

RICE IN THAILAND

— Thai Rice and Maize Production —

The Institute of Asian Economic Affairs, *Tai no Beikoku Jijō* (Rice in Thailand), Tokyo, 1962, 510 pp.

Introduction

Close examination of the statistical supplements to the United Nations' *Economic Survey of Asia and the Far East* (1962 edition) will reveal a remarkable increase of maize production in Thailand, which increased from 115 thousand metric tons in 1956 to 401 thousand metric tons in 1961 (According to the monthly report to Bank of Thailand, dated February, 1963, production reached as high as 598 thousand metric tons in 1961 and 650 thousand in 1962). However, few people are aware of the fact that this sharp increase may be credited to the author's accumulation of knowledge of Thai rice.

The volume under review is a research report by Mr Yoshihiko Hasegawa, at present servicing Counselor at the Japanese Embassy in Washington, and previously attached to the Embassy in Bangkok (1952-53). It was edited by the reviewer and Mr Torao Tamai of the Ministry of Agriculture and Forestry at the request of Mr Hasegawa and Mr Kakuten Hara of the Institute of Asian Economic Affairs.

Mr Hasegawa was seconded by the Ministry of Agriculture and Forestry to the Economic Planning Agency to become Deputy-Director of its Planning Bureau and joined the reviewer in producing the "Doubling National Income Plan" during the period from June, 1958 to December, 1959. One of the main tasks encountered in formulating this plan was the promotion of economic cooperation with overseas countries—, and a concrete and basic solution had to be found to the difficult question of how to link Japan's economic growth with the economic development of overseas countries, particularly those of Asia and the Far East. Mr Hasegawa grappled with this question and came up with an excellent solution, which called for a series of measures centred on the importation of Thai maize.

The idea of importing maize from Thailand was not just a brilliant and isolated brainwave. He was posted by the Government to Thailand in the years 1951 to 1953 and there experienced the difficulties of purchasing rice. He turned his attention from rice to maize, studying the conditions of rice production in Thailand scientifically and soon grasped the factors and limitations on which rice cultivation depended.

He attached great importance to the fact that all suitable locations had been turned into wet rice fields, and that encroachment was occurring into hill fields, and he attributed this situation to the heavy overseas demand for Thai rice at lucrative prices. From this he concluded that a "shock"

to the northeastern and other areas of Thailand — areas of marginal productivity of rice cultivation — would encourage these areas to replace rice cultivation with that of a more profitable and suitable crop.

He also felt that as Thai agricultural produce was handled by Chinese middlemen, they would provide a favourable means of effecting this change-over. He was convinced that he was right in this matter since it is a historical fact that under the *liangzhan* system the cultivation of such cash crops as soy-bean and wheat rapidly spread throughout Manchuria using this method.¹ When he had completed his plan for economic cooperation, he could not sit and wait. Prior to the drafting of the "Doubling National Income Plan", he visited various government agencies and importers, and persuaded them to promote the import of Thai maize, with the result that imports of Thai maize rose sharply in and after 1959.

Time and time again Mr Hasegawa was asked to put down the result of his studies in paper, but he pleaded lack of time on each occasion. It was not until he had left for the United States that it was known that he had been working on a book and that he had left behind a large number of manuscripts, in all amounting to more than 1,000 sheets, with the Institute of Asian Economic Affairs.

These papers were reduced to some 500 manuscript papers to meet the needs of publication. This volume is in two parts, one dealing with Thai rice production, and the second part with its distribution. Mr Hasegawa himself is probably more versed in the latter, but it is felt that the merit of the volume lies in the first part rather than in the second.

