

## PRICE FACTORS, CHANGES, AND RELATIONSHIPS

There is no international market for rice comparable with the international wheat market of western Europe, where a great number of types and grades of wheat from many different sources regularly compete with one another, as well as with other grains. The rice trade is less highly commercialized. Hence one cannot expect to find for rice as detailed and precise a record as exists for wheat, with regard either to prices or to the particular types, varieties, and grades to which prices refer. Lacking a full record of price facts, one cannot expect to present for rice a coherent set of explanations that account for the facts. Yet the record of rice prices during the past two decades warrants discussion, and leads to a few conclusions of interest and significance.

## RICE AND OTHER GRAIN PRICES

Like any other grain, rice, as it is bought and sold on grain exchanges, is not a homogeneous commodity with a single price at any moment. The price ranges of the several grains, though overlapping, may nevertheless be differentiated one from the other by selection of the price of a particular type or grade of each as reasonably representative of the range of prices of the several types or grades exchanged. In this sense one may properly speak of the price of rice and compare it with the price of wheat, maize, or any other grain.

Rice, as grain, at least if quoted in terms of cleaned or of brown rice and not of paddy, appears in many markets to be consistently the most expensive of the cereals per 100 pounds. This was the situation in the British grain market, where all grains were imported free of duty before 1933 (see Chart 12, p. 136); it was also true in northern China under substantially the same conditions of free trade. There are no

data to indicate whether or not the same relative premium position of cleaned rice over other grains would hold under all circumstances of free trade—as for example in a market (if any existed) from which a surplus of rice was exported but to which other grains were imported; or in a free-trade import market like Singapore, close to a rice-surplus region but far from regions with surpluses of other grains. In such markets, given the presence of trade in other grains, rice might not enjoy a premium position over wheat, perhaps not even over one or another of the inferior cereals.

If in a grain-deficit country tariffs or other import controls are imposed differentiating against or in favor of rice as compared with other grains, the price relationships may of course differ from what they would be without controls. Thus in France, wheat has been kept much more expensive than rice, in furtherance of protection to domestic wheatgrowers, coupled with a policy of absorption of the rice surplus of French Indo-China. On the other hand, rice in Japan has presumably been held at a higher premium over wheat than a free-trade system would have permitted.

Within Monsoon Asia, if the inferior cereals come into competition at all, they seem everywhere to be cheaper than either rice or wheat. As to rice and wheat, it seems reasonably clear that cleaned rice must normally be more expensive per 100 pounds in the wheat-surplus and rice-deficit regions of northwestern India and northern China, in Japan, and probably also in Chosen and Taiwan. In the first two of these regions, rice must be brought from considerable distances and must bear the costs of transportation, whereas wheat is locally produced. In the Japanese Empire, the protective system helps to keep rice at a premium.

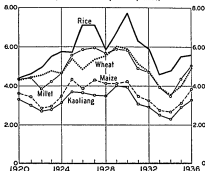
Elsewhere, however, there is next to no competition between the two grains in the form of grain. In southern China, the Philippines, the Netherlands Indies, the Indo-Chinese Peninsula, Ceylon, and eastern India, such competition as exists is between rice produced within the region and wheat

flour imported from more distant sources of supply, largely Australia and North America. Price comparisons of rice with wheat flour are not feasible. A fair presumption may exist that wheat flour is ordinarily—but not invariably—more expensive than cleaned rice in these regions, because it is brought in from distant sources; but the price record is not available to test the presumption.

China is a region where most of the cereals compete. Chart 11 shows annual average prices per 100 pounds of five

CHART 11.—WHOLESALE GRAIN PRICES IN NORTH CHINA,  
ANNUALLY 1920-36\*

(Chinese dollars per 100 pounds)



\* Data from Nankai Institute of Economics, *Nankai Index Numbers, 1936* (Nankai Univ., Tientsin, March 1937), pp. 9-10; converted from shih to weight units.

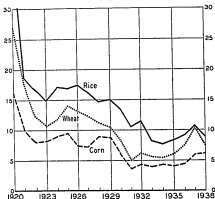
grains in that region from 1920-36. Rice commanded the highest price in every year, kaoliang and maize the lowest. Wheat and millet stood in an intermediate position, on the whole closer to rice than to maize and kaoliang; in 11 years of the 17, wheat prices were above millet prices, but the position was reversed in the other six years.

The spreads were not constant, but variable. This would

be expected in any market if only because supplies of the several grains either locally or world-wide do not bear constant relationships each to the other from year to year. Moreover, in the British import market, the price spreads between any two grains vary more or less from year to year, though (as Chart 12 shows) rice tends to exceed wheat in price, and

CHART 12.—AVERAGE PRICES OF CEREALS IMPORTED INTO THE UNITED KINGDOM, 1920-38\*

(Shillings per cent.)



\* As deduced from quantities and values given in Great Britain, *Accounts Relating to Trade and Navigation of the United Kingdom*.

wheat to exceed maize. If in any market, differential tariffs or other import controls are imposed, previously established price relationships will tend to be altered. Application of export subsidies may likewise affect price relationships in the exporting country, and perhaps also in the importing one.

In northern China, rice has often brought a price 25 per cent above that of wheat, and 75 per cent above that of maize. In the British market, the percentage differentials have ordi-

narily been smaller. Little is to be gained, however, by attempting to determine what differentials are normal for Monsoon Asia as a whole. If price records were available in Bombay, Calcutta, Singapore, Batavia, Rangoon, Hong Kong, and Manila, one would expect to find in the grain-price relationships not uniformity, but substantial differences—though with rice and wheat (or wheat-flour) prices tending to stand above the prices of other grains.

It seems probable that, over the past half-century or more, wheat has tended to become cheaper in relation to rice. On British markets, this is suggested by the following index numbers of prices (average for 1867-77 = 100):<sup>1</sup>

Period	Wheat			Rice	Ratio wheat to rice
	English Gazette	Americana	Average	Rangoon cargoes to arrive	
1867-77.....	100	100	100.0	100	1.00
1878-87.....	73	78	75.5	80	.94
1890-99.....	52	56	54.0	63	.86
1904-13.....	58	64	61.0	77	.79
1922-39.....	85	94	89.5	152	.59
1931-39.....	48	58	53.0	93	.57
1939.....	39	54	46.5	111	.42

It is suggested also by Chang's<sup>2</sup> study of prices in Kiangsu province of China (a rice-wheat region 130 miles from Shanghai), covering the 33-year period, 1894-1926. He found average annual increases of 3.4 per cent in the price of late rice (unhulled) and 3.3 per cent in that of white rice (polished), but only 2.9 per cent in that of wheat. Jasny's<sup>3</sup> investigations show that wheat prices have tended strongly to come nearer the price level of other grains excluding rice. Wheat seems therefore to be tending to become cheaper in

<sup>1</sup> The Editor of "The Statist," "Wholesale Prices in 1939," in *Journal of the Royal Statistical Society* (London), N.S., Vol. CIII, Part III, 1940, p. 356.

