

Rice Economy and Rice Policy in South Vietnam up to 1974

An Economic and Statistical Analysis*

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I Introduction

The rice economy of South Vietnam has been affected greatly by the continuing war after the end of the Second World War. The war reduced rice production and marketing in South Vietnam for several reasons. The first reason is danger and destruction by the war which make rice production impossible. Secondly, the farmers in a dangerous area produce rice only as much as they consume. Thirdly, farmers are withdrawn from rice production by their moving from their villages to cities as refugees and by military draft. The fourth reason is the shortage of inputs for rice production. The fifth reason is the decline in the efficiency of marketing of rice and of production factors.

These effects of war show up clearly in the long-run data of rice production and trade. Table 1 shows these data for Chochinchina and the Southern Region of South Vietnam. The area under the Southern Region is almost the same as it under Chochinchina. Until the beginning of the 40's, about 1.5 million tons of white rice was exported each year because area planted to rice was more than 2 million hectares and population was less than 5.5 million which is about a half of the present population. But, because of the Second World War, of the Indo-China War which lasted up to the mid 50's, and of the Vietnam War which continued through the 60's and intensified in the latter half of the decade, the area planted to rice and rice production stagnated from the mid 40's to the end of the 60's. None the less, fair amounts of white rice had been exported until 1963 almost every year. The stagnation of rice area and rice production continued and population continued to grow, and finally from 1965 it became necessary for South Vietnam to import considerable amounts of white rice every year. In the Mekong Delta, i. e., Western Part of Southern Region, in 1974 it is believed that a considerable amount of paddy field was abandoned because of the war.¹⁾ In Central Region the area planted to

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1) Based on the author's interview of private and official people who are in close contact with rice production and rice marketing in South Vietnam in August 1974.

Table 1 Rice Production and Rice Trade for Cochinchina and Southern Region

	A	B	C	D	E	F
	Rice Area* Cultivated	Paddy Production	Paddy Production-SVN	Rice Export	Rice Import -SVN	Population
units	1,000ha.	1,000ton	1,000ton	1,000ton	1,000ton	1,000
1935	—	—	—	1530	—	—
36	—	—	—	1560	—	4616
37	2200	—	—	1350	—	—
38	2300	—	—	—	—	—
39	—	—	—	1680	—	—
1940	2300	—	—	1467	—	—
41	—	—	—	—	—	—
42	2303	—	—	—	—	5400
43	2204	—	—	—	—	5578
44	1987	—	—	—	—	—
1945	1715	—	—	492	—	—
46	1330	—	—	—	—	5579
47	1316	—	—	—	—	—
48	1103	—	—	—	—	5625
49	—	—	—	—	—	—
1950	1237 ^D	—	—	—	—	—
51	1288	—	—	272	—	5737
52	1349	—	—	152	—	5702
53	1541	—	—	102	—	6004
54	1572 ^D	—	—	177 ^D	0	5601
1955	1821	2318	3229	82	0.3	7089
56	2060	2741	3412	5	28	7642
57	2125	2542	8192	193	18	8372
58	1702	3477	4235	117	2	8152
59	1810	4113	5092	249	4	8908
1960	1749	4148	4955	346	14	9111
61	1823	3750	4607	156 ^D	2	—
62	1925	4296	5205	86	42	9335
63	1965	4364	5327	338	0	9156
64	1954	4205	5185	49	0	9405
1965	1877	3972	4822	n	130 ^D	9785
66	1819	3539	4336	0	434	9857
67	1832	3904	4688	0	765	10414
68	1929	3662	4366	0	678	10283
69	1966	4307	5115	n	326	10494
1970	2045	4812	5716	0	559	11211
71	2154	5269	6324	n	137	12193
72	2288	5331	6348	n	276	12670
73	—	—	7025 ^{pr}	n ^D	304 ^D	—
74	—	—	7200 ^{pr}	0**	291*	—
1975	—	—	—	—	200 ^u	—

1. Rice area cultivated and paddy production for t/t+1 crop year can be found in the t-th year row.
2. —: The data are not available, D: Certain discontinuity in time series, SVN: South Vietnam, pr: FAO's estimate, n: Negligible value, **: January and February only, *: January to June only, U: UN estimates for Vietnam.

3. Sources of each data

- A. (1) 1937, Robequain (32, p. 220).
 (2) 1938-53, Sansom (34, pp. 262-63)
 (3) 1954-1972, Rep. of Vietnam, M. of Agr., AESS, *Agricultural Statistics Year Book*. Data from 1954 to 1957 were estimated by Directorate of Agriculture. From 1958 henceforth they are results of surveys carried out by the AESS.
 (4) Up to 1953 the data for Chochinchina and after 1953 the data for South Vietnam were adopted.
 (5) USAID stated that area in cultivation was over stated for 1956-58.
 - B. (1) A-(3), (4).
 - C. (1) A-(3).
 - D. (1) 1935-1953, Sansom (34, pp. 262-63).
 (2) 1954-1960, National Institute of Statistics.
 (3) 1961-1974, Directorate General of Customs.
 (4) In and after 1954 rice by-products are also included.
 - E. (1) 1954-1964, Directorate General of Customs.
 (2) 1965-1972, USAID/Vietnam.
 (3) 1973, Directorate General of Customs.
 (4) Jan. -June, 1974, FAO, *Rice Trade Intelligence*, Feb. 10, 1975, p. 24.
 - F. (1) 1936-1955, Sansom (34, p. 263).
 (2) 1956-1972, National Institute of Statistics, (27, p. 357).
4. In 1961 there was a flood. In 1968 there was a drought. In 1968 there was a Tet offensive. Rice export was banned in 1956 and in 1965. In 1972 there was a spring offensive.

rice decreased by 140 thousand hectares from 1964/65 to 1972/73.²⁾

As described just above, the rice economy of South Vietnam was depressed greatly by the continuing war. But from around the end of the 60's this rice economy experienced new technological, institutional, and economic changes. These changes are (1) development of land reform launched by the 1970 Land-to-the-Tiller-Law, (2) the fast dissemination of the IR varieties, (3) expansion of double and triple rice cropping in the Delta, (4) the establishment of National Food Administration (NFA), and (5) the fast inflation of most goods including rice and petroleum.

The followings are the several recent researches on the rice economy of South Vietnam: A research report of rice marketing and storage by Wildman Agr. Res., Inc.³⁾; A series of econometric research reports by Economic Research Service of USDA.⁴⁾ But according to the author's knowledge, there was no empirical and comprehensive study of rice economy and rice policy in recent years. This paper is a

2) Directorate of Agricultural Economics, *Agricultural Statistics Yearbook*, 1972, p. 34.

3) Wildman Agr. Res., Inc., *Economic and Engineering Study, Grain Storage and Marketing System*, USAID, Toledo, Ohio, March 1970.

4) USDA, ERS, *Economic Considerations in the Development of Agriculture in Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, Feb. 1974: R. F. Daly, et al., *Vietnamese Agricultural Situation and Near-Term Prospects*, ERS, USDA; Vietnam MLRAFD; USAID, Jan. 1973: R. F. Daly, et al., *Agriculture in the Vietnam Economy, A System for Economic Analysis*, ERS, USDA; Vietnam MLRAFD; USAID, June 1973: A. D. Jones and F. E. Niernberger, *Grain Marketing in South Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, Nov. 1972: C. A. Moore, *Transportation and Vietnam's Agriculture*, ERS, USDA; Vietnam MLRAFD; USAID, Oct. 1973: Bill Bulton, et al., *Production Capacity and Supply Response in Vietnam's Agriculture: An Application of an Economic Research Service Production-Distribution Model for Vietnam*. ERS, USDA, May 1974.

result of this kind of study.

The objectives of this paper are as follows:

1) To describe rice production, consumption, trade, rice price determination, and the relevant policies with an emphasis on rice marketing for the period from the 60's through the early 70's until August 1974, and to clarify the related problems. To describe also the new changes from around the end of the 60's which were mentioned just above.

2) To investigate the collection method of and reliability of the statistics concerning the rice economy during the 60's and the 70's until 1974.

3) To present some proposals regarding the future rice policy and the future agricultural development of Vietnam based on the results from 1) and 2).

The major materials used for this study are the statistics of South Vietnam Government, other published materials, and the results of the author's interviews and observations in the Delta and Saigon in 1974 in addition to the recent research publications mentioned just above. The author's investigation in South Vietnam, although it was very short in terms of duration,⁵⁾ was very useful for evaluating and analyzing statistics and documents, and gave very good information about the actual conditions of the rice economy in 1974. The author's investigation had emphases on (1) rice market and rice marketing and the policies related to these aspects, and (2) the methods for collecting government statistics and reliability of the statistics. The author's past researches on the rice economy and rice policy of Thailand provided a good comparative viewpoint for the study presented in this paper.

II The Rice Economy of South Vietnam

The agriculture, forestry, and fishery sector of South Vietnam had relatively larger share than the same sector in the neighbouring countries. The average share of this sector in GDP of South Vietnam from 1966 to 1970 was about 34%.⁶⁾ This share actually meant much more because the government sector occupied up to 23% of GDP due to the war situation.⁷⁾ In the total value of production of the agriculture, forestry, and fishery sector, paddy occupied about 30-45% during the 60's and thus paddy was the most important agricultural product in South Vietnam.⁸⁾ Rice is

5) About two weeks from the end of July to the middle of August, 1974.

6) National Bank of Vietnam, *Economic and Financial Indicators*, National Income and Statistics Department, 1st Quarter, 1974., Table 5. 4.

7) For example, the shares of the agriculture, forestry, and fishery sector and the government sector of Thailand in GDP for the same period were 30% and 5% respectively. Bank of Thailand, *Monthly Bulletin*, August 1974, p. 105.

8) This share is about at the same level as it for Thailand according to Royal Thai Government, Min. of Agr. and Coop., *Agricultural Statistics of Thailand, Crop Year 1972/73*, No. 25, 1974, p. 91.

the staple food for South Vietnamese, and it was one of the two most important foreign exchange earners together with rubber in the past.

2. 1 Production

The paddy production in South Vietnam during the 50's and the 60's changed slightly depending on the situation of the war, but as a trend it stagnated as Table 1 and 2 indicate. Especially during the latter half of the 60's paddy production and the area planted to paddy decreased greatly because of the escalation of the Vietnam War. But from the end of the 60's the production and area increased rapidly, and the paddy yield per hectare also increased rapidly as shown in Table 1 and 2.

