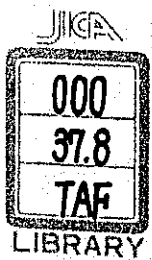


INDEX NUMBERS OF RURAL CONSUMPTION LEVELS

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Index Numbers of Rural Consumption Levels

1. Outline of Index Numbers of Rural Consumption Levels

Index numbers of rural consumption levels are a means of comprehensive representation of the quantitative changes in the commodities and services which farm households consume in their daily lives, and they are designed as an indicator for measuring the general level of rural livelihood. The Economic Planning Agency was the first to design index numbers for this specific purpose, and they comprised two kinds calculates with the pre-war period (1934 ~ 1936) as base period and 1949 as base year. These index numbers involved many problems on account of the limits set on the data used, so that their design was no more than a trial. However, as Survey of Farm Household Economy and Survey of Prices Received and Paid by Farmers came to be conducted in an increasingly elaborate and consolidated manner by the Ministry of Agriculture and Forestry, they eventually went beyond the confines of trial calculation and firm root was given to the present system of design.

In the past, the Ministry of Agriculture and Forestry has designed the captioned index numbers with base year taken at 1951, 1957, 1960 (calendar year), 1965, and 1970. In 1977, the base year was changed from 1970 to 1975. This revision was effected because the Japanese rural consumption structure, which exhibited a pronounced tendency towards urbanisation and improvement after 1970 with the increasing farm household income, has undergone drastic changes on account of soaring commodity price from the latter half of 1973 to 1974 and the subsequent decline of business condition, with the result that it became impossible to measure such changes by the index numbers of rural consumption levels designed with 1970 as base year.

At present, index numbers of rural consumption levels are designed by different government offices as tabulated below.

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Index Numbers	Data Used for Design	Competent Government Office
Index numbers of rural consumption levels	Data of Farm Household Economy Survey, and index numbers of rural commodity prices	Ministry of Agriculture, Forestry and Fisheries
Index number of national consumption levels	Index numbers of <u>national non-rural consumption levels</u> and those of rural consumption level	Economic Planning Agency
<u>National index numbers of non-rural consumption levels</u>	Data of household budget survey (national and all households), and index numbers of commodity prices (national)	Prime Minister's Office
<u>National index numbers of workers' household consumption levels</u>	Data of household budget survey (national and all workers' households), and index numbers of consumer prices	"
<u>Index numbers of all urban households consumption levels</u>	Data of household budget survey (all households in cities with a population of more 50,000), and index numbers of consumer prices (cities with a population of more than 50,000)	"
<u>Index numbers of urban workers' household consumption levels</u>	Data of household budget survey (all worker households in cities with a population of more than 50,000), and index numbers of consumer prices (cities with a population of more than 50,000)	"

Notes: The following are the main revisions effected to the index numbers of rural consumption levels designed with 1975 as base year.

1. Base year was changed to 1975 (April 1975 ~ March 1976).
2. Weights and index items and brands were revised.

2. Outline of Design of Index Numbers of Rural Consumption Levels

Index numbers of rural consumption levels, comprising monthly and annual index numbers designed with 1975 as base year, are the "index numbers of real consumption expenditure" which are calculated in the following way.

First, the average family living expenditure per farm household, as disclosed by Farm Household Economy Survey, is adjusted to the consumption expenditure for a certain fixed number of family members during a fixed number of days or months in order to design the nominal index number of rural consumption expenditure, then the nominal index number thus obtained is divided by the separately designed index number of rural consumer price for the same number of days or months.

1) Index Number Formula

(1) Formula of monthly consumption level

$$I = \frac{V}{P}$$

where, I : Index number of rural consumption level

V : Nominal index number of rural consumption expenditure

P : Index number of rural consumer price

- (2) Formula of annual consumption level (fiscal and calendar year bases)

Arithmetic mean of monthly index numbers during the period covered is obtained for the nominal index number of rural consumption expenditure (V) and for the index number of rural consumer price (P), and the index number of rural consumption level (I) is obtained by the application of the same formula as given in Item (1) above.

Flow Chart of Design of Index Numbers of Rural Consumption Levels

Consumption expenditure
in t-month (Household
budget disclosed by Farm
Household Economy Survey)

E_t

$$Z \rightarrow \frac{365}{12} \frac{1}{Z} = \alpha t$$

Number of days in
t-month

Adjusting
coefficient of
number of days

$$X \rightarrow \frac{A_m}{b + ax} = \beta t$$

Number of family
members in t-month

Adjusting coefficient
of number of family
members
(A_m , a , and b : Constants)

$\alpha t \beta t E_t \rightarrow$
Adjusted
consumption
expenditure

$$\frac{\alpha t \beta t E_t}{E_0} = V$$

Nominal index
number of con-
sumption ex-
penditure
(E_0 : Base year
consumption
expenditure)