<sup>2</sup> L. L. Chang, *Farm Prices in Wuchin, Kiangsu, China* (China Ministry of Industry, Bur. Foreign Trade, Booklet Series 19, Shanghai, June 1932), p. 36.

<sup>3</sup> *Competition among Grains*, esp. pp. 186-92.

relation to other grains generally, rice included. If this tendency should continue, and wheat becomes cheaper in relation to rice in Monsoon Asia, wheat consumption may be expected to expand, especially at the expense of the inferior cereals.

#### DIFFERENTIALS IN RICE PRICES

The record of rice prices in the principal rice markets is so fragmentary that little can be said of "normal" relationships. As between identical grades in different markets, export prices must obviously be lower than c.i.f. duty-free import prices by at least the inclusive costs of transport,<sup>4</sup> in the absence of price support and export bounty in the exporting countries. The following tabulation shows Rangoon and London prices of Burma No. 2 rice, in gold francs per quintal, together with ocean freight costs in selected years:<sup>5</sup>

Year	Prices		Spread		
	London	Rangoon	Total	Freight <sup>4</sup>	Other
1927.....	36.11	28.68	7.43	3.72	3.71
1928.....	34.03	26.05	7.98	3.29	4.69
1929.....	32.72	25.59	7.13	3.05	4.08
Av. ....	34.29	26.77	7.51	3.35	4.16
1936.....	11.71	8.23	3.48	1.80	1.68
1937.....	13.72	8.83	4.89	2.03	1.96
1938.....	12.19	8.41	3.78	2.37	1.41
Av. ....	12.54	8.49	4.05	2.37	1.68

<sup>4</sup> Burma-United Kingdom/Continent.

The total spread between import and export price averaged about 23 per cent of the import price in 1927-29, about 32 per cent at the lower price levels of 1936-38. Freight rates declined much less than import or export prices, while other

<sup>4</sup> Export prices of rice as quoted in the exporting countries include sacks but not export duties. Hence spreads between export and import prices cover the export duties as well as the more usual inclusive costs of transport.

<sup>5</sup> From International Institute of Agriculture, *International Yearbook of Agricultural Statistics*, 1931-32 and 1936-39 (Rome, 1932, 1939).

elements in the spread, presumably including the profits of exporters, declined more than freights but proportionately less than rice prices. The spreads between export prices and import prices in nearer markets like Singapore, Hong Kong, and Ceylon would have been smaller than the London-Rangoon spread; but the available evidence is insufficient to establish either the general relationships or particular changes during the past two decades.

Appendix Table VIII (pp. 330-31) provides some limited evidence on price differentials in several markets of Monsoon Asia. In the import market of Singapore, what is known as "Siam No. 2" rice is consistently more expensive than those termed "Rangoon No. 1" or "Saigon No. 1," and Saigon No. 1 is usually though not invariably more expensive than Rangoon No. 1. In the import markets of Java, Rangoon rice is consistently more expensive than Saigon rice. The grades quoted are not specified, but both are probably lower than the qualities of foreign rice imported into Singapore. The general relationship is apparently that rice from Thailand occupies a premium position, that from Indo-China a discount position; this is probably a reflection both of the types of rice produced and of grading and marketing practices (see p. 80), and possibly also of consumer preference.

In Japan, as a reflection of well-defined consumer preference, domestic rice obtains premium prices; that from the colonies sells at a small discount as does rice from California; and rice from the major rice exporters of the Indo-Chinese Peninsula suffers the largest discount.

Within each of the exporting countries, the rice-price structure reflects millers' preferences for certain types of paddy and the milling results obtained. Price differentials between grades of the same variety of rice in large part reflect the content of broken kernels.<sup>9</sup> Other factors in judging quality

<sup>9</sup> The fact that Japanese types of rice can be milled without great breakage may be one reason for the Japanese practice of partial milling on the farm (p. 75). Conceivably this may also have something to do with the Japanese preference for Japanese types.

from a commercial standpoint are: color and uniformity of the grains; amount of foreign matter; percentage of unhulled, damaged, or chalky grains; mixture of other varieties; and general appearance.

Despite some pronounced preferences on the part of Oriental rice eaters, one finds little evidence of wide price differentials between types and varieties of rice on Asiatic markets. This is presumably attributable to the fact that where such preferences are strongest, radically different rices are seldom found in important volume in the same market. In the Occident, appearance and length of the grain seem to be the chief basis of consumer preference. Neither convenience or ease in cooking, nor flavor or texture, seems to loom so large.<sup>7</sup>

The typical Asiatic rice consumer is able to distinguish very sharply between different types of rice and apparently has strong preferences for some varieties over others. The basis for such highly developed preferences is not wholly clear. Why the Japanese prefer one flavor and the natives of Thailand another appears to be based partly upon taste that has been developed over generations. Rice varieties adapted to the soil and climatic conditions of one region probably possess flavor characteristics differing from those adapted to other regions. When conservatism is so strong in matters of taste and when the population tends to be immobile, the local consumer might well be inclined to regard rice grown in more distant regions and possessing different flavors as in some vague sense inferior. Furthermore, the extent to which rice is consumed in the Orient tends perhaps to develop discriminations beyond the comprehension of the typical Western consumer.

