Yield (Ton/Ha)			MV Adoption (%)
	Wet	Dry	Total	
Laguna, Philippines				
Village A				
1966	2.4	3.1	5.5	0
1976	3.2 <sup>a</sup>	3.6 <sup>b</sup>	6.8	100
Village B				
1967	2.0	2.8	4.8	0
1977	2.8 <sup>c</sup>	3.9	6.7	100
Subang, Indonesia				
Village C				
1968 <sup>d</sup>		2.6 <sup>e</sup>	5.2	11
1978	2.6	2.9	5.5	14
Village D				
1969 <sup>f</sup>	2.5	2.1	4.6	7
1979	3.9	2.9	6.8	100

<sup>a</sup> 1974-77 average.

<sup>b</sup> 1974-76 average.

<sup>c</sup> 1976 wet.

<sup>d</sup> 1968-71 average.

<sup>e</sup> Average of wet and dry.

<sup>f</sup> 1969-71 average.

TABLE V  
CHANGES IN WAGE RATES IN SAMPLE VILLAGES

	Nominal Wage Rate per Day		Paddy Price per Kilogram (3)	Real Wage Rate per Day	
	Land Preparation (1)	Trans-planting (2)		Land Preparation (1)/(3)	Trans-planting (2)/(3)
Laguna, Philippines					
Village A					
1966	P 4.5	P 3.4	P 0.40	11.3 kg	8.5 kg
1976	P 13.0	P 8.4	P 1.02	12.7 kg	8.2 kg
(% change)	(189)	(147)	(155)	(12)	(-4)
Village B					
1966	P 4.5	P 3.4	P 0.40	11.3 kg	8.5 kg
1977	P 15.0	P 9.0	P 1.09	13.8 kg	8.3 kg
(% change)	(233)	(165)	(173)	(22)	(-2)
Subang, Indonesia					
Village C					
1968-71	Rp. 185	Rp. 100	Rp. 19.4	9.5 kg	5.2 kg
1978	Rp. 550	Rp. 300	Rp. 65.0	8.5 kg	4.6 kg
(% change)	(197)	(200)	(235)	(-11)	(-12)
Village D					
1968-71	Rp. 153	Rp. 90	Rp. 19.3	7.9 kg	4.7 kg
1979	Rp. 775	Rp. 325	Rp. 67.5	11.5 kg	4.8 kg
(% change)	(407)	(261)	(250)	(46)	(2)

TABLE VI  
AREA HARVESTED BY TYPE OF SYSTEM IN SAMPLE VILLAGES

	Laguna, Philippines				Subang, Indonesia			
	Village A (1976 Wet)		Village B (1977 Dry)		Village C (1978 Dry)		Village D (1978/79 Wet)	
	Ha	%	Ha	%	Ha	%	Ha	%
<i>Hunusan/bawon</i>	16	15	162	83	1	4	64	97
<i>Gama/ceblokan</i>	90	83	27	14	22	88	0	0
Family	2	2	6	3	2	8	2	3
Total	108	100	195	100	25	100	66	100

TABLE VII  
DIFFUSION OF *Gama* AND *Ceblokan* SYSTEMS IN SAMPLE  
VILLAGES OF FARMERS ADOPTED

	Laguna, Philippines		Subang, Indonesia
	Village A	Village B	Village C
Before 1960	0	0	0
1960-64	7	0	9
1965-69	31	13	61
1970-74	64	26	91
After 1975	83	36	96

communal works in which all community members could participate without any restriction and received a certain share of output as wage in kind. The traditional system was called the *hunusan* system in Laguna and the *bawon* system in Subang.

As shown in Table VI, while the traditional *hunusan* or *bawon* system is still practiced widely in Village B in Laguna and Village D in Subang, it is no longer a major system in Village A and Village C. A new system called *gama* system has replaced the old *hunusan* system in Village A in Laguna. *Gama*, as explained earlier, is the system in which harvesters are limited to those who do weeding without receiving wage. In other words, harvesters are required to perform weeding as obligatory work in order to establish the right to harvest rice on a certain field. This *gama* system is adopted in Village B too but the percentage of area harvested under this system is minor comparing to old *hunusan* system.

