Change of Japanese Dietary Life

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Abstract

Change of Japanese dietary lives, especialy multifacialization, is one of the most interesting phenomena in the Japanese society. It is closely related to various social tendencies; contraction of the family size, shortage of the labor force, increase of aged people, rising up of income levels, increase of the number of married women with occupation and of unmarried women, progress of the food technology, increase of the number of highly educated people, etc.

The present study is a trial of model building for the analysis of change of Japanese dietary lives, based upon system dynamics. Simulation was carried out up to the year 2005, for total dietary expense, expense for processed foods, expense for dining-out, etc.

According to the simulation results, the fraction of expense for processed foods and dining-out in total life expenditure increases more rapidly compared with that of total dietary expense, and, in addition, it depends upon families' income level. That means that the social work division of preparing foods and meals, which has, so far, been housewives' work, is now rapidly advancing in Japan, and that the tendency toward seeking pleasures in foods and meals is getting stronger. These results suggests, with other changing social tendencies, bipolarization of Japanese dietary lives, e.g.

proffesional cooking — domestic cooking
natural type — sophisticated type
tradition-oriented type — globalization type
isolate type — family type
practical type — pleasure-oriented type

1. Introduction

As the Japanese society is getting more affluent, big changes are observed in the Japanese dietary life. The primary object of eating has, of course, been to take various nutrients and keep good health, i.e., for physiological one. But, as the developement of the human society, it has turned to seek pleasure and tastefulness. Japanese, too, are not exception, and evident changes are seen in the food expenditure of households, i.e., remarkable increase of the proportion of the expenditure for dining-out and processed foods, which occupied 7% and 48%, respectively, in the total food expenditure per household in 1965, while they increase to 15% and 55%, respectively, in 1985(Shokuryo Eiyo

Chosakai 1986). Especially, the trend should be noted that labor-saving food with high value-added are preferred. Economically speaking, it means the developement of social work devision of food processing service, the cause of which is considered to be consumers' behavior such as the increase of working housewives and single-person households, the trend to seek pleasure in dietary life with increasing income and leisure hours, the deversification of food materials, and processing methods, and the needs for hand-made and sophisticated cooking. The diversification of foods by generation differences,too,is promoted. While young generations request processed foods, western-style foods, such as breads and milk, and dining-out, old and middle generations prefer traditional meal and dining-home.

Furthermore, depending on circumstances, same consumer lays weight sometimes on economy and sometimes on sophistication and individuality. Thus, while the total amount of food consumption does not increase, complication and diversification in the consumer behavior grows rapidly (Shokuryo Eiyo Chosakai 1986).

On the other hand, the role of food suppliers is production, import, processing, and distribution of foods. What connects the suppliers with the consumers is all sorts of food information, and so, the developement of the mass media, such as TV, newspapers, and magazines including suppliers' advertisement, has important infuences on the consumers' behavior.

2. System Dynamics Model

The purpose of the present paper is to investigate the influences of social and economic environment and the life style upon the Japanese dietary life and to predict the future change.

