

# DISCUSSION

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## Nutrition economics – important source of information

*Ekonomika výživy – důležitý zdroj informací*

J. HRUBÝ

*Prague, Czech Republic*

### INTRODUCTION

Before coming to the nutrition economics, it is necessary to devote the attention to two more general questions, to the problem of consumption in the national economy and to the specific situation in the tremendous sector of this economy which is providing of the population with food.

In the economic literature, we meet with different opinions regarding consumption. On one hand, there are authors who hold consumption as the decisive area of the economic system, on the other hand, we can quote those who totally omit the consumption problem. Adam Smith (1958) keeps consumption as the unique goal of the all-economic activity. Similarly Marx (1953) says that “the production produces the consumption and the consumption produces the production”. For Keynes (1963) “the propensity to consume” plays a very serious role in his conception. Also the acknowledged modern economic textbook by Samuelson and Nordhouse (1995), the 13th edition of which was issued in the Czech Republic (1995), emphasises the importance of consumption writing “who reigns in the market economy – consumers and technology” and the aggregate demand has an extraordinary position here. In the Czech literature, the importance of consumption is confirmed in the extensive book by Klimecký (1946). Engliš (1938) in opposite does not touch consumption at all, or in a negligible extent, even when he elaborated (1917) the consumption in an interesting sector of the population. Similarly Šik (1962) does not see consumption as an economic activity, because it is not an activity for others. This short survey of economists’ opinions cannot and does not want to exhaust this area totally, but it intends to indicate the basis for our following deliberations. But one can rather speak, despite the prevailing opinions, about the dictating position of the producers with a very limited application of the consumption-aspects. We observed the influence of this production-lobbying in our planned economy too, as we could show in the nutrition sector (Hrubý 1989a).

The second general introductory remark is devoted to the specific part of consumption, to the food consumption. The important sector of the national economy is

namely providing the population with food i. e. securing nutrition of the population. In this economic sense, food consumption equals nutrition of the population. That means the satisfaction of the nutrition need. This need belongs without doubts to the basic needs of man and it is frequently held for the primary one. This need has in opposite to other needs a very tremendous biologic aspect. This is of course the case for agricultural production. Food brings to the human body a series of substances necessary for its existence. The nutrition level influences the health status of the population positively or negatively and it is in this sense an important factor of the “quality of life” what is a every frequent term of today. Mašek (1971) summarised the role of nutrition in its formative, preventive and curing functions. That transfer of important substances requires the extension of the economic analysis onto biologic indicators.

### NUTRITION ECONOMICS, ITS DEFINITION AND METHODS

Aside the discussed biologic aspect of nutrition of the population it has also clear economic consequences, because nutrition influences directly labour productivity which we have to see not only as the daily condition or the productivity but also from the point of view of generations – the present adolescents will be adult workers tomorrow (Hrubý 1983a), nutrition of the population has a distinct economic aspect. The nutrition need is satisfied by material goods which must be produced or imported. Further, nutrition creates a meaningful part of the household expenditures. That all constitutes the reason which led, after long discussions, to the nutrition economics, which is thus an economic discipline following economic phenomena and connections regarding the satisfaction of the nutrition need and from the point of this need (Hrubý 1980). We can find examples of a similar approach at Orr (1936), Cépède, Langellé (1956), Schmidt, Ulbricht (1973). The decisive point of these conceptions is the extension of the analysis to the biological factors. The FAO (Food and Agriculture Organization) keeps the same position, we meet there also with the term “eco-

nutritionist". The FAO statistics (Food Balance Sheets) covers on one hand the sources of nutrition of the population – production of food, import of food, on the other hand quantities of commodities and values of the basic biological indicators – energy, proteins, fats, exceptionally also the broader scale of biological elements (Food Balance Sheets 1980). The same approach is kept in recent publications of FAO as well (The State of Food and Agriculture 1998). FAO co-operated also with the World Health Organisation (WHO) in the field of biological requirements, e.g. Energy and protein requirements (1985).