In Village C in Subang, a new system called *ceblokan* has replaced old *bawon* system. The *ceblokan* system is essentially same to *gama* system, in the sense that harvesters have to perform some obligatory works such as transplanting and weeding to establish the right to harvest rice on the field. This *ceblokan* system is widely adopted not only in Village C but also in neighboring villages.<sup>2</sup>

Both the *gama* system in Village A and the *ceblokan* system in Village C have diffused since the early 1960s (Table VII). However, significant changes had occurred in Village C before the *ceblokan* system was introduced. Even

<sup>2</sup> As for geographical distribution of harvesting system in Java, see Hayami and Hafid [7].

TABLE VIII  
CHANGES IN RICE HARVESTING SYSTEM (PERCENTAGE OF FARMER ADOPTERS)  
IN VILLAGE C, SUBANG, INDONESIA

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

\* *Bawon* system: PO—purely open, OV—open for villagers only, OM—open with maximum limit, LI—limited to invitees.

† *Ceblokan* system: 1/6, 1/7—harvesters' share; T, W, H—obligatory works to establish the harvesting right (T—transplanting, W—weeding, H—harrowing).

before the introduction, not all the farmers in Village C had practiced "purely open" *bawon* (PO) in the sense that everyone was allowed to participate in harvesting. The system nearest to the traditional "purely open" *bawon* harvesting was the case in which harvesting was open only to villagers in the same village (OV). Another system placed a further limit on the maximum number allowed to participate (OM). A more severe restriction was involved in the case that participants were limited to those who received specific invitations from farmers (LI). Farmers in Village C had gradually shifted from more open *bawon* to more restricted ones until the *ceblokan* was introduced (Table VIII). Likewise, the *ceblokan* system itself includes a spectrum of arrangements in terms of harvesters' share and obligatory works. Originally, *ceblokan* harvesters received traditional share of one-sixth for harvesting works with an 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 works required to establish the harvesting right. Changes in harvesting systems in Village C where the rice technology has been stagnant show successive shifts from more open and more generous arrangements to more restrictive and less generous ones. Underlying this process would have been the decline in the return to labor relative to the return to land due to the growth of labor force against limited land resources.

The adoption of the *gama* system and the *ceblokan* system has the effect of reducing the real wage rate of harvesters because the same share of output (*hurus* and *bawon*) is paid for larger amount of work. Both systems can be considered as an institutional innovation for employer farmers to reduce the



TABLE IX  
NUMBER OF FARMERS BY LEVEL OF HARVESTERS'  
SHARE ADOPTED IN VILLAGE B, LAGUNA,  
PHILIPPINES (1977 DRY)

Harvesters' Share (Dry, Wet)	Number of Farmers Adopted	
	No.	%
(1/6, 1/5)	1	2
(1/7, 1/6)	17	31
(1/7, 1/7)	14	35
(1/8, 1/7)	23	42
Total	55	100

wage rates for harvesting to a level equal to market wage rates. In earlier days, when labor was scarcer and the rice yield was lower, the one-sixth of output under the traditional *hunusan* and *bawon* systems might have been equivalent to the market wage rate which was close to the marginal product of harvesters' labor. However, as the rice yield increased and the labor supply became more abundant, one-sixth of output would have become substantially larger than the market wage rate. The gap emerged between one-sixth of output and the market wage rate can be filled up by adding obligatory works such as transplanting and weeding without pay under the *gama* or *ceblokan* system.

However, the gap can be filled up by reducing harvesters' share from a traditional to a lower level. This was actually practiced by farmers in Village B under the *hunusan* system and in Village D under the *bawon* system. The traditional output-sharing rates for harvesters in Village B were one-sixth for dry season and one-fifth for wet season. In 1975, the two large tenant farmers reduced the sharing rates into one-eighth for dry season and one-seventh for wet season. The reduction of harvesters' share by the large farmers was followed by small farmers as shown in Table IX.

Similarly, the traditional harvesters' share of one-fifth under the *bawon* system in Village D has been reduced in the course of years (Table X). It is interesting to observe that some of the farmers in this village tried to introduce the *ceblokan* system in the early 1960s, at about the same time when it was initially introduced to Village C. However, they soon shifted back to the *bawon* system.

