LABOR'S RELATIVE SHARE IN THE JAPANESE AGRICULTURE SINCE 1878*

By TSUTOMU NODA

Assistant, The Institute of Economic Research

I. *Introduction*

This paper deals with the long-run changes in labor's relative share in the Japanese agriculture. We define the labor's relative share as the proportion of returns to labor to the total net income.

Since Meiji Restoration, we had two big institutional changes of the land tenure system in the Japanese agriculture. One was the land-tax revision in 1873 and the other was the land reform in 1946.

In 1868, Japan terminated her feudal era (Meiji Restoration), and has emerged as a modern nation. As a natural consequence, feudal elements in agriculture such as restrictions of cultivation and transaction of land, and other feudalistic fetters binding farmers to land were removed. But as to the land had been collected by landlords through somewhat irrational transactions such as in the form of forfeited pawn and the like, none of the ownership who transactions of the land were facilitated at the time of the land-tax revision (1873). Through the revision of land-tax, the landowners whether small independent producers or absentee landlords, were asked to pay the land-tax in cash (3 per cent of land value), but the tenant-farmers were not allowed to pay their rent to the landowners in cash. Tenants were demanded by landowners to pay land rents in kind, and the percentage of it to the total yield was as high as that of land-tax during the feudal age.

It is estimated that the land leased to farmers by landowners in 1883 was 37 per cent of the total cultivated area.[1] During the 1880–1900 period, land was rapidly concentrated in the hand of landowners and in 1903 about 50 per cent of the paddy field was estimated as the tenant land. This land tenure system had last untill 1945.

However, the land reform, which had commenced on October 1946 when the Owner-Farmer Establishment Special Measures Law was enacted, brought revolutional changes in the land tenure system. Under the law, the ownership of about 2 million *cho* (1 *cho* is 0.99 hectarl) of tenanted land was transfered to

[1] *No-Shomu Sho Tokei Hyo (Statistical Yearbook of the Ministry of Agriculture and Commerce),* 1886. This percentage is for 3 *fu* and 33 prefectures, so this excludes 9 prefectures.

tenant-farmers by July 1950, and the rent in kind was prohibited furthermore the rate of cash rent was controlled.

The changes of percentage of tenant land are listed in the attached table.

Years	Total			Paddy Field			Up-Land Field		
	Area	Own	Tenant	Area	Own	Tenant	Area	Own	Tenant
	1,000 *cho*	%	%	1,000 *cho*	%	%	1,000 *cho*	%	%
1903	5,266	55.5	44.5	2,832	50.7	49.3	2,434	61.2	38.8
1913	5,794	54.5	45.5	2,945	49.0	51.0	2,849	60.2	39.8
1923	6,039	53.5	46.5	3,067	48.3	51.7	2,972	58.8	41.2
1933	5,969	52.5	47.5	3,219	46.7	53.3	2,750	59.3	40.7
1942	5,759	53.8	46.2	3,158	46.6	53.4	2,601	62.5	37.5
1949	4,958	86.9	13.1	2,817	86.1	13.9	2,141	88.1	11.9

Sources: N. Kayo, *Nihon Nogyo Kiso Tokei* (*Basic Statistics for Agriculture in Japan*), 1958.

II. *The Assumptions*

Any results obtained naturally depend on the particular assumptions made for the purpose of estimation, therefore a careful description of the assumptions adopted in this study may be made in the following part of this section.

Although the net agricultural income has been estimated,[2] the estimates of the functional distribution of net agricultural income present a number of difficulties. Very large portion of all types of agricultural resources does not receive an appropriate market return nor has a price determined in market. As the result, a number of assumptions needs to be made in deriving desired estimates. Net agricultural income is the sum of net farmers' income, so it includes the adjustments for changes in value of inventories, wage paid and rent to absentee landowners, interests on farm debt.

There may be three different methods of estimation available, they are as described below.

Method A. The returns to land are estimated by blowing up the total net rent on rented land to include all the land. The returns to capital are calculated by multiplying the value of non-real estate inventories by an estimated rate of interest. The returns to labor are determined as the residual, being the difference between net agricultural income and the computed returns to land and capital.