These new trends around 1970 can be considered to be made possible by (1) the decrease in intensity of the war after the Tet Offensive in early 1968, (2) fast spread of the high yielding varieties (HYV) and extension of the double and triple paddy cropping supported by this spread, and (3) fast execution of land reform from 1970. Introduction of HYV began with IR8 in 1967 and IR5 in 1968 (designated as TN8 and TN5 in South Vietnam) developed by IRRI, and followed by IR20 in 1969 and IR22 in 1970. In 1971 RD1, a locally developed HYV in Thailand, was imported from Thailand.⁹⁾ From around 1971 IR8 and IR5 which had low quality in various aspects were rarely planted, and IR20, Improved IR20, IR22, IR26, IR73/1, IR73/2 which had better quality substituted for IR8 and IR5.¹⁰⁾ The area planted to HYV increased very rapidly from 500 hectares in 1968/69 to 840,000 hectares in 1972/73, and it was said to reach 500,000 hectares in the Delta only in 1974.¹¹⁾ The average yield of HYV was very high, and reached 3.7–4.0 ton/ha. (paddy) while that of the traditional varieties was 1.7–1.8 ton/ha. (paddy). This yield difference was probably caused by the considerably high fertilizer input to HYV in South Vietnam. Lee estimated this input level as 122 kg/ha. in terms of the 3 plant nutrients in 1970/71.¹²⁾

Regarding multiple cropping of paddy, it was estimated that about 400,000 hectares of double cropping and about 30,000 hectares of triple cropping were done in 1973/74.¹³⁾ The paddy area under multiple cropping increased very rapidly and mainly in the Delta.¹⁴⁾ This fast increase was facilitated by the high-yielding capacity, non-photosensitivity, and short maturity of the HYV of paddy.

9) D. G. Dalrymple, *Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations*, For. Econ. Dev. Service, USDA; USAID, Feb., 1972, p. 44.

10) Based on the author's interview of government officials, rice merchants, and farmers, and on the information provided from Professor K. Kyuma of the Center for Southeast Asian Studies of Kyoto University who made a survey trip in the Delta from December 1974 to January 1975.

11) Based on the information from Professor K. Kyuma.

12) Dong-Bai Lee, *Economic Survey of Fertilizer Situation in the Asian and Pacific Region*, ASPAC Food and Fertilizer Technology Center, Dec. 1973, pp. 169–173, 182–185. In Thailand fertilizer input in terms of the 3 plant nutrients in paddy production in general was only 13 kg/ha.

13) Based on the author's interview at Directorate of Agricultural Economics, Min. of Land Reform and Agriculture and Fishery Development.

14) Refer to Daly, *et al.*, *Agriculture in the Vietnam Economy*, p. 150.

Table 2 The Rice Economy of South Vietnam

	H*	I*	J*	K	L	M	N	O	P	Q	R
	Cultivated Area	Area under HYV	Average Yield C/H	Import of Fertilizer	Rice Arrival at Saigon (Paddy Equiv.)	Saigon Retail Price (Soc Nau)	Saigon Whole- sale Price (NO. 1 Rice)	CPI (Working Class)	Nitrogenous Fertilizer Price	Paddy at Rice Mills (Delta)	Paddy/Fert. Price Ratio. (Q/P)
Units	1,000ha.	1,000ha.	ton/ha.	1,000ton	1,000ton	\$ VN/kg	\$ VN/100kg	1963=100	\$ VN/ton	\$ VN/ton	
Sources	AESS	AESS	AESS	D. G. Cust.	D. Int. Trade	NIS	NIS	NIS	Lee (20), NIS	IDC, ERS USDA, <i>et al.</i>	Lee (20), NIS Daly (4), DAE
1955	2244	0	1.26	—	—	—	455	80.3	—	—	—
56	2540	0	1.34	79	—	—	457	89.8	—	—	—
57	2719	0	1.17	55	630	—	435	85.7	—	—	—
58	2291	0	1.85	81	661	—	484	84.0	—	—	—
59	2400	0	2.12	159	892	5.2	385	86.1	—	—	—
1960	2318	0	2.14	131	887	5.0	397	85.0	—	2650	—
61	2353	0	1.96	124	848	6.8	519	90.4	—	3490	—
62	2479	0	2.10	116	877	6.5	520	93.2	—	3390	—
63	2538	0	2.10	323	1116	6.5	529	100.0	—	3370	—
64	2557	0	2.03	261	774	7.7	550	102.9	—	3630	—
1965	2429	0	1.99	251	684	8.8	654	119.7	—	3730	—
66	2295	0	1.89	267	488	13.4	1050	194.4	6300	6870	1.1
67	2296	0	2.04	205	448	27.2	2030	279.0	8700	13330	1.5
68	2394	0.5 ^u	1.82	70	445	28.2	2073	354.2	8955	12130	1.4
69	2430	40 ^u	2.10	485	494	39.5	3135	431.6	9100	20510	2.3
1970	2511	502 ^u	2.28	518 ^{sf}	627	53.2	4023	590.0	10210	24670	2.4
71	2625	674	2.41	179 ^{nf}	656	58.5	4799	698.1	12000	29380	2.4
72	2700	835	2.35	315	760 ^{et}	90.1	7229	874.5	27717	46170	1.7
73	2800 ^e	—	2.51 ^e	326	739 ^{et}	11.20 ^t	11174	1263.3	—	—	1.0 ^{ee}
74	—	—	—	110 ^{**}	215 ^{**et}	—	14738 ^{tt}	1840.0 ^{ttt}	—	—	0.5 ^{ee}
1975	—	—	—	—	—	—	—	—	—	—	—

1. In the columns with *, the area or yield data for t/t+1 crop year are located in the t-th year row.
2. —: Data are not available, e: DAE's estimate, u: Darlymple (7, p. 44), sf: In 1970 about 280 thousand tons of fertilizer was used and 365 thousand tons was reserved, Lee (20, p. 182), nf: A large amount of fertilizer was stocked in 1971, Lee (20, p. 181), **: Jan. & Feb. only, et: Tsujii's estimate, t: June, tt: February, ttt: March, ee: USAID's estimate.
3. Soc Nau appears under column M was the low quality rice for low income people, and No. 1 Rice under column N was the first class whole grain rice.
4. For the price of nitrogenous fertilizer, 46% urea price from Lee (20, p. 185) and the retail price of urea from NIS were used for 1966-'71 and 1972 respectively.
5. Paddy price at rice mill was obtained from Daly *et al.* (5, p. 187) for 1960-'71 and from DAE for 1972.
6. Paddy/fertilizer price ratios for 1973-'74 were obtained from USAID (44).

The land reform under the Land-to-the-Tiller-Law redistributed about one million hectares of land to farmers from 1970 to the end of 1972.¹⁵⁾ The importance of the effect of this land reform on the South Vietnamese rice economy is clear considering the fact that the total area planted to paddy in South Vietnam in 1972/73 was about 2.7 million hectares.

Next we investigate the regional distribution of paddy production. This distribution is biased strongly to Southern Region. About 80–85% of the countries' paddy production comes from this area. Especially Western Part of Southern Region, i. e., the Delta is the surplus producing area and the rice bowl of South Vietnam. There, about 70–75% of the total paddy production in South Vietnam is produced. This share did not change much since 20 years ago. It was the Delta that supported large amounts of rice export from Chochinchina in the past.¹⁶⁾

In the foregoing the paddy production in South Vietnam was described using the former government's statistics. Now we investigate the reliability of the statistics.

In this section the statistics relating to paddy production, yield and the area planted to paddy were mainly used. These statistics based themselves on Area Survey and Crop Cutting Survey (CCS) which had been executed every year by Agricultural Economics and Statistics Service (AESS) in Directorate of Agricultural Economics (DAE) starting from 1958/59.¹⁷⁾ These surveys covered 13 crops including paddy. In the following we will discuss major contents of these surveys and reliability of the statistics obtained from these surveys.

These two surveys were done to 1,000 villages and 20 farmers for each of the villages selected by the two stage random sampling method. In Area Survey area planted to each crop by the 20 sample farmers for each sample village was surveyed in October of each year. The area collected in this way, then, was weighted by the total number of farmers to give the provincial average area planted to each crop under survey on farmer basis. Regarding crop yield, crop cutting of one sample plot selected at random in each sample village was done under CCS. The result obtained from this crop cutting was then weighted by planted area obtained in Area Survey to give the provincial average yield for each crop. The total area planted to each crop was obtained by multiplying the provincial average area planted to each crop for a single farmer estimated from Area Survey and the total number of farmers in that province and summing the products up over all provinces in South Vietnam. The total production of each crop was estimated by multiplying the provincial total area planted and the provincial average yield obtained from CCS and summing the product up over all provinces in South Vietnam.

15) Directorate of Agr. Econ., Min. of Agr., *Agricultural Statistics Yearbook* 1972, Dec. 1973, p. 176.

16) Charles Robequain, *The Economic Development of French Indo-China*, tr. by Isabel A. Ward, Oxford Univ. Press, 1944, pp. 308–309.

17) In and before 1957–58, there exist estimates of Directorate of Agriculture.

The foregoing is the formal description of the method by which planted area and production data for 13 crops were collected by the government. This method was, however, affected by the conditions of the war and error in the survey process. War situation put strong limitations on sampling villages and crop cutting plots. According to Sansom the rural area of South Vietnam was once divided into 5 regions: (1) government village, (2) semisecure government village, (3) contested village, (4) semisecure Viet Cong village, (5) Viet Cong village, depending on the balance of military control. The first two areas were under good government control. Third area often went under National Liberation Front's (NLF) control during the night. The last two areas were under NLF's control and trade between these areas and other areas were restricted. The fourth area was often attacked by the government forces. From 1966 to 1967 about a half of the land and population of the Delta belonged to the third area, and about 15% of the land and 25% of the population belonged to the second area. The government officials could not move in the third area without military protection even at daytime.¹⁸⁾ Consequently area under the last three regions of the Sansom's demarcation must have occupied a large part of the Delta. This situation must have affected the sampling process for the crop production and the planted area data. First, according to the section chief of AESS who was in charge of the sampling, about 30% of the original sample villages was in fact selected in the NLF controlled area. Then these villages were replaced with other villages where survey could be conducted.¹⁹⁾ Second, the total number of farmers in each province used in estimating the total paddy production as described just above, was probably calculated for the area under the government control (probably including the contested villages).²⁰⁾ From these two points we can say that the government's paddy production statistics before 1974 did not include paddy production in the area under the strong NLF control.²¹⁾ Consequently this production statistics tended to be smaller than the "true production level" of South Vietnam. Area under government control changed over time. Because of this change we can say that the government's paddy production statistics had a tendency to fluctuate over time.

