

INSTITUTIONAL CHANGES IN A CENTRAL THAI VILLAGE

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I. INTRODUCTION

RECENT experiences in developing Asian countries have made it clear that technological innovations such as the development of high yielding varieties and construction of irrigation facilities are essential conditions for agricultural development. At the same time, it has been rather widely recognized that such technological innovations have brought remarkable changes in the traditional institutions existing in Asian village economies. This paper will discuss, first, the various aspects of the institutional changes in a rice-growing village in the central plain of Thailand observed during the writer's field survey conducted in December 1977 and January 1978. Secondly, this paper will attempt to explain major changes observed in labor allocation and the utilization of the water within the village community.

Two hamlets (*muban* Nos. 6 and 7) were surveyed in the village of Onkarak, Phothong District, Anthonng Province.¹ This village is located in the upper area of the Chao Phraya Delta stretching from Chainat to Ayutthaya, which has been the center of the rice cultivation since the Ayutthaya dynasty (1350–1767), and the village structure there, consisting mainly of owner-cultivators, has been maintained until quite recently. Uncultivated land has continued to exist in spite of a rather high population growth rate. This area was chosen for study in order to observe the institutional changes in a village constituting mainly owner-cultivators, based on the broad hypothesis that such a village might be the original form of contemporary village structures in Southeast Asia.

II. TECHNOLOGICAL AND INSTITUTIONAL CHANGES IN THE VILLAGE OF ONKARAK

A. *Preconditions for Technological Innovations*

After the end of World War II, the possibilities of increasing rice production in the Chao Phraya Delta were discussed internationally, with the aim of helping solve the postwar food crisis. In consequence, a World Bank loan of U.S. \$18 million was arranged in 1950 for the Greater Chao Phraya Irrigation Project. The project covered both the upper and lower delta areas and originally had

¹ As regards the surveyed village, please refer to [3, Chap. 1].

the following objectives: (1) to stabilize the yield of the wet season paddy crop with supplementary irrigation; (2) to increase the yield of wet season production; and (3) to increase the irrigated area by distributing the water of the Chao Phraya over as large an area as possible, while at the same time to limit flood damage in the high water season by the dispersion of floodwater.

The construction of the barrage at Chainat was completed in 1957, and by 1962 the main part of the trunk and lateral canal system for the conveyance and distribution of water had assumed its present form [1]. Onkarak is located on the natural levee along River Noi, and it was on this levee that canals were constructed. Construction of these canals was the essential condition for technological innovations in Onkarak. The development of Thailand's own high yielding rice varieties (RD varieties) should be emphasized as another precondition.

B. *Introduction and Widespread Development of Double Cropping of Rice*

The practice of double cropping in Onkarak was introduced in 1974 and has since developed on a rapid and widespread basis. Increases in paddy price were the main reason for adoption of double cropping. Double cropping of rice has forced a change in the crop calendar in the village. In the case of single cropping, farmers ploughed with buffaloes in the middle of May, at the beginning of the rainy season, sowed seeds in June, and then harvested in December or January of the following year. But after the widespread diffusion of double cropping, farmers sow seeds to make a seedbed in February, plough the paddy fields in March, transplant the seedlings in April, and harvest in July for the first crop. For the second crop, they plough in July just after harvesting of the first crop, transplant in August, and harvest in January.

Farmers now grow the new high yielding *suphan* variety as the dry season crop, whereas the traditional varieties are grown for the rainy season crop. The differences between the high yielding and the traditional varieties are summarized in Table I.

C. *Development of Tractor Rental Markets and Increase of Fertilizer Input*

Utilization of tractors for ploughing and harrowing has become widespread, while traditional methods using buffaloes have completely disappeared. This transition is one of the most important changes in cultivation techniques brought about by the introduction of double cropping. Of course, since all farmers do not have their own tractors, many farmers have to rent tractors together with the operators.

Thus, within the rural economy, we see the development of a rental market for tractors. This should be recognized as an institutional change induced by the technological innovations in rice production. Tractor rental costs range from 100 to 120 baht per rai including labor costs for tractor operators. The farmers in Onkarak, therefore, rarely employ family labor in ploughing and harrowing. For this reason we did not include this labor as part of the calculation of total labor input presented in Table I.

