
TARC Notes

Impact of double cropping of rice on farm management in the Muda Irrigation Project Area of Malaysia

Since the completion of the Muda Irrigation Project in 1970, the double cropping of rice has rapidly spread in the Project area under the guidance and support of the Muda Agricultural Development Authority (MADA), a governmental organization responsible for the over-all agricultural development based on double cropping of rice in that area.

The author carried out a study on the economic and technical impact of rice double cropping on farm management in the area. The study consisted of (1) to investigate variations in farm income among farmers and locations, (2) to identify changes in traditional farming practices caused by the introduction of double cropping of rice, (3) to analyse changes in farm household accounts caused by the development of double cropping, and (4) to investigate relationships between paddy output and productive factors in the double cropping of rice.

The farm management survey was carried out during the period from February 1974 to March 1975 at six villages selected from three different soil class areas. A total of 100 farmers was selected at random from the above mentioned areas. The survey was conducted in cooperation with MADA.

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1. As the yield of rice is an end-product of farm management activities, differences in yields among farmers must involve differences in farm management. The coefficient of vari-

ation in yields among the sample farmers was 20% for the year 1974/75. This variation, however, was not caused by the difference in farm management alone, but must be affected by the local difference in physical environments such as soil and water conditions. The coefficient of variation in paddy yield among villages which can be considered as expressing local differences was 15%. Therefore, it seems that the variation among farmers was primarily caused by the local difference in physical environments in those areas.

Farm management activities can be reflected by farm expenditures per unit farm area. The coefficient of variation in farm expenditures of sample farmers was 34%. This variation was due to the remarkable difference in labor input among farmers, and labor input was found to be related to local differences in physical conditions. Thus, it is suggested that the improvement of water control, realignment of farm holdings, and soil improvement could reduce the variation in paddy yields among farmers.

2. Seasonal peaks in labor demand in rice cultivation evolved the *derau* (mutual exchange of labor) and *gotong royong* (cooperative farm operation) systems for particular farm works such as transplanting and harvesting even at the past time of single cropping. With the development of double cropping, dependence on outside labor has increased, but *derau* and *gotong royong* systems have been on the decline, because they were substituted by *upah* (cash wage labor) system reflecting the increasing currency economy and expanding labor market.

About 60% of the total labor input of average-sized farms consisted of hired labor and *derau* labor. Majority of the labor was supplied by small holders, who wanted to get any additional income by taking advantage of these employment opportunities. However, labor shortage during the peak season was becoming more serious, and accordingly farmers were enforced to mechanize farm operations, particularly harvesting. In pro-

moting farm mechanization, problem of wage income for small holders should be taken into consideration.

3. It was difficult to trace up directly the improvement of farm economy induced by double cropping of rice, because comparable data before the introduction of double cropping were not available. An attempt, however, was made to compare the data obtained from the present study with the FAO/IBRD's data¹⁾, as a proxy of the single cropping income. Results were as follows:

1) Agricultural receipt of farmers increased by 4.6 times in nominal terms and 2.5 times in real terms after the introduction of double cropping of rice. This increase was born from an increased paddy production and increased farm labor wage receipt.

2) Paddy receipt increased by 2.3 times in real terms, mainly due to an increased cropping intensity and partly due to an increased paddy yield, especially in the off season.

3) Farm labor wage receipt contributed not only to increase the income of small holders, but also to reduce the income disparity between large holders and small holders.

4) Agricultural expenditures increased by 5.2 times in nominal terms and 2.8 times in real terms after the introduction of double cropping of rice. The rate of increase was greater than that of agricultural receipt.

5) Thus, the net farm income increased by 4.3 times in nominal terms and 2.3 times in real terms.

6) The farm household income increased by 4.2 times in nominal terms and 2.3 times in real terms after the adoption of double cropping of rice.

4. Farm income is a function of a number of variables. In the present case, the farm income was found to be primarily a function of paddy production, and, to a lesser degree, of farm labor wage receipt.

Paddy production itself is a function of a number of independent variables. A production function was formulated by using a

Table 1. Regression analysis on paddy production

	Off season crop	Main season crop
Number of sample farmers	91	94
Log. A	1.496	2.031
Regression		
coefficient: Sum	1.118	1.013
Area	0.612	0.696
Labor	0.358	0.123
Fertilizer	0.028	0.038
Capital	0.120	0.156
R ²	0.901	0.950
F	98.3	219.7

simple model with four independent variables; area cropped to rice, labor input, total fertilizer used and the capital used, based on Cobb Douglas function method.

The result of the regression analysis (Table 1) indicates that:

1) Sum of regression coefficients in the formula was greater than 1.0 showing the law of increasing return with respect to the size of farming.

2) The most important factor for increasing paddy production was the area cropped to rice under the present level of agricultural technology. Labor input showed a relatively high correlation with paddy production, but the regression coefficient was small.

3) A small positive regression coefficient for fertilizer use implies that the fertilizer use under the existing farming condition was not a significant determinant for paddy yields.

4) Relationships between paddy production and each productive factor showed a considerable dissimilarity between off season crop and main season crop.

1) FAO/IBRD: The Muda Study (1975).

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