Method B. The returns to land are determined by multiplying the annual average rate of interest on farm mortagages by the estimated value of farm land. The returns to capital and labor are determined as in the Method A.

Method C. In contrast to treating the returns to labor as a residual claimant,

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[2] K. Ohkawa and Associates, *The Growth Rate of the Japanese Economy since 1878*, 1957, Part II, Chap. I.

this method derives an independent estimate of labor returns. An assumption is made so that all family workers, including the operator, receive the same amount of wages. The income figure for hired workers is the total wage bill paid by farmers. When this imputed labor income figure is added to land income and capital income as calculated under the Method A and B, the total of the three shares never becomes exactly equal to the total agricultural income.

After considering the availability and reliability of statistical data, we decided to apply the Method A, and furthermore we gave up the attempt in making a separate estimate of the returns to capital owing to the lack of data. Consequently, our estimates of returns to labor include the returns to capital. However, even if we could make a separate estimate of the returns to capital by putting a heroic assumption, it is expected that they are probably quite small fraction of the net agricultural income.[3]

III. *Measurement*

In this section, we explain our procedure used in the estimation of the returns to land for the years over 1878–1942. Since the statistics of arable land area, which is classified into the paddy and up-land fields, is available for the entire period under investigation, our main task here is to derive the separate estimates of land rent per unit of area both for paddy field and for up-land field. The procedure of estimation of the land rent adopted in this paper is as follows:

A. Land rent of the paddy field:

(1) The Kangyo Bank has published annually the statistics of paddy field rent in terms of rice per *tan* (10 *tan*=1 *cho*) since 1921.[4] We use this statistics without any modifications and estimate the value of rent by multiplying it by the price of rice received by farmer.

(2) For the period before 1921, the data are available for the years of 1885, 1887, 1890, 1899, 1908–12 and 1916–20.[5] We can estimate the paddy field rent for the other years where there are no data available by using them as the benchmarks. Since it was a prevailing habit that a paddy field rent actually paid by a tenant-farmer was adjusted in proportion to the yield in any year, it is reasonable to interpolate the rent not in terms of the absolute volume in rice paid but in

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[3] According to Professor Tatsuo Inoue's estimate, the returns to capital in agriculture for the period of 1933–42, on the basis of the "*Noka Keizai Chosa*" (*Economic Survey of Farm Household*), are about 2–4 per cent of the total farm income. See T. Inoue, "Nogyo Shotoku no Haibun" (The Allocation of Agricultural Income), cited in *Nogyo Sogo Kenkyu* (*Quarterly Journal of Agricultural Economy*), April 1949, pp. 82–97.

[4] Nihon Kangyo Bank, *Denpata Baibai Kakaku oyobi Kosakuryo Shirabe* (*Survey of Sales Prices of Farm Land and Land Rent*).

[5] 1885, 1908–12 and 1916–20: Ministry of Agriculture and Commerce, *Kosaku Kanko ni kansuru Chosa Shiryo* (*Survey of the Tenancy Habit*), 1921. 1887: Takeo Ono, *Meiji Zenki Tochi Seidoshi Ron* (*History of Land System in Early Meiji Era*), 1948, pp. 253–8. 1887 and 1890: Mankichi Saito, *Nihon Nogyo no Keizaiteki Hensen* (*Economic Aspects of Japanese Agriculture*), 1919, p. 151.

terms of the ratio of rent to the yield per *tan* (the rent rate) for the benchmark years. The rent rates thus obtained for the benchmark years are as follows:

1885	73.4%	1899	69.3%
1887	72.8	1910	57.7
1890	60.9	1918	55.2

We use these benchmark rent rates and interpolate the other years proportionately. The annual figures of volume of rent on paddy field in terms of rice are calculated by multiplying the rent rates thus far obtained into the rice yield per *tan* which is available in statistics since 1878, and we estimate the value of rent by multiplying the volume of rent into the wholesale price of rice because of the lack of data on the price of rice received by farmer.