#### IV. INDUCEMENTS TO THE CHANGES IN HARVESTING SYSTEMS

The basic motivation of the farmers in Village B and Village D in reducing the harvesters' share would be same to that of farmers in Village A and Village C in adopting the new *gama* and *ceblokan* systems. It was to restore equilibrium between the output share for harvesters and the marginal productivity of harvesters' labor, which had been disturbed by the growing population pressure and the increase in land productivity.

In order to test this hypothesis, imputed costs of *gama* and *hunusan* labor

TABLE X  
CHANGES IN RICE HARVESTING SYSTEM (PERCENTAGE OF FARMER  
ADOPTERS) IN VILLAGE D, SUBANG, INDONESIA

	<i>Bawon</i> (Purely Open)						<i>Ceblokan</i> * 1/5 (T)	Total
	1/5	1/6	1/7	1/8	1/9	1/10		
1940s	100							100
1950s	77	23						100
1960-64	57	30					13	100
1965-68	56	34	6	4				100
1969-70		53	23	17	7			100
1971-72		35	23	21	12	9		100
1973-74		23	23	27	11	16		100
1975-76		2	18	36	11	33		100
1977-78			16	32	9	43		100
1979			11	28	7	54		100

\* *Ceblokan* system with 1/5 *bawon* share and with transplanting and pulling seedlings as obligatory works.

TABLE XI  
COMPARISON BETWEEN IMPUTED COST OF *Gama/Hunusan* LABOR AND HARVESTERS'  
SHARE IN SAMPLE VILLAGES IN LAGUNA, PHILIPPINES

	Village A*		Village B†		
	<i>Hunusan</i>	<i>Gama</i>	Large Farmers <i>Hunusan</i>	Small Farmers <i>Hunusan</i>	<i>Gama</i>
Number of working days of <i>gama/hunusan</i> labor (days/ha)					
Weeding	—	21	—	—	19
Harvesting/threshing	34	34	31	30	35
Imputed cost of <i>gama/hunusan</i> labor (kg/ha)‡: (1)	367	531	341	330	525
Actual share of harvesters (kg/ha): (2)	504	504	343	444	528
(2)-(1)	137	-27	2	114	3

\* 1976 wet. Based on employers' data.

† 1977 dry. Based on employees' data.

‡ Imputed wage costs in paddy equivalent by using market rates for Village A, paddy price=P1.02/kg, wage rates=P8/day for weeding, =P11/day for harvesting; for Village B, paddy price=P1.09/kg, wage rates=P8/day for weeding, =P12/day for harvesting.

are computed based on market wage rates in comparison with actual output shares of harvesters for the Laguna villages (Table XI) and imputed wage rates of *ceblokan* and *bawon* labor are computed in comparison with market wage rates for the Subang villages (Table XII).<sup>3</sup>

The results for Village A show that the actual harvesters' share is about 30

<sup>3</sup> In the Laguna villages the market wage rates for harvesting works are available because some *gama* workers who get too many *gama* contracts to finish within a limited time span hire other workers for harvesting (and/or weeding) at daily wage rates, whereas no such a market rate for harvesting is available in the Subang villages.

TABLE XII  
 IMPUTED WAGE RATE FOR *Ceblokan/Bawon* LABOR  
 IN SAMPLE VILLAGES IN SUBANG, INDONESIA

	Village C <sup>a</sup>			Village D <sup>b</sup>	
	<i>Bawon</i> 1/7	<i>Ceblokan</i>		<i>Bawon</i>	
		1/7 (T)	1/7 (T+W)	1/7	1/10
Number of working hours of <i>ceblokan/bawon</i> labor (hours/ha)					
Transplanting	—	111	111	—	—
Weeding	—	—	147	—	—
Harvesting/threshing	324	324	324	258	258
Total: (1)	324	435	582	258	258
Actual share of harvesters (kg/ha): (2)	414 <sup>c</sup>	465 <sup>c</sup>	533 <sup>c</sup>	557 <sup>d</sup>	390 <sup>d</sup>
Imputed wage rate (kg/hour): (2)/(1)	1.28	1.07	0.92	2.16	1.51
Market wage rate (kg/hour)	0.92 <sup>e</sup>	0.92 <sup>e</sup>	0.92 <sup>e</sup>	1.52 <sup>f</sup>	1.52 <sup>f</sup>

<sup>a</sup> 1978 dry.

<sup>b</sup> 1978/79 wet.