In this way, the methodology of the nutrition economics is founded on the analysis of both mentioned aspects of nutrition – economic and biological. We can enumerate the following points of the methodology:

- the ex post analysis of:
  - quantities of commodities and their development in time,
  - prices of food commodities and their development in time,
  - share of nutrition expenditures in total expenditures and their development in time,
  - development of total expenditures on food in stable prices,
  - statement of the nutrition need according to the demographic structure of the population,
  - transfer of commodities into biological, nutritious values and their development in time,
  - construction of balances between the nutritious values and the nutrition needs,
  - international comparisons (Hrubý 1989b);
- the ex ante analysis:
  - construction of the recommended food allowances (RFA) (Hrubý 1971),
  - estimates of the future demand of food commodities.

This broad approach brings results what concern the general characteristics of the nutrition of the population but also other economic branches – in agriculture and the food industry, in the standard of living, in trade, in the social policy. The very narrow relation between nutrition of the population and agriculture is given in the preamble of the constitution of the FAO (Basic texts 1989), where it is said "raising levels of nutrition and standards of living of the people" what is the first purpose of the Organisation. In the connection with Lord John Boyd Orr, one of the founders of this institution and its first director general, we can speak about the marriage between nutrition and agriculture (Cuthbertson 1975). Agriculture must issue from the nutrition needs of the population as we showed a long time ago (Hrubý 1963). This requirement is enforced in a difficult way as the discussion on this theme among American agricultural economists proves (Chafkin 1978). Similarly, the effort to apply the conception of the nutrition economics in the evaluation of the standard of living meets with objections. The information from the nutrition economics can also substantially contribute to the quality and to a greater accuracy of the social policy.

## RESULTS OF THE NUTRITION ECONOMICS

### Impact of the general characteristics of nutrition of the population

The nutritious value of the food commodities enables to evaluate the dispersed data of many items in a synthetic way and to compare these data with the physiological requirements which are expressed in Recommended Dietary Allowances (RDA) and transferred then per the average inhabitant (Hrubý, Maňas 1977; Štiková, Chmeliková 1990). The physiological requirements are stated in many countries as Cannon

Table 1. Food consumption expressed in nutritious values and their comparison with RDA  
(a – quantity per capita and day; b – year 1989 = 100; c – RDA)

Factor	Unit	Years		
		1989	1993	1996
Energy	a kJ	12 194	11 955	11 809
	b index	100	98	97
	c index	127	123	122
Proteins	all a g	95	90	90
	b index	100	95	95
	c index	127	121	121
Proteins animal	a g	59	50	50
	b index	100	84	84
	c index	155	130	130
Fats	a g	127	115	112
	b index	100	91	88
	c index	182	163	160
Carbohydrates	a g	359	377	373
	b index	100	105	104
	c index	105	110	109
Calcium	a mg	911	785	775
	b index	100	86	85
	c index	105	90	89
Iron	a mg	18.5	18.4	18.3
	b index	100	100	99
	c index	123	123	122
Vitamins: A	a µg	858	761	803
	b index	100	89	94
	c index	99	84	93
B <sub>1</sub>	a mg	1.43	1.45	1.44
	b index	100	101	101
	c index	130	130	130
B <sub>2</sub>	a mg	1.56	1.44	1.42
	b index	100	92	91
	c index	103	95	94
C	a mg	43	48	53
	b index	100	112	122
	c index	55	62	70

Source: Štiková, Sekavová, Mrhálková, Baudisová (1999)

Table 2. Food commodities with the reduced consumption in the last decade  
(a – kg per capita and year; b – year 1989 = 100)

Commodities		Years			
		1989	1993	1996	1999
Meat (total)	a	97.4	84.2	85.3	83.0
	b	100	86	88	83
Beef	a	30.0	19.8	18.2	13.8
	b	100	66	61	46
Pork	a	49.9	48.1	49.2	44.7
	b	100	96	99	90
Fish	a	6.0	4.5	5.2	5.2
	b	100	75	87	87
Milk and prod.	a	259.6	190.1	199.2	207.3
	b	100	73	77	80
Eggs (pieces)	a	336	318	276	297
	b	100	95	82	88
Butter	a	9.4	5.3	4.2	4.0
	b	100	56	45	43
Lard	a	6.8	6.1	5.2	5.0
	b	100	90	76	74
Sugar	a	39.8	38.9	39.5	37.1
	b	100	98	99	94
Cereals (in flour)	a	115.4	118.2	113.8	104.0
	b	100	102	99	93
Potatoes	a	82.8	84.0	77.2	75.9
	b	100	101	93	92
Fruit (without southern)	a	53.6	48.5	42.1	46.6
	b	100	90	79	87