Furthermore, fertilizer input per rai has increased along with the introduction

TABLE I
DIFFERENCES BY VARIETY

Crop Yield, Inputs	Rice Varieties	High Yielding Varieties	Traditional Varieties
Crop yield and factor inputs:			
Yield (thang ^a /rai ^b)		69.5	34.1
Labor input (man-day/rai)		15.1	11.7
Fixed capital (tractor, baht/rai)		110	115
Fertilizer input (mixed fertilizer, kg/rai)		33	17
Factor shares for gross product (%):			
Labor ^c		24	38
Fixed capital		8	17
Current input ^d		8	9
Residuals		60	36
Sample households		21	19

^a One thang is equivalent to 10 kg of paddy.

^b One rai is equivalent to 0.16 hectare.

^c Estimated costs of family labor are as follows: Transplanting=33 baht/man-day; Harvesting=30 baht/man-day; and Other works=15 baht/man-day.

^d Fertilizer price: 50 kg=175 baht.

of high yielding rice varieties. Lastly, the introduction of transplanting techniques also represents a major change in cultivation method.

D. Disappearance of Mutual Labor Exchange and Increase in Hired Labor

Significant increases in hired labor in the process of producing rice is another important institutional change in the rural economy created by the adoption of double cropping. Formerly, farmers had exchanged family labor on the basis of reciprocity. This tradition, called *chuai kan*, was widely observed during the harvest season. Double cropping of rice has significantly increased labor demand throughout the year, especially at the peak periods of harvesting and transplanting, in response to which the practice of hiring labor developed. This practice has gradually spread throughout the rural economy, and the traditional mutual exchange of labor has disappeared. In hiring labor, the social relationship between the employer and the employee is limited solely to an economic contract, that is, the payment and receipt of wages.

Increased labor supply is related to the rapid population growth of 3 to 4 per cent per annum and is felt most keenly by small farmers. According to our survey, small farmers received a large part of their income from sources other than rice production on their own farms (Table II). This observation suggests that the small farmers play an important role in supplying labor.

The wage rate prevailing in the villages was found to be thirty to thirty-three baht per day during transplanting and harvesting periods when hired labor is most often used. This wage rate was almost equal to the daily wage received for non-rice activities, such as maintaining irrigation canals.

TABLE II
HOUSEHOLD INCOME BY FARM SIZE: OWNER CULTIVATOR

Cultivated Area	Sample Household	Average Household Income (Baht)	Income from Rice Cultivation (Baht)	Income from Elsewhere (Baht)
- 9 rai	5	10,698	3,600(34)	7,098(66)
10-19 rai	7	15,910	7,759(49)	8,151(51)
20-29 rai	7	25,565	12,439(49)	13,126(51)
30-39 rai	3	14,823	9,743(65)	5,080(35)
40-49 rai	3	35,480	26,880(76)	8,600(24)
More than 50 rai	2	71,915	70,715(98)	1,200(2)

Note: Figures in parentheses are the shares of income from rice cultivation and from elsewhere in average household income respectively by farm size.

In order to evaluate the characteristics of the emerging labor market in the agricultural sector, this wage rate should be compared with the marginal productivity of labor put in rice cultivation. Production functions were estimated independently for traditional and new varieties. It should be noted that for both traditional and new varieties no significant variances were observed with respect to fertilizer and tractor input per land among the sample farmers. This observation is reasonable when taking into consideration the fact that all the farmers surveyed had the same two production functions and faced the same prices for these inputs. Therefore it is quite natural that all farmers had the same level of factor inputs.

Meaningful variances were observed both for traditional and new varieties only in connection with labor input per land. This difference in labor input might be due to the fact that self-evaluation of family labor in households with high labor intensity was lower than that in households with low labor intensity. Such a differential in self-evaluation of family labor among farmers is a rather common phenomenon in rural areas of the world. If the mechanism generating variances in labor input works in this way, then the statistical relationships between rice output per land and labor input per land can be identified as the production functions (see Figure 1).