Next we investigate the bias in the survey process. The largest bias was probably the underreport of planted area by the farmers. Yield was estimated by the crop cutting method, but planted area was obtained by interview.²²⁾ Farmers have a

18) R. L. Sansom, *The Economics of Insurgency in the Mekong Delta of Vietnam*, Cambridge, Mass: M. I. T. Press, 1970, pp. 8-9.

19) Based on the author's interview with the government officials in AESS and Can Tho provincial government who were in charge of agricultural statistics.

20) Daly, *et al.*, *Agriculture in the Vietnam Economy*, pp. 148-179.

21) A statistics officer of the Can Tho office of Ministry of Agriculture said to the author that he considered the area under Viet Cong control was waste land, and paddy production there belonged to Viet Cong, and that not much paddy production was done there because of the danger from the war.

22) Based on the author's interview at AESS.

general tendency to underreport their planted area to the government who is their tax collector. Tenancy was prevalent in the Delta until around 1970, and the rent was a considerable share of paddy production. During the 60's the security in rural area deteriorated greatly, and the local government officers' collecting land rent on behalf of absentee landlords on 30% commission became very prevalent.²³⁾ The author thinks that the general underreporting tendency of the farmers and the local government officers' collecting rent mentioned just above were major reasons of the underreport of planted area. The section chief of AESS in charge of agricultural production statistics admitted the existence of the underreport, and estimated its degree as 10–20%. But this underreport of planted area was not adjusted in estimating the total planted area.²⁴⁾ The land reform started in 1970 was reported to have progressed considerably, and thus the effect of the second reason on the underreport mentioned just above probably decreased considerably after 1970.

We can conclude from the above investigation of the reliability of the former government's paddy production statistics as follows. The formal method and framework of collection of the statistics were good, but in effect planted area statistics during the 60's were probably underestimated by 10–20%, and consequently production statistics by similar degree. The paddy production statistics did not cover the area under the solid NLF control where statistical survey was not possible, and thus did not represent the total paddy production of the whole South Vietnam's region. It is very probable that the underestimation of paddy production during the 60's mentioned just above became smaller in 1974 because of the fast progress of land reform starting in 1970 in South Vietnam. If this holds, the fast increase of paddy production from around 1970 to 1974 discussed in the beginning of this section must be viewed with some reservation.

2. 2 Consumption

As described in the preceding section paddy production in South Vietnam was regionally greatly biased. Rice consumption was also regionally biased in the same way as paddy production. This conformity between production and consumption biases was probably due to the following reasons: (1) Paddy growing farmers tend to eat more rice than other farmers and families in other occupations because the paddy farmers eat what they produce. (2) Rice price is cheaper in the surplus paddy producing area than in the shortage area. The regional *per capita* annual rice consumption in 1972 estimated by the author using mainly the government statistics is 329 kg, 132 kg, 151 kg, and 214 kg for the Delta, Eastern Part (including Saigon), Central Region, and whole South Vietnam respectively. The bias among the estimated regional rice consumption levels and the level of the national rice consumption seem

23) Sansom, *op. cit.*, pp. 66–67.

24) Based on the authors interview.

to be too large in comparison with those of, for instance, Thailand.²⁵⁾ Details about this point will be discussed in Section 2.5 when rice balance will be investigated.

In South Vietnam there were no independently measured time series data of rice consumption until 1974.²⁶⁾ Therefore the author's estimates of rice consumption above were obtained through the demand supply balance approach. USDA estimated annual rice use by the same approach from 1961 to 1970 and further estimated the income and price elasticities of rice consumption for South Vietnam. The estimated income and price elasticities are for the whole country 0.25~0.35 and -0.2~-0.3 respectively, and for the rural area -0.1~-0.5 and -0.5~-0.7 respectively.²⁷⁾ It is interesting to note that the income elasticity in the rural area has negative value. These elasticities play important roles in policy analyses and demand supply projections.

2. 3 Foreign Trade

As described above South Vietnam became a net importer of rice in 1965, and then from 1966 became one of the large rice importing countries in the world until 1974.²⁸⁾ Except a small amount of Thai rice, most of the imported rice was American rice and was imported under PL 480. The imported rice under PL 480 mostly consisted of the Tytle I rice under concessional sales agreements and only partly of the Tytle II rice, i. e., donation in emergency. Very large trade deficit and low level of foreign currency reserve of South Vietnam deteriorated further and rapidly from around 1965, and the import of large amounts of rice every year by South Vietnam could be done only on concessional basis. In 1971 the ratio between values of total export and import was 1 to 70.5. The reserve of foreign currency in 1973 was about 12.5 million U. S. dollars, while rice import under Tytle I only reached 8.5 million U. S. dollars in the same year.

As described just above all the rice import of South Vietnam toward the end of the 60's and early 70's was conducted virtually under the food aid program of the United States. Thus rice import was decided on the G-G basis between the South Vietnam Government and the United States. But the short run decision of rice import seemed to be affected by the demand and supply situation of rice in Saigon. An econometric analysis by USDA mentioned above showed that the delivery of rice from the Delta to Saigon was a very important factor to determine the amount of rice imported.²⁹⁾

25) The survey by NIS of 7 cities and 5,427 families in South Vietnam in 1962 gave annual *per capita* rice consumption as 156 kg. The 1963's nationwide survey gave annual *per capita* rice consumption of Thailand as about 170 kg, and for some of the rice growing rural area it was reported that *per capita* rice consumption reached more than 200 kg per year.

26) This is true in the neighboring countries, e. g., Thailand.

27) Daly, *et al.*, *Agriculture in the Vietnam Economy*, p. 12.

28) See Table 1 and refer to various issues of FAO *Rice Trade Intelligence*.

29) Daly, *et al.*, *Agriculture in the Vietnam Economy*, p. 45.

The rice import in 1971 was rather low. But from 1972 to 1974 its quantity tended to increase. The fact that a large amount (about 300,000 ton) of rice was imported during the first 6 months of 1974 seemed to be related with the intensification of the war in 1974.

Before 1968 all of the PL 480 rice was imported through Saigon. But because of the congestion of the Saigon Port, part of the PL 480 rice began to be imported from some ports in Central Region from 1968.

The reliability of rice trade statistics is relatively higher in comparison with production and consumption statistics because of the way these statistics were collected. This point holds true for most of the rice trading countries in the world.

2. 4 Rice Price and Fertilizer Price

Rice and paddy prices in South Vietnam were surveyed by National Institute of Statistics (NIS) and Agricultural Marketing Research Service (AMRS) of DAE in 1974. NIS had been collecting monthly wholesale and retail prices in Saigon from long time ago. AMRS was surveying paddy prices at the farm level, paddy and rice prices at the rice mill level, and retail price of rice for all over the country. The AMRS's survey was done by about 100 agricultural statistical officers and representatives, and these local statistics people reported monthly and sometimes weekly to AMRS. In special cases AMRS conducted survey by itself sometimes using questionnaire. In the present section we investigate the AMRS's price data.

The paddy price at the farm level began to be collected from the 70's, and this price was not yet listed in the annual and monthly statistical report of DAE. According to AMRS this price was surveyed from the randomly selected 200 pilot farms in South Vietnam in 1973. But actual number of farms surveyed was only about 20~25% of the whole pilot farms. An officer in charge of this price survey thought that the sample size was big enough to measure the paddy price at the farm level. The author thought that the sample size should be bigger than what it was in 1973. The number of the pilot farms was planned to be increased up to 300 in 1974.

The paddy and rice prices at the rice mill level, i. e., the wholesale prices were surveyed for two grades of white rice (Rice No. 1 and Long Rice) and three grades of paddy (Long Grain, Ordinary, High Grade). This survey was conducted twice a month for 25 sampled rice mills for each province. The rice mills surveyed were planned to be sampled at random. But, in effect, if some rice mills were too "far away" to be surveyed their substitutes were surveyed.

The retail price of rice was originally surveyed for a single grade (Rice No. 1, 25% broken). This price was collected from 3 retail shops in each of at least 3 market places in each province in South Vietnam. From September 1973 number of grades under this survey increased to 5, i. e., Long Grain, Ordinary Grain, Rice No. 1, TN 20 and TN 22, Broken No. 1 and No. 2. The results of this survey were published

together with the retail prices of other 40 commodities in the monthly statistical report of DAE. The daily retail rice price in Saigon was also collected from 5~10 retail shops in each of 6 market places for the following 4 grades: Red Rice, Rice No. 1 (25% broken), Good Rice (White), Special Rice (Long Grain). Furthermore, by the request of the Minister of Agriculture, the retail rice price of these four grades in the major provinces of the Delta was surveyed by 2~3 days interval using telephone.

As described above, in addition to the long time series of the wholesale and retail rice prices in Saigon collected by NIS, DAE initiated the survey of the producers', wholesale and retail prices of rice and other agricultural products for whole South Vietnam in the early 70's. There were some problems in relation to the methods of collecting the DAE's price data as mentioned just above, but it was desirable that this kind of price data be accumulated for long time period.

Now based on the DAE's price data we investigate the regional and inter-variety price differences of rice. The facts were as follows: The wholesale price of paddy was lower in the Delta and Saigon in Eastern Part, and higher in Eastern Part except Saigon and Central Region. The annual average wholesale price of Ordinary Paddy³⁰⁾ per 100 kg was 4,617, 4,614, 5,613, 4,866 piastol for the Delta, Saigon, Eastern Part, Central Lowland respectively. For Central Highland there was the price data only for Pleiku and it was 6,444 piastol. In Eastern Part, the price difference between Saigon and the other area was much larger in 1972 than in 1971. These facts can be explained schematically as follows: South Vietnam was a net rice importing country from 1965, and thus its spatial price structure became a reversed cone with its peak at Saigon where was a rice importing place. In other words, rice price at Saigon was cheapest, and it became higher as we move farther from Saigon. When the war was intensified rice transport from Saigon toward the base of the cone where marginal provinces were located became difficult. Then rice price at the marginal provinces rose and the reversed cone shaped price structure was elongated. Nineteen seventy-two was the year of Spring Offensive. The much larger price difference between Saigon and the other area in Eastern Part in 1972 mentioned above could probably be caused by the elongation of the price cone discussed just above. The following two points support this schematic explanation: (1) Paddy price in Phuoc Long province where was on the Cambodian border and was the farthest province from Saigon in Eastern Part was 6,735 piastol per 100 kg in 1972 and the highest in South Vietnam. (2) In the transport cost of rice and other goods from Saigon not only economic costs but also security costs were included.³¹⁾

The actual spatial price structure of South Vietnam was in fact more complex than what was described above. From 1968 to 1974 this price structure must have

30) Paddy grades were from better to ordinary, Long Grain Paddy, High Grade Paddy, and Ordinary Paddy

31) Wildman Agr. Res., Inc., *Economic and Engineering Study, Grain Storage and Marketing System*, USAID, Toledo, Ohio, March 1970, p. 76.

been the complex of some reverse cones with their peaks at Saigon, in the Delta, and several port cities in Central Region. This complex was also bended depending on the geographical, economic, and military conditions at certain point in time. The peaks in the Delta in 1972 were at Chau Doc, Vinh Binh, and Ba Xuyen according to the price statistics.

