

Agrarian Policy and Agricultural Transformation: Mainland China and Taiwan, 1895 – 1945*

Ramon H. Myers†

As the prospect becomes ever brighter that Asian countries can increase their food supply significantly in the decades ahead to avert famine and assist industrial development, the problem of which producing unit can best exploit the new technologies of hybrid seeds, inorganic fertilizers, and chemical pesticides becomes more critical for policy makers.¹ Should cooperative, large scale producing units be established or can small, family farms perform the task of adopting the necessary farming inputs to carry out an agricultural transformation? Policy makers and students of Asian economic development should understand agricultural development on mainland China and Taiwan between 1895 and 1945 to assess the capabilities of small family farms to serve as the instruments of agricultural transformation.

This essay compares agricultural development in both farming systems for the 1895 to 1945 period, describes the growth mechanism by which farm output increased, and discusses the policies that promoted these developments.

To state the argument in advance, Taiwan began to experience an agricultural revolution but mainland China did not. Farm output in Taiwan increased at a much more rapid pace than population growth whereas in mainland China the rate of food production increase barely kept pace with population growth. Taiwan's green revolution depended upon the government introducing new farming inputs and technology to family farms and educating the peasants in their use. The agrarian policy initiated by the Japanese colonial government

*The author wishes to thank the Ford Foundation for financial support to write this essay.

†Ramon H. Myers is Professor of Economics and History at the University of Miami, Coral Gables, Florida. In 1964 he was Fulbright Lecturer at Chung Chi College of the Chinese University of Hong Kong. He has been a Research Fellow at the Australian National University and Harvard University.

¹ The seed-fertilizer revolution fast overtaking Asian agriculture has been ably discussed by Clifton R. Wharton, Jr., "The Green Revolution: Cornucopia or Pandora's Box?" *Foreign Affairs* (April 1969), pp. 464-476; see also Bruce F. Johnston and John Cownie, "The Seed-Fertilizer Revolution and Labor Force Absorption" *The American Economic Review* 59:4, part 1 (September 1969), pp. 569-582. In the case of Japan and Taiwan the rate of increase of farm output has greatly exceeded the rate of increase of farm inputs. Technological change accounts for difference between physical inputs and their contribution to total output and actual output itself. This technological change represents embodied skills and new elements connected with the use of new seeds and chemical fertilizers by family farms. For a discussion of the importance of technological change for Japanese agriculture see Shūjirō Sawada, "Technological Change in Japanese Agriculture: A Long-Term Analysis" in Kazushi Ohkawa, Bruce F. Johnston, and Hiromitsu Kaneda (Editors), *Agriculture and Economic Growth: Japan's Experience*, Tokyo, 1969, pp. 136-154.



in Taiwan did not interfere with traditional rural customs or the system of family farming. After 1928 the Nationalist government proposed and introduced a similar rural program, but the achievements of this program cannot be fairly measured because war intervened in 1937, followed by civil war after 1945. The system of farming in both regions possessed the capabilities of great progress if a proper engine to generate new farming technology could be found. Rural institutions did not prevent family farms from increasing crop yields and production. In fact, this traditional family farming system contained all the necessary ingredients to carry out an agricultural revolution, except the means by which to improve and increase the supply of new farming inputs.

Agricultural Development and the Growth Mechanism

What are the available facts about the growth performance of mainland China agriculture between the 1890s and 1937? According to D. Perkins the expansion of food supply roughly kept pace with population growth.² The rate of food supply increase was somewhere between 1 and 2 per cent per annum. The growth of exports in quantity terms, and roughly two-thirds of exports were furnished by farm producers, increased at an average annual growth rate of around 2.1 per cent.³ During this same period urban population growth exceeded the growth rate of the rural population: the largest cities expanded their populations at annual growth rates ranging between 3 and 5 per cent compared to a rural population growth rate of only 1 or 2 per cent.⁴ After World War I food imports rose, but only during periods of civil war and extreme natural calamities like those for years 1922-23, 1926-27, and 1931-32 did they increase greatly. After 1933 they declined, only to rise after 1938 because of war.⁵ Although our statistical estimates are exceedingly rough, the following conclusions appear valid.

² Dwight H. Perkins, *Agricultural Development in China, 1368-1968*, Chicago, 1969, chapter 1.

³ This estimate was calculated with data obtained in Yu-Kwei Cheng, *Foreign Trade and Industrial Development of China*, Washington, D. C., 1956, pp. 258-259.

⁴ These estimates were derived from the following. The annual growth rate of urban population was obtained from K'ung Tz'u-an, "Chung-kuo liu ta-tu-shih ti jen-k'ou chi ch'i tseng-chien" (Population Fluctuations in Six Large Chinese Cities) in Hsiang-kang Ya-tung hsieh-she, *Chung-kuo li-tai jen-k'ou wen-t'i lun-chi* (Collected Essays on the Problem of China's Dynastic Population Problem), Hong Kong, 1965, pp. 209-229. The estimates of rural population growth were derived from C.M. Chiao and John L. Buck, "The Composition and Growth of Rural Population Groups in China" *Chinese Economic Journal* 2:3 (March 1928), pp. 219-235. These authors concluded that China's rural population increased at the annual growth rate of 1.43 per cent or doubled every 70 years.

⁵ Ou Pao-san, *Chung-kuo liang-shih tui-wai mao-i; ch'i ti-wei ch'u-shih chi pien-ch'ien chih yuan-yin* (China's Foreign Grain Trade: Its Role in Foreign Trade, General Trends and the Reasons for Trade Changes), Shanghai, 1933, see statistical appendix. Also Inspector General of Customs, *Report on the Trade of China, 1930-1940*, Shanghai, 1934 onwards to 1939. According to Dr. Friedrich Otte, coastal urban centers became dependent upon periodic import of cereals when supply from the countryside was interrupted. However, Otte was fairly optimistic about China becoming self-sufficient in grain. "The Chinese farmer is fairly quick to notice his own advantage, provided he is left alone and is sure that the fruits of his labor become his. One need only point to the tremendous increase in the cultivation of groundnuts in the neighborhood of the Tsinan-Tsingtao railway, or of soya bean and wheat along all the Manchurian railways, or to the transformation of agriculture around Shanghai: wheat and cotton instead of rice, in order to realize that the passiveness even of the northern Chinese farmer is by no means due to dullness of perception." Friedrich Otte, "Sketch of Chinese Agricultural Policy" *Chinese Economic Journal* 2:5 (May 1928), p. 369.

Chinese peasant agriculture supported steady population growth, particularly, an accelerating urban population expansion and rising demand from cities for industrial crops for processing, consumption, and export, without becoming excessively dependent upon food imports.⁶ Given the fact that family farms during this period received no new farming inputs and financial assistance for development, this is a remarkable performance for a farming system that undoubtedly could have performed far better had it received from government a new farming technology. What growth mechanism enabled this sector to perform as well as it did?

Prior to the 1890s market towns and cities demanded little food and few industrial crops, and aside from cotton yarn and cloth, a mass market for consumer goods supplied by raw materials from agriculture still did not exist.⁷ After the 1890s railroad and treaty port development increased the demand for food and industrial crops, thereby pushing farm prices upward. Family farms responded by specializing in industrial or food crops depending upon regional climatic, soil, and commercial circumstances.⁸ The profitability of crop specialization for farms depended upon the existence of increasing returns to labor. The following example indicates how greater output and higher yields could be achieved through specialization.

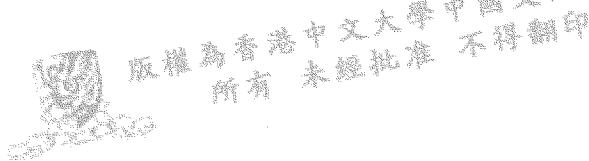
If two family farms devoted two-thirds of their labor to food crops and one-third to an industrial crop, and there existed increasing returns to labor to produce food and constant returns to produce the industrial crop, a farm devoting all its time and effort to produce food might satisfy the food requirements for both households.⁹ Meanwhile, the other farm devotes two-thirds of its labor to producing an industrial crop at the cost of only a loss of one-third of the first farm's labor. The industrial crop producing farm now pays the food crop producing farm more product than it had forgone with a surplus left over. This example can be enlarged to include villages and even regions. Certain areas through specialization become able to provide more food crops than previously, and if other areas specialized in industrial crop production, all that is necessary is that improved transportation and marketing allow farms to market their surplus and purchase what they require. As long as food pro-

⁶ For further support of this assertion see Ramon H. Myers, *The Chinese Peasant Economy: Agricultural Development in Hopei and Shantung, 1890-1949*, Cambridge, 1970, part 4.

⁷ Inter-regional trade, of course, expanded during the Ch'ing period, but only in cotton textile and raw cotton exchange can one properly say that a mass consumer market had arisen. See Nishijima Sadao, *Chūgoku keizaishi kenkyū* (Studies in Chinese Economic History), Tokyo, 1966, pp. 729-903; Yen Chung-p'ing, *Chung-kuo mien-fang-chih shih kao* (A Draft History of the Chinese Cotton Textile Industry), Peking, 1963, chapter 1.