$\frac{V}{P} = I$
Index
number
of con-
sumption
level

Consumer price
in t-month
(Survey of Prices
Received and Paid
by Farmers)

$$P_t \rightarrow \frac{P_t}{P_0} \rightarrow W_0 \frac{P_t}{P_0}$$

(P_0 : Base
year
price)
(W_0 : Base
year
weight)

$$\frac{P_t}{\sum W_0 \frac{P_t}{P_0}} = P$$

Index number
of consumer
price

2) Method of Design

(1) Design of nominal index numbers of rural consumption expenditure

Nominal index number of rural consumption expenditure is the ratio of the base year average of family living expenditure (as revealed by Farm Household Economy Survey) to the current (compared year) average of the same expenditure. It is generally the case that the number of family members in the base year differs from that in the current year, and the number of days or months in the base year from that covered in the current year. In other words, the secular changes in the number of family members causes fluctuation of consumption expenditure. In time-series comparison of consumption expenditure per household, therefore, adjustment must be effected to the number of family members and to the number of days or months covered. For this reason, these base year factors were so adjusted as would coincide with the current year factors in the design of index number of household living expenditure.

a. Formula

a) Monthly index number formula

$$V = \frac{\alpha_t \cdot \beta_t \cdot E_t}{E_o}$$

where, V : Nominal index number of rural consumption expenditure

E_o : Base year expenditure

E_t : Current year expenditure

α_t : Adjusting coefficient of current year number of days

β_t : Adjusting coefficient of current year number of family members

b) Design of annual index number (fiscal and calendar year bases)

Annual index number of each fiscal year is the arithmetic mean of the sum total of monthly index numbers of 12 months from April of that year to March of the following year, and that of each calendar year is also the arithmetic mean of the sum total of monthly index numbers of 12 months from January to December of that year.

b. Base year expenditure

Base year expenditure is the arithmetic mean of the sum total of monthly household living expenditures from April 1975 to March 1976 shown in the Monthly Statistics of Farm Household Economy. The said expenditures exclude depreciation expenses of buildings and automobiles but include expenditure of farmers' own consumption of their products.

The adjusted monthly average expenditure for 1975 is as shown in the following table.

Table 1 Base Year Expenditure (Family members: 5)

Unit: yen

Total	Foods	(Cereals)	(Other foods)	(Fish, shellfish, meat, hen eggs, and cow milk)	Clothing
211,782.6	60,037.4	14,343.1	45,699.6	14,935.4	20,617.1
Fuel and electric power	Housing	(Furnitures and fixtures)	Miscellaneous	(Education and culture)	Contingencies
7,232.9	22,575.4	14,530.5	84,855.4	18,614.3	16,458.7

c. Current expenditure

Current expenditure is the household living expenditure as obtained from data shown in the Monthly Statistics of Farm Household Economy in the current year after adjusting the numbers of days and family members. This expenditure also excludes depreciation expenses of buildings and automobiles but includes expenditure of farmers' own consumption of their products.

d. Adjustment of number of days

As any increase in the number of days results in augmented disbursement of consumption expenditure, the same conversion rate is applied in the adjustment of number of days regardless of account items. Specifically, the family living expenditure in the current (compared) month was adjusted to that disbursed for 30.4167 days (35 days/12 months), the average of monthly number of days through the year. For this purpose, the adjusting coefficient was obtained by dividing the number of days in the current (compared) month by 30.4167 and applied to the family living expenditure shown in the Monthly Statistics of Farm Household Economy.

Table 2 Adjusting Coefficient of Number of Days

Number of days	28 days	29 days	30 days	31 days
Adjusting coefficient	1.0863	1.0489	1.0139	0.9812

e. Adjustment of Number of Family Members

As the number of family members varies largely from household to household, it is adjusted to five for all sample households. For this purpose, the adjusting

coefficient was obtained for each account item using regression formula, $Y = f(X)$ wherein X denotes the number of family members and Y the family living expenditure, on the basis of family expenditure shown by the number of family members (2 to 9 persons) in the Monthly Statistics of Farm Household Economy Survey, and this coefficient was applied to the family living expenditure in the month covered.

