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WOMEN'S ROLE IN AGRICULTURE IN SOUTHERN THAILAND:
THE IMPACT OF NEW RICE TECHNOLOGY^{*}

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ABSTRACT

It is often argued that, in the southernmost provinces of Thailand where Malay Muslims predominate, women are excluded from participating in development. This paper investigates the participation of Malay Muslim women in rice cultivation. In particular, it examines the effect of technological changes on women's role. Interviews were undertaken with 122 households in two Muslim villages located in the same biophysical and cultural environment, but with different degrees of access to new agricultural technology, especially high yielding rice varieties (HYVs). A village level comparison was done to investigate the effects of HYVs. Respondents were stratified into large, medium and small landholding classes to analyse the effects of household resources endowments on women's role. The results indicated that women participated actively in rice production with the traditional rice varieties. They were dominant or highly dominant in transplanting, harvesting and threshing. However, adoption of HYVs induced changes in some practices, particularly in harvesting and threshing. Adoption of sickle harvesting and hand threshing following the adoption of HYVs led to a decrease in women's degree of participation in these two tasks. The change in favour of men was related to characteristics of the new practices and cultural perceptions of the suitability of the new practices for men. Landholding differences did not directly affect women's participation in household rice production, either with traditional varieties or HYVs, because of a fairly even distribution of operated area. However, reduction in paid work due to the use of HYVs put more pressure on women in the small landholding class.

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1. INTRODUCTION

In Thailand, as in other developing countries, women represent about half the total labour force. Their contribution to economic development is important at family, community and national levels. In particular, the contribution of rural women in household economic production has been reported to be high (Phillips, 1966; Gordon and Sirisambhand, 1987; Hollsteiner, 1981). They participate in farm work as well as undertaking housekeeping, which is traditionally considered women's work. Even so, most studies concerned with women in Thailand relate to health, nutrition and educational aspects. Only a few studies have focussed on the roles of women in agricultural activities, and none of these has been undertaken in the Muslim communities of Southern Thailand.

Muslims comprise the largest religious minority in Thailand (about four per cent of the total population). About 70 per cent of Muslims are concentrated in the southernmost provinces of Narathiwat, Pattani, Yala and Satun. These Muslims have their own way of life, which is closely related to their beliefs, and share a common cultural heritage with Malays (Office of the Prime Minister, 1984). According to Islamic thought men are dominant, especially in non-domestic affairs, and this would seem to limit women's roles outside the household sphere. It is thus frequently argued that Muslim women are excluded from development. However, since most tasks in rural areas are undertaken within the household sphere, and given the poor economic conditions in Southern Thailand, it would be expected that Muslim women participate significantly in household economic production as well as in decision-making. Moreover, the influence of pre-Islamic elements in Malay culture and the cultural practices of Buddhist women living in surrounding areas should not be underestimated. In both Malay and Buddhist cultural

traditions, women are extensively involved in household economic production.

Many questions arise in relation to the existing role of Muslim women in Southern Thailand. It is not clear which categories of farm work women undertake, nor how much they participate in each task as compared to men. The relationship between participation in work and in decision-making is also of importance. With the introduction of new agricultural technology in the past few years, especially in rice cultivation, the consequences for women's involvement in agriculture needs to be examined, and since access to land and other resources differs between farm households it is necessary to investigate how this affects women's role. The interaction of Malay-Muslim culture with each of these variables is a basic question which should not be omitted in rural development planning and evaluation. Failing to understand the existing circumstances and traditional practices not only means missing a valuable opportunity to utilize existing socio-cultural resources but can lead to a negative effect on women.

In this paper the focus is on women's role in the various tasks associated with rice cultivation and the impact on this role of new rice technology and differential ownership of land. The paper is organized as follows. The next section sketches the conceptual framework of the study. This is followed by a discussion of the methodology used. A brief account of rice cultivation in the study villages precedes an analysis of women's role in rice cultivation as affected by differences in technology and size of land holding. The final section summarizes the conclusions.

2. CONCEPTUAL FRAMEWORK

Hayami and Ruttan (1985) have analyzed the processes of technical and institutional change in rural development at the macrosocial level. They conclude that these processes can best be analyzed in terms of a "pattern model" which explicitly recognizes the mutual interaction between a society's resource endowments, technology, institutions and cultural endowments. The model in Figure 1 is adapted from Hayami and Ruttan (1985, p. 111). It applies the same general concept at the microsocial level of the farm household. The farm household is viewed as an institution comprising male and female members, each performing household tasks and making household decisions according to specific norms and conventions. The cultural endowments of the household (e.g., values and beliefs) indicate appropriate roles for different household members. However, other factors can also direct them to adjust their roles in order to accommodate the economic circumstances of the household. Differences in household resource endowments (i.e., land, labour, capital) may lead to adjustments in household organization (i.e., the roles of members of the household). At the same time, adjustments can also occur to cope with changes in the technology available to and used by the household.