The estimation results² are as follows, where Y , L , and A denote output, labor input, and planted area respectively.
High yielding varieties (number of sample 21):

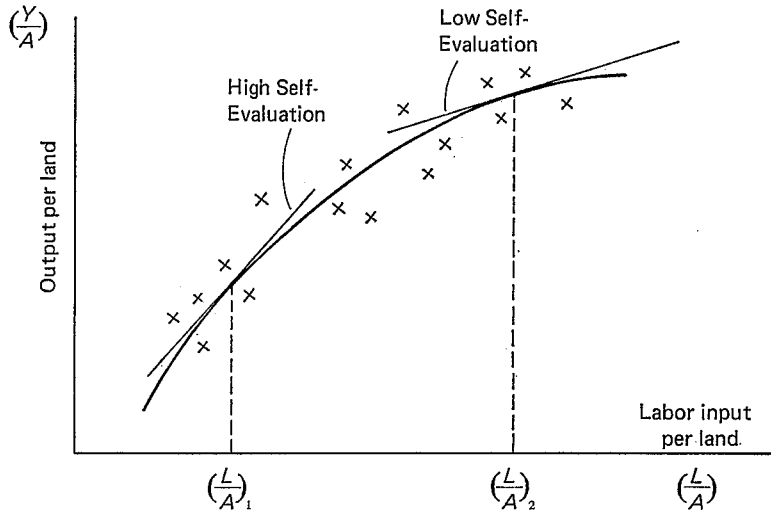
$$\ln \left(\frac{Y}{A} \right) = 3.90 + 0.218 \ln \left(\frac{L}{A} \right), \quad R^2 = 0.80; \\ (3.35)$$

Traditional varieties (number of sample 19):

$$\ln \left(\frac{Y}{A} \right) = 2.65 + 0.369 \ln \left(\frac{L}{A} \right), \quad R^2 = 0.49. \\ (1.98)$$

² Figures in parentheses are t -values.

Fig. 1. Identification of Production Function: Differentials in Self-Evaluation of Family Labor



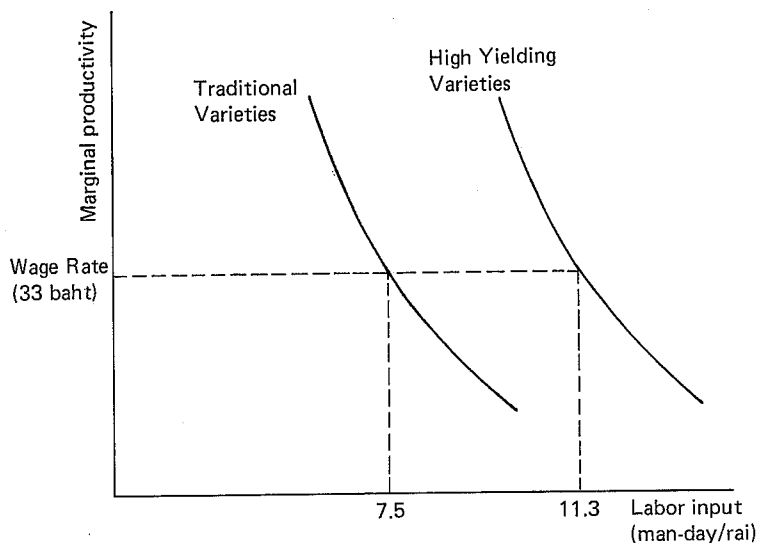
From these results, the marginal productivity of labor was calculated using the average productivity of total labor of those farming households who hire labor for both crop varieties. In both cases it was found to stand at thirty-three baht, which is equivalent to the wage rate prevailing within the rural economy. It can be said that the level of labor input is determined so as to equalize the marginal productivity of labor with the wage rate and that the system of hiring labor has developed on the basis of a market economy principle (Figure 2).

Thus the adoption of double cropping of rice together with an increasing labor supply has resulted in the disappearance of the traditional custom of mutual help, and the development of hired labor based on the principle of market economy. This should be strongly emphasized as an important institutional change induced by technological innovations within villages consisting mainly of owner-cultivators.

