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BOOK REVIEWS

Modern Rice Technology and Income Distribution in Asia edited by Cristina C. David and Keijiro Otsuka, Boulder and London, Lynne Rienner Publishers / Manila, International Rice Research Institute, 1994, xxiii + 475 pp.

It has been more than a quarter of a century since the International Rice Research Institute, based in Los Baños, the Philippines, began in 1966 to distribute high-yielding modern rice varieties (MVs). During that time, with the assistance of governments and international agencies, MVs have become widespread throughout Asia, and contributed to some extent to the resolution of problems of population and of poverty in rural villages. MVs, while making possible an increase in rice production and higher income from rice farming, caused changes in the socioeconomic systems of rural villages, and brought about a major transformation in Asian rice cultivation. At present, when MVs have spread to just about every corner of the Asian region, a review of the effects of this spread will have great significance as a means of looking at prospects for the future.

Evaluations are split on the question of the results of the diffusion of MVs, in particular from the viewpoint of equity of income distribution. For instance, those who deny the effects emphasize that (1) MV technology involves high yields and high costs, and are thus easily incorporated by big farms with abundant capital, but not by small impoverished farms; (2) MV technology contributes to raising income for farmers who own land, but has little benefit for landless agricultural laborers; and (3) it brings about higher yields in areas with good irrigation systems, and thus widens productivity gaps between areas with good and poor conditions. On the other hand, people who see the effects in a positive light say that, for instance, (1) the enactment of government institutional credit for farmers and changes in the informal credit markets allow a relaxation of credit restrictions against small farmers, making it possible to ignore the effects of the gap in financial means between large and small farmers; (2) rises in productivity and intensity create increases in demand for agricultural hired labor, leading to increases in the income of hired labor; and (3) the gaps that arise between regions because of a disparity in the diffusion rate of MV technology can be counteracted by interregional labor movements.

The present volume begins on the basis of these debates, and does an international comparison, confirming that there is indeed a close correlation between environments suitable to the propagation of MVs (and in particular irrigation conditions) and the spread of MVs bringing about production increases in rice. The authors then, from a pro-MV perspective, try to make a quantitative analysis concerning the effects of the spread of MVs on the equity of income distribution in the seven following countries: the Philippines, Indonesia, Thailand, Bangladesh, Nepal, India, and China.

The contents of the chapters are as follows. Part 1 (Chapters 1–3) provides an outline of the issues, background, and methods of analysis used in the book. The following concrete

issues are discussed: (1) What are the major factors behind farmers' decisions in choosing whether to use MV technology? (2) Do differences in the diffusion rates of MVs create gaps in factor demand and yields among different regions? (3) Are interregional gaps in factor costs and income reduced by interregional factor movements? (4) What factors determine the inequality of income distribution? Lastly, as a summation of the previous questions, does the introduction of MVs lead to widening inequality? The authors then set forward a common framework of analysis to examine these questions through research studies in the seven countries. For the first issue, they regress the diffusion rate of MVs, utilization rate of labor-saving technology, and cropping intensity, on irrigation conditions, price ratio of paddy to fertilizer, farm size, and tenancy patterns. For the second issue, they regress yields and factor input per hectare, on irrigation conditions, factor prices, farm size, technological levels, and tenancy patterns. For the third issue, a labor force growth function is estimated using the per village population growth rate as a dependent variable, and such factors as irrigation conditions, the rate of change in the diffusion rate of MVs, and population density as explanatory variables, and following that, a factor price function is estimated using factor prices (wages, land rents, and rent for fixed capital) as dependent variables, and factors such as the diffusion rate of MVs, irrigation conditions, farm size, and the price of rice as explanatory variables. Finally, for the fourth issue, the authors use a decomposition analysis of the Gini coefficient, which is an index of the inequality of income distribution, to estimate the extent of contributions that inequalities in income from rice farming and income from other factors play in overall income. The results of the analyses using this common framework in the different countries are presented in Part 2 (Chapters 4–11), and Part 3 (Chapter 12) gives a summary and policy implications.

The following is a summary of their findings:

(1) With the exception of Thailand, Bangladesh, and China, the diffusion rate of MVs is highest where irrigation conditions are favorable, and is not significantly correlated with farm size and tenure systems.

(2) The introduction of MVs increases yields and cropping intensity, and as a result, leads to a rise in land productivity. MVs make a greater contribution to rises in the level of yields than does irrigation, but irrigation makes a greater contribution to increases in cropping intensity. Socioeconomic factors such as the tenure system have no effect on rises in yield levels and cropping intensity.

(3) The introduction of MVs into areas with favorable irrigation conditions leads to increases in labor use per hectare. Moreover, if MVs are introduced into areas with favorable irrigation conditions, farmers use a larger amount of hired labor. Consequently, if increases in income from rice farming lead to the creation of larger amounts of employment in non-rice sectors, substantial rises can be expected in the incomes of landless laborers.

(4) In general, it is considered that labor-saving technology is applied when MVs are introduced and this leads to losses in employment creation, but in the cases of Thailand and Indonesia, the authors find the use of labor-saving technology to be more closely correlated with farm size and relative factor prices than to the introduction of MVs.