In this study it was hypothesized that these three influences were of primary importance in explaining women's role within the farm household, hence the bold arrows in Figure 1. In the larger study of which this paper is a part, some attention was given to the influence of household organization itself on the adoption of new technology, so this arrow is also shown in bold.) The model recognizes the possibility of other interactions between the variables. For example, changes in actual household organization may eventually influence beliefs and values about

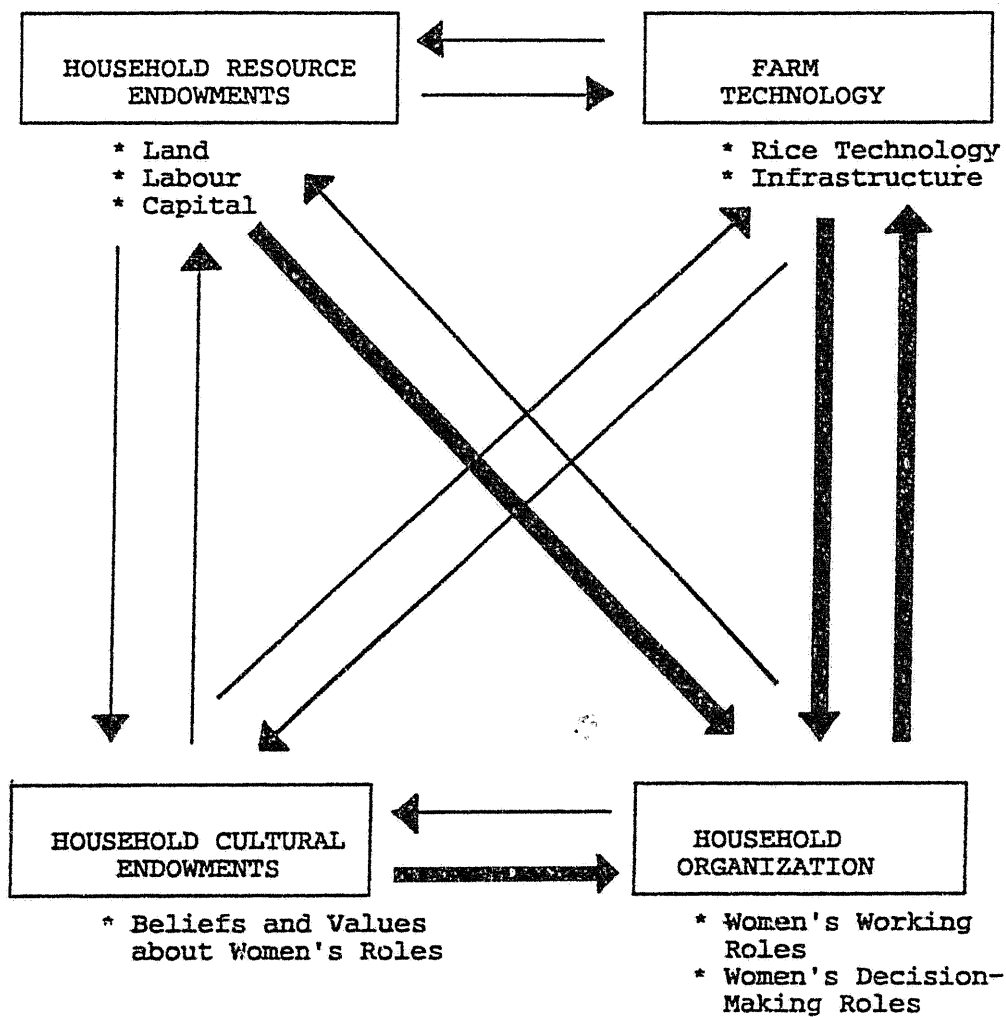


Figure 1: Conceptual Framework

the appropriate or ideal organizational structure. However, these other interactions were beyond the scope of the study.

3. METHODOLOGY

3.1 Research Design

According to the conceptual model outlined above there are three main factors - household resource endowments, farm technology and cultural endowments - which are interrelated with each other and with household organization. The study was undertaken among villagers with essentially the same cultural background, hence cultural endowments could be considered as given. Variation was sought in the other two factors - household resource endowments and farm technology. Since the study was conducted at only one point in time, cross sectional differences were used as a basis for inferring changes through time. First, inter-village comparisons were used to examine the effect of technological change. Therefore, selection of the villages had to be based on differences in adoption of new farm technology. Second, comparisons between landholding classes (large, medium, small) were used to examine the effect of resource endowments. This was done under the assumption that land is the most important resource for small farmers. In considering the differences in household organization, the focus of the larger study was on women's participation in farm work and decision-making, though only the results relating to participation in work are reported here.