Sources: Štiková, Sekavová, Mrhálková, Baudišová (1999); Food consumption in 1999 (CSO)

Table 3. Food commodities with the growth of the consumption in the last decade  
(a – kg per capita and year; b – year 1989 = 100)

Commodities		Years			
		1989	1993	1996	1999
Poultry	a	13.0	11.7	13.6	20.5
	b	100	90	105	158
Vegetable fats	a	12.5	14.5	15.8	16.4
	b	100	116	126	131
Pulses	a	1.3	1.8	2.0	2.0
	b	100	138	154	154
Vegetables	a	68.7	74.2	79.5	85.3
	b	100	108	116	124

Sources: Štiková, Sekavová, Mrhálková, Baudišová (1999); Food consumption in 1999 (CSO)

(1992) analysed. This construction of biologic requirements is used for the evaluation of the effective situation and of food consumption.

This all is applied in the Table 1. Unfortunately, the data after the year 1996 were not published till now (Štiková, Sekavová, Mrhálková, Baudišová 1999). The deep economic changes after year 1989 caused the reduction of the intakes at 6 factors, the maintenance at 4 factors. This movement did not change the previous situation, i. e. our nutrition is still prevailing above the physiological requirements. At 3 factors – calcium, vitamins A and B<sub>2</sub> – we can speak about an impairment. A special case is presented by the vitamin C – ascorbic acid, where a distinct raise is recorded, but the level of the intake remains insufficient.

The main contribution of these biological data is generally for the formulation of the nutrition and food policy (NFP), which belongs in the last decades to the priorities of the professional public. Numerous countries stated namely their physiological requirements. The idea of the NFP was started by FAO (Formulation of Food and Nutrition Policies 1972) for developing countries and extended later to developed countries as well. Helsing (1989) enforced this idea for Europe too. We meet with similar proposals earlier – Los (1964), Norway had its official document (1975–1976). We also elaborated this subject (Hrubý 1964, 1979, 1983a, b) and we came to the term used here. Even when our present situation is not too favourable for the establishment of the NFP, it is the question of the near or remote future. For this purpose, the analysis of biological indicators is not sufficient. The goals of the policy ought to be stated in the terms of food commodities. We constructed therefore, aside the mentioned dietary allowances, also the Recommended Food Allowances (RFA), as the second step of biologic requirements (Hrubý 1971). They are guidelines for the direction of the future development, for structural changes, for the indication of the future level of the nutrition of the population. It is necessary to mention that the RFA were not revised since that time according to the changes of RDA and according to the recent development of the food consumption. This reality is a very tremendous lack and a serious warning for the further development of the nutrition economics. The idea of the Recommended Food Allowances was confirmed as a correct approach by other authors, e.g. by Aganbegjan (1964).

### Impact on agriculture, food industry and trade

Food commodities are divided in the Tables 2 and 3 according to the development of their consumption in the last decade. These data inform us about the development of the consumption since 1989 and the decisive point is the relation to the year 1999. In some cases, the development is singularly irregular. From the followed 17 items, the reduction occurred at 12 items. From the analysis above, this reduction is, with the exception of milk,

Table 4. International comparisons – period 1992–1994

1	2	3	4	5	6	7	8	9
Energy (cal.)	3 163	3 473	3 543	3 382	3 343	3 251	3 216	7th
Proteins	96.0	101.9	115.7	98.3	100.8	91.7	90.5	5th
Fats	112.2	158.7	163.8	143.4	139.0	146.0	139.1	7th
Cereals	116.8	89.7	111.5	94.0	77.1	99.2	92.9	1st
Potatoes	84.9	55.4	72.5	77.5	86.2	45.2	106.7	3rd
Sugar	41.3	38.0	35.7	37.5	55.8	40.3	40.2	2nd
Pulses	6.7	1.0	2.0	1.2	3.9	1.1	4.9	1st
Vegetables	60.1	76.8	118.2	88.8	69.2	88.5	91.3	7th
Fruit (mild zone)	30.5	104.7	45.0	89.1	86.8	86.3	49.1	7th
Meat	91.1	105.9	98.9	85.8	87.6	76.2	67.4	3rd
Milk	219.8	270.9	281.2	227.9	314.6	307.4	218.2	6th
Eggs	13.6	13.4	14.8	12.4	13.2	10.3	10.2	2nd
Fish	3.2	9.9	28.4	12.3	11.2	13.2	18.6	7th
Butter	6.5	5.0	8.3	6.9	2.1	6.2	3.6	3rd
Vegetable oils	16.2	18.6	17.0	16.0	18.3	14.8	18.3	4th