It is probably impossible, however, to determine the precise basis for preference in different localities. It is certainly

<sup>7</sup> Western consumers are not typical of rice eaters generally, and the dishes prepared from rice are usually quite different from those more common in the Orient. A tendency toward "mushing" when cooked, for example, is not objectionable in a rice pudding, whereas in curry and similar dishes maintenance of the whole grain throughout cooking and serving is much desired.



not wholly a chemical matter. Texture of the boiled product may be even more important. If one asks intelligent Japanese, Chinese, Filipinos, and Javanese why they dislike certain types of rice, they are not able to give a clean-cut answer. Usually they can do no better than to say that the rice in question is "coarse." Sometimes they add "and poor in flavor."<sup>8</sup>

Preferences based upon cooking properties vary. The Chinese, for example, generally prefer their rice firmer than do most Orientals, notably the Japanese, and they carry this preference with them wherever they migrate in southeastern Asia. The desirability of a "solid" or "soft" grain may depend upon the manner of eating the cooked product—whether it is consumed along with other foods or as part of a mixture with other foods or sauces. In the case of parboiled rice, both convenience of preparation and taste of the cooked product are factors involved in its use. Parboiled rice may be prepared the night before it is consumed and is palatable as a cold dish. It is particularly suitable to plantation conditions where time and facilities for cooking are commonly not available. Japan-type rice is also palatable when cold, but China-type rice on standing after the first cooking becomes dry.

The rice produced in Chosen and Taiwan was once quite different in quality and taste from that grown in Japan and therefore was less acceptable in the Japanese market. It was regarded with the same disfavor as rice grown in southeastern Asia. Japanese scientists succeeded in developing for the colonies varieties that now differ little from rice produced in Japan Proper. Inasmuch as the Japanese have long been under pressure to increase the rice output of the Empire, it is probable that in the development and introduction of im-

<sup>8</sup>One Japanese explanation of the Japanese preference has been that foreign rice "has a coarse skin of cells which contain protein, and do not break when the rice is boiled, thereby producing a tough and unpalatable food. . . . the cell skin of the Japanese product is soft and easily broken when boiled, and the protein content therefore produces a glutinous effect which makes this rice soft and more tasteful." See Ryosichi Ishii, *Population Pressure and Economic Life in Japan* (Chicago, 1937), p. 146. Hawaiians of Japanese blood have told one of the authors that, in their opinion, the prominent difference between Japan-type and China-type rice is not flavor or aroma, but relative softness and moistness of the Japan-type rice after cooking.

proved varieties much emphasis was placed upon high-yielding characteristics. In general, rices regarded as superior in flavor are not heavy yielders. Perhaps the strongly developed Japanese preference for Japan-grown rice has undergone modification during the course of the government's efforts, dating back to the Tokugawa Era (beginning of the seventeenth to the middle of the nineteenth centuries), to provide sufficient rice for its people. Rice was at one time at the root of practically all economic problems of the country, and government control measures were designed chiefly as protection against famine and military insecurity.

British Malaya is another area where differences in consumer preferences for rice are marked. The explanation seems to lie in the presence of large numbers of Chinese and Indians in the population. Both groups are comparatively recent arrivals, and their preferences differ from those of the native Malays. The Bengalese and the Javanese also discriminate sharply among different types of rice. It has been reported, for example, that Carolina rice grown in Calcutta could not be sold by any native dealer but had to be exported to London; that even famine could not induce the Bengalese to eat Burmese rice in Bihar in 1874;<sup>9</sup> and that Carolina rice grown in Java had to be exported to Holland.<sup>10</sup> Just how much reliance can be placed upon such reports is difficult to say at this distance, but it is hard to believe that starvation would be preferred to an unfamiliar or foreign rice.

However, reasons seem to exist for large premiums on highly favored types of rice, and heavy discounts on types not preferred. Yet most of the statistical evidence refers to price differentials between grades of a given variety that are based not upon consumer preference but upon the percentage of broken kernels in each grade. In order to perceive clearly whether or not consumer preference in fact gives rise to large

<sup>9</sup> J. van E. de Haan, "Waarom de Teelt van Carolina-Rijst in Britisch-Indië weinig ingang vond," *Tijdschrift (Batavia)*, 1903, XIV, 236.

<sup>10</sup> W. R. T. de Haan, "Nogmaals Carolina-Padi," *ibid.*, p. 250.

price differentials, it would be necessary to have price quotations on each of several markets for high-grade rice (containing few brokens) of different types and varieties. Such positive evidence is not available. Fancy qualities and discount qualities are rarely quoted, but more important—and this may be considered a negative sort of evidence supporting the contention that taste preferences for rice are in fact very highly developed in Oriental countries—foreign rices held generally in disfavor in a particular region would not be imported to local markets except in an emergency, or for nonfood uses, and hence prices of such rices would not be quoted with regularity.

#### ELASTICITY OF DEMAND

The demand for rice for human consumption, though it cannot be characterized with precision, undoubtedly consists both of elastic and of inelastic elements.

As previously shown, the demand in the Japanese Empire is for home-grown rice of the Japanese type, rather round-grained and relatively nonvitreous. The colonies of Chosen and Taiwan produce a closely similar type of rice almost equally acceptable to the Japanese. California rice, similar in type, ranks next in acceptability in Japan. Least desired are the types from Burma, Thailand, and Indo-China. The demand of the Japanese Empire as a whole is probably inelastic in large degree, as judged by the small range in quantities consumed from year to year in Japan Proper, which seldom differ by as much as 5 per cent from one year to the next.<sup>11</sup> It may be more elastic in Chosen and Taiwan.

Quantitatively much more important is the local demand from the rest of Monsoon Asia. It is mainly for ordinary rice, not highly milled, and is probably in the main elastic in character. But a small demand, probably inelastic, exists

<sup>11</sup> See C. E. Campbell, *Factors Affecting the Price of Rice* (U.S. Dept. Agr., Tech. Bull. 237, April 1932), p. 47.

among upper-class and middle-class natives for medium and fancy qualities of rice; and the demand for imported rice into Malaya and Ceylon must be regarded as rather inelastic because imports show so little variation from year to year (Chart 7, p. 96).

The demand from non-Asiatic countries, chiefly Europe, for rice from Monsoon Asia is mixed in character. Considerable medium-grade and some fancy-grade rice is taken to serve a market presumably inelastic. But a good deal of poorer-quality rice was formerly and has recently been absorbed for industrial uses and animal feed, typically a very elastic type of demand.

In sum, the elastic elements appear to predominate in the demand for rice produced in Monsoon Asia. But, outside of the Japanese Empire, little demand exists for carrying stocks from one year to another (see p. 82). In general, the conditions of demand seem to be such that fluctuations in consumption of rice produced in Monsoon Asia would be expected to parallel fluctuations in crops rather closely, and that prices would move within rather narrow ranges so far as demand might affect the price changes.