3.2 Selection of Study Villages and Households

The study was undertaken in two villages in Yarang District (Amphoe Yarang) in Pattani Province of Southern Thailand (Fig. 2). Since a major aim of the study was to examine the impact of technological change on women's participation in agricultural activities, it was considered that

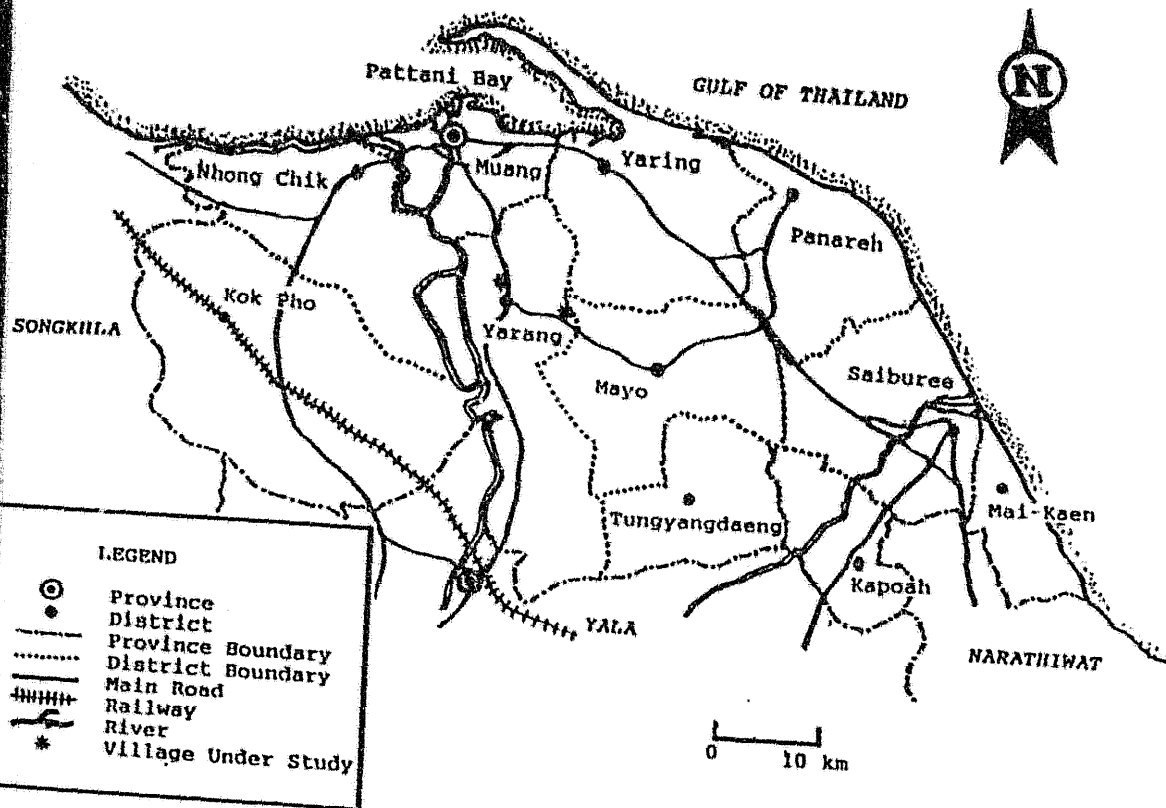


Figure 2: Map of Pattani Province
 Source: Pattani Provincial Office (1985)

two villages with different levels of adoption of the improved rice varieties should be selected. Out of 67 villages in the district, Mapat was selected as a technologically less developed village and Bendang Badan as a technologically more developed village.

A second objective of the study was to look at any difference in the roles of women between households of different landholding classes. It should be noted here that all households in the two villages owned some land. Three classes were defined - large, medium and small. The large landholding class included households owning more than 10 rai, the medium landholding class included households owning between 5 and 10 rai, and the small landholding class included households owning less than 5 rai of land (1 rai equals 0.16 ha). This classification was used not only in sampling but throughout the subsequent analysis.

Households in the two villages were stratified into these three classes prior to sampling. Systematic random sampling was used to draw samples of approximately 20 households from each class in each village (Table 1). In addition, a sub-sample of 5 households was drawn from each sample previously drawn for a second-round interview on specific topics. The main criterion used in selecting these households was their cooperation in providing information, though the types of farm work carried out were also considered.

Table 1: Total number of households and number of households selected in each village, by landholding class

Village	Landholding Class			Total
	Large	Medium	Small	
Mapat - Total	24	19	22	65
- Selected	23	18	20	61
Bendang - Total	41	67	83	191
- Selected	19	20	22	61

3.3 Survey Method

The major part of the data needed for this study required estimation of the level of women household members' participation in each category of farm work. A single-visit household survey using a face-to-face interview was considered the most suitable technique, given the availability of resources and time. The face-to-face interview was appropriate given that the majority of respondents were non-literate and used the local Malay language which is not used officially. Since not all required information could be included in the survey, a second-round survey of selected households was conducted to provide a number of case studies. In addition to these two major sources of data, the senior author was able to draw on his experience as a participant observer in one of the study villages (Mapat).

The interviews for the main survey were conducted by the senior author in association with local Malay-speaking assistants between December, 1987, and February, 1988. The interviews for the case studies were all conducted by the senior author from November 1988 to January 1989.