Next we discuss about inter-variety price difference of rice. It was well known that IR8 and IR5 which were early HYV were sold in most of the Southeast Asian countries at the price 10–20% less than TV because taste of IR8 and IR5 was not liked by the Southeast Asian people. In South Vietnam, for instance, the wholesale price of IR8 was lower than the prices of the traditional high quality rice (Nang Huong) and the traditional ordinary rice (Soc Nau) by 43% and 13% respectively in Saigon on the average for the period from May 1970 to April 1971. IR20 and IR22 were the varieties which were improved especially about the disadvantage of the early HYV's mentioned just above. Thus price difference between these varieties and TV should be smaller than the price difference between the early HYVs and TVs. According to the DAE's wholesale price data in the Delta in February 1974, the price of IR20 and IR22 was lower than the price of (1) the high quality Long Grain Rice and (2) the medium quality Ordinary Rice and Rice No. 1 (25%) by 18~25% and 5~13% respectively.³²⁾ This smaller price difference for IR20 and IR22 was an important reason why these varieties completely substituted for IR8 and IR5 in the early 70's in South Vietnam. But the price difference implies that TVs were still preferred by the South Vietnamese to IR20 and IR22.

Finally we discuss about the relative price between rice and fertilizer. As shown in Table 2, the wholesale price of No. 1 Rice rose from 1966 to February 1974 by a little less than 1,400%. The price rise after 1972 was very fast, and this was caused by the world as well as the domestic inflation. One of the most important factors for the HYV to spread very rapidly from the beginning of the 70's and to produce high yield was that the farmers who planted HYV could buy fertilizer at low price in comparison with paddy price. In Table 2 the relative price between paddy and nitrogenous fertilizer is given. This relative price tended to rise from 1966 to 1969 because the government controlled the domestic fertilizer price³³⁾ by the multiple exchange rates policy and the American aid for the fertilizer import of South Vietnam. But this trend disappeared in 1971, and from 1972 this relative price decreased rapidly. This means that the domestic fertilizer price increased far more rapidly than the fast rise of the domestic wholesale price of rice after 1972. This was a bad situation for the HYVs to produce high yield.

2. 5 Market and Marketing

32) In Central Region there often were reverse price differences. This might be a reflection of the regional difference in the people's taste.

33) Lee, *op. cit.*, pp. 179–87; USAID, *Economic Background Data*, Saigon, July 1974, p. 4.

Until 1974 rice marketing in South Vietnam was done mostly by the Overseas Chinese. The government executed considerable adjustment of demand and supply, and of price in the rice market through National Food Administration (NFA). A new change in the rice market in the 70's was that several rice trading companies owned by Vietnamese entered into the rice market. However it was believed that the rice market in South Vietnam was virtually in the hands of 6-8 Overseas Chinese in Cholon (Chinese section in Saigon). Overseas Chinese in Saigon could be divided into several groups. Their family ties were very strong, and they had large amounts of capital, and tended to deal with one another, and relied on private financing.³⁴⁾

The larger rice trading companies which were owned by Vietnamese and entered the rice market recently as mentioned just above were VIMECO, Kim Nga, Tuy Viet Me Coc, and Viet Nam Aid Me Coc in July 1974. It seemed that these companies were indirectly supported by the government. Take VIMECO for example, it had been established in September 1973 by a man³⁵⁾ who was the Director General of Taxation in July 1974. The rice mills in the Delta could be grouped into many small ones and fewer medium and large ones. The larger ones were mostly owned by the Overseas Chinese, while a considerable part of the small rice mills were owned by Vietnamese. The Vietnamese owned rice trading company, VIMECO was established in order to counteract the dominance of Overseas Chinese in the rice market by grouping the Vietnamese owned small rice mills in the Delta and doing business with this group based on the nationalistic cooperatives idea. Upon establishing VIMECO, a Vietnamese who had a long experiences in rice mill business was hired as its manager. VIMECO dealt about 12,000 ton of rice and 20,000 ton of paddy from October to December, 1973. It planned to handle about 50,000 ton in 1974. It had branch offices in the six provinces in the Delta and each office was equipped with a rice mill of 1 ton/hour capacity. It also owned a rice warehouse of 20,000 ton size in Saigon and many warehouses of 100-200 ton capacity in the Delta.

Establishing the Vietnamese owned rice trading companies under the government support to counteract the dominance of Overseas Chinese in the rice market is one development of nationalism in South Vietnam. Overseas Chinese are probably very efficient merchants in South Vietnam as they are so in Thailand. It will be important to observe how this nationalistic movement in the rice market of South Vietnam will develop in the future.

With respect to NFA we will discuss about it in this section as far as it is related with rice marketing. We will discuss the function of NFA in the national rice policy in the next chapter. NFA was under the supervision of Ministry of Trade and Industry,

34) Based on the author's interviews with rice traders and government officials in charge of rice market policy, and Jones and Niernberger, *op. cit.*, p. 23.

35) Information about VIMECO was obtained from this man, Mr. Nguen Huyhan, and from other people in VIMECO.

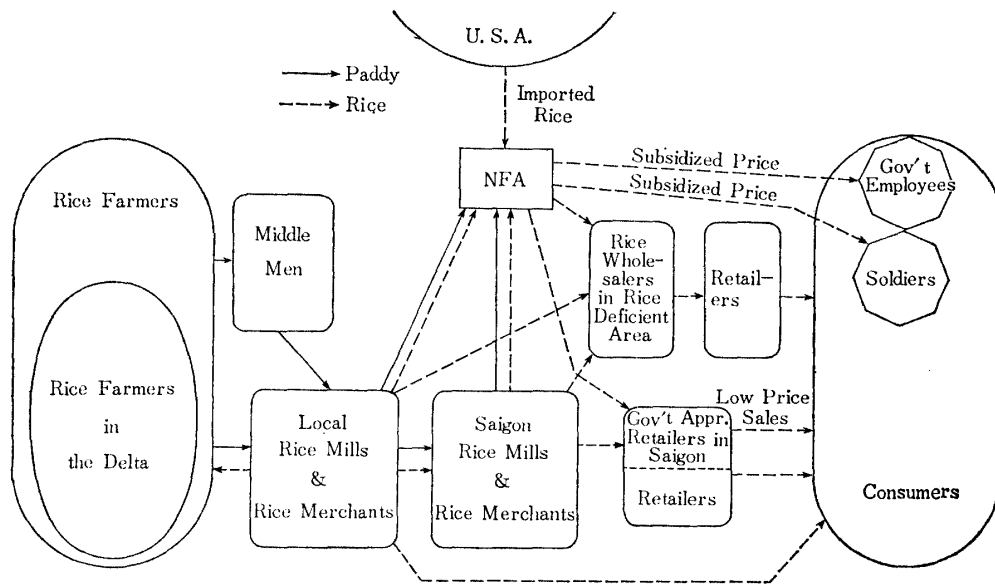


Fig. 1 Marketing Structure of Rice and Paddy in South Vietnam, 1974

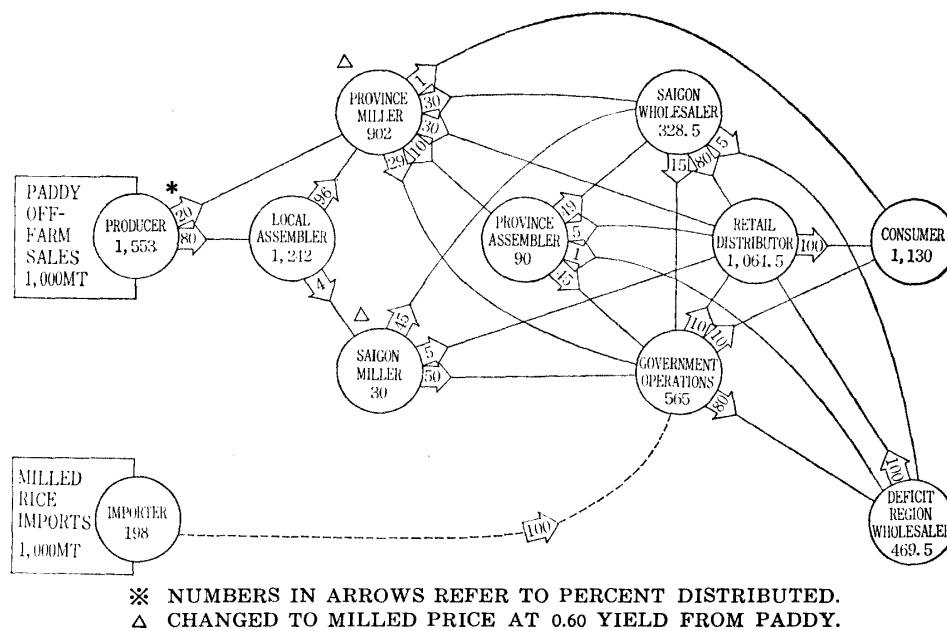


Fig. 2 Marketing Network for Rice in Vietnam, Nov.~Oct., 1970~71

and it was in charge of purchasing, storage, and distribution of imported rice and domestic rice and of the control of rice price and marketing. On the first of August 1974 NFA had rice stock of 300,000 tons in total, and about 50% of the stock was the imported PL480 rice. Around 1974 the total amount of paddy marketed in South Vietnam in one year was estimated as about 1.5 million tons. Out of this amount NFA handled 500~600 thousand tons in terms of rice. On the distribution side, NFA supplied rice (1) to the soldiers and the government employees at the subsidized price,

(2) to the government approved rice retailers in Saigon to be sold at low price, and (3) to the rice wholesalers in Central Region where rice supply was deficient. The marketing structure of rice and paddy in South Vietnam in 1974 including the role of NFA³⁶⁾ is depicted simply by Figure 1. Jones and Niernberger also described the structure for the period from November 1970 to October 1971 by Figure 2 with marketed quantities and shares.³⁷⁾

As described above NFA had a very high share of about 50% in the total amount of paddy marketed in South Vietnam around 1974. This high share of NFA could be kept probably by the Rice Marketing Administrative Decree. Under the Decree all rice traders who transported a certain quantity of rice for commercial purposes from the Delta to Saigon had to sell the same amount of rice to NFA. The author considers that this high market share of NFA must have been high enough to exert a good control over the rice market of South Vietnam.³⁸⁾

Next we investigate the regional rice marketing and regional rice balance in South Vietnam. Table 3 shows a regional rice balance taking into account interregional rice transfer and regional rice stock for 1972. The numbers in the table are estimated by the author based on mainly the government statistics.