#### VARIABILITY OF SUPPLY

The conditions of supply, on their part, are such that only moderate fluctuations in rice crops would be expected. Natural conditions, methods of cultivation, and the incentives of producers all contribute to stability of supply. The hazard of deficient moisture is in considerable degree obviated both by the natural abundance of rainfall in the major producing areas, and by the prevalence of irrigation. Acreage is likely to change little from year to year because so much rice is grown on paddy land not readily shifted to other uses, because it is so largely a subsistence crop produced on small holdings under primitive methods, and because enlargement of the paddy acreage is necessarily a slow process. If coefficients of variation of the world wheat crop excluding China

and the USSR and of the rice crop of Monsoon Asia excluding China are compared, the wheat crop—though itself more stable than many crop-production series—has a variation of 5.4 per cent over the period 1920–39, whereas the rice crop has a variation of only 3.0 per cent.<sup>12</sup> So much of the world's wheat crop is grown in subhumid and semiarid climates and thus subjected to a major hazard of yield, and acreage is so readily expanded (but less readily contracted) under mechanized farming, that this contrast between wheat and rice would be expected. In India, the coefficients of variation are 6.8 per cent for wheat, 5.5 per cent for rice. The less marked difference than in "world" crops is probably explained largely by the fact that irrigation of wheat is much more important in India than in the world as a whole. More than two-fifths of the Indian wheat crop is irrigated, but less than one-fourth of the rice crop.

Within Monsoon Asia, however, the degree of variability of rice production seems to differ appreciably from region to region. Charts 13 and 14 show trends and fluctuations in the rice crop of Monsoon Asia (excluding China) and in various parts of the area. In India as a whole and the two specified major parts of it, production has tended to remain at about an even level during the past two decades. So far as the statistics can be trusted,<sup>13</sup> the upward trend in total output, as Chart 14 shows, has come elsewhere—in all of the non-Indian regions except China, where the trend is unknown.

<sup>12</sup> If the rice crop of China and the wheat crops of China and the USSR could be included in the calculations, the results of such a comparison might be different. Some official estimates of the Chinese rice crop are available from 1931 to 1936, as follows, in million metric tons of cleaned rice:

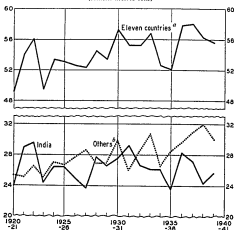
1931 .....	28.7	1934 .....	26.1
1932 .....	33.0	1935 .....	32.0
1933 .....	32.2	1936 .....	32.0

The largest crop, that of 1932, was 26 per cent larger than the smallest crop of 1934 (a year of drought). In India, the percentage variation in the same years from smallest crop (1935) to largest (1931) was 24 per cent; in the Japanese Empire (1934 and 1933), 25 per cent; in the three major rice exporters (1931 and 1933), 17 per cent; and in other countries of Monsoon Asia as a group, 14 per cent between 1931 and 1936.

<sup>13</sup> For comment on the probable reliability of statistics of acreage, yield per acre, and production, see chapter ix, pp. 197–99.

CHART 13.—RICE PRODUCTION OF INDIA IN RELATION TO THE PRODUCTION OF OTHER COUNTRIES OF MONSOON ASIA (EX-CHINA), 1920-21 TO 1939-40\*

(Million metric tons)



\* Data from Appendix Table II.

\* Monsoon Asia, ex-China.

<sup>b</sup> Monsoon Asia, ex-China and ex-India.

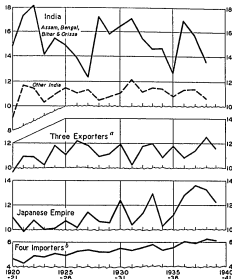
Coefficients of variation of production, 1920-39, in the five regions shown in Chart 14, are as follows, in percentages:

Eastern India .....	8.4 per cent
Other India .....	4.2 per cent
Japanese Empire .....	6.0 per cent
3 exporters .....	4.4 per cent
4 importers .....	2.7 per cent

Variability appears to be greatest in northeastern India (Bengal, Assam, and Bihar and Orissa); in large degree the variations of rice output in this part of Monsoon Asia give rise to the fluctuations in aggregate output of the whole region,

CHART 14.—RICE PRODUCTION OF SELECTED GROUPS OF COUNTRIES OR PROVINCES IN MONSOON ASIA, 1920-21 TO 1939-40\*

(Million metric tons)



\* Data from Appendix Table II and India Dept. Commercial Intelligence and Statistics, *Estimates of Area and Yield of Principal Crops in India*.

\* Burma, Thailand, and French Indo-China.

<sup>b</sup> Ceylon, British Malaya, Netherlands Indies, and Philippine Islands.

China excluded. But, particularly in the past decade, the Japanese Empire has also contributed substantially to fluctuations in the Asiatic rice crop, while the crops of the three exporters, of "Other India," and especially of the four importers, have varied less.

These coefficients of variation of crops reflect several sets of influences, including changes in acreage, changes in yields,

and changes in statistical methods of estimating production; and manifold influences affect each of these. No effort can be made here to offer adequate explanation of the differences between the several coefficients. It is perhaps not surprising to find production more variable in northeastern India than in "Other India," since only about one-seventh of the rice acreage in the northeast is artificially irrigated, as against one-third in the rest of the country. On the other hand, the greater variability of output in the Japanese Empire than in the three exporting countries seems surprising, in view of the higher degree of intensity of cultivation, wider use of irrigation, and lesser exposure to hazards at least of flood in Japan Proper. Similarly, the much greater variability of output in the Japanese Empire than in the four importing countries (among which Java is much the largest producer) might not be expected in view of the differences in climate and methods of cultivation. But perhaps the Japanese Empire is the more exposed to hazards of drought, typhoons, and low temperatures. In any event, the qualifications necessary in the interpretation of such computations are sufficiently numerous to make definite conclusions unwarranted.

#### PRICE CHANGES SINCE 1920

One ultimate effect of demand and supply conditions for the rice of Monsoon Asia is that rice prices are somewhat less variable from year to year than wheat prices. This is shown by the following average annual percentage changes in the prices of each cereal in specified exporting countries over the 15-year period from 1925 to 1939:<sup>14</sup>

Rice		Wheat	
Burma (Rangoon) .....	12.6	Canada (Winnipeg) .....	19.7
French Indo-China (Saigon) .....	15.6	Argentina (Buenos Aires)...	17.2
Thailand (Bangkok) .....	16.3	Australia .....	17.8

<sup>14</sup>Wheat prices for crop years 1934-35 to 1939-40 are taken from series regularly carried in *Wheat Studies*; rice prices are of representative export grades as in Appendix Table VIII (for Thailand 1925-26 only). All prices converted to the common basis of gshl.