⁸ For estimates of change in acreage of primary crops between 1904-09 and 1924-29 see John L. Buck, *Land Utilization in China*, Chicago, 1937, p. 217. His data show that peasants gradually shifted to food crops yielding greater food per unit of land which in turn released more land for industrial crop production. In the north cotton and potato cultivation steadily increased whereas in central China a shift to oil seed bearing crops occurred. For a good attempt to measure the expansion of cotton cultivation see the ph.d. thesis of Richard A. Kraus, *Cotton and Cotton Goods in China, 1918-1936; The Impact of Modernization on the Traditional Sector*, Harvard, 1968, chapter 2.

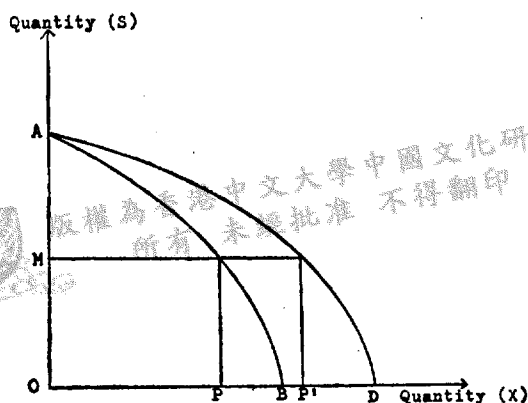
⁹ Proof of this proposition is contained in R. Shand, "The Development of Trade and Specialization in a Primitive Economy" *The Economic Record* 41:94 (June 1965), p. 199.



duction can be increased to meet urban and village demand and some villages specialize in industrial crops, improved trade and specialization now enable a traditional agrarian system to increase both yield and output considerably.

Meanwhile, modest improvements of traditional technology such as wider use of best traditional practices for fertilizing the soil and selecting better seeds can shift a leg of the production possibility curve for family farms and increase the output of certain crops.¹⁰ Finally, when farmers substitute inferior food crops requiring less land, yet providing the same per capita caloric intake as before, land saving food crops permit peasants to specialize in industrial crops. For example, in north China peasants gradually adopted the potato while increasing their specialization in fiber and oil seed bearing crops. Specialization, modest improvements of traditional farming practices, and substitution of inferior food crops for traditional foods enabled peasants on the mainland to increase the marketed surplus of food and industrial crops after the 1890s. Merchants and entrepreneurs converted part of this marketed surplus into industrial working capital to give greater off-farm employment to peasants.¹¹ As long as peasants continued to specialize and earn off-farm income, the family farm continued as a viable production unit capable of maintaining living standards

¹⁰ This is observed in the figure. Family farms are producing some product mix of subsistence goods (S) and industrial cash crops (X). The production possibility curve AB indicates the amounts of OM and OP of food and industrial crops which are initially cultivated and produced. Due to better seed selection, improved fertilizers such as ash, bean curd, etc., extension of irrigation by constructing wells and sluices, and improved methods for combatting pests, these modest technical improvements shift the lower part of the production possibility curve rightwards (AB becomes AD) to permit more cash crops (OP') to be produced with the same output of food crops OM.



For historical examples of how traditional technology improved without any sharp break with previous production methods and farming inputs see Amano Motonosuke, *Chūgoku nōgyōshi kenkyū* (Studies of Chinese Agricultural History), Tokyo, 1962, pp. 632-639. For an example of an improvement in combatting crop pests during the Ch'ing period see Kato Shigeshi, *Shina keizaishi kōshō* (Studies in Chinese Economic History), Tokyo, 1953, II, pp. 714-729. Katō describes how local officials had established an ingenious warning system to alert districts and villages of flying pests in order that they might take necessary preventive measures.

¹¹ For an excellent discussion of how farm surpluses can be utilized to provide for increased employment and economic development see William H. Nicholls, "Development in Agrarian Economies: The Role of Agricultural Surplus, Population Pressures, and Systems of Land Tenures" *The Journal of Political Economy* 71.1 (February 1963), pp. 1-29. See particularly pp. 20-29 for their relevance to conditions of Republican China.

at levels equivalent to those of the recent past. Several empirical examples are cited below to show this process.

The first example refers to a county in south Manchuria which became increasingly populated after 1890 but retained its rural character into the 1930s. By 1900 much of I-t'ung county in Kirin province was being farmed. Railway development during the next quarter century brought more migrants into the county, and by the mid 1930s nearly 60 per cent of village households were still without land.¹² In spite of a population of over 200,000 people, I-t'ung possessed more land that could be reclaimed, so that prospects were still favorable for accommodating these families and many more into farming. Peasants cultivated soy bean, sorghum, millet, corn, wheat, rice, and assorted vegetables, the typical food and industrial crops of south Manchuria. They marketed about 60 per cent of their soy beans and sold food consisting of about half the sorghum harvest, 80 per cent of their rice, and often some millet.

In villages large landholders leased some of their land to tenants. The original large landowning families had mortgaged and eventually sold their land to enable a new group of owner-cultivators to emerge. Although many landlords still resided in cities, they constituted a smaller number with fewer holdings than a half century before. Migrants settling in I-t'ung before the 1920s specialized in soy beans and from their cash earning acquired farm land. They then employed other migrants during the peak farming periods, and some of these workers gradually obtained cash first to rent land and then to buy land, thus securing a small toe-hold in farming. In this fashion villages successfully absorbed waves of migrants through specialization in soy bean. Market towns processed most of the raw materials marketed by peasants, but these activities provided only a little extra employment. Around 1900 the county contained less than 50,000 persons, but by 1935 it resembled any typical densely populated, rural county on the mainland proper.

Wu-tien village of Liang-hsiang county, Hopei, was located only a kilometer away from the county seat.¹³ Around 1910 this village contained about 40 households, but in 1942 there were 70 families. The village claimed about 1,100 mow of land of which around 600 was farmed. The peasants reported that village land had gradually declined during the 1930s because some households had sold their land to farmers in other villages. Only 20 of the 70 households depended entirely upon farming.¹⁴ These were larger farms, averaging 40 mow in size, while the typical farm was only 10 mow. Each year families sent their young men to work part-time on other farms, to seek work in market towns, or travel

¹² My brief historical sketch of conditions of I-t'ung was obtained from Sarai Rokurō, "Chū-Man nōson ni okeru kokunai shijō hatten no ichi kōsatsu" (A Study of the Development of Rural Markets in Central Manchuria) *Mantetsu chōsa geppō* 17:1 (January 1937), pp. 69-152.

¹³ Chūgoku nōson kankō chōsa kankōkai (comp.), *Chūgoku nōson kankō chōsa* (A Survey of Chinese Rural Customs), Tokyo, 1957, V, pp. 407-651.

¹⁴ This information was provided by a 64 year old farmer who had served in a semi-official capacity in the first decade of the century and was regarded by villagers as Wu-tien's most important and powerful elder. *Ibid.*, p. 574.

to Peking to labor in shops and handicraft establishments. Peasants in Wu-tien specialized in wheat as a cash crop and used the rest of the land, around 60 or 70 per cent of their holdings, to grow corn, millet, potatoes, and vegetables. Since the 1920s peasants began allotting a half mow or so of land for potato to supplement food production.¹⁵ Peasants marketed their wheat for cash to buy millet and sorghum. A half century before, more farms were self-sufficient and did not depend upon off-farm income to buy grain. Population increase, the decline of farm size, and occasional poor harvests combined to force peasants to specialize in wheat for earning cash, introduce inferior food crops like the potato, and send labor away from the village to earn cash to buy food. Farming practices remained like those of the late nineteenth century, and new inputs could not be purchased in market towns.

The village of T'ou-tsung miao, located near the large town of Chin-sha chen in Nan-t'ung hsien of Kiangsu, produced cotton, assorted grains, and vegetables.¹⁶ Nan-t'ung supplied nearly one-fifth of the province's annual cotton output for its thriving handicraft and modern textile mills. T'ou-tsung miao contained 94 households of nearly 400 persons in which farmers specialized mainly in cotton: about 40 per cent of land in the first cropping period being used for cotton.¹⁷ Farmers rotated their crops by inserting yellow beans between wheat, cotton, and other crops. Farms with less than 3 mow depended greatly upon handicraft weaving and off-farm earning to support themselves,¹⁸ whereas larger holdings used all of their labor for farming and home weaving of cloth. Only a few households were entirely self-sufficient in food, because the average farm size of 3 mow was too small to provide enough grain, so farmers used most of their land to grow cash crops. The typical farm purchased about one-fifth of its wheat and four-fifth of its rice.¹⁹ In spite of steady population growth over the past half century and the absence of any major change in farming technology, peasants had still managed to supply a very modest surplus to the urban sector by specializing and engaging in subsidiary activities like handicraft weaving.