B. Land rent of up-land field:

   In contrast with the paddy field rent, the payment of up-land field rent has usually been made in cash. For the period before 1921, the data are available for the years of 1890, 1899, 1908–12 and 1916–20. We interpolate them for the other years by using the price index of rice. For the period since 1921, we directly used the data of the up-land rent in cash compiled by the Kangyo Bank.

   Then we can estimate the total land rent of paddy field and up-land field, by multiplying the rents of paddy and up-land fields into the corresponding total cultivated areas respectively and by adding them up we can get the annual returns to land.

   Now, the returns to labor were determined as the residual according to our assumption, that is to say the returns to labor being the difference between the net agricultural income and the returns to land.

   The annual figures, thus obtained, are shown in the Annex Table. Figure 1 shows the results in five years moving average.

Figure 1   *Labor's Relative Share*, 1878–1942 (5 years moving average)
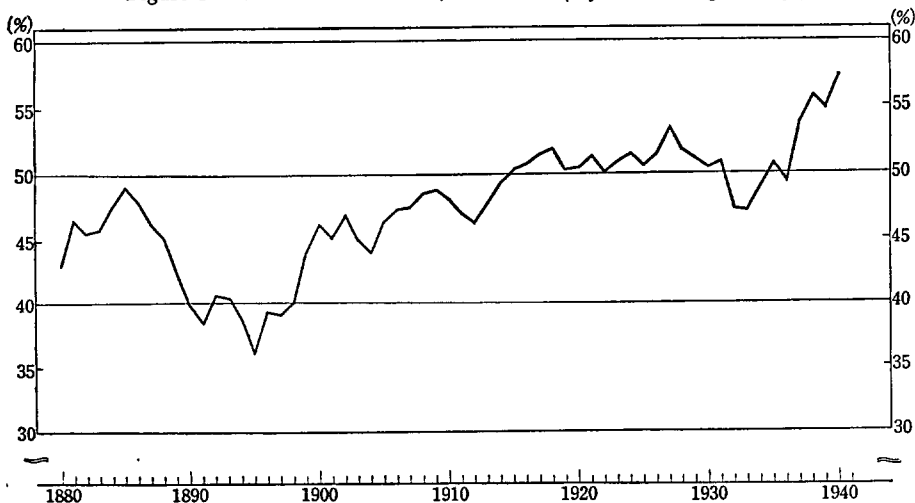
IV. *An Analysis of Long-run Change*

From Figure 1, we can conclude that the figures of labor's relative share fluctuate within a range of 40–60 per cent. The movement of labor's relative share during 19th century appears somewhat out of the following trend and we feel this a questionable. It may have been the result of faults in our estimation, and requires further careful investigation of basic data and of our procedures. Since the turn of the century, Figure 1 clearly suggests us steady long-run rising trend in labor's relative share which is accompanied by the minor cyclical variations from the trend.

Among the institutional, social and economic factors, which are supposed to affect the long-run changes of labor's relative share in agriculture, some strategic factors are selected and arranged in Figure 2.

They are (i) yield per unit of area, (ii) rent rate, (iii) net income ratio, and (iv) man-land ratio.

(i) yield per unit of area

The yield of rice, which is the most important crop in the Japanese agriculture, shows a rapid increase up to the end of the World War I and then slacken its speed in increase during the inter-war period. In 1920s, it shows even a slight decrease.

(ii) rent rate

The rent for the paddy field in kind had increased up to the beginning of the World War I and then declined considerably during the 1920s and rised again with the general recovery of economy in the 1930s.

By the comparison of these two series i.e. yield and rent, we may conclude that the rent rate per unit of area is apt to lag behind the productivity growth when increase of yield per unit of area is sufficiently rapid. The rise of labor's relative share during the period of 1900–20 may partly be due to this lag.

(iii) net income ratio

The net income ratio, which is defined as the ratio of net income to gross value of production, remains almost constant in the 19th century and turns down gradually since the beginning of the 20th century.[6] Since the long-run changes of relative price are quite minor throughout the entire period,[7] it can be said that the fall of net income ratio is mainly due to the shifts in the composition of products replacing crop by the products whose net income ratio is relatively low such as that of sericulture, livestock and dairy production, and horticulture. The produc-

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[6] K. Ohkawa and Associates, *ibid.*, Part II, Chap. 1.