<sup>c</sup> Harvesters' share (1/7 of 2.9 ton)+ meals served in transplanting/weeding.

<sup>d</sup> Assume 3.9 ton per hectare of paddy yield.

<sup>e</sup> Market wage rate for female works (transplanting and weeding) in paddy equivalent.

<sup>f</sup> Market wage rate for dry season land preparation in paddy equivalent.

per cent higher than the imputed cost of labor for the areas under the *hunusan* system, while the gap is reduced for the areas under the *gama* system. In Village B, the large farmers who adopt the *hunusan* system with reduced harvesters' share of one-eighth and small farmers who adopt the *gama* system succeed to equalize the actual harvesters' share to the imputed cost of labor. However, a large gap is still left for the areas under the *hunusan* system of the small farmers who are still in the process of adjusting their harvesters' share to the large farmers' level.

The results for the *ceblokan* case in Village C show that the imputed wage rate of *bawon* labor is 40 per cent higher than the market wage rate; by adding transplanting labor under the *ceblokan* system the gap is reduced to less than 20 per cent; by further adding weeding labor as an obligatory work the imputed wage rate is equalized to the market wage rate.<sup>4</sup> Similarly in Village D, the imputed wage rate more than 40 per cent higher than the market wage rate under the *bawon* system with one-seventh share is equalized to that by reducing the share to one-tenth.<sup>5</sup>

<sup>4</sup> In this village as in villages where traditional varieties are still planted, rice is harvested by female workers using *ani-ani*. The market wage rate used here for comparison is that for female labor tasks such as transplanting and weeding.

<sup>5</sup> In Village D, all rice harvesting is with sickles and it is no longer a female-only work. The market wage rate used here for comparison is of land preparation in dry season for which the wet season harvesting overlaps.

These results are highly consistent with our hypothesis that the harvesting systems have been induced to change by the motivation to reduce the gap between the shares of output for harvesters under the traditional systems and the marginal productivity of harvesters labor, which emerged and grew over time due to the population increase and/or the increase in land productivity after the introduction of MVs.

#### V. FACTORS AFFECTING THE DIRECTION OF CHANGES IN HARVESTING SYSTEMS

If the changes in harvesting systems in the four villages were actually induced by the same economic force, then, an interesting question to ask is why the changes took different forms in these villages, i.e., why the *gama* and *ceblolan* systems that added obligatory works without pay for harvesting works were introduced mainly in Village A and Village C, while the reduction of harvesters' share under the *hunusan* and *bawon* systems took place to reduce wage rates for harvesters in Village B and Village D. The answer should be sought in the difference in the social structures of the villages.

As explained in the previous section, Village A and Village C are relatively tightly-structured villages. The villages consist of relatively homogeneous villagers and kinship relationship within the villages is intense. The cohesion and the solidarity of the village community seem to be based on the norms and moral principles such as "mutual help" and "income sharing" which have evolved in the course of long village histories. In contrast, such norms and moral principles have not well developed yet in Villages B and D which have shorter histories of settlement with numerous immigrants of different origins. Moreover, the progressive polarization in these villages has fostered an antagonism between classes in the village communities. As a result, the identity of villagers as members of an organic community has not been established so strongly, and thus these villages are much more loosely structured than the other two.<sup>6</sup>

In the villages with tight structure where the traditional norms and moral principles are sanctioned by tradition and deeply ingrained in the mind of villagers, the costs of changing a long established custom in the community such as the one-sixth share for harvesting would not have been so small. Actually in the polarized village in Laguna, Village B, when the two large farmers announced the reduction of harvesters' share, some of their fields were destroyed during the night. This fact clearly suggests that such a change in village custom

<sup>6</sup> The difference in village structures is reflected in the systems of mutual help and insurance within the village. For instance, common reserves of paddy held by groups of neighboring households in preparation of sickness and other emergencies are found in Village C but are absent in Village D. All the loan cases, not only production loans but consumption loans, are stipulated to pay interests at a rate of 50 per cent per crop season in Village D, whereas the zero-interest loans are frequently found among relatives and friends in Village C. Similarly the zero-interest loans are commonly observed in Village A in contrast with in Village B where usurious loans for consumption purpose with the interest of 20 per cent per week are widely practiced.

entails certain costs. Under such a social environment, the *gama* and *ceblokan* systems which preserve the traditional share for harvesters are more congruent with the traditional systems, thereby involving less social frictions.