The most significant of the rice-price series, that for rice exported from Rangoon, shows the greatest stability of all; and it is much less variable than Winnipeg prices of Canadian wheat, also a very significant series.

Broad features of rice-price movements in Monsoon Asia since 1920 are summarized in Charts 15 and 16 (pp. 150, 151).<sup>15</sup> Index numbers of prices as quoted in the domestic currencies, and of these prices as converted to gold values, are shown in both charts, for three importing countries in Chart 15 and for three exporting countries in Chart 16.

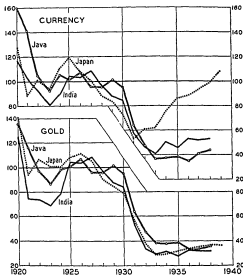
The diversity of price fluctuation shown by the currency prices warrants little comment. Among the three importers, Japanese currency prices deviated most from their gold equivalent, reaching their interwar low in 1931 rather than in one of the years 1934-36 as occurred elsewhere, and rising persistently after 1931 to a level (in 1937-39) not far from their average level of 1925-29. Conversely, currency depreciation was least marked in Java, where currency prices moved fairly closely in accord with their gold equivalent. Among the three exporters, Indo-Chinese currency prices deviated most widely from their gold equivalent, especially in 1929 and 1930 following depreciation of the French franc (to which the Indo-Chinese piaster was tied) in 1928, and again after 1936.

In view of the fact that Burma was a part of India up to 1937, with the same currency, holding the same relationship to British currency and without trade barriers between the two, it is interesting to observe that Calcutta prices moved in the opposite direction from Rangoon prices in nearly half of the years in the past two decades, and in several other years fluctuated either substantially more or substantially less though in the same direction. These developments pre-

<sup>15</sup> No attempt is made to take into account price developments following the outbreak of war in Europe. Shortage of shipping space, an unexpected deficit in the rice supply of the Japanese Empire, and attempts to build emergency stocks in several importing countries, all conspired to raise the export prices of rice to levels not attained since the late 1920's.

CHART 15.—CURRENCY AND GOLD PRICES OF RICE IN INDIA, JAVA, AND JAPAN, SINCE 1920\*

(Index numbers: 1925-29 = 100)

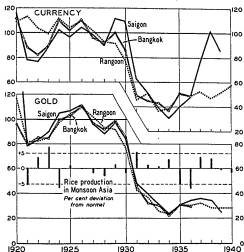


\* Based on data in Appendix Table IX.

sumably reflect changes in local supplies of particular grades or types of rice, much as the price of such a grade of wheat as No. 2 Hard Winter at Kansas City may at times move differently from the price of such a grade as No. 1 Dark Northern Spring at Minneapolis. But particularized information is not available concerning variations in the supplies respectively of Ballam No. 1 rice in India and Big Mills Specials in Burma.

CHART 16.—RICE PRICES IN BURMA, THAILAND, AND FRENCH INDO-CHINA  
IN RELATION TO VARIATIONS IN SUPPLY, 1920-40\*

(Index numbers: 1925-29 = 100)



\* Based on data from Appendix Tables II and VIII.

If attention is focused upon the movement of gold prices in the importing countries since 1925, conspicuous exceptional developments appear in the relatively high level maintained by Javanese prices in 1929-30 and also in 1933-35. The high levels of 1929-30 probably reflect the short Javanese crops in 1928 and 1929 (Chart 21, p. 198), and the relatively well-maintained levels of 1933-35 reflect price effects induced by introduction of an import-licensing system and tariff duties in 1933, plus the influence of the short crop of 1934. Import controls in the Netherlands Indies and Japan apparently helped to keep the level of domestic prices in

terms of gold from falling to as low a level, in the period 1933-39 as compared with 1925-29, as was true in the exporting countries. Gold prices of rice in the importing countries moved in 1933-39 at levels which were only 28-38 per cent of their 1925-29 levels. The arsenal of weapons available to combat price deflation and to protect domestic rice producers was, as usual, more ample for importing than for exporting countries.

If attention is focused upon the course of gold prices in exporting countries since 1925, perhaps the most conspicuous deviation from general rice-price trends is the failure of prices at Rangoon to rise between 1928 and 1929 along with prices at Bangkok and Saigon. This may also be explained by changes in the geographical distribution of crops. On the side of the exporters, Burma had a good crop for sale in 1929, a little larger than in 1928; while both Indo-China and Thailand had much smaller crops available for sale in 1929 than in 1928.<sup>14</sup> On the import side, the crop of India, Burma's chief market, was considerably larger in 1929 than in 1928, making for smaller demands upon Burma; the situation was reversed in certain markets naturally more readily open to Indo-China and Thailand, namely, Java, the Philippines, and Japan.

The course of gold prices of export rice over the whole period since 1920, however, differs little from one exporting country to another. In general, there was a sharp drop from 1920 to 1921, a moderate rise to 1926, a moderate decline to 1929, a very steep decline to 1934, and gradual stabilization thereafter at a level not much above the low of 1934. With differences as to degree of change, and particularly the timing of the peak in the middle 'twenties, this was also the general course of wheat prices in terms of gold,<sup>15</sup> or of gold

<sup>14</sup> Chart 21, p. 198. The crops there given as those of 1927-28 and 1928-29 may be regarded as available for sale in the calendar years 1928 and 1929.

<sup>15</sup> See Wickizer, "Rice and Wheat in World Agriculture and Consumption," p. 301.

prices of commodities generally in many countries of the world. The broader movements in rice prices (gold) therefore reflect not so much commodity developments within the rice situation itself, as general movements in world prices.