1. Production of Rice in Thailand

The author follows his predecessors in that he stresses that rice production in Thailand is governed by natural conditions and irrigation. In Chapter 1 "Geographical Conditions for Rice Cultivation in Thailand" he deals with the terrain, soil, temperature, rivers and other geographical features on the basis of the studies of Credner, Brankenburg and Von Bernezz.² The author develops his ideas and concludes that the natural conditions in Thailand, especially rainfall, are more favourable to the cultivation of dry field crops than that of rice. Chapter 2 "Irrigation and Floods" forms the most interesting part of the book; in which he pursues the study of the question he himself poses, on the basis of data. In this chapter, he begins with specialized explanations of the rivers in Thailand, and discusses the relation between the water volume of the

¹ See, e.g., Kunzan Inaba, *Manshū Hattaisushi* (The History of Manchuria), Tokyo, 1926, and South Manchurian Railways Co., *The Yearbook of Manchurian Economy*, Tokyo, Chūō Kōron Sha, 1933, 1934, 1935, etc.

² W. Credner, *Siam, Das Land der Thai*, Stuttgart, Engelhorns Nachf., 1935, 430 pp.; P. Brankenburg, *Der Reis, Eine Wirtschaftsgeographische Untersuchung*, Berlin, 1934, 302 pp.; and Sprecher Von Bernezz, *Tropische und Subtropische Weltwirtschaftspflanzen*, Stuttgart, 1929.

Chaopya River (Menam River) and rice production, analyzing the water level of the river during the past 120 years as recorded on the watermarks on the "Ayuthya stone pillar," as well as the statistics on the planting and harvesting of rice, and on the damage done to rice, and then reaches the following remarkable conclusion:

Firstly, as the average highest water level of the Menam River is 3.65 metres and its standard deviation 54 centimetres, rice cultivation in Thailand has suffered more from droughts than from floods, in view of the fact established by experience that a normal crop of rice is harvested in a year when the waterlevel ranges between 3.5 and 4.2 metres. Thus, during the past 120 years, floods damaged rice crops in four years and droughts in as many as 60 years.

Secondly, statistics of rice crop damage related to the total area of rice cultivation in each province in and after 1937 show that the water level of the Menam River has no bearing on the rice crop in provinces other than those in the valley of the Menam River. If this is true, it cannot be accepted that "Rice Cultivation in Thailand is closely related to the water level of the Menam River" (Credner) and that "There is a relationship between rice crop records and the water volume and water level of the Menam".¹

Thirdly, the entire country divides into the central, northern, southern and northeastern regions, and the harvesting rates of rice in all regions, weighted by the respective amount of rice crop, are totalled, and then the harvesting rate of rice for the entire country may be expressed in a permillage of $432 + 534Y$. In this case, the value of Y is the function of the water level (X) of the Menam River. It is 0.9 when the highest water level ranges between 3.5 and 4.2 metres; $\log Y = 2.0089578 + 0.00461636 X$ when the water level is lower than 3.5 metres; and $\log Y = 2.0181047 - 0.00399567 X$ when the water level exceeds 4.2 metres. There is an interrelationship degree of 0.967 between actual rice crops and the values obtained through this estimation formula for the national harvesting rate of rice. The figure 432 is stable and is used as a constant in this formula, because in regions other than those irrigated by the Menam River, a harvesting rate of rice is very close to an average irrespective of the water level of the Menam River, or in other words a bumper crop of rice is harvested in some areas when the rice crop is poor in other areas.

Thus, he advances his arguments in a concise and clear way, not only here but in other parts of this book, and this is characteristic of his method of work. In Chapter 3 "Rice Cultivation Techniques in Thailand" and Chapter 4 "Irrigation Facilities" he describes the technical production conditions of rice mainly with regard to irrigation, while in Chapter 5 "Land Utilization" and Chapter 6 "Regional Structure of Rice Cultivation in Thailand" he reaches a conclusion concerning the question he raises earlier in this book, the regional classification in regard to the type of

¹ Ministry of Agriculture, Thailand, *Agriculture in Thailand*, Bangkok, 1957, p. 134.

rice cultivation. In the first place, he examines land utilization by critically appraising various kinds of data and materials and points out the following fact: Whilst it is true that rice occupies a leading position in that 63 per cent of farmland is utilized for rice cultivation, the area of tree crops such as rubber and fruit and that of dry field crops other than rice both exceeded 5 million lais in 1954, and this area expanding at an unexpected rapid rate. Then he proceeds to explain the economic background of the four regions, in which he divides the whole country from the standpoint of natural conditions and economic development.