In both surveys, household head and spouse were interviewed together, except in the case of widows, widowers and divorcees. This method of interview was employed in order to minimize bias (Wahuni et al., 1987) and because it was culturally unsuitable for male interviewers to conduct separate interviews with women. By interviewing them together, it was expected that both men and women could express their views at the same time. Most interviews took place at the farmers' home at a time convenient to them. The case study interviews involved several visits. Some field observations were also undertaken in the case studies. Informal discussions were also held with three village leaders

from each village, including two religious leaders and the village head (phu yai ban).

3.4 Measurement and Analysis

In measuring the level of women's involvement in farm tasks, a scale of measurement was developed. Scores were given to indicate women's degree of involvement in each category of farm work and decision-making as illustrated in Table 2. To obtain this score, a two-stage questioning

Table 2: Score for level of men's and women's participation in farm work and decision-making

Score	Level of Participation
1	Men only
2	Men and women together - men dominant
3	Men and women together - equal
4	Men and women together - women dominant
5	Women only

process was used. First, the respondents were asked whether men or women were involved in a particular task or decision. If the answer was "both", they were then questioned further about whether men were dominant, women were dominant or men and women were involved equally. Replies were scored in the above way.

It is important to note that the data were fully derived from the respondents' replies. It is possible, therefore, that the replies might reflect ideal perceptions rather than the actual practice. Interviewers were asked to focus their questions on the actual practices of respondents in order to reduce this limitation.

Frequency distributions were used to depict the distribution of response scores for each variable. The mean scores were used as a convenient shorthand way of summarizing the data. Use of the mean score involved the assumption that women's participation in work occurred along

a continuous range, so that the mean scores could provide the global picture of their level of involvement within a group. Interval scales were used in classifying women's level of participation based on the mean scores. Five intervals were defined as shown in Table 3. However, mean values were not used in testing the significance of differences between groups of respondents. For this purpose, two non-parametric methods were

Table 3: Interval scale for mean scores used in classifying women's level of participation

Interval Scale	Women's Level of Participation
1.0 - 1.7	Men Highly Dominant
1.8 - 2.5	Men Dominant
2.6 - 3.4	Equal Participation
3.5 - 4.2	Women Dominant
4.3 - 5.0	Women Highly Dominant

used. The Mann-Whitney U Test was used to test for significant differences between the two villages and the Kruskal-Wallis One-Way Anova Test was employed for comparing the distribution of scores between landholding classes.

4. RICE CULTIVATION IN THE STUDY VILLAGES

Rice production was the most important type of agriculture in both villages, involving more than 90 per cent of the population. Though rice production was primarily for subsistence, farmers considered it to be their most important farming activity. Most respondents identified rice farming as their primary occupation, even if other jobs were better sources of family income. This indicates the high value placed on rice production as a part of their traditional livelihood.

According to the survey data the average area of rice cultivated per household was 5.8 rai in Mapat and 4.9 rai in Bendang Badan. Line d of Table 4 shows that this figure was not significantly different between

landholding classes. The leasing in and out of land in various ways evened out the area of land operated by households in the different classes. This needs to be remembered when considering the effects of landholding class on household members' participation in rice cultivation.

Table 4: Area of rice land owned, leased and operated in 1986/87, by village and landholding class (rai)

Village	Landholding Class			Total
	Large	Medium	Small	
<u>Mapat</u>				
a. Land owned	6.0	4.2	2.3	4.3
b. Land owned & operated	3.9	3.2	1.9	3.0
c. Leased in land*	2.5	2.3	3.3	2.8
d. Operated land	6.3	4.6	5.2	5.8
<u>Bendang Badan</u>				
a. Land owned	7.3	4.5	1.9	4.4
b. Land owned & operated	5.0	3.7	1.6	3.4
c. Leased in land*	0.5	0.9	3.0	1.5
d. Operated land	5.5	4.6	4.6	4.9

Note: * Land in this category included mortgaged land.

All households grew rice only in the wet season due to inadequate water during the dry season. The growing of wet season rice extends from October to April. Dry season production was tried by some farmers in Bendang Badan in 1984/85, but the trial was not successful and it was not continued. Non-glutinous rice (padi jemah) was the main crop of both villages. Glutinous rice (padi pulot) was also grown, mostly in small plots. It was consumed for special occasions such as traditional ceremonies.

Rice cultivation in both villages depended mainly on family labour. Hired labour was used mainly in land preparation though a few farmers used hired labourers to ease the labour bottleneck during transplanting and harvesting. The labour hired for land preparation frequently involved the hire of two-wheel or hand tractors as well. All the hand

tractors hired in 1986/87 were owned by farmers within the villages or in neighbouring villages. Large and medium landholders were more likely to own hand tractors than the small landholders (Table 5).

Table 5: Number of hand tractor owners, by village and landholding class

Village	Landholding Class			Total
	Large	Medium	Small	
Mapat (n=61)	7	6	1	14
Bendang Badan (n=61)	5	5	3	13
Total (n=122)	12	11	4	27

Table 6 presents data on the number of households using the high-yielding varieties (HYVs) in each village and landholding class. Seventy-four per cent of households in Bendang Badan planted the HYVs in 1986/87 compared with 16 per cent in Mapat. Hence a comparison between villages can give an indication of the impact of HYVs on women's work roles. As background to Table 6 it can be noted that the HYVs were first introduced officially into Bendang Badan in 1983. However, the first HYVs were brought into the village about four years before the official introduction. It started from one opinion leader who brought two HYVs from Kedah in northern Malaysia, and planted them in his own plots. These two varieties then spread to a few neighbours, until now most farmers use these two varieties as well as the HYVs recommended by the extension officer and their traditional varieties.