It is in fact difficult to perceive much apparent effect of changes in rice supplies upon rice prices (gold). This would be expected if demand is predominantly elastic and supply is moderately variable but not highly responsive to changes in rice prices. The bottom sections of Chart 16 (p. 151) show changes in the rice crop of Monsoon Asia ex-China, expressed as percentage deviations of crops from trend, in contrast with the course of rice prices in the exporting countries. Prices rose moderately between 1921 and 1922, although the crop for sale in 1921 was more than 5 per cent below "normal," while the crop for sale in 1922 was more than 3 per cent above. Similarly, the large change of crop between 1936 and 1937 brought only a very small increase in price, and a smaller change in crop between 1928 and 1929 that might have been expected to bring a reduction in prices was accompanied by increase in two markets and reduction in only one. On the other hand, it is possible that the large reduction in crop between 1923 and 1924 was a significant price influence, and the changes between 1930 and 1931 and 1934 and 1935 as well. The latter change, at least, was intensified by developments in China, where the crop available for 1935 was more than 20 per cent below the crop available for 1934.

The effect of change in supply upon price thus appears not to be of major importance, at least if "supply" is defined as the rice crop of Monsoon Asia excluding China, as that crop is estimated. Perhaps the estimates are grossly inaccurate. Perhaps crop changes would seem more systematically related to price changes if the Chinese crop could be counted as "supply." Perhaps a more systematic supply-price relationship would emerge if account could be taken of year-end stocks as part of the supply, though this seems improbable

because, outside of the Japanese Empire, year-end stocks seem quantitatively unimportant.<sup>18</sup>

Possibly, or indeed probably, certain segments of the rice supply influence price much more strongly than other segments. It may be that only those parts of the supply that are closest to trade channels, especially in the relatively few important regions where demand is inelastic in type, influence the export prices significantly. Perhaps it is rice supplies particularly in "key" markets<sup>19</sup> of Monsoon Asia, such as Malaya, Ceylon, Java, and the exporting countries, taken in connection with demand from Europe, that might reasonably be singled out as the most important in their bearing on price. In any event, rice output, at least of southeastern Monsoon Asia, seems to be absorbed every year without appreciable change in carryovers, whatever the supply situation, and whatever the distribution of output between exporting and importing countries. Cumulative carryovers, twice or three times as large as annual exports, though known in the wheat world, have thus far been unknown in Monsoon Asia, and seem unlikely even under the stress of war.

#### CHINA AS A "SHOCK ABSORBER"

During the 'twenties and early 'thirties, before governmental policies resulted in near-disappearance of China as a market for rice imports after 1935 (pp. 93-94), a belief persisted that Chinese import purchases tended to act as a stabilizing influence on Asiatic rice prices. The general view was current that China bought heavily when export prices were low, checking extreme price decline, and purchased little when prices were high, checking extreme price advance.

<sup>18</sup> See above, p. 82. In the exporting countries, usually not much more than the equivalent of one month's shipments are ever in the hands of the trade; these are merely working stocks. Carryovers at the end of a season, though not closely estimated, are apparently not much larger. For example, in Burma at the end of 1930 the carryover was "estimated at 150,000 tons, a figure only a little higher than usual" (Burma, *Interim Report*, . . . p. 16). It was less than 6 per cent of the exports of 1930.

<sup>19</sup> Cuba seems to be such a "key" market in the West. Competition from Asiatic rice, especially during months of favorable shipping conditions, affects the volume and distribution of United States exports, with repercussions on the price structure and the industry.

Thus Smits,<sup>19</sup> writing in 1929, found an inverse relationship between rice prices (Ballam rice at Calcutta, India) and Chinese net imports by calendar years, 1909-26. Such a relationship might more or less reasonably be expected in view of the probability that Chinese demand is characteristically elastic, although few would expect to observe a high degree of regularity in the relationship in view of the numerous influences that might well disturb it.

After a sharp rise to 1910 and an equally sharp drop to 1912, Chinese net imports rose steadily to 1916. Rice prices dropped between 1909 and 1910, rose sharply to 1913, then declined slightly to 1914. Thus developments accorded with the theory from 1909 to 1912 inclusive. But from 1914 to 1916 prices rose without apparent discouragement of imports. Net imports into China declined from 1916 to very low levels in 1919 and 1920. The decline from 1916 to the latter part of 1918 would not have been in response to rising prices, since prices fell; but the reduction of imports from the end of 1918 to 1919 and 1920 occurred when prices were rising. Thus the record yields a suggestion of an inverse relationship between price change and import change in this period, but exceptional behavior seems somewhat frequent.

A record of Chinese net imports annually from 1921 to 1935, in comparison with index numbers of export rice prices (gold) at Saigon and Rangoon, is given in Chart 17. Here there is little evidence of inverse relationship between price change and import change. If one compares year-to-year changes of Chinese net imports with year-to-year changes of Saigon rice prices, there are only 6 occasions out of 14 in which the direction of change in imports was opposite to the change in price—namely, 1923 to 1924, 1924 to 1925, 1926 to 1927, 1928 to 1929, 1929 to 1930, and 1931 to

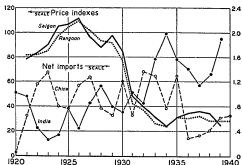
<sup>19</sup> M. B. Smits, *The Rice Situation* (Fourth Pacific Science Congress, Batavia-Bandoeng, Java, May-June 1929), pp. 60-61 and figure 6 opposite p. 60. The inverse relationship was not consistently apparent from 1909 to 1918 and was closest from 1918 to 1926.

1932. If the Rangoon prices are used as the basis for comparison, there are only 5 such occasions; the change of imports from 1928 to 1929 was in the same direction as the change in export price. The evidence of price-import relationship afforded by this chart is certainly unconvincing.

Nevertheless a definitive answer to the assertion that

CHART 17.—NET IMPORTS OF RICE INTO CHINA AND INDIA, AND GOLD PRICES OF RICE AT RANGOON AND SAIGON, 1920-40\*

(Index numbers: 1925-29 = 100; million metric tons)



\* Based on data from Appendix Tables IV and VIII.

Chinese rice purchases tend to stabilize rice prices may well require other evidence than that afforded by Chart 17.<sup>20</sup> Perhaps neither Saigon nor Rangoon export prices serve as a proper basis of comparison; a c.i.f. import price at Hong Kong (unfortunately not available) would theoretically serve the purpose better. It would be desirable also, for so large a country as China, to examine the particular points of import and to ascertain, by study of grain-rice relationships, whether

<sup>20</sup> It might be possible that such an effect tends to occur from week to week or month to month within years; but with this hypothesis we are not concerned here.



rice was imported as addition to rice supply or as substitute for some other grain. It would further be desirable to know whether or not large imports coincided with small Chinese rice crops, small imports with large rice crops. This is feasible only for the years 1932 to 1935 inclusive. Official estimates of Chinese rice crops (p. 145 n.) show small crops available for sale in 1932 and 1935, large crops in 1933 and 1934. The net imports were heavy in both years of small crops, small in one of the two years of large crops (1934), but large in one of the years of large crops.<sup>21</sup> Information concerning the geographical distribution of the rice crop within China, as well as its aggregate size, might help to explain some aspects of import behavior. Possibly shortage or abundance of rice crops in coastal rice-growing provinces would explain import fluctuations better than would crop fluctuations in the interior provinces. Finally, it would be desirable to ascertain whether or not internal political instability, and fluctuations in the price of silver, the basis of Chinese currency until recently, have affected the volume of rice imports.