Aside from Japan, Taiwan is the only other Asian society in which farm output increased at a more rapid rate than population and food imports ceased to be of major im-

¹⁵ *Ibid.*, p. 514 for a description of how potatoes were purchased in the market towns, planted, and harvested.

¹⁶ Minami Manshū tetsudō kabushiki kaisha Shanhai jimusho chōsashitsu, *Kōsoshō Nantsūken nōson jittai chōsa hōkokusho* (A Report of Agrarian Field Investigation in Nan-t'ung Hsien, Kiangsu Province), Shanghai, 1941. This was one of five rural surveys undertaken by a Mantetsu research team led by Amano Motonosuke.

¹⁷ *Ibid.*, p. 41. After 1937 cotton production declined because peasants substituted more soy bean and wheat so as to ensure themselves a stable food supply. Rapid inflation discouraged the peasantry from specializing in cotton and handicraft cloth to sell and buy consumer necessities from the market. As the prices of these articles rose more rapidly than crop and handicraft commodity prices, peasants shifted progressively to self-sufficiency. See p. 68 for a good discussion of this change in crop cultivation and land use.

¹⁸ *Ibid.*, pp. 172-174. Out of a total of 94 households, 64 farms owned no land or less than 3 mow of land. These data are found in appendix 1.

¹⁹ *Ibid.*, pp. 163-165.

portance for the economy.²⁰ For the first quarter of this century, the rapid increase in cultivated land contributed greatly to rising crop production, but the long run application of fertilizer, water, and new seeds became progressively more important for increasing output. The four prime crops of rice, sugar cane, sweet potato, and peanut occupy roughly four-fifths of cultivated farm land. Between 1900 and 1940 increase in yield accounted for most of their output increase. The following table shows this impressive production performance, and why Taiwan's agricultural development rapidly surpassed that of mainland China.

TABLE 1

Change in Crop Area, Yield, and Production of Four Main Crops in Taiwan, 1901-1940

Crop	Time Period	Area (hectare)	Yield (kilogram)	Production (metric tons)
native rice	1901-05	324,228	1,358	455,982
	(index)	100	100	100
	1936-40	304,560	2,430	565,587
	(index)	93	179	124
<i>p'eng-lai</i> rice	1922-25	23,960	2,234	49,492
	(index)	100	100	100
	1936-40	305,264	2,234	680,572
	(index)	1274	100	1375
sugar cane	1901-05	21,659	28,721	627,168
	(index)	100	100	100
	1936-40	161,378	68,426	9,670,099
	(index)	745	238	1504
sweet potato	1901-05	74,895	6,200	488,755
	(index)	100	100	100
	1936-40	134,505	11,877	1,601,789
	(index)	179	191	328
peanut	1901-05	15,713	537	8,640
	(index)	100	100	100
	1936-40	30,650	954	29,222
	(index)	195	177	337

Source: Joint Commission on Rural Reconstruction, *Taiwan Agricultural Statistics*, Taipei, 1956. Data calculated from pp. 22, 32, 36, 44.

The productivity record in table 1 indicates that in spite of the large extension of cultivated land, crop yields rose instead of declining. The area devoted to the new Japanese rice seed, the *p'eng-lai*, roughly increased twelve-fold during the 1920s and 1930s but yield

²⁰ Yhi-Min Ho, *Agricultural Development of Taiwan 1903-1960*, Nashville, 1966; Samuel Pao-San Ho, "Agricultural Transformation under Colonialism: The Case of Taiwan" *The Journal of Economic History* 28-3 (September 1968), pp. 313-340. For the post-war period see You-Tsao Wang, *Technological Changes and Agricultural Development of Taiwan 1946-1965*, Joint Commission on Rural Reconstruction, Economic Digest Series No. 19, Taipei, 1968. Also see Ramon H. Myers, "Taiwan" in R. T. Shand (edit.), *Agricultural Development in Asia*, Canberra, 1969.

TABLE 2
Five Year Average Yields for Four Main Crops
by Region in Taiwan, 1906-1940

Period	Region ^a							
	All island	Taipei	Hsinchu	Taichung	Tainan	Kaohsiung	Taitung	Hualien
(1) Ground nut (koku per chia)^b								
1960-10	11.9	19.9	18.7	13.5	6.9	8.8	13.1	10.9
1911-15	10.1	23.0	14.5	13.8	7.4	8.4	15.3	23.3
1916-20	12.6	22.9	13.8	15.4	9.6	9.3	17.3	22.2
1921-25	15.1	25.6	14.9	19.0	13.7	11.9	15.5	22.3
1926-30	16.6	26.1	14.3	17.6	17.1	13.5	16.3	20.1
1931-35	17.6	24.3	13.8	15.1	19.1	14.3	15.2	22.2
1936-40	18.3	22.0	13.2	15.0	21.3	14.3	16.0	21.8
(2) Sweet potato (kin per chia)^c								
1906-10	11.5	8.0	9.1	13.5	14.1	12.7	7.7	7.5
1911-15	11.1	8.2	8.2	11.5	13.8	10.5	7.9	13.9
1916-20	11.8	6.9	10.1	14.7	14.3	9.5	11.5	12.8
1921-25	13.6 ^d	8.4	10.4	18.0	15.8	11.6	9.6	16.8
1926-30	16.3	10.2	12.5	18.9	20.4	13.3	9.7	15.6
1931-35	18.1	11.8	13.9	18.5	23.3	15.5	9.1	15.8
1936-40	19.3	12.6	15.3	19.1	23.2	19.0	10.5	16.4
(3) Sugar cane (kin per chia)								
1911-15	38.8	42.3	27.8	41.7	46.4	35.2	25.7	36.3
1916-20	49.4	37.0	37.2	62.4	45.4	48.0	28.9	33.0
1921-25	55.6	39.4	45.2	61.8	58.8	52.6	33.3	49.4
1926-30	88.9	72.7	51.6	98.4	89.9	88.9	54.0	76.9
1931-35	109.7	87.3	66.5	107.0	115.8	111.6	101.0	95.1
1936-40	111.2	90.8	70.0	114.1	115.7	116.9	86.4	90.4
(4) Native rice (koku per chia)								
1926-30	10.96	10.95	9.61	10.52	10.60	11.14	9.96	9.16
1931-35	11.55	11.38	9.88	13.85	10.71	12.20	8.86	9.44
1936-40	12.45	12.03	12.90	14.89	11.01	12.85	9.41	10.11
(5) P'eng-lai rice (koku per chia)								
1926-30	12.20	12.20	9.82	13.33	16.10	13.31	7.88	10.82
1931-35	14.78	13.20	11.60	16.14	17.14	20.76	9.01	12.01
1936-40	15.12	13.52	13.26	17.20	15.60	18.67	19.76	11.21

^aThese regions correspond to the administrative prefectures of the period. Adjustments have been made for the pre-1925 period to insure that regional similarity is maintained over the period.

^bThe Japanese *koku* is a capacity unit whose weight varies from crop to crop.

^cThe Japanese *kin* is equal to .6 kilograms.

^dOnly four years have been averaged.

Source: All calculations are based upon the annual Taiwan *sōtokufu*, *Taiwan iōkeisho* (The Annual Statistical Yearbook for Taiwan), for years 1901-1941.

remained constant. For sugar cane, cultivated area rose more than seven fold, but production increased more than fifteen times the base level. Although the cultivated area for native rice actually declined when peasants substituted more *p'eng-lai* for traditional rice types, native rice yield and output continued to increase. For all crops, except *p'eng-lai*, yields rose impressively.

In table 2 I have calculated five year averages for the yields of the same four main crops according to administrative area or prefecture to show regional yield trends. Yields appear to have increased sharply during the 1920s, about the time family farms began making extensive use of new inputs. Second, yield disparity appears to be much greater in the early period between regions but gradually narrows by the late 1930s. The standard deviation also declines over the period for all crops. Third, very low yield areas in the early period rapidly achieve the high yields of advanced areas by the late 1930s as seen by the example of the groundnut in Tainan district.

As farm output increased, income rose and peasant living standards improved. Some scholars have maintained that family farm nutritional levels did not rise over the period, per capita availability of rice declined while that of sweet potato rose, and as a result, the "real income level (or welfares) of the population did not noticeably change for the better".²¹ The Japanese colonial government squeezed the peasants in a variety of ways to exact a greater surplus from agriculture without exchanging more goods and services with them. This proposition can be confirmed by examining if the proportion of income spent for food rose, remained constant, or declined over this period. It is generally acknowledged that if income rises, the proportion of income spent on food declines while that spent for non-food items remains high and even rises.²² If family farm budget data can be compared over time to show that the fraction of income spent by peasants on food declined, this finding would verify that farm output and peasant real income rose together.