In computing rice balance in South Vietnam in the past, various estimates for milling yield, for the amounts used for seeds and feed, and for the amount wasted were made and used. The author considers some of these estimates are biased based on his experience in computing the rice balance in Thailand and his field survey in South Vietnam.³⁹⁾ The author's estimates used for computing Table 3 are presented in Table 4.

Table 3 tells us that in 1972 about 500 thousand tons of rice was transferred from the Delta to Saigon (X_5), and about 100 thousand tons of rice was imported into Saigon. Out of these rice shipments into Saigon about 300 thousand tons of rice was used in Saigon and Eastern Part, and about 200 thousand tons of rice was shipped out of this area to Central Region. In 1972 about 140 thousand tons of rice was also imported directly from the U.S.A. to Central Region. There was no direct transfer of rice from the Delta to Central Region in 1972. These interregional and international flows of rice in 1972 are depicted in Figure 3.

Regional *per capita* rice consumption in 1972 can also be calculated as indicated

36) The marketing role of NFA described just above is mainly based on the author's interview with Dr. Tran Prang Minh, Administrator General of NFA.

37) Jones and Niernberger, *op. cit.*, p. 12.

38) Dr. T. P. Minh, Administrator General of NFA confirmed this point in the author's interview with him.

39) The past estimates for milling yield were smaller than what it should be. The estimate for loss or waste in the above-mentioned study of Wildman Agr. Res., Inc. (10% of the total paddy production) was too high. The estimate for seeds in the above-mentioned Daly and *et al.* study (2% of the total paddy production) was too low.

Table 3 Regional Rice Balance of SVN, 1972^a, 1000 tons of milled rice

	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁
	Beginning Stock	Supply ^b	Import	Domestic Shipment- In	Domestic Shipment- Out	Consumption ^c	End Stock	<i>Per Capita</i> Consumption ^d (kg)	Population (1000)	Paddy Production (paddy)	Paddy Avail- able for Consumption ^e
Western Part (Delta)	6	2942	—	—	489	2430	29 ^f	329	7392	4755.0	4327
Saigon and Eastern Part	2 ^g	318	104	489	192	698	23 ^g	132	5278	514.2	468
Central Region	—	653	144	192	—	989	—	151	6543	1055.0	960
SVN	8	3913	248 ^h	681	681	4117	52	214	19213	6324.2	5755

a. Calculated by the author based on the data from NFA, NIS, DAE of Min. of Agr., USAID of Vietnam and other publications in Thailand.

b. $X_{11} \times 0.68$. Based on 71/72 crop year production.

c. Includes both food and processed food consumption.

d. X_6/X_9 .

e. Paddy production minus waste (5%) and seed (4%).

f. January 1973.

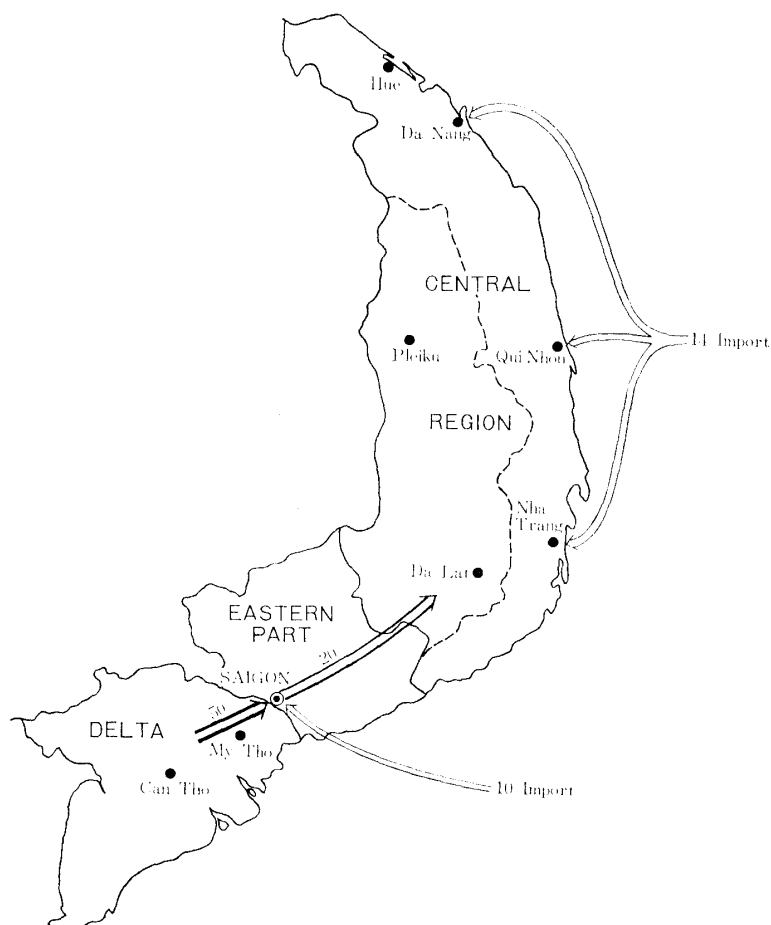
g. Stock at Saigon. Includes imported rice.

h. Data from Directorate of Supply.

i. —: No entry.

Table 4 Various Estimates for Computing Rice Balance

At Rice Mill Level		(% of yield out of 100% paddy input)
For Food	(whole rice, great broken, a part of medium broken)	68
For Feed	(a part of medium broken, small broken, bran)	11
Rice Hulls		21
At National Level		(% distribution of the total paddy production)
For Seeds	(taking account of the ratio between transplanting and broadcasting)	4
Loss or Waste		5
Amount Milled		91



Note: Numbers attached to arrows stand for Quantities of rice in terms of 10,000 tons.

Fig. 3 Inter-regional Transfer and Regional Balance of Rice in South Vietnam, 1972

in Table 3. As discussed in Section 2.2 above, the regional variation and the national average of the calculated rice consumption are too large in comparison with the Thai case. A USDA study calculated regional *per capita* rice consumption in 1970 using the similar method to the author's one, and it also obtained the similar results to the author's results. Then it judged that the calculated *per capita* rice consumption in the Delta was too large. The study considered that this calculated too large rice consumption was caused by feeding a large amount of paddy to pigs in the Delta. It estimated the part of paddy fed ranged from 12% to 17% of the total paddy production during the late sixties and the early seventies.⁴⁰⁾ But as recognized in the study⁴¹⁾ many Vietnamese questioned whether that much of paddy was fed to animals in the Delta. The author of this paper feels the same way based on his field survey, and he estimates that about 10% of the total paddy production was used as feed in South Vietnam as indicated in Table 4 above.

In the USDA studies' estimates of the regional rice consumption, rice fed to animals was included as discussed in the preceding paragraph. But in the author's estimates of rice consumption, rice used as feed was not included as was clear from the footnote b of Table 3 and the milling yield for food shown in Table 4. Then what were the causes for too large regional variation and too large national average of the author's rice consumption estimates? The author thinks that the causes were inaccuracy of the domestic transport data of rice and error in population estimate.

It was believed that the rice shipment data out of the Delta were underestimated by 10~25%. The reasons for this underestimation were (1) failure to count some of the rice shipments out of the Delta at check points, (2) ignoring rice shipments of less than 500 kg of rice per shipment, and (3) underestimate of weights on movement permit.⁴²⁾ It was also quite probable that a considerable amount of rice was controlled by NLF in the Delta and that NLF itself sent fair amount of rice from the Delta to Central Region. A high official of NFA confirmed this point to the author. The amount of rice under NLF control is hard to estimate. A minimal estimate is the rice consumption by the soldiers of NLF. If we assume the number of the NLF soldiers to be a generally believed level of a half million, then this estimate will be around 100 thousand tons of white rice. Regarding population estimates many people believed that they were underestimated.

As discussed in Section 2.1 above, the data on paddy production could probably be underestimated because of the underreport of the area planted to paddy by the farmers. This underestimation had reverse effect on the calculated rice consumption in comparison with the errors in the domestic shipments and in the population estimates.

40) Daly, *et al.*, *Agriculture in the Vietnam Economy*, pp. 155-56 and p. 201.

41) *ibid.*, p. 155.

42) Jones and Niernberger, *op. cit.*, p. 11.

If all the necessary adjustments for the errors discussed just above could be done, more accurate rice balance and rice consumption could be estimated. After these adjustments, *per capita* rice consumption will probably be lower in the Delta, higher in the other regions, and lower for the whole South Vietnam in comparison with the author's original estimates presented in Table 3 above.⁴³⁾

Next we investigate each stage of rice market in South Vietnam in detail. The structure of the rice market was depicted simply by Figure 1 and Figure 2 above.

At the stage of rice market between farmers and local middlemen ("roving merchants") or local rice mills, the progress of land reform in the early seventies caused considerable changes. This land reform increased the number of small scale owner farmers greatly, and they started to grow more rice varieties than the tenants had done under the directions from landlords before this land reform. Multiple cropping of rice also became popular facilitated by the wide introduction of HYV. Farmers became less dependent financially on the middlemen, and the bargaining power of the farmers in the sale of their paddy increased.⁴⁴⁾ These changes must have increased economic gain of the rice farmers.

In 1972 machine driers were rarely used for rice in South Vietnam. In the early 70's HYV of rice spread very rapidly with multiple cropping of rice, and the amount of rice harvested in rainy season (mainly HYV paddy) increased considerably.⁴⁵⁾ Consequently rice drying became a big problem in 1974. One of the so-called "the second generation problems" of the green revolution was occurring. With respect to the exact amount of paddy harvested in rainy season, there were contradictory reports. USAID reported that about 2 million tons of HYV paddy was harvested in rainy season in 1971/72 crop year, while the Ministry of Land Reform and Agriculture and Fishery Development (MLRAFD) of the South Vietnam government reported very small acreage of HYV paddy field was harvested in rainy season in the same year.⁴⁶⁾ Anyway a considerable amount of HYV paddy was harvested in rainy season in South Vietnam in 1974.⁴⁷⁾

With respect to the capacity of grain storage in South Vietnam, Jones and Niern-

43) This expectation is based on (1) Annual *per capita* rice consumption in Thailand which was a rice exporting country was about 170 kg in 1963, (2) the NIS's consumption estimate from a survey of seven cities in South Vietnam was 156 kg *per capita*, (3) the underestimation of the total paddy production was probably weakened in 1972 as described in Section 2.1 above.