[7] The long-run changes of relative price in Japan is almost constant. See T. Noda, "No-Ko kanno Koekijoken to Nogyo no Shotokuritsu" (Terms of Trade between Agriculture and Industry and Agricultural Income Ratio), cited in *Nihon no Keizai to Nogyo—Seicho Bunseki* (*Japanese Economy and Agriculture—Analysis of Growth*), 1956, edited by S. Tobata & K. Ohkawa, pp. 175–92.

Figure 2   *Changes of Yield, Land Rent, Income Ratio and Man-Land Ratio*

(1878~82=100)
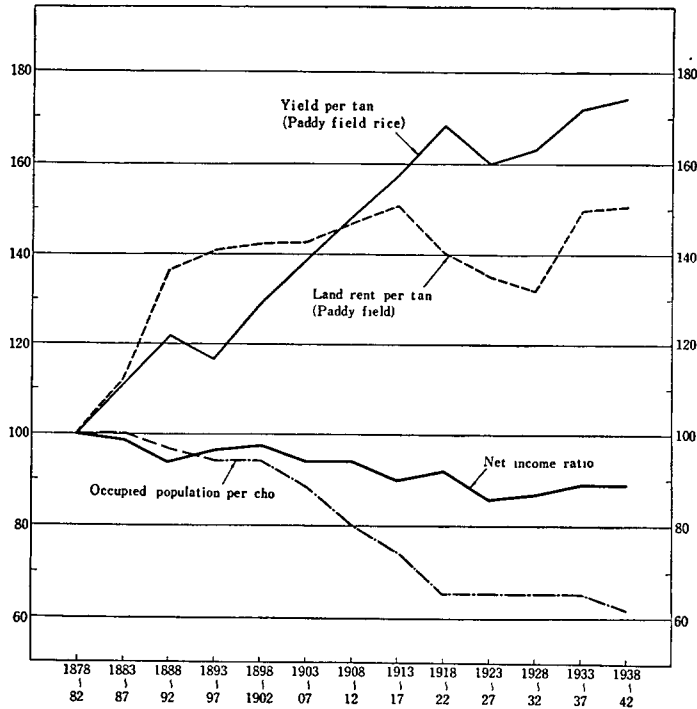
tion of agricultural products other than rice increased from 100 for the period of 1913–17 to 132 for the period of 1933–37, while the production of rice increased only by 15 per cent during the same period.

(iv)   man-land ratio

The man-land ratio within agricultural sector gradually falls during the 19th century, and decreases rapidly during the period of 1900–20, and remains almost constant since 1920.   Since 1900 the secondary industries developed rapidly and the demand for labor in the industries increased very much.   Consequently the migration of farm population to urban districts was accentuated.   This is the main cause for the observed decrease of man-land ratio in agricultural sector.

The higher level of labor's relative share after 1935 is mainly due to the rise in the income ratio, which is caused by the favourable change in relative price to farmer, and the decrease of population pressure in the rural districts, this is in turn caused by a large scale military mobilization of man power and a revival of migration of civilian population from rural to urban districts.   Furthermore, it should not be overlooked that the Farm Land Adjustment Act in 1941 and the Land Rent Control Act in 1942 might have some effects on the rise of labor's relative share in this period, because these Acts had for two objects, one was

establish of tenant farmer's right and the other was stem a rising tendency of land rent under control.

We will compare the agricultural labor income per gainfully occupied population with the annual earnings of a manufacturing worker in Table 1. Although the available estimate of annual earnings of urban workers is unreliable in its absolute value, but the changes of it over time may seem realistic, therefore it may be reasonable to deal only with the changes of relative income in the two sectors.