The situation was different in Mapat. The HYVs had not yet been officially introduced in this village. Those who used the HYVs cited either a neighbour or an outsider as the first source of the HYVs seed. Another interesting point is that the use of the HYVs in Mapat was not accompanied by other practices. Even in harvesting and threshing the old methods were still used.

Table 6: Number of household using the HYVs in 1986/87, by village and landholding class (percentage in parenthesis)

Village	Landholding Class			Total
	Large	Medium	Small	
Mapat	16 (26.1)	1 (5.6)	3 (15.0)	10 (16.4)
Bendang Badan	18 (94.7)	15 (75.0)	12 (54.5)	45 (73.8)
Total	24 (57.1)	16 (42.1)	15 (35.7)	55 (45.1)

5. WOMEN'S ROLE IN RICE CULTIVATION

5.1 Task Involvement and the Effect of New Technology

The tasks involved in rice cultivation were categorized as land preparation, seed bed preparation, transplanting, field management, harvesting, transportation of rice from field to rice barn or home, threshing, taking rice for milling and selling rice. All respondents were questioned about each task as to whether it was performed by men or women alone, or involved joint participation. In the case of joint participation respondents were further asked whether men or women were dominant or participation was equal. Table 7 shows the percentage distribution of responses for each village.

For both villages, men were highly dominant in land preparation. In seedbed preparation and transportation, both men and women participated jointly but with men still dominant. Their participation tended to be equal in taking rice for milling whereas in selling rice women were highly dominant.

Table 7: Participation of men and women in household rice cultivation tasks, by village (row percentage)

Task	Percentage						Mean ² Score
	Not applicable ¹	Men only	Men dominant	Equal	Women dominant	Women only	
<u>Mapat (n=61)</u>							
Land preparation	11.5	70.5	14.8	0	0	3.3	1.31
Seedbed preparation	9.8	14.7	52.5	4.9	3.3	14.7	2.45
Transplanting	8.2	0	0	4.9	42.6	44.3	4.43
Field Management	8.2	8.2	29.5	16.4	24.6	13.1	3.04
Harvesting	1.6	0	1.6	29.5	50.8	16.3	3.83
Transportation	1.6	4.9	83.9	4.9	1.6	3.3	2.13
Threshing	1.6	1.6	0	0	54.1	42.6	4.30
Milling ₃	1.6	11.5	19.7	8.2	37.7	21.3	3.38
Selling	81.7	0	0	0	0	18.3	5.00
<u>Bendang Badan (n=61)</u>							
Land preparation	16.4	52.5	29.5	0	0	1.6	1.39
Seedbed preparation	6.6	11.5	47..	14.7	13.1	6.6	2.52
Transplanting	4.9	3.3	0	13.1	62.3	16.4	3.93
Field Management	4.9	21.3	32.8	23.0	8.2	9.8	2.50
Harvesting	0	4.9	19.6	44.3	31.1	0	3.03
Transportation	0	24.6	59.0	13.1	1.6	1.6	1.97
Threshing	0	1.6	16.4	11.5	45.9	24.6	3.75
Milling ₃	0	9.8	23.0	9.8	32.8	24.6	3.39
Selling	85.2	0	0	0	1.6	8.2	5.0

Note: ¹ Data in this column included land owners who leased all their rice field out to sharecroppers.
² The calculation excluded missing and inapplicable values.
³ Only 11 and 5 respondents from Mapat and Bendang Badan respectively reported that they had sold rice in the past three years.

In transplanting, field management, harvesting and threshing, women's level of participation tended to be higher in Mapat, where rice production was based on traditional practices, than in Bendang Badan where HYVs were widely used. The data show that the mean scores for women's participation were considerably different for these tasks. The largest difference was found in harvesting followed by threshing, field management and transplanting. Women were found to be highly dominant in transplanting and threshing of rice in Mapat whereas in Bendang Badan they were only dominant. In harvesting, women were dominant in Mapat while in Bendang Badan both men and women tended to participate equally. In field management, whereas the participation tended to be equal in

Mapat, men were found to be dominant in Bendang Badan. The Mann-Whitney U Test showed that the differences were statistically significant at the 95 per cent level in the case of transplanting, field management, harvesting and threshing.

These results were consistent with data collected from the sub-samples on the estimated time spent in each task (Table 8). The data show that the average number of hours spent by women in these four tasks was lower in Bendang Badan than in Mapat. The differences were clearer in harvesting and threshing where women in Bendang Badan spent about half as much time as those in Mapat. At the same time, men in Bendang Badan spent about 50 per cent more time than those in Mapat.