44) Jones and Niernberger, *op. cit.*, p. 13.

45) When the author made a field survey in the Delta in July 1974 in the midst of rainy season, a lot of paddy was being harvested or was going to be harvested soon. Considerable part of this paddy was HYV.

46) Jones and Niernberger, *op. cit.*, pp. 15-16.

47) In the field survey, many rice mill owners and rice traders told the author that wet paddy was a serious problem and it had low milling quality and sometimes rotted or germinated in marketing process, and that wet paddy was often mixed with dry paddy to decrease the overall moisture content in the mixed paddy. They also told the author that wet paddy was priced lower than dry paddy.

berger estimated it to be about one million tons in 1972.⁴⁸⁾ The increase of multiple cropping of rice mentioned above may decrease the necessary storage capacity of rice. The total amount of paddy marketed in the early 70's was about 1.5 million tons as stated above, and paddy was the overwhelmingly important crop among other crops in South Vietnam. Consequently one million tons of the estimated storage capacity in South Vietnam must have been big enough to handle the marketed paddy with some reservation about location of storage houses. But it was reported that the conditions of these storage houses were not good, and that considerable repairs and insect and rodent control were necessary. The costs for the repairs and insect and rodent control were reported to be more than offset by the benefits which could be obtained from these actions.⁴⁹⁾

The first impression about the rice mills the author got when he traveled in the Delta was that they did not have any chimneies. In Thailand most rice mills have tall chimneies. Although this point might seem to the readers trivial, it did imply an important fact. The fact is that the rice mills in South Vietnam in 1974 were much newer than the rice mills in Thailand. In Thailand about 600 rather large rice mills were built before 1929, and large mills became a little more than 900 in 1951, and many of them are still operating now. Many of these rice mills still use steam engines as a source of power for milling which use paddy husks as fuel, and consequently they need tall chimneies. In South Vietnam, on the contrary, many rice mills used diesel engines and relatively recent milling machines which did not require tall chimneies. A FAO's survey of rice mills in South Vietnam in 1964 showed that the rice mills were relatively newer than those in Thailand. This survey was done by the Consultative Sub-Committee on the Economic Aspects of Rice, and pointed out that there were about 2,018 rice mills in South Vietnam in 1963, and out of this total about 97% were built after 1948 and about 32% after 1958.

The FAO's survey mentioned just above pointed out that about 17% of the total rice mills were located in cities and near market places. According to the author's observation in the Delta large and medium size rice mills were located along road or canal near big cities, and many small rice mills were in small villages. Many of these small rice mills used Japanese milling machines, and they milled paddy mainly for farmers' home consumption. The large and medium sized mills milled paddy mainly for commercial purposes, and some of them were owned by the Overseas Chinese in Saigon, and other were operating independently and selling rice to Saigon. Rice traders in Saigon often owned 5~10 large rice mills in the Delta, and each trader specialized in a few specific provinces there. The medium and large rice mills often milled paddy not owned by the mills on the basis of fee payment.

Regarding the number and milling capacity of rice mills in South Vietnam, there

48) Jones and Niernberger, *op. cit.*, p. 18.

49) *ibid.*, p. 19 and Wildman Agr. Res., Inc., pp. 161-62.

were DAE data.⁵⁰⁾ According to the data there were 2,646 rice mills in the country and about 65% of the total were in the Delta at the end of 1971. These rice mills milled 1,630 thousand tons of paddy using about 2.8 million hours, and this amount was about 44% of the total paddy production in 1970/71. The number of rice mills reported by DAE is too small in comparison with it in Thailand if we compare the amount of paddy production per one rice mill.⁵¹⁾ This probably implies that in the DAE data a considerable part of those small rice mills in villages mentioned above were not counted. The amount milled by the rice mills reported by DAE is also too small because the DAE data implies that each rice mill operated only about 7.1 hours per day if we assume that these rice mills operated 150 days per year. But the author's survey and other data⁵²⁾ indicate that rice mills operated on the average much longer than just 7.1 hours per day. Because tax on rice mills was calculated based on the amount milled⁵³⁾, the rice mills probably underreported the amount milled as well as the total hours of their operation. Consequently, if we take into account the omission of many small rice mills in the DAE data and the underreport of the amount of paddy milled and of the total milling hours by the rice mills in the DAE data, we can say that the total milling capacity of rice mills in South Vietnam was probably not deficient⁵⁴⁾ in milling the total paddy production in the country.

During last 15 years the location of rice milling in South Vietnam changed considerably. Up to 1964 considerable amount of paddy was milled in Saigon area. But after 1964 this amount decreased rapidly, and became nominal amount in and after 1967.⁵⁵⁾ This change probably occurred because (1) the transport cost of rice is much cheaper than that of paddy, (2) the medium of transport of agricultural products from the Delta to Saigon changed mostly from ships to trucks transport cost of which is much more expensive, and (3) the need on the side of rice mills for easier access to paddy in local markets. The dispersion of rice milling operation similar to the one described just above also occurred in Thailand with Bangkok as the dispersion center. But the Thai dispersion almost completed by 1950.

The general quality of milled rice in South Vietnam was very poor in comparison with that in Thailand in 1974. This poor quality was not due to the quality of milling machines or the skill of mill operators. As described above rice mills in South Vietnam were much newer than the mills in Thailand. And the author cannot find

50) Directorate of Agricultural Economics, *Agricultural Statistics Yearbook*, 1972, p. 35.

51) This amount was 1,500 tons for Thailand in 1960 and 2,400 tons for South Vietnam in 1971.

52) Jones and Niernberger, *op. cit.*, p. 21; Wildman Agr. Res., Inc., *op. cit.*, p. 156.

53) Wildman Agr. Res., Inc. *op. cit.*, p. 161.

54) In the field survey the author did not come across any problems related with deficiency in rice milling capacity.

55) From 1958 to 1964 the weight of paddy sent to Saigon was roughly a half of the weight of rice sent to the city each year. But after 1964 the amount of paddy sent to Saigon decreased rapidly, and in and after 1967 the amount became negligible. See p. 133 of *Agricultural Statistics Yearbook*, 1972 by DAE.

any evidence to support that Vietnamese mill operators are on the average less skilled than Thai operators. The author thinks that the poor quality of milled rice in South Vietnam was due to the following reasons: (1) South Vietnam was once a leading rice exporting area in the world as Thailand and Burma. She had stopped to export rice since 1965, and thus there had been no pressure or influence to maintain quality of milled rice from the side of exporters to the domestic rice market; (2) Since South Vietnam faced shortage of rice in the state of war, people were more concerned with quantity rather than quality of rice; (3) the HYV of rice was widely adopted and grown mainly for sale by the farmers, and as described above a large quantity of wet HYV paddy harvested in rainy season went into the market which gave poor quality milled rice after milling. Therefore the problem of poor quality milled rice could be solved if South Vietnam would again become a rice surplus and rice exporting area in the near future and proper paddy dryers would be used.

III Marketing Policy and Market Policy Concerning Rice

In the previous chapter supply of, demand for, and marketing and market of rice were analyzed in their various aspects. In this chapter we will discuss about the government policies with respect to rice marketing and rice market around 1974. As touched a little in Section 2.5 above, these policies were executed through NFA.

NFA was established in 1967, and handled many food items until 1972. But from 1973 NFA concentrated on rice. In 1974 NFA had one regional office in each of 4 Military Regions,⁵⁶⁾ and NFA conducted the following activities: (1) procurement and storage of rice and paddy, (2) handling imported rice, (3) domestic distribution of rice, (4) supply of subsidized rice to the government employees and soldiers, and (5) control of demand and supply of rice in Saigon. According to the head of NFA, Administrator General Dr. T. P. Minh, the objectives of the activities of NFA were as follows:⁵⁷⁾

- (1) To assure a minimum price of rice to the farmers and to help farmers to increase rice production,
- (2) To maintain security stock of rice and to stabilize the rice market,
- (3) To prevent rice from going to the NLF side.

In order to achieve the first objective NFA in cooperation with MLRAFD supplied production credit to farmers, and bought rice and paddy at the minimum price as much as farmers wanted to sell to NFA. The author can point out two problems

56) Military Regions of South Vietnam consisted of 4 regions located and numbered from north to south as Region I up to Region IV. Military Region IV plus Long An Province was equal to Western Part (the Delta) of Southern Region.

57) The functions and objectives of NFA described in this chapter are based on the author's interviews with Dr. T. P. Minh and with officers in the NFA's Regional Office of Military Region IV at Can Tho.

related with the procurement of rice and paddy by NFA. The first problem was the low ratio of paddy in the total NFA procurement of paddy and rice. (The ratio was about 10%.) What farmers sell is paddy. Thus if NFA wanted to assure a minimum price directly to the farmers, it would better buy much more paddy from the farmers. According to the NFA officials NFA could not buy much paddy because a) NFA did not have any drying machines, and b) NFA did not have enough human and physical resources to purchase paddy from the individual farmers in very small quantities in 1973 and 1974. But NFA intended to increase its purchase of paddy in the future with a help of foreign aids.

The second problem was the tendency that the quality of rice and paddy purchased by NFA was poorer⁵⁸⁾ than it by merchants. This tendency was caused by (a) relatively low procurement price of NFA b) low competitive power of NFA in the procurement of rice and paddy in comparison with rice merchants.

These two problems in the NFA's procurement was originated from the very short experience of NFA in the rice market.⁵⁹⁾ Since NFA was a young institution, it had to depend on rice merchants or it could not compete on the equal basis with them.

In order to achieve the second objective, NFA kept security stock of rice and paddy based on (1) NFA's direct purchase of rice from farmers, cooperatives and rice merchants, (2) NFA's supply of credit to rice merchants and banks for their procurement of rice for NFA, and (3) NFA's control of the PL480 imported rice, and NFA used this stock for the stabilization of the domestic rice market. The NFA's security stock amounted to about 300 thousand tons on August 1, 1974, and the top officials of NFA considered this amount to be appropriate. This amount is sufficient for two million Saigon population to live on for one year if we assume annual *per capita* rice consumption to be at a reasonable level of 150 kg. Around 1974 the amount of rice and paddy which NFA handled in a year was 500-600 thousand tons. NFA considered this amount to be sufficient in order to fulfill its objectives. A large part of this amount consisted of imported PL480 rice, and thus we can say that the PL480 rice contributed greatly for NFA to keep large shares in the domestic rice market. The basic policy of NFA with respect to rice marketing was to function as one channel in the rice market competing with other private channels and not to control the rice market completely.⁶⁰⁾ In order to maintain efficiency in rice marketing this basic policy was very appropriate.