For what it may be worth, a curve has been added to Chart 17, showing the annual fluctuations of net imports of rice into India. If China has a characteristically elastic demand and acts as a stabilizer of rice prices, it would seem reasonable to suppose that Indian demand might exercise a similar influ-

<sup>21</sup> The probable influence upon imports of fluctuations in the volume of domestic crops is minimized by some writers. Thus Friedrich Otto, in his "Correlation of Harvests with Importation of Cereals into China," *Chinese Economic Journal* (China Ministry of Industry, Bur. Foreign Trade, Shanghai), October 1934, XV, 302 ff., concludes that there is no correlation between quantity or quality of grain crops in China and the volume of cereal imports. Studying rice, wheat, and wheat flour during the period 1918-33, he finds an explanation for the increase in cereal imports between 1918 and 1931 in the abnormal growth of population in large cities without parallel development of agriculture in the environs of the cities; he credits the state of world markets as being the chief cause of increased imports thereafter; and he regards harvest results in the chief producing centers as the last and least influence on cereal imports. P. O. Nyhus, of the U.S. Department of Agriculture (quoted in "Wheat Crop in Important Areas of China below Normal," *Northwestern Miller*, Minneapolis, Nov. 23, 1932, p. 469), concludes that the "imports of foreign wheat at Shanghai during the past five years seem to bear very little relationship to . . . annual changes in the size of the crop in the lower Yangtze Delta . . . ."

ence.<sup>22</sup> Curiously enough, a substantial degree of inverse correlation appears between Indian and Chinese net imports; except on only 2 occasions out of 14, year-to-year changes in Indian imports have been in the opposite direction from the Chinese. We find no basis for explaining this phenomenon.<sup>23</sup> What emerges is that changes in Indian net imports are apparently more closely related (inversely) to changes in export prices than are the changes in Chinese net imports. At least the year-to-year changes in Indian imports were in the opposite direction to price changes in 9 or 10 out of 14 occasions, as against 5 or 6 out of 14 for China.

Furthermore, there appears to be some tendency for Indian net imports to fluctuate inversely with the size of the Indian rice crop, which itself fluctuates mainly with crops in northeastern India (Charts 13 and 14, pp. 146, 147). Year-to-year changes in the crop of northeastern India were opposite to changes in Indian net imports on 10 occasions out of 14 in the period 1921-35. Thus the statistical evidence indicates an elastic demand for rice in India but fails to support the logical belief that Chinese demand is also elastic. Despite the lack of conclusive evidence, it would seem that Indian import demand, though probably elastic, may be less so than Chinese, and the hypothesis may be advanced that China tended before 1936 to act as a sort of residual recipient of rice available for export in Monsoon Asia, absorbing residues unclaimed elsewhere. But the inference and the hypothesis require much more analysis than can be offered here before their credibility can be taken as established.

#### PURCHASING POWER OF RICE

From such fragmentary evidence as is available, it appears that the drastic change in the level of rice prices, from the

<sup>22</sup> The behavior of Indian wheat exports suggests considerable elasticity of domestic demand for wheat; with crops of similar size, exports tend to be large when world wheat prices are high, and low when prices are low.

<sup>23</sup> One reason for hesitating to press explanation is that the Chinese net imports are for calendar years, the Indian for April-March years. It is not at all certain that the apparent inverse relationship would appear so clearly if the two series were strictly comparable.

middle 'twenties to the early 'thirties (Charts 15 and 16, pp. 150, 151), involved a rather general decline in the purchasing power of rice; and that during the 'thirties up to the outbreak of war in Europe, the level of purchasing power of rice, though improving, failed to recover to the position prevailing in the early 'twenties. Costs of living and costs of producing rice declined much less than the price of rice in the steep deflationary movement of 1929 to 1933 or 1934. This was also the case with prices of other agricultural products, both in Monsoon Asia and generally throughout the world, especially among countries customarily exporting agricultural products. The unfavorable position of rice growers, who faced much greater reductions in prices of their chief product than in prices of commodities purchased by them, inevitably generated pressures upon governments toward relief of the economic situation of farmers, the most numerous occupational group among Oriental populations.

Evidence concerning changes in the purchasing power of rice is at best somewhat sketchy. Indexes of wholesale prices in general are available only for five countries or cities within these countries, and in at least two cases are probably not representative for recent years. These are summarized in the following tabulation (average annual wholesale prices, as published by the League of Nations, 1929 = 100):

Year	India (Calcutta)	Netherlands India	French Indo-China (Saigon)	China (Shanghai)	Japan (Tokyo)
1919 .....	139	...	...	...	142
1924 .....	123	117	...	93	125
1929 .....	100	100	100	100	100
1934 .....	63	46	63	93	81
1939 .....	76	59	106	232	126

After at least doubling in several countries between 1913 and the years immediately following the World War, wholesale prices took varying courses downward until 1934-35, after which they rose in all five countries, though by widely different amounts. In China the cheapening of silver and in

Indo-China the depreciation of the French franc, to which Indo-Chinese currency was pegged, were influential in causing the wholesale price level to rise during the late 1920's, when prices in the other three countries continued to fall.

Drastic deflation in all countries during the world depression led to the adoption of different types of monetary policies. Their diverse effects are shown by contrasting the index numbers of 1939 with those of the common base year, 1929. Lowest prices were in the Netherlands Indies (59 per cent of the 1929 level), which adhered to gold although the guilder was devalued, while prices in Indo-China, Japan, and China all rose above the 1929 level, reflecting varying degrees of price inflation or currency depreciation. Chinese (Shanghai) price inflation was most marked, Japanese next. In India, prices rose more than in the Netherlands Indies, but less than in the other three countries.