The *gama* and *ceblokan* systems also help 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 labor enforcement cost to supervise the performance of laborers. From employees' side, the *gama* or *ceblokan* system might also be preferred because of the stronger patron-client bond as it reduces risks in finding employment.

Thus, in villages like Village A and Village C where a high degree of social interaction based on community principles such as "mutual help" and "income sharing" prevails, the institutional adjustment in rice harvesting toward the *gama* or *ceblokan* system is conformable to the societies, thereby it entails the least cost in the adjustment to the societies.

However, the same institutional adjustment may not be of the least cost under different social structures. In villages like Village B and Village D, of which community structure is characterized by a low degree of cohesion and solidarity and where polarization of villagers is in progress resulting in sharp class conflicts, there would be little incentive to develop harvesting arrangements that limit participation to villagers only or specific group of villagers under the guise of patron-client relations. Under such social climate, the patron-client relationship is not an effective means to enforce labor contracts or to prevent shirking and cheating. In such a situation, it would be less costly for farmers to reduce directly the output shares for harvesters within the framework of traditional *hunusan* or *bawon* system. As is typical with Village B, the reduction of harvesters' share is usually initiated by larger farmers. In polarized villages like Village B, the large farmers can dare to change an established village custom based on their strong bargaining position in the communities. The weak personal tie among villagers in the loosely structured villages makes it easier for them to exercise their strong bargaining power.

The comparative study of changes in rice harvesting in the four villages, thus, sheds a light into the process by which the same economic forces can produce different institutional arrangements, depending on different social structures created through different histories.

#### REFERENCES

1. BARKER, R., and CORDOVA, V. G. "Labor Utilization in Rice Production," in *Economic Consequences of the New Rice Technology*, ed. R. Barker and Y. Hayami (Los Baños: International Rice Research Institute, 1978).
2. CHEUNG, S. N. S. "Private Property Rights and Sharecropping," *Journal of Political Economy*, Vol. 76, No. 6 (November/December 1968).
3. ————. "Transaction Costs, Risk Aversion, and the Choice of Contractual Arrangements," *Journal of Law and Economics*, Vol. 12 (April 1969).

4. CLAY, E. J. "Institutional Change and Agricultural Wages in Bangladesh," *Bangladesh Development Studies*, Vol. 4, No. 4 (October 1976).
5. COLLIER, W. L.; GUNAWAN WIRADI; and SOENTORO. "Recent Changes in Rice Harvesting Methods: Some Serious Social Implications," *Bulletin of Indonesian Economic Studies*, Vol. 9, No. 2 (July 1973).
6. COLLIER, W. L.; SOENTORO; GUNAWAN WIRADI; and MAKALI. "Agricultural Technology and Institutional Change in Java," *Food Research Institute Studies*, Vol. 13, No. 2 (1974).
7. HAYAMI, Y., and HAFID, A. "Rice Harvesting and Welfare in Rural Java," *Bulletin of Indonesian Economic Studies*, Vol. 15, No. 2 (July 1979).
8. HAYAMI, Y., and KIKUCHI, M. *Asian Village Economy at the Crossroads* (Tokyo: University of Tokyo Press, 1981).
9. KIKUCHI, M.; BAMBO, L. M.; and HAYAMI, Y. "Evolution of Land Tenure System in a Laguna Village," IRRI Agricultural Economics Department Paper No. 77-11 (Los Baños, 1977).
10. KIKUCHI, M.; FORTUNA, N.; BAMBO, L. M.; and HAYAMI, Y. "Polarization of a Laguna Village," IRRI Agricultural Economics Department Paper No. 78-01 (Los Baños, 1978).
11. KIKUCHI, M.; HAFID, A.; SALEH, C.; HARTOYO, S.; and HAYAMI, Y. "Class Differentiation, Land Employment, and Income Distribution in a West Java Village," *Developing Economies*, Vol. 18, No. 1 (March 1980).
12. KIKUCHI, M.; HAFID, A.; YUSUF, A.; and HAYAMI, Y. "Technological Progress and Income Distribution in a Rice Village in West Java," IRRI Research Paper Series No. 55 (1981).