Peasant household budget studies undertaken first by the Japanese and later by the Chinese government between 1920/21 and 1960/61 contain considerable expenditure data that can be subjected to statistical analysis to determine expenditure patterns over time. The method used below was taken from a study by H. S. Houthakker who compared dif-

²¹ Samuel Pao-San Ho, "Agricultural Transformation Under Colonialism: The Case of Taiwan" *The Journal of Economic History* 28-3 (September 1968) p. 336. This argument is controverted by evidence produced in Han-yu Chang, "A Study of Living Conditions of Farmers in Taiwan, 1931-1950" *The Developing Economies* 7:1 (March 1969), pp. 35-62. I too challenge the assertion argued by Professor Ho in my analysis of farm expenditure patterns between 1921 and 1961.

²² This proposition was first presented in a study on the conditions of production and consumption in the Kingdom of Saxony by Ernst Engel in 1857 in which he formulated an empirical law concerning the relation between income and expenditure of food. Engel's law, as it is now known, states that the proportion of income spent on food declines as income rises. Engel's original essay appeared as Engel, E., "Die Productions-und Consumptionsverhältnisse des Königreichs Sachsen", *Zeitschrift des Statistischen Bureaus des Königlich Sächsischen Ministerium des Inneren*, Nos. 8 and 9 (November 1857.) It was reprinted in *Bulletin de L'institut International de Statistique*, IX (1895).



ferent country household expenditure patterns to confirm the validity of Engel's Law.²³ This method involved fitting data for various expenditure categories, total household expenditures, and family size to the following function.

$$(1) \text{ Log } Y_i = a_i + \beta_i \text{ Log } X_1 + \gamma_i \text{ Log } X_2 + E_i$$

In expression (1) Y_i is the expenditure on the i th group of items, X_1 is total expenditure, X_2 is family size, E_i represents a disturbance term, and a_i , β_i , and γ_i are the constants to be estimated by means of classical least square regression. The multiple regression coefficients β_i and γ_i are the constants to be estimated by means of classical least square regression. The multiple regression coefficients β_i and γ_i are the partial elasticities of the i th group of items with respect to total expenditure and family size respectively. Equation (1) is expressed in log terms.

The four expenditure categories consisted of food, clothing, housing (fuel, furniture, rent), and miscellaneous (all other items). Expenditures instead of income were used because large household income fluctuations can still be associated with little change in expenditures whereas rising total expenditures reflect that rising real income is most likely taking place. Total expenditures in all case included outlays in kind and cash. Data were obtained from 124 farms sampled between 1919-22, 111 farms sampled between 1931-32, 202 rice farms surveyed between 1941-42, 293 farms surveyed between 1950-51, and 218 farms sampled between 1960-61. These data were fitted to equation (1) to obtain the partial elasticities for food, clothing, housing, and miscellaneous expenditures. The four partial elasticities with the standard error of each are presented in table 3.

Observe that the elasticities for food expenditures are less than one and decline gradually for the pre-war period, rise for the immediate years of the post-war period, but then decline by the early 1960s. The gradual decline in partial elasticity for food expenditures simply means that as expenditures rose, a smaller fraction was spent for food. This trend can be interpreted to mean that real income rose gradually before 1943, declined during the 1940s, but rose during the 1950s and thereafter. All partial elasticities for expenditures are highly significant. The very low .481 value for food expenditures in 1941-42 could possibly represent growing wartime influences upon the rural economy where food outlays perhaps become checked by peasants themselves. This is very difficult to ascertain, because wartime controls over food production and rationing did not really take place until late 1942 and 1943. But the decline in partial elasticity for food expenditure during the 1920s is unmistakable. Food expenditure elasticity in 1950-51 approximates that of the 1920s, but by 1960-61 it fell below the 1930s level. Clothing and housing expenditure elasticities decline slightly during the 1930s, but those for miscellaneous outlays are well above one. For the post war period all non-food expenditure elasticities are higher than food, and those for clothing and miscellaneous items well exceed 1.0.

²³ H. S. Houthakker, "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law" *Econometrica*, 25:3 (July 1957), pp. 532-533.

TABLE 3

Partial Elasticities for Four Expenditures
with Respect to Total Expenditures (b)
and Family Size (c): 1921/22 — 1960-61

Sample	Food		Clothing		Housing		Miscellaneous	
	b	c	b	c	b	c	b	c
124 farms ^a (1921-22)	.779 (.049)	.163 (.065)	1.139 (.168)	-.167 (.225)*	1.037 (.148)	-.040 (.198)*	1.808 (.166)	-.459 (.222)
111 farms ^b (1931-32)	.640 (.043)	.446 (.071)	.913 (.117)	.130 (.192)*	.825 (.072)*	.077 (.118)	1.310 (.064)	-.459 (.105)
202 farms ^c (1941-42)	.481 (.038)	.474 (.043)	0.896 (.095)	-.002 (.107)*	.573 (.059)	.018 (.067)*	1.560 (.095)	-.517 (.107)*
293 farms ^d (1950-51)	.759 (.037)	.263 (.038)	1.384 (.168)	-.219 (.175)*	.878 (.064)	-.150 (.067)	1.283 (.076)	-.307 (.079)
218 farms ^e (1960-61)	.591 (.032)	.326 (.036)	1.192 (.149)	-.337 (.167)*	.877 (.097)	.020 (.109)*	1.921 (.095)	-.563 (.106)

Source:

- Taiwan sōtokufu shokusanakyoku, *Taiwan nōka keizai chōsa*: (No. 5) (A Survey of the Taiwan Farm Economy), Taipei, 1923.
- Taiwan sōtokufu shokusanakyoku, *Nōka keizai chōsa: beisaku nōka* (No. 30) (A Survey of the Farm Economy: Rice Farms), Taipei, 1934; *Nōka keizai chōsa: shasaku nōka* (No. 34) (A Survey of the Farm Economy: Sugar Cane Farms), Taipei, 1936; *Nōka keizai chōsa: chasaku nōka* (No. 32) (A Survey of the Farm Economy: Tea Farms), Taipei, 1934; *Nōka keizai chōsa: beisaku nōka* (No. 37) (A Survey of the Farm Economy: Rice Farms), Taipei, 1938.
- Taiwan sōtokufu shokusanakyoku, *Beisaku nōka seikeihi chōsa* (No. 44) (A Survey of Living Expenditures for Rice Farms), Taipei, 1943.
- Department of Agriculture and Forestry (Taiwan Provincial Government), *Nung-chia ching-chi tiao-ch'a pao-kao shu* (A Report on a Survey of the Farm Economy), Taipei, 1952.
- Ibid., *Taiwan nung-chia chi-chang pao-kao* (A Report of Farm Recordkeeping Families in Taiwan, 1962), Taipei, 1963.

*indicates partial elasticity value is insignificant.

Family size was measured by the number of persons, without any weighting according to age and sex. The partial elasticities for food with respect to family size are all significantly positive and range between .16 and .47. The value of γ for food is higher for a lower value of β . Where households spent a higher proportion of their income for food, family size tended to be small and probably contained fewer children. In the case of clothing and miscellaneous items the partial elasticities for household size are nearly all negative, and where the expenditure elasticity rises, appears to be negative and higher.

As in mainland China, expansion of the market in Taiwan through railroad, road, and port developments enabled family farms to benefit from exchange and greater crop specialization. Improvements in marketing, sanitation and communications also favored market expansion and an extension of cultivated area. Contrary to the process on the mainland, growth of the market was accompanied by a steady improvement of farming technology, based to a large measure on government research stations and agricultural associations

providing new seeds, fertilizers, and better farming methods to the peasants. Local government also assisted villages in flood control and irrigation projects. Due to the introduction of more new farming inputs to agriculture, the production possibility curve for family farms shifted outward considerably, so that with greater commercialization and specialization peasants greatly increased crop yields and their marketable surplus.

Agrarian Policy

A national agricultural policy in China only began to take solid form by the early 1930s. This policy rested upon different ideological tenets than those for Kuomintang policy of the early 1920s toward the agrarian problem. This early party stance toward agriculture is well reflected by statements made by KMT and Communist Party delegates to the January 13, 1924 Kwangtung Party Congress.²⁴

Because the peasants lack land and are gradually falling into the ranks of tenant farmers, the government should give them land to farm; moreover, the government should construct irrigation projects and reclaim untilled land for the peasants; it should also equalize land holdings. Finally, as the peasants lack capital and shoulder a heavy interest burden on their debt, the state should establish institutions such as farmer banks to alleviate the scarcity of capital. In this way the peasants will be able to enjoy the happiness and prosperity natural for all of mankind.

The basic assumption justifying this farm program was that land scarcity and heavy debt prevented the peasants from obtaining the necessary capital to increase farm production. Farms were too small and peasants too poor to acquire such capital. Officials, scholars, and revolutionaries of this period believed these conditions to be at the root of the agrarian problem.

After the Wuhan revolutionary government moved to Nanking in April 1928 KMT party officials began to chart a comprehensive economic policy for the country. From the outset the new government did not intend a dramatic shake-up of the village social and economic order but merely planned extensive fence mending of local administration and village relationships. The following line of reasoning gradually emerged as the official party line to deal with the agrarian problem.²⁵

The general rules the government should adopt to preserve social peace and order are as follows. It should systematize the laws pertaining to land, land use, taxes on land values, and land rents, protecting the peasantry, and reforming the village. By establishing farm banks and various organizations the government can protect the peasantry's gains, improve their living standards, and guarantee their livelihood.