58) According to the interviewed rice merchants TN5 and TN8 among the HYVs and low quality TV's belonged to this category. TN20 and TN22 and medium to high quality TV's tended to flow to the free market.

59) The NFA's Regional Office at Can Tho was established in June 1974. The author observed that this office as well as the Regional Office at Tan An in the Military Regional III were recently built and considerably small in size, and that officers there were very young without much experiences in rice market.

60) Dr. T. P. Minh's statement.

For the rice price stabilization, NFA conducted price policies at retail level as well as at wholesale level. At retail level the two policy measures depicted in Figure 1 above were used. They were supply of rice to government employees and soldiers at subsidized price and release of rice through about 700 government approved retailers in Saigon at a price lower than market price in the period of rice shortage. NFA considered the second measure as an effective policy in Saigon during off-season. At wholesale level the price policy was executed through the regional offices of NFA. The regional office, and a local committee in each province composed of government officials, provincial representatives, farmers' representatives, and rice traders jointly determined the local wholesale prices. These prices were determined for each grade of paddy and rice. For paddy the price was determined at farm level as well as at rice mill level. The local wholesale prices were determined by fixing maximum and minimum levels for each grade, and these two levels were adjusted as market conditions changed. The NFA's regional office bought rice and paddy at a price⁶¹⁾ between these two levels from farmers, rice mills, and rice merchants. The NFA's procurement from rice mills and rice merchants was facilitated considerably by the Rice Marketing Administrative Decree described in Section 2.5 above. There was a network composed of the NFA's regional office, provincial governor, police, and comptroller located at the road connecting each province and Saigon in order to enforce this Decree.

The inter-regional adjustment of demand for and supply of rice was another important aspect of market stabilization objective of NFA. Central region was especially watched by the government regarding this adjustment.

The third objective of NFA was pursued by the help of the police, the military, and the provincial governments. South Vietnam was divided into three zones, i. e., Free Zone, Contested Zone, and Forbidden Zone regarding the restriction on the movement of strategic goods like rice, fuel, medicine, etc. Rice transport and rice milling were put under government licensing, and the government tried to control rice marketing, and tried to impede NLF's rice marketing.

In conclusion the author thinks that the NFA's basic policy orientation of being one of many channels in the rice market was proper since it would maintain efficiency of the rice market in South Vietnam. But since NFA was a young and not very much experienced institution, it was not able to be very successful in the price support for paddy, and poor quality rice and paddy tended to be purchased by NFA. In keeping the security stock and stabilizing the rice market, however, NFA seemed to act fairly successfully because of the NFA's control of large amounts of imported PL480 rice and of the Rice Marketing Administrative Decree.

61) This price for farmers was different from the minimum price of paddy assured to farmers mentioned in the first objective of NFA according to an officer of NFA's Regional Office at Can Tho.

Conclusion

The rice economy of South Vietnam after the Second World War was affected greatly by the continuous warfare. The total paddy production stagnated, the total population increased steadily, and the total rice export declined sharply from its high level before the War. From 1965 war intensified and the balance between rice supply and demand deteriorated further, and South Vietnam had to start importing large amount of rice every year. Simultaneously the rice shipment from the Delta to Saigon decreased by about 50%.

From around 1968 the war decreased its intensity, and the area planted to rice and the total paddy production began to increase considerably from around 1969. Starting with TN8 and TN5, the HYV of rice spread rapidly in the Delta facilitated by the government policy on fertilizer price. The HYV of rice produced high yield because of large fertilizer input in South Vietnam. The overall paddy yield per hectare also increased considerably in this period. This increasing trend in the paddy production and yield was probably accelerated by the fast development of land reform based on the Land-to-the-Tiller Program started in 1970.

The government policies for rice market and rice marketing were done by NFA in 1974. The author thinks that the NFA's basic policy orientation of being one of many channels in the rice market was very proper. NFA had a very short experience in rice marketing, and faced shortage of facilities like driers. Thus poorer quality rice tended to be procured by NFA than by merchants, and mostly rice and only a small quantity of paddy were purchased by NFA. NFA began to simplify its commodity lines and to emphasize rice from 1973, and maintained the security stock of rice bringing together large amount of the imported rice under PL480 from the U.S. and the procured domestic rice under the Rice Marketing Administrative Decree. The NFA's market stabilization policies depending on this security stock seemed to be fairly successful.

With respect to rice marketing, the degree of economic independence of farmers from the landlords and rice merchants increased as HYV of rice spread rapidly and land reform progressed widely in early 70's. Thus the bargaining power of the farmers against the landlords and merchants increased, and consequently the farmers' paddy production and their economic gain from the paddy sales also increased. On the other hand the fast spread of the HYV paddy increased the amount of HYV paddy harvested in rainy season considerably. Thus the difficulty of drying the HYV paddy in rainy season became a very serious problem. Mechanical drying machines were rarely used in South Vietnam. Wet paddy is very easy to deteriorate in its quality, by rotting or germinating during its marketing.

Rice mills in South Vietnam in the early seventies were on the average newer

than rice mills in Thailand. The milling capacity was sufficient for the total paddy production in South Vietnam. The storage capacity for rice and paddy was also enough for the total amount of paddy and rice marketed in the country. But many storage facilities were old and needed considerable repair and adequate measures against insects and rodents.

The quality of milled rice in South Vietnam around 1974 was considerably inferior to that in Thailand. This is because (1) the large amount of wet HYV paddy harvested in rainy season went into the rice market, (2) cessation of rice export since 1965 decreased pressure or requirement to maintain quality of milled rice from rice exporters to the domestic market, and (3) the persistent rice shortage situation made people consider quantity first than quality of milled rice.

The investigation of rice statistics of South Vietnam in and before 1974 in this paper resulted in the following conclusions. Regarding the paddy production statistics, the area planted to paddy was probably underestimated by 10–20% during the 60's. But the degree of this underestimation was decreased considerably in the 70's. The total paddy production was consequently underestimated by 10–20% during the 60's, then by less degree in the 70's. This conclusion implies that the fast increase of paddy production after 1969 described above based on the governmental statistics must be viewed with some discount. The total paddy production statistics did not include in them the paddy production in the solid NLF control area. The foreign trade statistics of rice were most dependable in comparison with other rice statistics. The domestic shipment data of paddy and rice existed, but they were considerably underestimated by the technical and political reasons described in the text. The total rice consumption data did not exist. Thus the regional total and *per capita* rice consumption was estimated using the production, domestic shipment, stock, and population data. The estimated *per capita* rice consumption for the whole country as well as difference between the estimated regional *per capita* rice consumption were too large. This was probably caused by the underestimation in the domestic rice shipment data and in the population data. With regard to the rice price statistics, DAE started to collect them at farmers', rice mills', and consumers' levels for the whole country in the 70's. NIS had collected retail and wholesale prices of rice in Saigon starting from the 50's. It is desirable that these price data will be accumulated for long period in the future. According to the DAE's price data, the retail prices of TN20 and TN22 in the Delta in February 1974 were 5–13% lower than the prices of TV rice of similar grade. People still preferred the TV rice to the HYV rice.

Finally the author would like to make some comments on the future government policies concerning rice. It is clear that the government policies for agricultural development should put an emphasis on rice because of the importance of rice in the Vietnam economy and the very high compatibility of rice with the climatic and environ-

mental conditions in the Delta and with the Vietnamese taste as mentioned in the beginning of Chapter 2 above. During the former regime South Vietnam became a rice importing country in 1965, and she had to import considerable amounts of rice every year until the fall of the former regime on April 30, 1975. Consequently the most important policy goal of the new regime was the attainment of self-sufficiency in rice. The new regime in South Vietnam was reported to put an emphasis on agriculture especially an increase in paddy production in its new economic policy and adopted a policy of transferring a large number of urban families in the Ho Chi Minh City(former Saigon) to rural area every year to resettle them as individual farms with assignment of land. During the former regime there were probably about half a million hectares of paddy field not planted because of the war. When this abandoned paddy field is all replanted and harvested, the goal of self-sufficiency in rice will probably be achieved.

The attainment of this self-sufficiency goal depends also on the future of the HYV of paddy. In 1972/73 crop year about one third of the total paddy area and about one half of the total paddy production in South Vietnam were the HYV paddy. The HYV of paddy requires large amount of fertilizer import in order to produce high yield, and this variety spread very rapidly in South Vietnam facilitated by the fertilizer aid from the U.S. and the facilitating policies of the former regime. The future of the HYV paddy depends on (1) the new regime's evaluation of this variety, (2) availability of fertilizer and other modern inputs, (3) consumers' and farmers' evaluation of the HYV paddy. The author thinks that since the HYV paddy was already widespread, and this variety was producing considerably higher yield than the TV paddy in South Vietnam, and there is a strong need to attain the self-sufficiency goal in rice, it is desirable for the new regime to support the spread of the HYV paddy. This course of action is conformable to the published first principle for the construction of the socialistic economy in Vietnam, i. e., "modernization by technical innovation." The second problem of availability of fertilizer and other modern inputs mentioned just above can be at least partially solved by foreign aid. In this aspect Japan can play an important role. If the new regime abandone the HYV paddy and support only the TV paddy, it will probably have difficulty in attaining the self-sufficiency goal in rice. When the new regime support the HYV paddy, then it is very important for the new regime to further institute a policy to make fertilizer, other agricultural chemicals, and fuel for pump, etc. available on time to the farmers as well as to teach the farmers the optimal use of these inputs in order to assure the HYV to produce high yield.

Is it feasible to set a large amount of rice export in the near future as one important goal for the agricultural development of Vietnam? The author thinks it is infeasible because of the following three reasons.