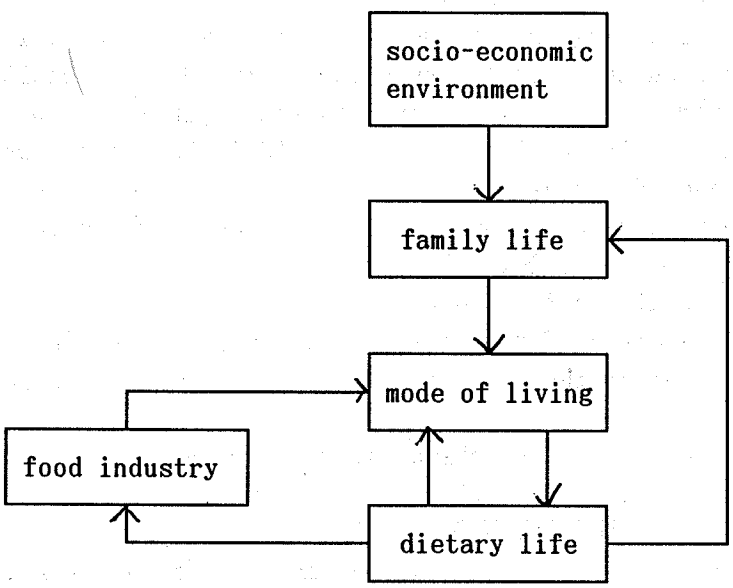

Fig.1 Sector structure

Main interest is concentrated on the change of the use of processed foods and the frequency of dining-out and the influence of the economic growth on them. Fig.1 shows the sector structure of the SD model. As shown in the Figure, the socio-economic sector is not included in feedback loops, i.e., it is treated exogeneously.

2．1 Exogeneous Sector

Exogeneous variables used to represent the socio-economic sector are as follows, and given as table functions.

1) ＡＣ : Proportion of those who have had formal education over 14 years in the whole population from 15 to 64 years of age, estimated from government statistics (Ministry of Education 1986, Ministry of Health and Welfare 1988).
2) ＫＫ : Average number of persons per household (Ministry of Health and Welfare 1988) .
3) ＡＡ : Proportion of population over 65 in the whole population (Ministry of Health and Welfare 1988).
4) ＩＳ : Amount of annual information supply, taking 100 in 1980 (Council of National Life 1986).
5) ＰＯ : Population (Ministry of Health and Welfare 1988).
6) ＧＮ : Gross private final consumption (Bank of Japan 1985). After 1986, 7 cases (0,1,2,3,4,5,and 6% annual growth rate) are assumed.

The values of the above variables up to 1985 are actual date and those after 1986 are projected ones as shown in the references.

2．2 Model and Endogeneous Variables

Fig.2 shows the flow diagram. The model has four level variables.

1) ＬＥＯ : Annual expenditure for leisure-type dining-out per capita. Using Governments' data, it is defined as the expenditure for items which are sensitive to the level of household income, i.e., which have large standard deviations.
2) ＰＥＯ : Annual expenditure for practical dining-out per capita, i.e., for items other than ＬＥＯ .
3) ＥＡＩ : Annual expenditure for dining-home per capita.
4) ＰＦＳ : Annual expenditure for processed foods per capita. Processed foods mean those other than grains and fresh foods (Statistics Bureau 1985).

Other variables are auxiliary variables, whose meaning is as follows:

1) ＴＯＥ : Annual total food expenditure per capita.
2) ＴＯＯ : Annual total expenditure for dining-out per capita.
3) ＣＳ : Self-cooking, i.e., annual expenditure for foods other than dining-out and processed foods per capita.
4) ＩＮ : Annual income per household.
5) ＣＬ : Desire for good living expressed as an index between 0 and 100. Hereafter indices take values between 0 and 100.

6) ＮＣ : Consciousness of nutrition and health expressed as an index.
7) ＮＩ : Annual supply of nutrition and health information.
8) ＦＴ : Level of food technology.
9) ＥＲ : Extent of leisure element involved in dining-out, expressed as an index.
10) ＬＴ : Annual leisure hours.
11) ＨＷ : Hours for household works.
12) ＴＩ : Proportion of married couples in which both wife and husband work.
13) ＷＴ : Hours for work per household.
14) ＦＩ : Annual supply of food information, expressed as an index.
15) ＬＯ : Proportion of dining-lone.
16) ＣＷ : Hours for cooking work.
17) Ｇ１ : ＧＮ／ＰＯ
18) ＴＯ : Criterion for decision whether one increases or decreases ones' food expenditure.

３. Results

Simulations were carried out for the annual growth rates 0,1,2,3,4,5, and 6%, respectively, from 1985 to 2005. The standard model is the one for the growth rate 3%.

３. １ Standard model

Engel's coefficient decreres from 29.2% in 1985 to 23.7% in 2005. But it does not have much sense, becaue it is not a good measure for a level of living in an affluent society. In Fig.3 is shown the change of ＴＯＥ, ＰＦＳ, and ＴＯＯ. The increase of ＴＯＥ between 1985 and 2005 is about ¥130,000, the major part of which is that of ＴＯＯ. The increase of ＰＦＳ is around ¥80,000. It means that the expense by social work division increase by ¥210,000 while the self-cooking (ＣＳ) decreases by ¥80,000. It should be noted that ＣＳ includes only the expense for materials but ＰＦＳ and ＴＯＯ include also the expense for service and processing.