The figures obtained in Column 3 Table 1 seems to show a downward trend, if not clear. Since the underlying estimates are not enough satisfactory to enable us to analize its long-run trend, we would like to leave a final judgement to future elavorated research. However, as for the cyclical change of relative labor earnings, it is clear that the relative income as defined in Table 1 changes to the same direction as the labor's relative share in agriculture. This positive correlation can be explained by the changes of labor migration between two sectors.[8] During the period of depression, some of laid off workers in manufacturing industries are obliged to come back to the rural districts where their relatives live, if not, at least the persons who are supposed to move out of the rural to urban districts seeking their jobs under normal situation of labor market, can not do so and are forced to stay in rural districts. These persons are apt to depress the agricultural labor income relative to the earnings of urban industrial worker and to the farm land rent in agriculture through the increasing competition in the agricultural factor market. Since it is observed that the labor's relative share in manufacturing industries decreases during the period of prosperity and increases during the depression owing to the relative rigidity of wage rate,[9] therefore it can be concluded that the labor's relative share in these two sectors move in opposite directions.

Table 1   *Comparison of Agricultural Labor Income and Manufacturing Wage*

Periods	Agricultural Labor Income per Occupied Population (a)	Annual Wage & Salaries per Head (b)	a/b
	Yen	Yen	%
1878~82	11	—	—
1883~87	9	—	—
1888~92	9	—	—
1893~97	11	—	—
1898~1902	23	—	—
1903~07	29	86	34
1908~12	37	117	32
1913~17	48	139	35

[8] This phenomenon appears in the rate of employment increase at manufacturing industries. See M. Umemura, "Labor's Relative Share in the Japanese Manufacturing Industry since 1900", *The Annals of the Hitotsubashi University*, Vol. VIII, No. 2, 1958, Table 2.
[9] M. Umemura, *ibid.*, Table 1.

1918~22	115	.	381	30
1923~27	106		457	23
1928~32	78		406	19
1933~37	94		398	24
1938~42	192		626	31

Sources: (a), K. Ohkawa and Associates, *ibid.*
          (b), M. Umemura, *ibid.*

V.   *Labor's Relative Share in the Post-war Period*

Now we turn to a short discussion on the labor's relative share in the period of post World War 2.   As a result of land reform mentioned in Section I, the tenanted land decreased to a quite small fraction of the total arable land and the land rent has been controlled by the Government.   Therefore, we can not adopt the Method A, which is practical under the situation in the pre land reform period. And we are obliged to adopt the Method C for the period of 1952–55.

The figures in the data used are the averages of all sample farm households in the "Economic Survey of Farm Household" for each year under consideration. The labor's relative share is estimated by dividing the annual farm wage bill, which includes both paid wage and imputed one for family workers, by the net agricultural income.

The result obtained are as follows:

    1952   58.5%   1954   65.2%
    1953   63.8%   1955   56.3%

As for the level of labor's relative share, we can not find any significant difference between the pre-war and the post-war figures.   But it is dangerous that we compare directly with both figures because of the difference in the method of estimation.

VI.   *Inter-country Comparison*

Here we will attempt the comparison of the labor's relative share in Japan, U.S.A., United Kingdom and Canada (See Table 2).[10]   Labor's relative share in Japan is lower than the other countries, and the difference may be due to the differences of the population pressure and of the growth rate of productivity in agriculture among the countries.

It is observed that labor's relative share in Japan shows minor cyclical variations, while the share in U. S. A. increased year after year.   Since the increase of rent shows a general tendency to lag behind the steady increase of productivity, it is expected that the labor's relative share will raise up

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[10] U.S.A.: D. G. Johnson, "Allocation of Agricultural Income," *Journal of Farm Economics*, Vol. XXX, No. 4, 1948, pp. 724–49.   U.K. & Canada: J. R. Bellerby, *Agriculture and Industry Relative Income*, 1956, Table 1 and 7.

gradually.   In the case of the U. S. A. and U. K. agriculture, this law was
fully valid for the whole period, while in Japan it was only valid throughout
in the earlier four decades and these effects became to weakness after 1920.