- (1) The conditions for rice production and marketing were deteriorated because of the long war, and it takes time to restore these conditions upto the level of a rice exporting country.⁶²⁾
- (2) After the unification of Vietnam in April 25, 1976, economic development of Vietnam will pursue the principle of comparative advantage, and thus the Delta will be shipping out rice first to the other part of Vietnam especially to the northern Vietnam in exchange of industrial products from there.
- (3) Even if Vietnam will export rice, price elasticity of the world demand for rice is considerably small, and thus the more rice Vietnam will export the lower export price she will get *ceteris paribus*, and the expected increased earning of foreign exchange from rice export will probably not obtainable. According to an author's econometric study the relative price elasticity of the world demand for Thai rice was estimated to be near unity.⁶³⁾

Consequently agricultural development policies with a large amount of rice export as a major goal⁶⁴⁾ should take these three points into due accounts.

Diversification is an essential element in agricultural development because diversification makes efficient use of domestic resources and increases the power of a country to deal with the large instability in the world markets of various agricultural products. It also mitigates the impact of bad rice crop on the Vietnamese economy such as the temporal climatic damages on rice production in 1977 in Vietnam. Possible products for diversification in Vietnam are rubber, maize, sugar cane, fruits, and vegetables, etc. It is reported that Chochinchina once exported a half million tons of maize per year.⁶⁵⁾

Regarding paddy and rice marketing, if the HYV paddy will be popular in the future, drying problem of the HYV paddy harvested in rainy season will be a serious problem as described in the text. It is very desirable that cheap small mechanical driers will be introduced into the rural area to solve this problem.

With respect to rice and paddy market policies, the new regime had better make best use of experienced people and their know-how in rice marketing in order to avoid the problem of lack of experience faced by NFA described in the text.

62) The USDA's econometric study quoted in the text of this paper (Daly, *et al.*, *Agriculture in the Vietnam Economy*, p. 52) projected that South Vietnam would have to import 350 thousand tons of rice in 1977 under an assumption that the war would cease in 1974.

63) The relative price was formed as a ratio of the average export price index of Thai rice to the FAO's world rice export price index. Hiroshi Tsujii, *An Econometric Study of Effects of National Rice Policies and the Green Revolution on National Rice Economies and International Rice Trade among Less Developed and Developed Countries: with Special Reference to Thailand, Indonesia, Japan, and the United States*, unpublished Ph. D. dissertation, University of Illinois, March 1973.

64) For example, The Netherland Delta Development Team, *Recommendations Concerning Agricultural Development with Improved Water Control in the Mekong Delta*, seven working papers and two appendixes, Bangkok, April 1974 takes this position.

65) Robequain, *op. cit.*, p. 311.

References

- 1) Bank of Thailand, *Monthly Bulletin*, August 1974.
- 2) Bulton, Bill, *et al.*, *Production Capacity and Supply Responce in Vietnam's Agriculture: An Application of Economic Research Service Production-Distribution Model for Vietnam*, ERS, USDA, May 1974.
- 3) Chamberlin, E. H., *The Theory of Monopolistic Competition*, 8th ed., Cambridge, Mass.: Harvard University Press, 1965.
- 4) Daly, R. F., *et al.*, *Vietnamese Agricultural Situation and Near-Term Prospects*, ERS, USDA; Vietnam MLRAFD; USAID, Jan. 1973.
- 5) ———, *Agriculture in the Vietnam Economy, A System for Economic Analysis*, ERS, USDA; Vietnam MLRAFD; USAID, June 1973.
- 6) Dalrymple, D. G., *Survey of Multiple Cropping in Less Developed Nations*, For. Econ. Dev. Service, USDA; USAID, Oct. 1971.
- 7) ———, *Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations*, For. Econ. Dev. Service, USDA; USAID, Feb., 1972.
- 8) Directorate of Agricultural Economics, Min. of Agr., South Vietnam, *Monthly Bulletin of Agricultural Economics*, 1, 2, 3, 4, 1974.
- 9) Directorate of Agr. Econ., Min. of Agr., South Vietnam, *Agricultural Statistics Yearbook 1972*, Dec. 1973.
- 10) Duymovic, A. A., *The Poultry Marketing System of South Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, July 1972.
- 11) FAO, Commodities and Trade Division, Rice Team, *Rice Trade Intelligence*, bimonthly, various issues.
- 12) Gaesuan, Y., Ammar Siam Walla, and D. E. Welsch, *Thai Rice Production and Consumption Data, 1947-1970*, Kasetsart University, Bangkok, June, 1974.
- 13) Hacklander, D., *Swine Marketing in South Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, Aug., 1972.
- 14) Hasegawa, Y., *Tai no Beikoku Jijoo* (Rice in Thailand), Institute of Developing Economics, 1962.
- 15) Hutchison, B., *et al.*, *Export Opportunities for Vietnam Timber Products in Japan, Korea, Taiwan and Singapore*, ERS, USDA; Vietnam MLRAFD, Feb. 1974.
- 16) ———, *Timber Development Opportunities in the Republic of Vietnam*, ERS, USDA; USAID; Vietnam MLRAFD, June 1974.
- 17) Irsankura, Vanrob, *A Study on Rice Production and Consumption in Thailand*, DAF, Min. of Agr., Thailand, Feb. 1967.
- 18) Jones, A. D. and F. E. Niernberger, *Grain Marketing in South Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, Nov. 1972.
- 19) Konjing, Chaiwat, *Demand and Supply of Rice in Thailand*, Dept. of Agr. Econ., Kasetsart Univ., Thailand, Dec. 1970.
- 20) Lee, Dong-Bai, *Economic Survey of Fertilizer Situation in the Asian and Pacific Region*, ASPAC Food and Fertilizer Technology Center, Dec. 1973.
- 21) Ministry of Agriculture and Forestry, Dept. of Agr. and For. Econ., Div. of Stat. Inf., Japan, *Dai 48ji Norinsho Tokeihyo, 1971-'72* (The 48th Statistical Table of Ministry of Agriculture and Forestry,

- 1971-'72), Tokyo: Norin Tokei Kyoaai, March 1973.
- 22) Moore, C. A., *Transportation and Vietnam's Agriculture*, ERS, USDA; Vietnam MLRAFD; USAID, Oct. 1973.
- 23) National Bank of Vietnam, "Gross National Product at Current Price 1960-1973", 1974 (?).
- 24) ———, *Revenu National du Vietnam 1971*, 1960-65, 1566-1970, Direction des Statistiques et du Revenu National, Oct. 1973, May 1973, May 1970.
- 25) ———, *Economic and Financial Indicators*, National Income and Statistics Department, 1st Quarter, 1974.
- 26) ———, *Economic Bulletin*, Vol. 20, No. 3-4, Saigon, 1974.
- 27) National Institute of Statistics, South Vietnam, *Viet Nam Statistical Year-book, 1972*, Vol. 18, Saigon, undated.
- 28) ———, *Monthly Bulletin of Statistics*, No. 4, 1974, Saigon, undated.
- 29) The Netherland Delta Development Team, *Recommendations Concerning Agricultural Development with Improved Water Control in the Mekong Delta*, seven working papers and two appendixes, Bangkok, April 1974.
- 30) Pearson, J. L. and L. V. Summers, *Processing of Sugar Cane and Raw Sugar in Vietnam, An Economic Appraisal*, ERS, USDA; Vietnam MLRAFD, USAID, July 1972.
- 31) ———, *Fruit and Vegetable Marketing and Processing in Vietnam — potential Improvements*, ERS, USDA; MLRAFD; USAID, July 1972.
- 32) Robequain, Charles, *The Economic Development of French Indo-China*. tr. by Isabel A. Ward, Oxford Univ. Press, 1944.
- 33) Royal Thai Government, Min. of Agr. and Coop., *Agricultural Statistics of Thailand, Crop Year 1972/73*, No. 25, 1974.
- 34) Sansom, R. L., *The Economics of Insurgency in the Mekong Delta of Vietnam*, Cambridge, Mass.: M. I. T. Press, 1970.
- 35) Shinpo, J. and T. Takahashi, *Tonan Ajia no Kachitaikei 3, Betonamu* (The Value System of Southeast Asia 3, Vietnam), Tokyo: Gendai Ajia Shuppankai, 1971.
- 36) Summers, L. V. and J. L. Pearson, *Demand and Cost Considerations Affecting Oilseed Processing*, ERS, USDA; Vietnam MLRAFD; USAID, July 1972.
- 37) Tsujii, Hiroshi, "An Econometric Analysis of the Effects of Technological Improvements in Rice Production on Rice Trade among Thailand, Indonesia and the World," in *Agriculture and Economic Development, Structural Readjustment in Asian Perspectives*. Japan Economic Research Center, pp. 544-576, May 1972.
- 38) ———, "Factors Determining Agricultural Productivities in Rice Exporting Countries and the Green Revolution," (in Japanese), *South East Asian Studies*, pp. 503-24., 10 (4), March 1973.
- 39) ———, *An Econometric Study of Effects of National Rice Policies and the Green Revolution on National Rice Economies and International Rice Trade among Less Developed and Developed Countries: with Special Reference to Thailand, Indonesia, Japan, and the United States*, unpublished Ph. D. dissertation, University of Illinois, March 1973.
- 40) ———, "Rice Economy and Rice Policy of Thailand," (in Japanese), *Monthly Report*, Bangkok Japanese Chamber of Commerce and Industry, pp. 3-11, No. 166, pp. 11-16, No. 167, March, April, 1975.
- 41) ———, "A Quantitative Model of the World Rice Market and Analyses of the National Rice

Policies with Special Reference to Thailand, Indonesia, Japan, and the United States," a paper presented at the Third World Congress of the Econometric Society, Toronto, Canada, August 20-26, 1975.

- 42) ———, "Economic Analysis of the Rice Premium Policy of Thailand," in S. Ichimura, ed., *Southeast Asia: Nature, Society, and Development*, Monographs of the Center for Southeast Asian Studies, Kyoto University, Honolulu: The University Press of Hawaii, 1977.
- 43) ———, "Economic and Institutional Analysis of the Rice Export Policy of Thailand, with Special Reference to the Rice Premium Policy," *The Developing Economies*, Vol. 15, No. 1, 1977. (forthcoming)
- 44) USAID, Saigon, *Economic Background Data*, Saigon, July 1974.
- 45) ———, *Economic Review, 1973*, Saigon, Jan. 1974.
- 46) ———, *First Quarter, 1974 Economic Review*, Saigon, May 1974.
- 47) USDA, ERS, *Economic Considerations in the Development of Agriculture in Vietnam*, ERS, USDA; Vietnam MLRAFD; USAID, Feb. 1974.
- 48) The White House, U. S. A., *1969 Annual Report on Public Law 480, Food for Peace*, June 1970.
- 49) Wildman Agr. Res., Inc., *Economic and Engineering Study, Grain Storage and Marketing System*, USAID, Toledo, Ohio, March 1970.