Source: Food balance sheets (1996), FAO Rome

Columns: 1 Nutritious factors – g/day; commodities – kg/year  
 2 Czech Republic – period 1993–1994  
 3 Austria  
 4 France  
 5 Germany

6 the Netherlands  
 7 Switzerland  
 8 United Kingdom  
 9 Rank of the Czech Republic among the compared countries

not harmful, on the contrary, it is advantageous, if we observe it from the point of view of the nutrition need. To milk, a special essay was devoted (Hrubý 2000a). Regarding the commodity meat, the demand shock must be taken in account concerning beef meat which is connected with the “mad cows illness” and also with the pressure of the supporters of the alternative ways of nutrition. That means that it is possible to reckon with the production growth at 5 items only. The described development is of course very narrowly connected with the meaningful raise of the food prices. We could prove a high statistic correlation, especially for milk and meat (Hrubý 2000b).

An important correction factor for the estimates of the future development are the international comparisons (Hrubý 1989b): They were also applied at the construction of the RFA. The data from the Table 4 were taken from the FAO Food Balance Sheets (1996). We preferred this source because of the comparativeness. The data cover the period 1992–1994. Since that time, development went on in the Czech Republic, but aside such breaks, as the fall of the planned economy has represented for us, there are no steeper changes in the nutrition of the population in developed countries and therefore such a comparison has a sense. The Czech situation is compared with the data of 6 market economies, including 2 neighbours. Generally speaking, our data are from the point of view of the biologic aspect more favourable (the lowest level of energy and fats, the 6th rank in proteins). What regards the commodities, the differences have occurred. We have a higher consumption of food of the

vegetable origin which contributes to the energy – cereals, potatoes, sugar. A special position have pulses, where the data of the FAO for the Czech Republic are undoubtedly, as we have drawn attention to already (Hrubý 2000b), exaggerated. On the contrary, the consumption of other vegetable foods is lower. That is valid also for the foods of animal origin, with an exception of eggs. Our above mentioned conclusions for agriculture are not clashing with this.

### Impact on the standard of living

The basic consequence of our conception of the nutrition economics for this segment of the economics is the following: It is not possible to take the growth of consumption as the indicator of the raise of the standard of living, i. e. the consumption which is or comes above the physiological requirements is not a sign of the good standard of living. Therefore, the decrease of consumption in the last decade regarding the prevailing number of commodities in the CR is a positive phenomenon. As a typical example, we can mention the commodities butter and sugar which are taken as for signs of the high standard of living by the broad public. It is not the case with the commodities milk, potatoes and fruit. The same meaning has the Engel's law (1895) stating that the decrease of the share of nutrition expenditures in the household budget is connected with the growth of household incomes. We devoted attention to this whole problematic earlier (Solnářová, Hrubý 1967).

## Impact on the social policy

Measures of the social policy have to use results of the nutrition economics in the area of the household budgets (Hrubý 1965; Sekavová, Hrubý 1986). Those results prove tremendous differences among various types of households, especially among the households with a different number of children. We tried also to extend and improve the methods of the household budgets statistics (Hrubý 1993).

## State of the art of the nutrition economics for the time being

I am sorry to say, that the indicated conception of the nutrition economics, the tasks of which were elaborated (Hrubý 1984), is not applied in the full extent as also the used data can prove. There are two basic lacks: the regular, immediate transfer of the food consumption into nutritious values is missing and the recommended food allowances are not further developed according to the changes of the recommended dietary allowances and according to the changes in the food consumption, including the influences of the supporters of the so called alternative nutrition. The main reason for this situation is an unfavourable atmosphere for the establishment of policy programmes, in this case of the nutrition and food policy what leads to the reduction of the number of workers in this field. Here, it is necessary to mention the relatively important position of the research collective from the Research Institute of Agricultural Economics (RIAE) Prague. Therefore, efforts to introduce the nutrition economics in the curricula of universities are also unsuccessful, even when the reasonable drafts existed years ago e.g. in the FAO (1978) or with us too (Hrubý 1987). This negative evaluation of our situation is in controversy with the whole post-war development all over the world. From many examples, we introduce at least the foundation of the International Union of Nutrition Sciences (IUNS) the IXth World Congress which took place in Prague in the year 1969, the American White House Conference (1970), the American study by Berg (1973).