E. *Changes in Landownership and Farm Rent*

In Onkarak we observed a tendency to divide landownership into smaller plots through inheritance. The average size of landholdings per household was as follows: 20.3 rai in 1960; 24.1 rai in 1970; and 21.5 rai in 1977/78. Since 1970 there has been a marked decreasing trend in farm size. Out of the total surveyed households, the number of households which borrowed land from other households was twenty-two. Included in this figure were twelve landless tenant farmers. In almost all cases, the lending and borrowing farmland took place between relatives. We also observed a trend toward rising farm rents, caused by the increase of marginal productivity of land induced by technological innovations, as well as from the increase of land demand created by population growth.

Fig. 2. Wage Rate and Marginal Productivity of Labor



Note: Only for those farming households who hire labor, the average labor inputs per rai were found to be 11.3 man-days for high yielding varieties and 7.5 man-days for traditional varieties.

F. Sign of Institutional Changes in Water Utilization

Widespread adoption of double cropping caused conflicts concerning the utilization of water among the villagers. Prior to double cropping, the water was considered to be free or unlimited by the farmers, and no conflicts arose concerning the utilization of water. With the introduction of double cropping, the situation changed drastically. The paddy fields which are close to the canal have an advantage over those far from the canal, because the latter are forced to use the water which flows through the former. As a result, conflict concerning the timing of water utilization has emerged. In 1977, the water in the canal was insufficient because of a rainfall shortage, and "water thieves" (*khamoy nam*) appeared in the village. No institution within the village exists to reconcile this kind of conflict. Many farmers have, however, recognized the need for just such an institution within the village.

G. Effects of Agricultural Credit through Cooperatives

Until recently it had been frequently observed in the villages that farmers sold their standing crops to middlemen from whom they had borrowed money. Today this practice is no longer observable. About ten years ago, agricultural cooperatives started to lend money, at most 5,000 baht per household, with an interest rate of only 1 per cent per month. Such institutional reform has reduced the necessity for farmers to sell their standing crops. This observation could endorse the widely held view that consolidation of an agricultural credit system serving small farmers in rural development programs is indispensable.

III. TOWARD A THEORETICAL EXPLANATION OF INSTITUTIONAL CHANGES

It has been made clear from the above that technological innovations in rice cultivation have induced various kinds of institutional changes in the village economy in the upper area of the Chao Phraya Delta. The main institutional changes observed in the traditional village economy are emergence of tractor rental markets, replacement of mutual labor exchange practices by a system of hiring wage labor, and signs pointing to the creation of institutional arrangements for water utilization. Among these institutional changes the widespread practice of hiring wage labor and institutional arrangements for water utilization will be investigated here mainly in terms of economic theory. As these two areas are deeply connected to the traditional methods of formulating social organization among Thai people, even a brief attempt to explain these changes in terms of economic theory might be important in opening the way toward an academic integration of economic theory and social anthropology.

Hired wage labor has replaced the traditional mutual exchange of labor among relatives and neighbors, that is, the peasants' reciprocal relationship has been transformed into the impersonal relationship of economic exchange based upon market mechanism [3, p. 44]. In terms of economic theory, it can be said that, after diffusion of double cropping of rice, hiring wage labor at necessary times has become more efficient than exchanging family labor mutually on the basis of reciprocity. In other words, the system of hiring wage labor has become a more efficient form of labor allocation than the traditional mutual exchange of labor in light of the technological innovations made in rice cultivation.

Before the adoption of double cropping, rice-growing families had been able to choose their own harvesting days rather freely within the harvesting season, making it possible for families to exchange labor on a mutual basis. In addition, the conditions of labor demand and supply should be considered. Traditionally the upper area of the Chao Phraya Delta had been characterized by a labor shortage. Given this situation the exchange of family labor was the most practical way of securing needed help. In other words, the exchange of family labor had been the most efficient form of labor allocation prior to the adoption of double cropping.