When rice prices in each of these five countries are compared with wholesale prices generally, some approximation may be obtained of the purchasing power of rice. Index numbers of the purchasing power of rice (rice prices divided by wholesale price indexes based on 1924-26, with results expressed as index numbers) for selected years since the peak of rice prices in 1926 are as follows:

Year	India	Java	French Indo-China <sup>a</sup>	China <sup>b</sup>	Japan
1924-26 . . . .	100	100	100	...	100
1926 . . . . .	112	106	105	100	105
1931 . . . . .	96	98	63	66	79
1933 . . . . .	75	81	49	56	79
1936 . . . . .	93	81	64	66	102
1937 . . . . .	83	71	77	68	90
1938 . . . . .	89	82	88	62	90
1939 . . . . .	...	...	70	70	89

<sup>a</sup> 1923-26 = 100.

<sup>b</sup> 1926 = 100.

In Japan, where government control is exercised over rice prices, the decline in purchasing power of rice was some 21

per cent in the worst years, but the recent level runs only 10 or 11 per cent below 1924-26. The decline in the worst years was apparently slightly less in Java and slightly more in India, and largest in Indo-China. In recent years, however, the purchasing power of rice in Java and China has tended to remain at relatively lower levels than in the other countries. One might expect that the level of rice purchasing power in the 1930's as compared with the 1920's would be lower in the rice-exporting countries than in the importing countries, and in so far as Indo-China is representative of exporting countries this is suggested by the data.<sup>24</sup> Since 1937 and the outbreak of the Sino-Japanese war, however, rice purchasing power in China has tended to drop below the low level of Indo-China. The possibility that statistical misrepresentation exists in these figures is so great that little is to be gained by attempting to carry the discussion further.<sup>25</sup>

Whatever their inaccuracies, the data indicate satisfactorily that the purchasing power of rice in some countries (probably all) of Monsoon Asia was substantially lower in the 1930's than in the 1920's. Distress among the numerous rice growers was general in the later decade. On the other hand, a reduction in the purchasing power of rice might be expected to be advantageous to rice consumers in so far as they were not producers as well. As will appear subsequently (chapters ix and x), per capita consumption of rice in most countries tended to fall to lower levels in the 1930's than in the 1920's. This may in some degree reflect the fact that producers of rice in rice-consuming regions outnumber non-

<sup>24</sup> The necessary data are not available for other rice-exporting countries, but various investigations in the early 1930's emphasize the discrepancy between the level of producers' prices and of commodities generally. See, for example, Burma, *Interim Report* . . . ; and H. K. Lee, *Land Utilization and Rural Economy in Korea* (A Report in the International Research Series of the Institute of Pacific Relations, Shanghai, 1934), p. 106.

<sup>25</sup> In view of declining tendencies in per capita rice consumption (chapters ix and x) which may be attributable to factors other than any lessening of desire, it may seem paradoxical that the purchasing power of rice has not been better maintained. If India and China, both huge reservoirs of ineffectively expressed demand, are disregarded, however, the apparent inconsistency that suggests itself, when a general or composite view of the Asiatic rice situation is taken, largely disappears.

producing consumers of rice and were under pressure to market a greater proportion of their crops in order to maintain their purchasing power at depression price levels; but other factors complicate the analysis.

#### SEASONALITY OF RICE PRICES

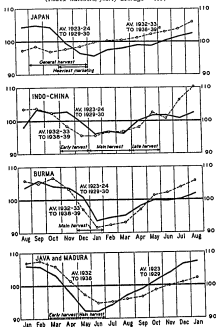
Important as reduction in the purchasing power of rice may have been in generating pressure toward governmental interventions in behalf of producers, the seasonal behavior of rice prices seems to have received even more attention. Possibly the effects of seasonal variations in rice prices are more readily identified with weakness of the cultivator's position; or governments may consider the remedy easier and more feasible politically than an attempt to manipulate the level of rice prices or purchasing power. The latter course might lead to government subsidies, currency manipulations, or other actions affecting smaller but more powerful groups of the population, whereas in attacking the problem of rice-price seasonality, speculators or alien merchants may conveniently be held responsible for a price behavior deemed contrary to the interests of growers.

Chart 18 illustrates the characteristic seasonal behavior of rice prices in four countries of Monsoon Asia. The lowest prices of the year are usually recorded during the two or three months including, and immediately following, the harvest. The decline from preharvest highs to main-harvest lows commonly exceeds 10 per cent but is less than 20 per cent. It is generally believed in the Orient that concentration of offerings is mainly responsible for this decline. Rice growers are generally poorly financed and unable to hold stocks. They borrow to carry on growing operations, and creditors expect repayment of loans as soon as the crop is harvested. Likewise, in some areas the government land taxes fall due during or immediately following the principal harvest.

Perhaps not too much credence ought to be accorded to the common Oriental view that it is dominantly the weak

CHART 18.—AVERAGE SEASONALITY IN RICE PRICES IN SELECTED COUNTRIES OF MONSOON ASIA\*

(Index numbers, yearly average = 100)



\* Monthly price data from official sources listed under each country in "Statistical Notes" (pp. 334-47); averaged for seven-year periods with the result expressed as a percentage of the average of all months, and without correction for trend.

\* Reflects price-control legislation passed in 1933 (see pp. 172, 175) and continuous upward trend of all prices with the currency depreciation of the 1930's.

financial position of growers and resulting postharvest concentration of offerings that causes the seasonal decline of rice prices from preharvest to main-harvest months. In Western

countries both the magnitude and the adverse effects upon farmers of seasonal fluctuations in wheat prices have probably been exaggerated,<sup>28</sup> and it has always been easy and politically convenient to argue that buyers victimize producers when producers are poor. Under a competitive system, however, it may be reasoned more soundly that seasonal fluctuations of prices mainly reflect merely the cost of carrying grain from one month to another. The situation in Monsoon Asia may well be that competition among buyers is not fully effective in many areas, in view of the system of credit extension from rice buyers to producers, and the producers' lack of familiarity with the course of price quotations on the principal markets (pp. 74-76). If this is true, something of a basis exists for regarding the seasonal fluctuations of rice prices as excessive and in some degree remediable. Whatever the true causes of these fluctuations, their existence has lent strong support to governmental interventions.

<sup>28</sup> See Holbrook Working, "The Post-Harvest Depression of Wheat Prices," *WHEAT STUDIES*, November 1929, VI, 1-40.