Since the main difference in rice cultivation between Mapat and Bendang Badan was the level of adoption of the HYVs and associated inputs, it can be concluded that the change in rice varieties led to the change in the level of women's participation in some tasks. Moreover, these changes seemed to occur in the tasks where women normally dominated over men under the traditional system, and the direction of change was towards decreasing women's involvement in those activities.

Table 8: Comparison of average time allocation in household rice production between adult male and female household members, by village (hours/household/year)

Task	Village					
	Mapat			Bendang Badan		
	Male	Female	Total	Male	Female	Total
• Land Preparation	113	3	116	85	1	86
• Seed Selection & Sowing	5	15	20	3	9	12
• Caring for Seedlings	2	1	3	2	1	3
• Pulling Seedlings	5	237	242	8	230	238
• Transplanting	21	237	258	29	164	193
• Field Management	11	13	24	16	7	23
• Harvesting	109	409	518	133	164	297
• Transportation	79	43	122	49	10	59
• Threshing	5	111	116	57	67	124
Total	350	1069	1419	382	653	1035

In order to understand more clearly how the changes occurred, it is necessary to consider the nature of each task. In rice transplanting, although there was no practical change due to the HYVs, many respondents in Bendang Badan explained that men now helped more in rice transplanting than before. The reason was that most of them (83 per cent) used a hand tractor in land preparation, either their own or rented from others. This saved considerable time in land preparation so that the men could help women members to complete transplanting, which takes more time. Although in Mapat 66 per cent of respondents used a hand tractor in ploughing, only those who owned hand tractors and those who worked as tractor operators for tractor owners used them exclusively; 44 per cent still used draught animals for part or all of their ploughing, compared with only 30 per cent in Bendang Badan (Table 9).

Table 9: Number and percentage of households using draught animal and/or hand tractor in ploughing their rice field in 1986/87, by village

Type of Ploughing Equipment	Households			
	Mapat		Bendang Badan	
	No.	%	No.	%
Hand tractor only	29	48	40	66
Hand tractor and draught plough	11	18	8	13
Draught plough only	16	26	10	16
Not applicable ¹	5	8	3	5

Note: ¹ This refers to landlords who did not plough their own land.

In the management of the rice field, it was found that the level of women's participation in Bendang Badan was significantly lower than that of women in Mapat. The only difference in field management following the

adoption of the HYVs in Bendang Badan was more intensive water control, and this was almost solely men's responsibility. Women's participation in other tasks such as fertilizing, pest control and weeding was found to be similar in both villages. The availability of water from a natural canal behind Bendang Badan enabled most farmers to irrigate their rice fields. Such irrigation did not exist in Mapat. More intensive water control can be considered as a component of the HYV technology adopted in Bendang Badan.

Harvesting and threshing are more obviously related to the use of the HYVs. Most HYVs have different characteristics to the traditional varieties which tend to be incompatible with traditional methods of harvesting and threshing. They are short statured, have short panicle stalks and more tillers. They also exhibit lower shattering, therefore the grain is separated from the stalk less easily as compared to the traditional varieties. These characteristics play an important part in changing the methods of harvesting and threshing. Their short stature and short panicle stalk make it inconvenient for farmers to cut panicles one by one. These characteristics have meant that the HYVs are associated with the use of the sickle for harvesting instead of the traditional small knife (kraeh or ketaman). With regard to threshing, many respondents mentioned that because the grain separated less easily from the stalk, the use of hand threshing was more appropriate than the traditional foot threshing. In fact, sickle harvesting and foot threshing are dependent on each other. Using the sickle in harvesting means the panicles are still attached to much of the stems making foot threshing unsuitable. At the same time, hand threshing can be done properly only if the stem is left long enough to be held.

In terms of labour use, the adoption of sickle harvesting and hand threshing seemed to change the division of labour. These two new ways of

working were said to be inappropriate for women. There were two major reasons given frequently by respondents; first, women lack skill in these two methods, and second, these two methods were considered to be physically unsuitable for women. The physical characteristics of these new methods were related to other kinds of work normally done by men such as cutting grass for animals, chopping, and digging soil. Therefore, with the HYVs men become more involved in these two activities, though women still participated. This shift towards greater participation by men also applied to working as hired labour.

5.2 Task Involvement and the Effect of Landholding Class

As mentioned earlier, respondents in each village were divided into three landholding classes to reflect different access to resources. The aim here was to examine how women's participation in the various tasks of rice cultivation varied with landholding class. Table 10 shows, for the two villages combined, the mean score for women's participation in rice cultivation tasks in the different classes.

Table 10: Mean score for women's participation in different rice cultivation tasks, by landholding class¹

Village	Landholding Class			Total
	Large	Medium	Small	
Land Preparation	1.26	1.25	1.53	1.35
Seedbed preparation	2.35	2.54	2.58	2.49
Transplanting	4.13	3.69	4.22	4.18
Field Management	2.85	2.68	2.70	2.77
Harvesting	3.57	3.19	3.47	3.42
Transportation	2.02	2.00	2.11	2.05
Threshing	4.33	3.89	4.19	4.07
Milling ₂	3.57	3.02	3.52	3.38
Selling	4.92	5.00	5.00	4.95

Note: ¹ The calculation excluded missing and inapplicable values.
² Very few respondents sold rice in the last three years so mean scores for this task are higher than in other tasks.