Table 2   *Inter-country Comparison of Labor's Relative*
Share in Agriculture (%)

Periods	U. S. A.	U. K.	Canada	Japan
	D. G. Johnson	J. R. Bellerby		Our
1867 ~ 78		62. 8		——
1878 ~ 82		59. 4		44. 7
1883 ~ 87		61. 1		49. 5
1888 ~ 92		64. 6		40. 3
1893 ~ 97		65. 5		36. 0
1898 ~ 1902		69. 5		46. 4
1903 ~ 07		67. 4		46. 6
1908 ~ 12		68. 7		48. 0
1913 ~ 17	55. 0	——		50. 1
1918 ~ 22	58. 3	——		50. 7
1923 ~ 27	59. 5	68. 4	71. 9	50. 8
1928 ~ 32	61. 3	71. 2	59. 7	51. 7
1933 ~ 37	62. 7	78. 2	65. 1	51. 0
1938 ~ 42	64. 9	——	81. 8	57. 9

Annex Table. *Labor's Relative Share*, 1878–1942

	Agricultural Income	Returns to Land	Returns to Labor	Labor's Relative Share	5 years Moving Average
	Million Yen			%	
1878	218	153	65	29.8	—
79	349	186	163	46.7	—
1880	473	248	225	47.6	42.8
81	462	253	209	45.2	46.5
82	376	208	168	44.7	45.4
83	289	150	139	48.1	45.7
84	216	127	89	41.2	47.5
85	307	156	151	49.2	49.0
86	321	147	174	54.2	47.8
87	304	145	159	52.3	46.1
88	254	147	107	42.1	44.9
89	287	193	94	32.8	42.2
1890	510	291	219	42.9	39.8
91	411	242	169	41.1	38.4
92	424	254	170	40.1	40.7
93	415	269	146	35.2	40.6
94	563	315	248	44.0	38.7
95	550	315	235	42.7	36.1
96	509	349	160	31.4	39.1
97	619	451	168	27.1	39.1
98	1,017	503	514	50.5	40.0
99	676	380	296	43.8	43.8
1900	796	419	377	47.4	46.0
01	861	428	433	50.3	45.1
02	730	454	276	37.8	46.7
03	976	526	450	46.1	44.8
04	1,031	497	534	51.8	43.8
05	791	491	300	37.9	46.1
06	1,030	563	467	45.3	47.1
07	1,249	633	616	49.3	47.4
08	1,243	605	638	51.3	48.4
09	1,079	506	573	53.1	48.7
1910	919	524	395	43.0	48.0
11	1,298	692	606	46.7	46.9
12	1,571	848	723	46.0	46.2
13	1,627	884	743	45.7	47.6

Annex Table. *(Continued)* *Labor's Relative Share,* 1878-1942

	Agricultural Income	Returns to Land	Returns to Labor	Labor's Relative Share	5 years Moving Average
	Million Yen			%	
14	1,307	656	651	49.8	49.2
15	1,070	535	535	50.0	50.2
16	1,304	595	709	54.4	50.7
17	1,802	880	922	51.2	51.4
18	2,829	1,466	1,363	48.2	51.8
19	4,460	2,082	2,378	53.3	50.2
1920	3,439	1,648	1,791	52.1	50.4
21	2,819	1,513	1,306	46.3	51.2
22	2,478	1,186	1,292	52.1	50.0
23	2,686	1,290	1,396	52.0	50.8
24	3,042	1,591	1,451	47.7	51.4
25	3,469	1,531	1,938	55.9	50.5
26	2,904	1,474	1,430	49.2	51.3
27	2,608	1,365	1,243	47.7	53.3
28	2,639	1,167	1,472	55.8	51.7
29	2,767	1,162	1,605	58.0	51.0
1930	1,837	959	878	47.8	50.4
31	1,462	795	667	45.6	50.8
32	1,836	1,012	824	44.9	47.2
33	2,292	972	1,320	57.6	47.1
34	2,026	1,210	816	40.3	48.8
35	2,429	1,281	1,148	47.3	50.5
36	2,772	1,284	1,488	53.7	49.5
37	3,175	1,470	1,705	53.7	53.8
38	3,313	1,571	1,742	52.6	55.8
39	4,968	1,904	3,064	61.7	55.1
1940	4,800	2,061	2,739	57.1	57.2
41	4,083	2,026	2,057	50.4	—
42	5,224	1,872	3,352	64.2	—