(5) Since there is a significant correlation between the rate of population growth and changes in the diffusion rate of MVs and there are many cases where a significant

correlation is not found between regional wage levels and either the diffusion rate of MVs or irrigation conditions, the authors find that the wage disparity that is supposed to emerge with the introduction of MVs is reduced by interregional labor movements and that the incomes of landless laborers increased.

(6) While interregional wage disparities are not found, there are large gaps in returns to land between those areas with favorable irrigation conditions and high diffusion rates of MVs and those without such conditions. It is thus considered that inequalities in income distribution emerge unless these sorts of interregional disparities in income from land increase the demand for land in favorable areas and lead to rising numbers of tenant farmers and to the fragmentation of land.

(7) With the exception of the Philippines and India, no large regional income disparities are found to be the result of gaps in irrigation conditions. These regional income disparities can be explained, to a great extent, by the disparities in income from land emerging from differences in farm size, tenancy patterns, irrigation conditions, and the diffusion rate of MVs. There are only small income disparities among landless agricultural laborers in areas with and without favorable irrigation conditions. In addition, there is little dependence on rice cultivation in areas with unfavorable irrigation conditions, and differences in income from rice farming can only partially explain inequality in household incomes. Consequently, one cannot say that inequality in incomes from rice farming determines differences in interregional income inequalities.

(8) From the preceding analyses and from separate simulation analyses conducted on the Philippines and Nepal, the authors give a positive evaluation of research and development on MVs, claiming that their introduction does not lead to inequality in income distribution either intra-regionally or interregionally.

With the exception of the evaluation of income differentiation between regions with and without favorable irrigation conditions, this reviewer can largely agree with the views of the authors. Moreover, the book must be given high marks because, unlike previous research works on the effects of the diffusion of rice MVs, which were limited to one region, it provides a clearer concept of regions and seeks a more universal theory on the effects of the diffusion of MVs by dividing regions according to irrigation conditions and looking at a wide area encompassing seven Asia countries.

However, because this book focuses on such a large area and this kind of study requires a huge amount of work, it is unavoidable that some questions remain concerning its results. For instance, I wonder why, in order to show that there are no gaps between the use of MVs in large and small farms, they estimate MV adoption functions based on data collected from an extensive survey, instead of conducting a survey on the period of use of MVs in large and small farms through an intensive survey, a method which would have been easier and more direct. In order to estimate the correlation between labor mobility and such variables as the irrigation conditions and diffusion rate of MVs, they use population census statistics to calculate the rate of population increase in each rural village, but it is impossible to grasp seasonal movements of labor using this method. This reviewer's experience is that the movement of farm labor to other regions is overwhelmingly seasonal, so this omission necessarily leads to doubts.

In addition, in another paper the authors used cross-section data to conduct a simulation

analysis to see how income distribution inequalities change as a result of the introduction of MVs, and these results are cited as grounds for the claim that the introduction of MVs does not cause changes in degrees of inequality. The problem with this method is that it also does not take into account changes in the distribution structure of agricultural landownership caused by the introduction of MVs.

Furthermore, the present volume touches upon the economic multiplier effects on nonagricultural and non-rice sectors of the introduction of MVs, but do not present any empirical evidence to support their arguments. The authors seem to support the idea that the introduction of MVs is effective in creating employment increases in regional labor markets, but is this really true? It seems true, yes, that increasing incomes from rice farming resulting from the introduction of MVs will lead to increased demand for non-rice sector commodities, but many of the commodities with high consumption propensities are produced outside of these regions, and the effects on the increase in employment opportunities may be small within the region. As the present volume's methods of analysis have not been devised to give proper consideration to the multiplier effects on non-rice sectors, this will remain as an issue for the future. As to the policy recommendations in the last chapter they seem to be somewhat lacking in concreteness, leaving the reviewer with some dissatisfaction. In truth, however, the comments by this reviewer listed above are mere trivialities compared to the enormous amount of work that the authors put into this volume.

According to a report by the Food and Agriculture Organization, the population in Asia living below the absolute poverty level is decreasing. There remain, however, in South Asia for instance, regions where many people continue to face poverty problems and food shortages. It seems certain that the present volume will be an important work giving rationale for making the improvement and spread of MV technology a major strategy for combating problems of poverty and food shortages. (Seiichi Fukui)

Rural China in Transition: Non-agricultural Development in Rural Jiangsu, 1978–1990 by Samuel P. S. Ho, Oxford, Clarendon Press, 1994, xvi + 352 pp.

This book examines transitions in the rural economy of Jiangsu Province between 1978 and 1990 by focusing on rural nonagricultural development through township-village enterprises (TVEs). The author looks at comparative economic development at the township (*xiang*/*zhen*) and village (*cun*) level, and adds to this analysis of field surveys conducted on sixteen individual TVEs between 1986 and 1988.

At present, in making micro case studies of Chinese rural TVEs, the questions of whether one can choose regions for study which conform to the analysis of the study theme and whether it is possible to carry out questionnaires are very important in carrying out the study. Given the present situation, where study themes are becoming deeper and more concrete, it is very difficult to grasp actual conditions by conducting "visit surveys" on model areas designated by the Chinese side.