A fifteen year agricultural development draft plan was drawn up and integrated with plans for developing the transport, flood control, and communication systems.

²⁴ See Ka-Hoku sangyō kagaku kenkyūjo (The North China Industrial Scientific Research Institute), *Kokumin seifu no nōgyō seisaku* (The Agricultural Policy of the Nationalistic Government), publication place unknown, 1937, p. 11. To my knowledge this is one of the most comprehensive surveys of Nationalist government agricultural policy ever written. I have relied upon this single source almost exclusively for my descriptive account of Kuomintang agrarian policy.

²⁵ *Ibid.*, p. 28.

To carry out such a plan the Bureau of Commerce and Industry was established in July of 1929.²⁶ The Bureau assumed the task of establishing agricultural research stations, promoting new seeds, reclaiming land, and developing forestry and irrigation. At the same time the Legislative Yuan passed ordinances pertaining to land and property rights, land transactions, and land rents, but steps to implement these laws were only undertaken in Kiangsu and Chekiang. In January 1931 new farmer associations were created in Kiangsu, Shantung, Shansi, and Hopei, and by late 1933 there existed associations in 252 counties, 4 cities, 1,055 districts, and 9,273 villages.²⁷ As yet this unit was poorly funded, few peasants participated, and many associations were not linked to research stations. Aside from these steps the government acted to undertake a national census of agriculture between 1929 and 1931 and initiate a land survey in Kiangsu. By 1935 the government was attempting to spend more funds for agriculture, to increase exports, and launch industrial development.²⁸ A five year draft plan was published indicating that the currency system was to be unified, the land system reformed, and economic development promoted.²⁹ The plan signified the government's belief that until currency and markets were standardized, land records correctly compiled to correspond with actual land ownership patterns, and local transport systems greatly improved, agricultural resources could not be effectively developed. The KMT party had now moved full circle from a position of urging redistribution of wealth and financial assistance directly to peasants to introducing new technology into agriculture and constructing a new rural infrastructure to assist family farms.³⁰

Between 1931 and 1937 the government used the National Economic Commission and the Bureau of Agriculture and Mining, later renamed the Bureau of Enterprises, as its chief instruments to carry out an agrarian program.³¹ Both agencies encouraged research on plant disease, control of crop pests, promotion of new seed varieties, proper application of fertilizers, soil surveys, and quality control of certain crops. A quality control institute for cotton was established in several provinces to prevent adulteration and promote new seeds. In 1934 silk improvement institutes were set up in Kiangsu, Chekiang, Anhui, Hunan, and Szechwan to provide peasants with new mulberry trees and standardize modern silk production and reeling methods. A tea experimental station was established in 1935 for Anhui province to improve the quality of tea production. A large organization designed to introduce scientific knowledge of agriculture to both farmers and officials was created in 1931 with branches initially in 13 provinces, but later extended throughout the country. This agency also established six agricultural schools and libraries as well as supervised model farms in special crop growing districts. On April 15, 1931 a central agricultural experimental station was established with sections for animal husbandry, agricultural economics

²⁶ *Ibid.*, p. 31.

²⁷ *Ibid.*, pp. 48-49.

²⁸ *Ibid.*, pp. 56-57.

²⁹ *Ibid.*, p. 62.

³⁰ *Ibid.*, p. 67.

³¹ *Ibid.*, pp. 87-116.

and plan research. Within this agency research concentrated upon rice, wheat, cotton, silk, and tea.

Another aspect of KMT rural policy not mentioned so far was the rural cooperative program. This program received strong endorsement from party leaders who were firmly convinced that only through a large organization could farmers participate and obtain credit and farm tools. They offered no social and economic theory to justify the superiority of this organization over any other, but the idea persisted, and in 1929 Chekiang and Shantung submitted draft proposals to establish these units with other provinces quickly following suit.³² By 1934 many cooperatives had been established with farmer banks whereby members were permitted to have saving deposits earning high interest rates and borrowing well below prevailing money market rates.³³ These units also purchased capital on behalf of their members. In 1928 the country possessed only 933 cooperatives with 27,000 members, but by 1936 this number climbed to 36,363 with over a million members.³⁴ Yet cooperative membership still embraced less than 0.5 per cent of the rural population, and it is far from clear how effectively they contributed to farmer welfare and the increase of crop production.

The scheme of establishing research stations eventually would have borne fruit. Research results published during this decade demonstrated that if peasant could apply more chemical fertilizer to existing seeds in use, rice production would be increased by 30 per cent, wheat by 23 per cent, cotton by 26 per cent, and rape by 28 per cent.³⁵ The introduction of new hybrid seeds also being studied at this time would have increased yields even more. A great misfortune for farming was that farmer associations established as early as 1916 had not proved effective in assisting farmers because local government had not the resources to give these units the strong backing they required. By 1936 there were about 3,000 technical personnel working in these associations, but their annual operating revenue rarely exceeded 1,000 yuan per year.³⁶ A Japanese study of farmer associations in Feng-t'ien province of Manchuria reported 24 in existence at the county, 134 at the district, and 733 at the village level,³⁷ but these associations only embraced a small fraction of the peasantry. An association had five personnel serving as chairman, vice-chairmen, accountant, secretary, and manager. It depended upon local government for funding, and small peasant membership provided little money for expansion. Between 1925 and 1930 the

³² *Ibid.*, p. 139.

³³ *Ibid.*, pp. 149-150. Cooperative borrowing rates were fixed at 2.6 per cent per year whereas the private money loan market annual rates ranged between 15 and 25 per cent per annum.

³⁴ *Ibid.*, pp. 145-146.

³⁵ See T. H. Shen, *Agricultural Resources of China*, New York, 1951, part II.

³⁶ Ch'en Shan-yung, "Chung-hua nung-hsüeh-hui ch'eng-li erh-shih chou-nien kai-k'uang" (The 20th Anniversary of the Founding of the Chinese Agricultural Associations) *Chung-hua nung-hsüeh-hui pao* (The Chinese Agricultural Association Report) 155 (December 1936) p. 1.

³⁷ Morihisa Masanobu, "Hötenshōka no nōkai no genjō" (Current Conditions of Farmer Associations in Feng-t'ien Province) *Mantetsu Chōsa Geppō* 13:2 (February 1933) p. 209.

Feng-t'ien associations had planted some orchards, experimented with new mulberry trees, assisted some farmers suffering from drought, and planted new seeds received from one of the county research stations.³⁸ In the main the over-all performance was exceedingly modest, but the potential of these associations assisting farmers to increase output remained great.

Enough has been said to indicate that KMT agrarian policy had become increasingly diverse and flexible. This policy aimed at creating a new rural infrastructure for family farms. The program began to take concrete form by 1936-37, but war interrupted these efforts and erased the small progress which had taken place. KMT agrarian policy has been severely criticized for not undertaking major socioeconomic reforms such as land reform. This criticism is a logical extension of interpreting China's agrarian problem as one in which rural institutions were used by certain social classes to oppress and impoverish the farmer and the small size of farms kept the farmers straight-jacketed in poverty. If this argument contains any validity, then the rural programs launched in Taiwan by the Japanese should have produced little improvement for the peasantry. We have seen, however, that Taiwan agricultural development sharply diverged from that of the mainland over this period and that peasant living standards gradually improved. In Taiwan the Japanese reaped greater benefits from their agrarian policies than did the KMT party because they remained in power for a half century and successfully brought villages closely under central government rule. At the same time they initiated a technological revolution in farming. While the KMT party had groped toward this goal, its short-term life in power prevented it from achieving it.

The development of the new rural infrastructure by the Japanese colonial government has become well known.³⁹ Between 1898-1906 the administration of Kodama Gentarō and Gotō Shimpei launched a policy of establishing a shipping line between Taiwan and Japan, constructed harbors at Keelung and Kaohsiung to handle this traffic, and built a railroad to connect Keelung in the north with Kaohsiung in the south. The administration also established research stations and farmer associations to introduce new techniques and inputs into agriculture. These two institutions performed ably because of the assistance received from local government officials. Local officials were in turn assisted by a large police force to implement local policy, and they worked closely with the recently revived traditional village *pao-chia*, conglomerates of households responsible to village headmen and the local police.⁴⁰ Local government units were dependent upon the governor-general's office for the funds they needed to carry out administration policy. The police made sure

³⁸ *Ibid.*, pp. 216-223 for a review of the 1925-1930 periods.

³⁹ See Chang Han-Yu and Ramon H. Myers, "Japanese Colonial Development Policy of Taiwan, 1895-1906: A Case of Bureaucratic Entrepreneurship" *The Journal of Asian Studies* 22:4 (August 1963), pp. 433-449. E. Patricia Tsurumi, "Taiwan under Kodama Gentarō and Gotō Shimpei" *Papers on Japan* (Vol. 4), Cambridge, Harvard University, 1967, pp. 95-146.