A Kruskal-Wallis Test was used to test the significance of differences in the distribution of scores for each task. There was no significant difference at the 95 per cent level of confidence. Hence landholding seemed to have no significant effect on women's degree of participation in rice cultivation. This does not necessarily mean that the time women spent in conducting each task was the same for each landholding class. However, estimates of time spent on each task obtained from the sub-samples also show no obvious differences (Table 11).

These results seem to contradict other studies which have found that women tend to participate less in farm work relative to men as farm size increases (e.g., Gasson, 1980; Morkeberg, 1978) and that women who belong to the small landholding class tend to work longer, not only on their own farms but also on other farms as hired labour and in non-farm jobs (Agarwal, 1985; Alam, 1985). The apparent lack of a relationship between women's participation and farm size in this study may be because the level of rice production in both villages was at the subsistence level.

Table 11: Average time allocation of adult females in household rice production, by landholding class (hours/person/year)

Task	Landholding Class		
	Large	Medium	Small
• Land Preparation	3.6	0	3.2
• Seed Selection & Sowing	10.7	8.4	12.9
• Caring for Seedling	0.9	0.9	1.6
• Pulling Seedlings	230.3	240.0	198.2
• Transplanting	188.0	164.0	177.9
• Field Management	10.6	5.7	14.0
• Harvesting	277.5	228.9	321.5
• Transportation	33.8	15.9	25.7
• Threshing	90.0	65.7	102.9
Total	845.4	729.5	856.8

Most households did not try to produce beyond household requirements for self-sufficiency. This can be seen from the area of rice cultivated which did not differ significantly across different landholding classes (Table 4), even though the area of rice land owned was related to the total size of landholding. This was because the economic profitability of rice production was very low in the study area. High input costs, low prices, and the risk associated with natural disaster, especially flooding, discouraged farmers from producing more than needed for self-sufficiency.

It is possible that, although the rice area cultivated was not greatly different, better-off farmers could have used hired labour, and this could have led to a reduction in women's participation in some tasks

Table 12: Number of households using hired labour in different rice cultivation tasks in 1986/87, by landholding class (percentage in parenthesis)

Village	Landholding Class			Total
	Large	Medium	Small	
Land Preparation	19 (45.3)	14 (36.8)	16 (38.1)	49 (40.2)
Seedbed preparation	-	-	-	-
Transplanting	10 (23.8)	6 (15.8)	3 (7.1)	19 (15.6)
Field Management	-	-	-	-
Harvesting	13 (31.0)	2 (5.3)	3 (7.1)	18 (14.8)
Transportation	-	-	-	-
Threshing	11 (26.2)	5 (13.2)	5 (11.9)	21 (17.2)
Milling	-	-	-	-

Table 12 shows that households with large landholdings were more likely to use hired labour than in the other two groups. However, from personal

discussion with several households of both villages and from data collected from sub-samples, it was found that the number of hired workers and the number of days worked were both small and regarded by the farmers as insignificant. The higher incidence of hired labour in land preparation in all classes was related to the availability of hand tractors in the villages, which tended to induce the use of hired labour to save ploughing time.

Thus most rice production tasks were done by household members regardless of the household's socio-economic status. Use of hired labour was considered to be unprofitable and the only reason that hired labour was used was to finish a task on time during peak periods. This seems to have had an insignificant effect on the level of household members' participation in each task.

5.3 Interaction between Technology and Landholding Class

It is important to examine whether the impact of the HYVs already discussed differed for the different landholding classes. Table 13 presents mean scores for women's level of participation in each task of rice cultivation for the different landholding classes in each village. The table shows that there was no significant difference between landholding classes within each village. However, there was a significant difference within the same landholding class across villages in the case of transplanting, field management, harvesting and threshing. For field management there was no significant difference within the large landholding class, and for threshing there was no significant difference within the medium landholding class. However, in general the table indicates that adoption of HYVs affected farmers similarly regardless of landholding class. This may be because, as already noted, the area of rice land cultivated did not differ significantly between households.

Table 13: Mean scores for women's participation in different tasks of rice cultivation, by landholding class and village

Village	Landholding Class					
	Large		Medium		Small	
	Mapat	B.Badan	Mapat	B.Badan	Mapat	B.Badan
Land Preparation	1.16	1.37	1.06	1.44	1.68	1.37
Seedbed preparation	2.25	2.47	2.40	2.67	2.70	2.45
Transplanting	4.25	4.00	4.75	3.69	4.35	4.10
Field Management	2.85	2.84	3.25	2.37	3.10	2.30
Harvesting	3.85	3.26	3.76	2.70	3.99	3.09
Transportation	2.13	2.89	2.06	1.95	2.20	2.05
Threshing	4.39	3.74	3.60	3.60	4.50	3.92
Going milling	3.48	3.68	3.12	2.95	3.50	3.55
Rice Selling	5.00	4.80	5.00	5.00	5.00	5.00