They are:—

Northeastern region — where glutinous rice is extensively cultivated, and where agricultural produce is grown mainly for home consumption (Average rainfall: 1,500–2,000 millimetres)

Northern region — where two crops of glutinous rice are raised a year for home consumption, dry field crops are cultivated for sale (Average rainfall: 1,000–1,500 millimetres)

Southern region — where ordinary rice is raised for home consumption, rubber and fruit are cultivated for sale (Average rainfall: 1,500–2,000 millimetres)

Central region — where one crop of ordinary rice is cultivated for sale (Average rainfall: 1,500–2,000 millimetres)

Then, he states that rice is raised as commodity in the northeastern, northern and central regions and that fruit and dry field crops are cultivated as commodities in the northern and southern regions, thus laying the theoretical foundations for his "maize policy".

Chapter 7 "Producers of Rice in Thailand," and Chapter 8 "Conditions for Rice Farming in Thailand" are devoted to an analysis of the productive capacity of rice farmers and their income. In these chapters the results of prewar research work by Zimmerman¹ and Credner and postwar Thailand Government statistics are arranged so that they may be compared, and the production function is figured out for each region. This will be a fresh and valuable contribution for the students of these matters. Some of the results of his studies which may be interesting to the reader, are shown below without relation to each other:

(1) Thai farmers are in a more advantageous position than farmers in other countries in managing their farms, in view of the fact that nearly 90 per cent of the total area of land under cultivation is owned by the cultivating farmers (this percentage is an average for prewar and postwar years), that they are not burdened either with a heavy land rent or with a high land tax, and that they are free from heavy overheads.

(2) According to a survey of the agrarian economy conducted in 1950, the average agricultural management cost stood at \$74.2 in the central region, \$19.2 in the northern region, \$11.5 in the northeastern

¹ Carl C. Zimmerman, *Siam, Rural Economic Survey, 1930–31*, Bangkok, Bangkok Times Press, 1931, 321 pp.

region. If the average agricultural management cost in the 1930's is expressed in 1950 dollar values, it is \$62.0 for the central, \$20.0 for the northern, and \$9.2 for the northeastern region. There is hardly any difference between the former and the latter figures. In the meantime, however, the average area of rice per farming household decreased by slightly less than 20 per cent in the central region and doubled in the northeastern region, while it remained practically the same in the northern and southern regions.

(3) The above analysis of farmers' agricultural costs shows that neither fertilizer nor equipment constitute an important item in their expenditures in the cultivation of rice in Thailand and that a larger part of it is expended on the purchase of seed. From this fact we assume that the amount of rice production Y is in proportion to that of circulating capital (or it may be assumed that the area of land under rice cultivation is in proportion to it). From this assumption, the production function $Y = bT^{\alpha}L^{\beta}$ may be established. Further, as land is considered to have little weight as land captial from the above-mentioned relations of landownership, it is possible to regard land as an implicit variable and modify the formula as follows: $Y = bT^{1-\alpha}L^{\alpha}$. As in this formula, L represents the amount of labour expended, the amount of crop per unit area is the function of the amount of labour expended per unit area. As a result of computation, the value of α is 0.26 for the northern region, 0.17 for the northeastern, and 0.21 for the central region. It is natural that the marginal utility of land is high in the northern region where irrigation facilities have been developed since olden times and rice is cultivated intensively and that it is low in the highlands where the soil is infertile and where hardly any irrigation facilities are to be found. The fact is, however, that the production of rice is extending into this northeastern region.