⁴⁰ Ching-chih Chen, "The Police and Hokō Systems in Taiwan under Japanese Administration (1895-1945)" *Papers on Japan* (Vol. 4), Cambridge, Harvard University, 1967, pp. 147-176; Shigeno Shinichi, "Hontō nōson seisaku to hokō seido no zenyō" (Village Policy in Taiwan and the Effective Use of the *Pao-chia* System) *Taiwan nōjihō* 19:4 (1925) pp. 292-308.



that government orders were obeyed at the village level, and their success on this matter was fairly well guaranteed by the satisfactory performance and operation of the village *pao-chia*.⁴¹

In order to increase sugar cane output the administration created in June 1902 a Provisional Taiwan Sugar Affairs Bureau to research and improve sugar cane production by disseminating new seeds and instructing the peasants in their proper use. These efforts produced the following results. Between 1902-03 and 1912-13 sugar cane cultivated area using new cane seeds from Hawaii jumped from 16,526 to 67,358 *chia*, cane output more than doubled, and yield rose gradually.⁴² In 1911-12 great typhoons nearly destroyed the cane harvest by weakening the Hawaiian seed cane and making it vulnerable to a stalk disease that rapidly spread throughout the island. The Bureau quickly imported new seeds from Java and saved the industry from certain disaster. By 1918-19 cultivated cane area with the new Java seed climbed to 150,450 *chia*, output amounted to about 4 million metric tons, and yield per *chia* stood at 2,490 kilograms compared to only 1,840 in 1902-03. Output continued to increase as research stations introduced new seed varieties. As a result, between 1927 and 1933 output averaged around 5 million metric tons per year but by 1937 it had risen to 8.5 million metric tons, well above the level predicted by General Kodama nearly four decades before. In 1939 the industry occupied a dominant position in agriculture: out of 400,000 farms, 120,000 specialized in producing sugar cane; approximately one-fifth of all farm land grew sugar cane; about 16 per cent of the annual farm production value came from sugar cane.⁴³ Even the island's small industrial base depended greatly upon new sugar mills: of total factory production value averaging 360 million yen in 1938-39, about 60 per cent was accounted for by sugar; finally, two fifths of export value originated from sugar.⁴⁴

The principal institution that mobilized farmers to adopt new farming technology and obtained for them new farming inputs was the *nōkai* or farmer association. In September 1900 the first farmer association was created in San-chiao-yung of Taipei prefecture, and in April 1901 another was established in Ho-shang-chou of Hsinchu prefecture.⁴⁵ Both were dissolved several years later, but after 1903 farmer associations were being established throughout the island. In 1908 the government issued ordinance 70 which in effect system-

⁴¹ In the early 1900s the police and *pao-chia* proved to be very effective instruments for distributing new sugar cane seeds to increase sugar cane area in yield. See Chang Han-yu, "Jih-chu shih-tai T'ai-wan ching-chi chih yen-pien" (The Transformation of the Taiwan Economy during the Period of Japanese Control) in *T'ai-wan ching-chi shih erh-chi* (Essays on the Economic History of Taiwan: No. 2), Taipei, 1955, pp. 78-79.

⁴² Taiwan sōtokufu shokusanakyoku, *Taiwan no tōgyō* (The Taiwan Sugar Industry), Taipei, 1929, pp. 10-11. The *chia* is roughly equal to the size of a hectare or 2.471 acres. For a good discussion on the diffusion of new sugar cane seeds see Tanaka Kazuji, *Taiwan sangyō sōran* (A Survey of Taiwan Industries), Taipei, 1919, p. 71; Satō Seizō (Comp.), *Kairei yonjunen no Taiwan* (Taiwan After Forty Years of Reform), Taipei, 1935, p. 179; Chang Han-yu, p. 80.

⁴³ *Op. Cit.*, *Taiwan no tōgyō*, p. 21.

⁴⁴ Taiwan civil affairs bureau, *T'ai-wan sheng wu-shih i-nien lai tung-chi t'i-yao* (The Basic Statistics for the Past Fifty-one Years of Taiwan Province), Taipei, 1946, pp. 946-951.

⁴⁵ Taiwan shokusanakyoku nōmuka, *Taiwan nōkai yōran* (A Survey of Farmer Associations in Taiwan), Taipei, 1933, pp. 1-2

atized the objectives and activities of these associations. Their expressed purpose was to serve as a transmission belt to convey new farming knowledge and inputs from research stations and government agencies to family farms. The farmer association of Taipei prefecture serves as a good example of how this organization functioned.

The Taipei farmer association pursued many objectives. It attempted to improve rice production by cultivating new seeds received from research stations on its experimental plots and then distributed these seeds to association members and villages.⁴⁶ The association used its funds to buy new seeds, tools, and fertilizers to sell to its members in order to demonstrate to other farmers their value so they would be encouraged to adopt these as well. The association operated a small livestock improvement station and frequently gave demonstrations of how to control and eradicate field pests. Aside from strictly farming efforts, the association collected crop statistics, urged villages to reform the practices by which land was leased and rent paid, and financed small projects such as flood control and irrigation ponds. Each year in March the association reported its accomplishments and a budget of income and expenditures.

Each prefectural farmer association received funds and property from the local government to commence operations. A manager was appointed with a small staff to handle management and accounting. The association immediately sought out landlords, wealthy farmers, and small family farms that could afford to pay annual dues to be members. Association members paid annual dues amounting to around two-thirds of association annual income. In addition to a small government subsidy the association leased some of its assets and sold its products to cover its operations. On the expenditure side wages for personnel accounted for a third, funding of various projects exhausted another third, and the remainder was spent for personnel travel, management, and debt financing.⁴⁷ In 1902 farmer associations spent only 1,496 yen, but by 1907 these amounts increased to 103,676 yen, and by 1913 annual outlays exceed 400,000 yen. Association expenditures continued to rise, passed the 1 million yen mark in 1922, and in the early 1930s averaged around 1.3 and 1.4 million yen.⁴⁸ Such financing indicates these associations were now engaged in a wide range of activities. By 1931 many had become extremely large and wealthy with nearly a third of their assets consisting of land and the remainder made up of buildings, machinery, investment in fertilizer, bonds, and cash.⁴⁹ Another important service undertaken by these associations was to purchase fertilizers and sell to their members. In 1909 association fertilizer purchases only totalled 36,212 yen, by 1915 they exceeded 1 million yen, and by the early 1930s averaged 3.5 million yen per year.⁵⁰

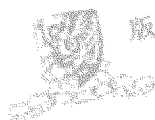
⁴⁶ *Ibid.*, pp. 65-66, p. 231.

⁴⁷ *Ibid.*, see statistical appendix on expenditures and incomes of farmer associations, particularly for 1920.

⁴⁸ *Ibid.*, pp. 165-166

⁴⁹ *Ibid.*, p. 235.

⁵⁰ *Ibid.*, pp. 203-217.



By the mid 1920s Taiwan was a model colony of progress, stability, and order.⁵¹ A traveler could leave Taipei in the morning and by late afternoon arrive in Tainan or Kaohsiung. Fourteen trains ran daily between Keelung and Taipei. All large cities communicated with one another by telephone and telegraph. Public health facilities existed throughout the island, and widespread fatalities from malaria and influenza were restricted to the south and east coastal areas. But by the late 1930s even these areas were safe from disease. Finally, farmers were linked through an organizational network to a system producing modern farming technology.

Visitors from China could easily compare the economic development of Taiwan with that of southeast China as topography and climate were similar. No Chinese coming to Taiwan could not but be favorably impressed by the enormous achievements of the Japanese on the island. For example, in December of 1915 an agricultural student from Fukien named Ch'iu Wen-luan was permitted to tour Taiwan. When he arrived at the Taichung farm research station, he expressed amazement at finding certain plants native to Kwangtung province being grown in the nearby farmer association garden. Association personnel informed him that because Japan spent 2 million yen annually to import these plants from China, the colonial administration decided to grow these same plants in Taiwan with the hope of saving precious foreign exchange. Ch'iu's anguished reactions appeared as follows in his diary.⁵²

Japan's success; our misery! Japan no longer spends 2 million yen, but China loses 2 million yen. If China's major industries are not improved, then we will see our wealth dissipated day by day. The people will live in poverty, and the future be too unbearable to consider. Will this not come about because of examples like these Kwangtung plants?

Ch'iu simply lamented his country's missed opportunities. As a student of agriculture, he well realized how improvement of Taiwan's agriculture had promoted the island's economic development. Another student named Hsieh Wu-k'o visited Kaohsiung at the same time to observe timber processing mills. Hsieh noted that the Japanese had developed timber processing, but this had only been possible because efforts were made to increase the supply of trees. In China, however, where one could still observe large "sections of natural forests, no one bothered to study forestry. A timber industry had yet to be created; no forests dotted the seacoast, and the inland hills stretched endlessly denuded of their trees."⁵³ By 1920 Taiwan was moving well ahead of the mainland in all sectors of primary industrial development.