In fact, small farmers did not depend solely on their own rice production. Working in other farmers' plots was equally important since this work provided extra income to them. When the HYVs were widely adopted, the extent to which women worked on other farmers' plots tended to be reduced as well. Numerical data collected in this study did not include an estimation of the amount of farm wage work lost among small farmers. However, in an interview with the village head of Bendang Badan and some other elders, it was revealed that less farm wage work is available today compared to five years ago or more. In the past, many women from the poorer families (i.e., small landholding class) used to do transplanting, harvesting or threshing, or a combination of either two or three of these tasks together, under an informal contract called tolong, which means giving help in exchange for a quantity of rice. (The term tolong also refers to mutual help among farmers during the peak seasons.) Some also performed these tasks for wages. However, the use of these systems has decreased since the HYVs became widespread. One reason is that these tasks, except transplanting, can be done faster through new

methods. Also, men have tended to take over from women due to the nature of the methods and the cultural perceptions of the people in the area.

The hardship imposed on poor women because of this change has not yet been very obvious, presumably because the adoption of HYVs and associated practices is relatively recent. Yet to some women in the poorer families, the decline of paid farm work has already had an impact. In the second survey visit to Bendang Badan, it was discovered that four women out of the five poor households studied were intermittently involved in home industry, processing fish crackers and fruit (buah keranji). When asked why they did not go out to find other long-term jobs, they pointed to the lack of jobs in areas nearby and the inappropriateness of young women going to work far away. It was also discovered that some married women of poor families even went to Kedah, Malaysia, to do transplanting of rice under contract during the peak production season there, which differed from the peak production season at home. This may reflect the reduction of employment opportunities for women in the villages.

In summary, the effects of the HYVs on women's level of participation in the work of rice production was not significantly different between landholding classes. However, with a broader view of their economic situation, taking into account their participation in paid work outside the household, it was found that in general adoption of HYVs was more likely to create economic hardship for women in poor families.

6. CONCLUSION

This study of two Muslim villages in Southern Thailand has shown that women have a major role in rice farming. Men and women in the study villages helped each other in conducting most tasks involved in rice cultivation, but gender-specific roles could be discerned in a number of

tasks. Under traditional technology, women were dominant or highly dominant in transplanting, harvesting, threshing and selling rice, whereas men were dominant or highly dominant in land preparation, seedbed preparation and transportation of rice from field to rice barn or home. Field management and taking rice for milling involved men and women equally. However, when new rice technology was adopted, women's level of participation in transplanting, field management, harvesting and threshing decreased. This change was a result of technical characteristics of the HYVs in association with cultural perceptions as to the unsuitability of women for the new methods which accompanied the adoption of HYVs.

In general, landholding class was not found to affect women's level of task involvement in rice production. The low profitability of rice production and the high level of risk due to natural causes seemed to discourage farmers from producing beyond their household requirements. This was evidenced by the area cultivated, which did not differ between different landholding classes due to leasing in and out of rice land (mostly under sharecropping agreements). However, a broader consideration suggested that the decrease in women's opportunity to participate in some tasks due to the adoption of HYVs affected women from some poor households who used to hire out their labour in transplanting, harvesting and threshing.

The study has shown the value of examining farm household organization as one element of a pattern model which includes household resource endowments, farm technology and cultural endowments. Specifically, the impact of new rice technology on women's role in farm activities was seen to be conditioned by differences in resource endowments and by cultural factors, as much as by the nature of the technology itself.

REFERENCES

- Agarwal, B., 1985. "Rural Women and High Yielding Variety Rice Technology in India". In: Women in Rice Farming. Proceedings of a Conference on Women in Rice Farming Systems, The International Rice Research Institute, Manila, 26-30 September 1983, pp. 307-335. Aldershot: Gower Publishing Company Limited.
- Alam, S., 1985. "Women and Poverty in Bangladesh". Women's Studies International Forum 8(4): 361-371.
- Gasson, R., 1980. "Roles of Farm Women in England". Sociologia Ruralis 20(3): 165-180.
- Gordon, A. and Sirisambhand, N., 1987. The Situation of Women Rubber Smallholders in Southeast Asia. Bangkok: Women's Studies Programme, Chulalongkorn University Social Research Institute.
- Hayami, Y. and Ruttan, V.W., 1985. Agricultural Development: An International Perspective. Revised Edition. Baltimore: The Johns Hopkins University Press.
- Hollsteiner, M.R., 1981. "Modernization, Changing Roles of Women and Expectations from Development in Southeast Asia". In Southeast Asia: Women, Changing Social Structure and Cultural Continuity, pp. 3-18. Edited by G.B. Hainsworth. Ottawa: University of Ottawa Press.
- Morkeberg, H., 1978. Working Condition of Women Married to Self Employed Farmers. Sociologia Ruralis 18(2/3): 95-106.
- Office of the Prime Minister, 1984. Thailand in the 80s. Bangkok: The National Identity Office.