In Chapter 9 "Development and Stagnation of Rice Cultivation" the writer reaches a conclusion on historical trends in rice cultivation in that country. So far as figures and conclusions derived directly from his study concerned, findings do not differ much from his predecessors. What characterizes his studies is the way he states his facts. First, he points out that the growth of rice production in Thailand far exceeds the natural increase in the domestic demand for rice, and attributes this situation to the increased export demand and the encouragement of rice cultivation by the state, which profits from increased exports. In Thailand, the interests of the Royal family and those of Chinese merchants encourage the export of rice. In the structure of distribution in which the merchants of Chinese ancestry play a leading role, increased demand from overseas countries for Thai rice was met by the expansion of the area under rice cultivation by farmers. This naturally led to a rapid decline in the average productivity of land under rice cultivation. The author regards this tendency as "stagnation."

The Rice Economy of Monsoon Asia by Wickizer and Bennet¹ is a respected and classic study. But their conclusion that because of the incredible increase in population in Southeast Asia farmers would have to work harder, tightening up their belts, cannot be agreed to, and Old Malthus is seen lurking behind this conclusion. To say the least, it appears that Mr Hasegawa's view on this question is much more reasonable than that quoted. It would seem that the author sees in Thailand's adaptability to rice cultivation something essentially different from plantation agriculture in other Southeast Asian countries (in which the production structure is thoroughly changed by modern capital) and that he judges that the agricultural structure of that country is such that it can adapt itself with comparative ease to a change in demand. This is the reason why as a solution to this stagnation of rice production, the author points out that there is still room for land improvement and other technical improvements but at the same time proposes the following with greater emphasis by way of a conclusion: "It would be necessary to lead farmers and help them to find other crops with greater marginal productivity. Because of strong tradition and conventions, and their lack of knowledge of other crops than rice, farmers are incapable of thinking of replacing rice with other crops."

2. Structure of Rice Market

As previously mentioned, the author is a practical expert on the Thai rice market. Consequently, his descriptions and explanations are detailed and vivid and present in such a way that the reader cannot but agree with him. It is a matter of regret that space does not allow a fuller description.

In Chapter 10 "Domestic Distribution Structure of Rice in Thailand" he begins with a graphic description of the floating market and analyzes on the basis of ample data and materials the relations between rice brokers, rice forwarding agents and rice polishers, and makes an estimate of the amount of rice produced as a commodity. According to his estimate, farmers sell a half of their production, and 70 per cent of the rice is supplied to the market by the central region, which also produces 90 per cent of the rice for export. In Chapter 11 "Delivery of Rice and Formation of its Domestic Price" the author explains the fact that the price of Thai rice is based on the price of unhulled rice in Bangkok and that in spite of this, the southern market and the Chanthaburi market in the southeastern part of the central region are relatively independent. He also points out that fluctuations in the price of unhulled glutinous rice follow a different course from that of ordinary unhulled rice, reflecting their nature as a domestic commodity and a world market commodity, respectively.

In Chapter 12 "Export Structure of Thai Rice" the author says that

¹ V. D. Wickizer, and M. K. Bennet, *The Rice Economy of Monsoon Asia*, California, Food Research Institute, Stanford University, 1941, 358 pp.

Hongkong and Singapore are the main export markets for Thai rice and that, therefore, the price of Thai rice is under the control of Chinese merchants, and then proceeds to explain prewar and postwar changes in the export structure. Japan made its debut as a purchaser of Thai rice in the postwar period, bringing about considerable changes in the patterns of export. But Japan's position as an importer of Thai rice soon declined and Thai rice gradually returned to dependence on the Hongkong and Singapore markets. This part of the book serves as an introduction to an analysis of the price fluctuations of Thai rice, with which he deals in the following chapter.

Chapter 2 and Chapter 13 "Formation of Export Price and Its Fluctuations" are the most interesting chapters in this book. Continuing his discussions of the previous chapter, he analyses the process of export price formation and factors of its fluctuation, paying attention to a time lag between the price fluctuations of unground rice and those of ground rice, in order to find a clue to an index to predict rice market tones.