⁵¹ This is not to say that riots and organized resistance to Japanese rule did not exist in Taiwan throughout the period. In the 1920s, in particular, landlord and tenant disputes and riots became more widespread, and these intensified during the 1930s. These manifestations of frustrated aims and hopes appear to represent rising expectations of the lower segment of the farming community. For a good discussion of such disputes see Taiwan shiryō hozonkai, *Nihon tōjika no minzoku undō* (Nationalistic Movements under Japanese Rule), Tokyo, 1969, II, pp. 987-1190.

⁵² Bank of Taiwan economic research office, *T'ai-wan lü-hsing chi* (Dairies of Travels in Taiwan), Taipei, 1965, p. 26.

⁵³ *Ibid.*, p. 105.

Conclusion

I have distinguished between family farming systems of commercialization without technical change in agriculture and commercialization with technical change. These conditions characterized mainland China and Taiwan respectively between 1895 and 1939. Different crop production performances and living standard trends can be explained by technological change in one farming system and not the other. Rural institutions in the village economy were the same for both farming systems.⁵⁴ At this point the similarity ends. Mainland China experienced throughout this period constant military strife and political turmoil. At one point, 1932-1934, the country suffered a devastating deflation and a monetary crises. Taiwan enjoyed political stability, a continuous rise in farm prices over the period, and gradual industrialization of the economy toward the end of the period.

Improving farming technology on the mainland was slow and tedious. At times farmers were lucky to select a high yielding seed from their harvest to replant again and again so that crop yields gradually rose over time. Both bad and fortunate experiences taught farmers how to plant, fertilize, irrigate, weed, maintain soil fertility, and rotate their crops so as to maintain high yields over time in spite of gradual over-crowding in villages.⁵⁵ As this knowledge passed from father to son, certain elements frequently were transmitted from one community to another by a process of slow diffusion performed by peddlers, migrants, or officials. By the early twentieth century mainland farmers probably had nearly exhausted the little remaining potential to increase yield that traditional farming technology provided. Naturally, the growth of trade enabled peasants to improve upon their specialization of resources and derive benefit from exchange, so that yields continued to increase slowly. But without major improvements in seed varieties, effective control of plant disease and crop pests, and more satisfactory maintenance of soil fertility, further, large increases in yield were not likely to be forthcoming. The validity of this assertion is further supported by the very low rates of return found from investment in farming by landlord and farmers alike.⁵⁶ Little new investment was taking place in twentieth century Chinese agriculture beyond that undertaken by the farmers themselves. Mainland agriculture became steadily characterized as a stagnant rural economic system — slowly reproducing itself in the same image as the past.

Similar circumstances probably characterized family farming in Taiwan during the eighteenth and nineteenth centuries although the rural records are inadequate to prove this

⁵⁴ Ramon H. Myers, "Rural Institutions and Their Influence Upon Agricultural Development in Modern China and Taiwan" *The Journal of the Institute of Chinese Studies*, 2:2 (September 1969), pp. 349-370.

⁵⁵ Each locale of China possessed its stock of conventional farming wisdom expressed by numerous aphorism. During the early 1930s several scholars at Chung-shan University collected these aphorisms from each province and grouped them on a topical basis. This source book was later translated by Japanese scholars for the Tōa kenkyūjo and published as *Shina nōgyō kishō rigenshū* (A Collection of Common Sayings Concerning Chinese Agriculture and Atmospheric Phenomena), Tokyo, 1943, pp. 142.

⁵⁶ This finding is containing in my new study titled *The Chinese Peasant Economy: A Comparative Study of Mainland China and Taiwan, 1890-1937*, Chapter 7 (unpublished).



conclusively. Yet evidence from the Japanese land survey of 1898 to 1902 shows that the rate of return to farm investment was as low as that obtained from farm survey data for mainland farms during the 1930s.⁵⁷ More than a quarter of a century later, however, farming conditions in Taiwan dramatically changed, and the rate of return increased markedly. What took place amounted to nothing more than an agricultural revolution. Taiwan family farms took advantage of the new technology introduced by the Japanese, and the adoption of new farming inputs prevented the peasantry from becoming as impoverished as their counterpart on the mainland. Government programs and spending to introduce these new farming inputs into agriculture gradually succeeded in elevating the rate of return to farm investment, so that eventually family farms themselves began to finance most of the new investment and the accumulation of rural community capital.

The historical lesson from this comparative study is that an agrarian program oriented to educating the peasantry to use new farming inputs and making these inputs available at prices which peasants can afford to buy will quickly produce substantial increases in yields and output of food and fiber crops. It is quite likely that such a program, predicated upon using the family farm as the instrument for agricultural transformation, will eventually have to be modified to deal with the problem of food surplus instead of food scarcity.

List of Chinese Works Cited In Essay

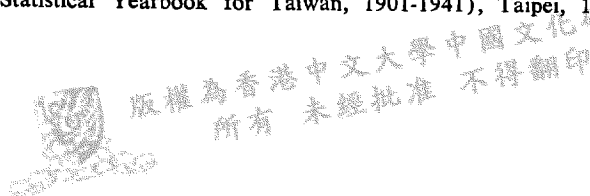
1. K'ung Tz'u-an 孔賜安, "Chung-kuo liu ta-tu-shih ti jen-k'ou chi ch'i tseng-chien" 中國六大都市的人口及其增減 (Population Fluctuations in Six Large Chinese Cities) in Hsiang-kang Ya-tung hsüeh-she 香港亞東學社, *Chung-kuo li-tai jen-k'ou wen-t'i lun-chi* 中國歷代人口問題論集 (Collected Essays on the Problem of China's Dynastic Population Problem), Hong Kong, 1965.
2. Ou Pao-san 巫寶三, *Chung-kuo liang-shih tui-wai mao-i; ch'i ti-wei ch'u-shih chi pien-ch'ien chih yuan-yin* 中國糧食對外貿易其地位趨勢及變遷之原因 (China's Foreign Grain Trade: Its Role in Foreign Trade, General Trends and the Reasons for Trade Changes), Shanghai, 1933.
3. Yen Chung-p'ing 嚴中平, *Chung-kuo mien-fang-chih shih kao* 中國棉紡織史稿 (A Draft History of the Chinese Cotton Textile Industry), Peking, 1963.
4. Ch'en Shan-yung 陳山榮, "Chung-hua nung-hsüeh-hui ch'eng-li erh-shih chou-nien kai-k'uang" 中華農學會成立二十週年概況 (The 20th Anniversary of the Founding of the Chinese Agricultural Associations), *Chung-hua nung-hsüeh-hui pao* 中華農學會報 (The Chinese Agricultural Association Report) 155 (December 1936).
5. Chang Han-yu 張漢裕, "Jih-chü shih-tai T'ai-wan ching-chi chih yen-pien" 日據時代臺灣經濟之演變 (The Transformation of the Taiwan Economy during the Period of Japanese Control) in *T'ai-wan ching-chi shih erh-chi* 臺灣經濟史二集 (Essays on the Economic History of Taiwan: No. 2), Taipei, 1955.
6. Taiwan Civil Affairs Bureau, Statistical Office 臺灣省行政長官公署統計室, *T'ai-wan sheng wu-shih i-nien lai t'ung-chi t'i-yao* 臺灣省五十一年來統計提要 (The Basic Statistics for the Past Fifty-one Years of Taiwan Province), Taipei, 1933.
7. Bank of Taiwan Economic Research Office 臺灣銀行經濟研究室, *T'ai-wan lü-hsing chi* 臺灣旅行記 (Dairies of Travels in Taiwan), Taipei, 1965.

⁵⁷ This finding was obtained from survey data contained in Rinji Taiwan tochi chōsakyoku, *Ta baibai kakaku oyobi kinri chōsasho* (The Survey Results for Rice Field Prices and Interest Rates), Taipei, 1906.

8. Department of Agriculture and Forestry (Taiwan Provincial Government) 臺灣省政府農林廳, *Nung-chia ching-chi tiao-ch'a pao-kao shu* 農家經濟調查報告書 (A Report on a Survey of the Farm Economy), Taipei, 1952.
9. Department of Agriculture and Forestry (Taiwan Provincial Government) 臺灣省政府農林廳, *Taiwan nung-chia chi-chang pao-kao* 臺灣農家記賬報告 (A Report of Farm Record-keeping Families in Taiwan, 1962), Taipei, 1963.