The introduction of double cropping and the high population growth in rice-growing villages in the area have changed the conditions of labor demand and supply immensely. The practice of double cropping has intensified the need for labor during the now very specific periods of transplanting and harvesting. The rice-growing families cannot choose their own transplanting and harvesting days as freely as before, and as a consequence they cannot afford to extend aid to their neighbors and relatives. Such a change in the labor demand has made hiring wage labor at necessary times a more efficient form of labor allocation than the traditional mutual exchange of labor. Changes in labor supply should also be taken into account. Labor has become relatively abundant recently because of the continued high population growth and the gradual disappearance

of arable land. This increased labor supply within the village economy has made it easier for the rice-growing families to find the necessary labor at critical times. Clearly, the development of the institution of hiring wage labor can be seen as a practical and efficient response to changes in agricultural technology.

The custom of mutual help among relatives and neighbors has been considered the most crucial mode of social integration within Thai villages [2]. Mutual exchange of family labor in rice cultivation played an important role in fostering this custom of mutual assistance. It has been observed that the mutual exchange of labor has disappeared very rapidly in the process of technological innovations in rice production. If the custom of mutual help was so deeply rooted in the social organization of Thai villages, how do we explain the rapid transition to hiring wage labor? Our analysis might suggest that the tradition of mutual help within Thai villages was rather weak or shallowly rooted in the social organization of village communities. According to anthropological studies, the principle underlying social integration within Thai villages is the dyadic relationship based upon a bilateral kinship system [2]. Each individual is at the center of a network of dyadic relationships radiating from himself, and the aggregation of such networks constitutes the social organization. Within such a social organization the individual is relatively independent from others. Even in such a dyadic relationship, the individual's voluntary conformity derives from his feeling of solidarity developing from general norms that control relationships between superiors, inferiors, and equals. Therefore a custom such as mutual assistance among relatives and neighbors exists, but the absence of cultural devices for emphasizing duty reveals the fragility of such social integration. Such a pattern of social organization within Thai villages is consistent with the observed fact that mutual exchange of family labor has disappeared rapidly and the practice of hiring wage labor on the basis of market efficiency has emerged smoothly according to the change in labor demand and supply.

We stated earlier that at present there does not exist any institution controlling the utilization of canal water by rice-growing farmers and that farmers still consider that they can utilize the water in the canal freely or independently from the other farmers. This observation is also consistent with the above-mentioned characteristics of social organization within Thai villages. There have been no functional groups within the villages in the central plain of Thailand, excepting such groups as the temple committee and the education committee [2], because functional groups would require the individual members to adhere to agreed rules; such groups have been difficult to develop within the networks of dyadic relationships.

It was also observed that many farmers in the surveyed village have begun to consider that the water in the canal is not free or unlimited and that some institution for controlling utilization of this scarce resource by village members is necessary. An economic demand for the institution has appeared within the village.

The functioning of such an institution, it should be emphasized, requires that farmers agree upon and follow a set of rules. It can be expected, however, that

when the economic benefits from such an institution become greater than the cost of creating and maintaining it, an institution controlling the utilization of the water would be formulated within the village. The most important economic benefit resulting from such an institution would be reduction in the uncertainty regarding the availability of the water for each farmer. Without such an institution each farmer will continue to be at the mercy of possible actions taken by other self-interested farmers. The cost includes not only the direct expenses of water charges, but, more importantly, the transaction costs involved in the farmers' acceptance of the necessary rules. As the problem of water scarcity increases the farmers will recognize that the economic benefits in establishing such a solid institution outweighs the costs involved in acceptance of a set of rules. In short, it can be expected that economic necessity will induce institutional innovation in the area of water management.

It should not be ignored, however, that the transaction costs in establishing such a solid institution is very great in Thai villages where dyadic relationships dominate the social organization and traditionally such organizations have been virtually nonexistent. The speed of institutional innovations will be slower there than in the other villages where there has developed such a functional organization.

In short, the directions of the institutional changes in Thai rice-growing villages were explained in terms of economic theory. Changes in the conditions of labor demand and supply clearly account for the observed changes in the form of labor allocation within the village economy. As regards the institutional arrangements for water utilization, the economic forces related to the benefit and cost of creating such an institution allows us to predict possible change in the distant future. At the same time, cultural factors such as the pattern of social organization should be integrated in any explanation of institutional changes because such factors provide insight into an understanding of the rapidity with which institutional changes take place in the village economy.

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