First, the relations between 1922 and 1938 of the price fluctuation rate of unground rice with that of ground rice are expressed by $\log Y = 0.180 + 1.000173 \log X$ ($r=0.9906$). (Y represents the price of unground rice and X that of ground rice.) This formula may be replaced for practical purposes with $\log Y = 0.180 + \log X$. Therefore, $Y = 1.51X$, or $X = 0.662Y$, or $X = \frac{2}{3}Y$. As the prices of unground and ground rice fluctuate in close inter-relationship with each other, the price relations between the two are balanced and the export market is quiet when the relationship of $X = \frac{2}{3}Y$ is maintained. When the relationship of $X > \frac{2}{3}Y$ is maintained, the increase rate of the price of ground rice is higher than that of the price of unground rice, and the export price is firm in tone. When the relationship of $X < \frac{2}{3}$ is maintained, the decline rate of the price of ground rice is higher than that of the price of unground rice, and the export price is weak in tone. If the prices of ground and unground rice in a given year are set at Y_n and X_n respectively, $\frac{\Delta X_n}{X_n} / \frac{\Delta Y_n}{Y_n} > 1$ when the price of Thai rice is on the uptrend; and $\frac{\Delta X_n}{X_n}$ and $\frac{\Delta Y_n}{Y_n}$ are positive. But when the price is on the downgrade, $\frac{\Delta X_n}{X_n} / \frac{\Delta Y_n}{Y_n} > 1$, $\frac{\Delta X_n}{X_n}$ and $\frac{\Delta Y_n}{Y_n}$ are negative. From the values obtained from the formulas $\frac{\Delta X_n}{X_n} / \frac{\Delta Y_n}{Y_n}$ showing the fluctuation rate and $\frac{X_n}{X_0} / \frac{Y_n}{Y_0}$ showing the market tone, it will be seen that the price movements of Thai rice are characterized by the following four features:

- (1) A typical price-rising period marked by a firm market tone and a fluctuation rate higher than 1.00;
- (2) A price-adjustment period marked by a still strong market tone

- and a fluctuation rate lower than 1.00;
- (3) A typical period of price decline marked by a weak market tone and a fluctuation rate higher than 1.00; and
 - (4) A price-adjustment period marked by a weak market tone and a fluctuation rate lower than 1.00.

The situation has changed in the postwar period due to various factors, but 10 per cent polished rice and A_1 Special may still be regarded as representative items for unground rice and ground rice, respectively. So, if we take their prices in January and July from 1953 to 1959 for computation, the following will be clear: the price fluctuation $(\frac{\Delta X_n}{X_n} / \frac{\Delta Y_n}{Y_n})$ of ground rice is sharper than that of unground rice, the value $\frac{X_n}{X_o} / \frac{Y_n}{Y_o}$ is larger than 1.00 in the price rise period, and the value of $\frac{X_n}{X_o} / \frac{Y_n}{Y_o}$ is smaller than 1.00 by the same reason in the price decline period. This means that the rule established by experience in prewar days is applicable in principle to the postwar situation. A difference is observed between the price fluctuation of unground rice and that of ground rice, owing to the fact that ground rice is regarded as an inferior foodstuff and used as an industrial raw material and animal feed. Therefore, when rice is in short supply, demand for ground rice becomes very strong, but it declines sharply when the demand-supply situation is balanced or rice is in oversupply. No optimism is warranted for the future export of Thai rice, inasmuch as its price levels are relatively higher than those of American rice. This is the conclusion he reaches in this chapter.

3. Postscript

This book is in no way complete. Its major defect is that throughout this book the author does not go beyond conducting a micro-analysis in empirical analysis. Further, it cannot be overlooked that although he attempts to clarify the connections between production and distribution, he does not seem to have succeeded in this respect.

In spite of these defects, however, his work may be said to compare favourably with the work of his predecessors in Europe and the United States in that it throws new lights on various basic questions on Thai rice, in view of the development policy applied to this country. The author will be satisfied if the careful reader will study this book with insight and realize its implied political significance as well as the fact that behind the word "rice", he will find the word "maize".

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