List of Japanese Works Cited In Essay

1. Nishijima Sadao 西嶋定生, *Chūgoku keizaishi kenkyū* 中國經濟史研究 (Studies in Chinese Economic History), Tokyo, 1966.
2. Amano Motonosuke 天野元之助, *Chūgoku nōgyōshi kenkyū* 中國農業史研究 (Studies of Chinese Agricultural History), Tokyo, 1962.
3. Katō Shigeshi 加藤繁, *Shina keizaishi kōshō* 支那經濟史考證 (Studies in Chinese Economic History), Tokyo, 1953, II.
4. Sarai Rokurō 佐瀨六郎, "Chū-Man nōson ni okeru kokunai shijō hatten no ichi kōsatsu" 中滿農村に方立ける國內市場發展の一考察 (A Study of the Development of Rural Markets in Central Manchuria), *Mantetsu chōsa geppō* 滿鐵調查月報 17:1 (January 1937), pp. 69-152.
5. Chūgoku nōson kankō chōsa kankōkai (comp.), 中國農村慣行調查刊行會 (The Committee for the Survey of Chinese Rural Customs), *Chūgoku nōson kankō chōsa* 中國農村慣行調查 (A Survey of Chinese Rural Customs), Tokyo, 1957, V.
6. Minami Manshū tetsudō kabushiki kaisha Shanhai jimusho chōsashitsu 南滿洲鐵道株式會社上海事務所調查室 (The Investigation Section of the Shanghai Office of the South Manchurian Railway Company), *Kōsoshō Nantsūken nōson jittai chōsa hōkokusho* 江蘇省南通縣農村實態調查報告書 (A Report of Agrarian Field Investigation in Nan-t'ung Hsien, Kiangsu Province), Shanghai, 1941.
7. Ka-Hoku sangyō kagaku kenkyūjo 華北產業科學研究所 (The North China Industrial Scientific Research Institute), *Kokumin seifu no nōgyō seisaku* 國民政府農業政策 (The Agricultural Policy of the Nationalist Government), publication place unknown, 1937.
8. Morihisa Masanobu 森久正信, "Hōtenshōka no nōkai no genjō" 奉天省下の農會の現状 (Current Conditions of Farmer Associations in Feng-t'ien Province), *Mantetsu Chōsa Geppō* 滿鐵調查月報 13:2 (February 1933).
9. Shigeno Shinichi 茂野信一, "Hontō nōson seisaku to hokō seido no zenyō" 本島農村政策及保甲制度の善用 (Village Policy in Taiwan and the Effective Use of the Pao-chia System), *Taiwan nōjihō* 臺灣農事報 19:4 (1925).
10. Taiwan sōtokufu shokusanryōkyoku 臺灣總督府殖產局 (The Bureau to Promote Enterprises of the Taiwan Governor-General's Office), *Taiwan no tōgyō* 臺灣之糖業 (The Taiwan Sugar Industry), Taipei, 1929.
11. Tanaka Kazuji 田中一二, *Taiwan sangyō sōran* 臺灣產業總覽 (A Survey of Taiwan Industries), Taipei, 1919.
12. Satō Seizō 佐藤政藏 (comp.), *Kairei yonjunen no Taiwan* 改隸四十年の臺灣 (Taiwan After Forty Years of Reform), Taipei, 1935.
13. Taiwan Shokusanryōkyoku nōmuka 臺灣殖產局農務課 (Agricultural Affairs Section of the Bureau to Promote Enterprise in Taiwan), *Taiwan nōkai yōran* 臺灣農會要覽 (A Survey of Farmer Associations in Taiwan), Taipei, 1933.
14. Tōa kenkyūjo 東亞研究所, *Shina nōgyō kisho rigenshū* 支那農業氣象俚諺集 (A Collection of Common Sayings Concerning Chinese Agriculture and Atmospheric Phenomena), Tokyo, 1943.
15. Rinji Taiwan tochi chōsakyoku 臨時臺灣土地調查局 (Provisional Taiwan Land Survey Committee), *Ta baibai kakaku oyobi kinri chōsasho* 田買賣價格及金利調查書 (The Survey Results for Rice Field Prices and Interest Rates), Taipei, 1906.
16. Taiwan sōtokufu 臺灣總督府 (Taiwan Governor-General's Office), *Taiwan tōkeisho* 臺灣統計書 (The Annual Statistical Yearbook for Taiwan, 1901-1941), Taipei, 1901-1941.



17. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Taiwan nōka keizai chōsa: No. 5 臺灣農家經濟調查* (A Survey of the Taiwan Farm Economy), Taipei, 1923.
18. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Nōka keizai chōsa: beisaku nōka (No. 30) 農家經濟調查: 米作農家* (A Survey of the Farm Economy: Rice Farms), Taipei, 1934.
19. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Nōka keizai chōsa: shasaku nōka (No. 34) 農家經濟調查: 蔗作農家* (A Survey of the Farm Economy: Sugar Cane Farms), Taipei, 1936.
20. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Nōka keizai chōsa: chasaku nōka (No. 32) 農家經濟調查: 茶作農家* (A Survey of the Farm Economy: Tea Farms), Taipei, 1934.
21. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Nōka keizai chōsa: beisaku nōka (No. 37) 農家經濟調查: 米作農家* (A Survey of the Farm Economy: Rice Farms), Taipei, 1938.
22. Taiwan sōtokufu shokusankyoku 臺灣總督府殖產局, *Beisaku nōka seikeihi chōsa (No. 44) 米作農家生計費調查* (A Survey of Living Expenditures for Rice Farms), Taipei, 1943.
23. Taiwan shiryō hozonkai 臺灣史料保存會 (The Committee for the Preservation of Taiwan Historical Materials), *Nihon tōjika no minzoku undō 日本統治下の民族運動* (Nationalistic Movements under Japanese Rule), Tokyo, 1969, II.

Clossary of Chinese and Japanese Names, Terms; and Place Names

<i>Chia</i>	甲	Kodama Gentarō	兒玉源太郎
Chin-sha chen	金沙鎮	<i>Koku</i>	石
Ch'iu Wen-luan	邱文鸞	Liang-hsiang hsien	良鄉縣
Feng-t'ien province	奉天省	Nan-t'ung hsien	南通縣
Gotō Shimpei	後藤新平	<i>Nōkai</i>	農會
Hsieh Ming-k'o	謝鳴珂	<i>Pao-chia</i> or <i>ho-kō</i>	保甲
I-t'ung hsien	伊通縣	<i>P'eng-lai</i> rice	蓬萊米
<i>Kin</i>	斤	T'ou-tsung miao	頭總廟
Kirin province	吉林省	Wu-tien village	吳店村

版權為香港中文大學中國文化研究所
所有 未經批准 不得翻印

版權為香港中文大學中國文化研究所
所有 未經批准 不得翻印

一八九五—一九四五年中國大陸與台灣的 農村政策及農業變遷

(摘要)

馬若孟

本文試圖比較中國大陸與台灣在1895至1945年間的農業發展，敘述與增加農業生產有關的機構，並討論促進這些發展的政策。

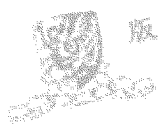
台灣自1900年以後即已開始經歷農業革命，而中國大陸卻沒有經歷到。台灣農產增加較人口增加迅速得多，而大陸的食物生產率則僅僅比得上人口的增長。大陸農民自1890年以後提高農作物專業化，並在傳統耕作技術所給予的有限度的機會下繼續獲得一些利益。因此產量確會慢慢增加，農民的勞作足以供應鄉村和城市的需求，而不至於過分依賴糧食的輸入。

相反的，台灣農業商業化卻帶來了急速的技術變更。其直接影響為產量與剩餘農產運銷的激增。當產量開始增大的時候，農村的真實所得也漸漸增加。我們若將一戶的預算數字作一番統計測驗，便可發現生活程度有適度的改進。這個測驗係用最小自乘數的方法把開支納入一個複累減方程式，從而尋求出食物與其他用度的部分彈性係數。由於食物用度部分彈性係數在1921至1941年間的下降，可以看出當農村所得增加時，農民支出僅小部分用於食物，其他項目則佔大部分。1951年以後這個係數顯示下降，象徵戰後又恢復戰前的趨勢。

1928至1937年間，國民政府曾經實施一種類似日治時期日人在台灣所創始的農業計劃。此計劃為建立一種農業機構，包括農業研究站和農業推廣組織，以促進新技術的傳播和新設備的介紹。這種政策的施行有賴於家庭農場的參加與活動。但因國民政府統治時間短促，國民黨農村政策的影響甚難估量。

台灣方面，日人所設之農業推廣機構使家庭農場能利用農作新技術和新設備。國民

政府的農村政策既和日人相類似，而兩方面的家庭農場亦甚相同，吾人甚有理由推論大陸終必經歷和台灣一樣的「綠色」革命。這是一個極有趣的結論，因為它提示社會經濟改革，如土地改革之類，可能並非改善亞洲農業的必不可少的方案。從大陸和台灣的歷史實例研究看來，最需要的似乎在於對家庭農場供給新農作設備和對農民授以使用方法。鑒於肥料和品種革命現在已在亞洲風行，這篇以家庭農場作為改變傳統農業的媒介之農村政策的比較研究，似很合時。



版權為香港中文大學中國文化研究所
所有 未經批准 不得翻印



版權為香港中文大學中國文化研究所
所有 未經批准 不得翻印



版權為香港中文大學中國文化研究所
所有 未經批准 不得翻印