Furthermore, ＰＦＳ occupies always about 50% in ＴＯＥ, and the increase of ＴＯＯ is, therefore, balanced by the decrease of ＣＳ. The possible reasons are 1) the trend of searching convenience owing to the increase of working married couples and the decrease of population per household, and 2) sophistication owing to the rising up of living level, the increase of leisure hours, and the trend of pleasure-seeking in dietary life, as shown in Fig.9.

３. ２ Economic Growth and Dietary Life

In Figs.4 to 9 are shown ＴＯＥ, ＴＯＯ, ＰＦＳ, proportion of ＴＯＯ and ＰＦＳ in ＴＯＥ, and that of ＬＥＯ in ＴＯＯ, respectively.

Though the change of ＴＯＯ is not noticeable for the growth rate 2%, the increase of ＴＯＯ is large. It increases to 1.5 times in 2005 even under 0% growth where ＴＯＥ is decreased, and attains 6 times under 6% growth. That means that housewives' work which has been carried out personally turnes to be

socialized and purchased as labor service in the market with increasing income.

The increase of PFS is much smaller than of TOO, probably because processed foods are mainly for convenience and poor in pleasure-seeking effect in contrast with dining-out. This is more evident by Fig.7 to 9. While the proportion of TOO in TEO and of LEO in TOO are always much increased, that of PFS in TEO does not change under 0% growth, and, under 6% growth, it once increases but decreases again. Thus, it proves that the use of processed foods is only transient and does not mean true high level of the dietary life.

References

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Council of National Life 1986, Indices of National Life, Printing Bureau.

Ministry of Education 1986, Summary of Statistics of Ministry of Education. Printing Bureau.

Ministry of Health and Welfare 1988, Trend of Population, Kosei Tokei Kyokai.

Shokuryo Eiyo Chosakai 1986. Foods, Nutritions, and Health, Ishiyaku Shuppan.

Statistics Bureau 1985, Annual Reports on Household Budget, Statistics Bureau.