Table 3 Regression Formula of Family Living Expenditure (Y) for Number of Family Members by Account Item

Total	$Y = 2,558,006 + 210,014 (X - 5)$
Foods	$Y = 723,440 + 87,902 (X - 5)$
(Cereals)	$Y = 170,227 + 26,219 (X - 5)$
(Other foods)	$Y = 553,212 + 61,681 (X - 5)$
(Fish, shellfish, meat, hen eggs, and cow milk)	$Y = 180,437 + 19,271 (X - 5)$
Clothing	$Y = 251,001 + 21,223 (X - 5)$
Fuel and electric power	$Y = 87,449 + 6,706 (X - 5)$
Housing	$Y = 270,964 + 13,082 (X - 5)$
(Furniture and fixtures)	$Y = 270,964 + 13,082 (X - 5)$
Miscellaneous	$Y = 1,025,479 + 67,997 (X - 5)$
(Education and Culture)	$Y = 225,872 + 28,469 (X - 5)$
Contingencies	$Y = 199,674 + 13,108 (X - 5)$

f. Classification of Account Items

Account items of family living expenditure are classified into "Total," "Foods (comprising 'cereals' and 'other foods' and 'fish, shellfish, meat, hen eggs, and cow milk')" "Clothing," "Fuel and Electric Power," "Housing (including 'furniture and fixtures' as sub-item)," "Miscellaneous (including 'education and culture' as sub-item)," and "Contingencies."

(2) Design of Index Numbers of Rural Consumer Prices

Index numbers of rural consumer prices are designed for the purpose of calculating the index numbers of rural consumption levels by deflating the nominal index numbers of rural consumption expenditure to real family living expenditure.

These index numbers are required to be an adequate deflator of nominal index numbers of rural consumption expenditure including that of self-supplied products so as to be able to indicate accurately the changes in consumer prices which exert influences on the trends of family living expenditure in rural communities. As they reflect the price fluctuations of not only commodities purchased by farmers but also self-supplied products, they differ in nature and objective from the index numbers of commodities for living which are included in the "Index Numbers of Rural Commodity Prices" prepared by the Ministry of Agriculture, Forestry and Fisheries.

a. Formula

a) Monthly index number formula

$$P = \frac{\sum W_o \frac{P_t}{P_o}}{\sum W_o}$$

where, P : Index number of rural consumer price

P_o : Base year price

P_t : Current year price

Wo : Weight

b) Annual index number (fiscal year)

Annual index number is the arithmetic mean of the sum total of monthly index numbers for 12 months from April of each year to March of the following year.

b. Price data

Prices of commodities for living disclosed by Survey of Prices Received and Paid by Farmers are used as price data of commodities purchased by farmers, and average prices of agricultural products covered by the same survey are used as price data of products produced and consumed by farmers.

c. Items selected for index coverage

A total of 258 items are selected for coverage by index numbers. As social expenses and miscellaneous household expenses constituting part of "Miscellaneous Expenses" are not represented by any suitable indicator items, the overall index number of all items excluding these two and contingencies is applied to them, assuming that they pursue the same tendency as general commodity price fluctuations.

As for contingencies which is not represented by a suitable indicator item either, it is divided into a number of weighted account items and the weighted arithmetic mean of index numbers of respective account items is adopted.

d. Classification of account items

As index numbers of rural consumer prices are designed as a deflator of nominal index numbers of rural consumption expenditure, relevant account items are classified in the same way as those of rural consumption expenditure.

e. Base year price

National average in 1975 is adopted for each item.

f. Current price

National average in the current (compared) year is adopted.

g. Weight

The weight applied to each account item and product item in the design of index numbers is the base period weight calculated on the basis of the average family expenditure per farm household (exclusive of depreciation expenses of buildings and automobiles and inclusive of expenditure of self-supplied products) which was covered by Farm Household Economy Survey in 1975, the base year. The weight applied to each account item is the share of that account item in the total family living expenditure taken at 10,000, and that of each product item is the share of that product item in the expenditure of relevant account item taken at 10,000.

Table 4 Weight by Account Item

Total	Foods	(Cereals)	(Other foods)	(Fish, shellfish, meat, hen eggs, and cow milk)	Clothing
10,000	2,781	645	2,136	698	980
Fuel and electric power	Housing	(Furnitures and fixtures)	Miscellaneous	(Education and culture)	Contingencies
343	1,074	698	4,036	867	786

3. Chaining of New and Old Index Numbers

Index numbers in years prior and subsequent to base year is designed with base year taken at 100.

As 1975 is newly taken as base year, index numbers in subsequent years will be designed with 1975 taken as 100. Annual index numbers designed in and prior to 1974 were chained with the new annual index numbers by multiplying the former index number by the link relatives obtained from the 1975 index number.

The following table shows an example of linking.

Year	Index numbers designed with 1970 as base year	Link relatives	Index numbers designed with 1975 as base year
1970	100.0	×	0.864 = 86.4
71	104.4	×	0.864 = 90.2
72	108.8	×	0.864 = 94.0
73	112.1	×	0.864 = 96.8
74	112.3	×	0.864 = 97.0
75	115.8	×	0.864 = 100.0
76	119.7		103.4 New index number

} Index numbers linked with old ones

As seen in the above table, the link relatives which makes the 1970-based index number 100.0 ($100.0 \div 115.8 = 0.864$) was obtained and applied to each annual index number prior to 1975 to link them with new index numbers.