Appendix SD equations

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A     TAA.K = TABLE(AA,TIME.K,50,100,5)
A     TKK.K = TABLE(KK,TIME.K,50,100,5)
A     TAC.K = TABLE(AC,TIME.K,50,80,5)
A     TIS.K = TABLE(IS,TIME.K,50,100,5)
A     TPO.K = TABLE(PO,TIME.K,50,100,5)
A     TGN.K = TABLE(GN,TIME.K,50,100,5)
A     IN.K = BIN(2).K*(BTI(1).K-BTI(2).K)*1.045
A     CL.K = MAX(0,((BIN(1).K-BIN(2).K)/BIN(2).K+TAC.K/100+LT.K/1440-(BPFS(1).K
            -BPFS(2).K)/BPFS(2).K)*100/3)
A     NC.K = (CL.K*3+(BIN(1).K-BIN(2).K)*100/BIN(2).K-FT.K*0.5)/2
A     NI.K = TIS.K
A     FT.K = (NI.K+((BPFS(1).K-BPFS(2).K)/BPFS(2).K)*100)/2
A     ER.K = MAX(0,(((BIN(1).K-BIN(2).K)*100/BIN(2).K)*2+CL.K+(BLT(1).K
            -BLT(2).K)*100/BLT(2).K+FI.K*2)/4
A     LT.K = BLT(2).K-((BHW(1).K-BHW(2).K)+(BWT(1).K-BWT(2).K)/2)
A     HW.K = (BHW(2).K*(BTI(1).K/BTI(2).K)-(BWT(1).K-BWT(2).K)/2)*0.98
A     TI.K = (BTI(2).K+((BKK(1).K-BKK(2).K)/BKK(2).K+TAC.K/100+(BPFS(1).K
            -BPFS(2).K)/BPFS(2).K+(BPEO(1).K-BPEO(2).K)/BPEO(2).K)/4)*1.01
A     WT.K = (BWT(2).K-((450/(100+TI.K))*TKK.K)/100)*0.99
A     FI.K = MAX(0,((FT.K+(BLEO(1).K-BLEO(2).K)*100/BLEO(2).K)/2)*(BIS(2).K)
            *100/BLEO(2).K)/2)*(BIS(1).K/BIS(2).K))
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A       LO.K = ((BKK(1).K-BKK(2).K)*100/BKK(2).K+TI.K)/2
A       CW.K = (HW.K*TKK.K/((1+(TAA.K+LO.K)/100)*2.9))*1.005
A       CS.K = (CL.K/100+BNC(1).K/BNC(2).K+0.65)*2920
A       G1.K = TGN.K/TPO.K
A       TO.K = (G1.K*0.45-TOE.K)/TOE.K
A       TOE.K = LEAI.K+TOO.K
A       TOO.K = LPEO.K+LLEO.K
R       RPFS.KL = (((FI.K-NC.K)/100*(BCW(2).K/BCW(1).K)*ABS(LEAI.K-LPFS.K)
                  *TO.K+7500)*0.44
R       RPEO.KL = ((ER.K/100+(1-BCW(1).K/BCW(2).K))*TO.K*LPEO.K-CS.K/30+4500)*0.19
R       RLEO.KL = ((ER.K/100)*TO.K*LLEO.K-(CS.K*2/30)+4500)*0.34
R       REAI.KL = CS.K+(BPFS(1).K-BPFS(2).K)
L       LPFS.K = LPFS.J+DT*RPFS.JK
L       LPEO.K = LPEO.J+DT*RPEO.JK
L       LLEO.K = LLEO.J+DT*RLEO.JK
L       LEAI.K = LEAI.J+DT*REAI.JK
B       BKK = BOXLIN(2,1)
B       BIS = BOXLIN(2,1)
B       BIN = BOXLIN(2,1)
B       BNC = BOXLIN(2,1)
B       BNI = BOXLIN(2,1)
B       BLT = BOXLIN(2,1)
B       BHW = BOXLIN(2,1)
B       BTI = BOXLIN(2,1)
B       BWT = BOXLIN(2,1)
B       BCW = BOXLIN(2,1)
B       BPFS = BOXLIN(2,1)
B       BPEO = BOXLIN(2,1)
B       BLEO = BOXLIN(2,1)
B       BEAI = BOXLIN(2,1)
A       BKK(1).K = TKK.K
A       BIS(1).K = TIS.K
A       BIN(1).K = IN.K
A       BNC(1).K = NC.K
A       BNI(1).K = NI.K
A       BLT(1).K = LT.K
A       BHW(1).K = HW.K
A       BTI(1).K = TI.K
A       BWT(1).K = WT.K
A       BCW(1).K = CW.K
A       BPFS(1).K = LPFS.K
A       BPEO(1).K = LPEO.K
A       BLEO(1).K = LLEO.K
A       BEAI(1).K = LEAI.K
N       LPFS = 131346
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N     LPEO = 15347
N     LLEO = 18382
N     LEAI = 248447
N     BKK = BOXLOAD(3,29,1)
N     BIS = BOXLOAD(96,1)
N     BIN = BOXLOAD(2586,1)
N     BNC = BOXLOAD(18,1)
N     BNI = BOXLOAD(96,1)
N     BLT = BOXLOAD(411,1)
N     BHW = BOXLOAD(163,1)
N     BTI = BOXLOAD(44.7,1)
N     BWT = BOXLOAD(242,1)
N     BCW = BOXLOAD(167,1)
N     BPFS = BOXLOAD(121411,1)
N     BPEO = BOXLOAD(13190,1)
N     BLEO = BOXLOAD(16251,1)
N     BEAI = BOXLOAD(231099,1)
A     RO.K = (TOO.K/TOE.K)*100
A     RI.K = ((LEAI.K-LPFS.K)/TOE.K)*100
A     RP.K = (LPFS.K/TOE.K)*100
A     RE.K = (TOE.K/G1.K)*100
A     RL.K = (LLEO.K/TOO.K)*100
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