## REFERENCES

- Agabegjan A.G. (1964): Determination of rational norms of consumption via method of linear programming (in Czech in the book "Soviet economists to the use of mathematics in economics"). NPL Praha.
- Basic tests of FAO (1989). FAO Rome.
- Berg A. (1973): The nutrition factor. The Brookings Inst. Washington.
- Cannon G. (1992): Food and health. The experts agree. Consumers Association, London.
- Cépède M., Langellé M. (1956): *L' économie de besoins*. Press Univ. Paris.
- Cuthbertson D.P. (1975): Lord Boyd Orr. *The J. Nutr.*, 105: 517–524.
- Energy and protein requirements (1985) – FAO Rome.
- Engel E. (1895): *Die Lebenskosten belgischer Arbeiterfamilien fruher und jetzt*. Bull. de l' Inst. Int. de Statistique, Rome.
- Engliš K. (1917): Theory of statistics of consumption economy (in Czech). Učitel'ská jednota, Brno.
- Engliš K. (1938): System of national economy (in Czech). Melantrich, Praha.
- FAO Guidelines for curriculum content in agricultural training (1978). Food Nutrition Agriculture, Rome.
- Food balance sheets (1980). FAO Rome.
- Food balance sheets (1996). FAO Rome.
- Formulation of food and nutrition policies (1972): *Nutr. Newsletter*, 10–14.
- Helsing E. (1989): Nutrition policies in Europe. *Eur. J. Clin. Nutr.*, 43: 57–66.
- Hrubý J. (1963): To the question of the relation between agriculture and nutrition (in Czech). *Zem. Ekon.*, 9: 65–88.
- Hrubý J. (1964): Economic aspects of nutrition (in Czech). *Sbor. SRV*, pp. 33–42.
- Hrubý J. (1965): Nutrition of children of employed mothers (in Czech). *Demografie*, 7: 326–331.
- Hrubý J. (1971): Contribution to the conception of the nutrition development (in Czech). Academia, Praha.
- Hrubý J. (1979): Nutrition and food policy in Czechoslovakia. *Var. Föda*, 31, (3): 383.
- Hrubý J. (1980): Chapters from the nutrition economics I (in Czech). *Výživa lidu*, 35: 50–51.
- Hrubý J. (1983a): Nutrition and food policy in the developed socialist society (in Czech). Academia, Praha.
- Hrubý J. (1983b): Problems of nutrition and food policy. *Wld. Rev. of Nutr., Diet*, 41: 1–39.
- Hrubý J. (1984): Questions of the further development of the nutrition economics in CSSR (in Czech). *Potr. Vědy*, 2: 221–227.
- Hrubý J. (1987): Zur Vermittlung von Ernährungswissen während des Hochschulstudiums in der CSSR. *Ernährungsforschung*, 32: 141–214.
- Hrubý J. (1989a): International comparisons of the food consumption (in Czech). *Zem. Ekon.*, 35: 189–194.
- Hrubý J. (1989b): Our schemes of rationalization of nutrition and their effectivity of realization (in Czech). *Výživa lidu*, 44: 166–167.
- Hrubý J. (1993): A possibility to improve the quality of the food, energy and nutrient intake. *Ernährung*, 17: 310.
- Hrubý J. (2000a): Real extent of the milk overproduction in the Czech Republic (in Czech). *Zem. Ekon.*, 46: 345–350.
- Hrubý J. (2000b): Food consumption, its connections and consequences (in Czech). *Potr. Vědy*, 18: 148–152.
- Hrubý J., Mañas F. (1977): Recommended per capita dietary allowances (in Czech). *Výživa lidu*, 32: 33–36, 55.
- Chafkin S.H. (1978): Nutrition policies, programs and politics. *Am. J. Agr. Econ.*, 60: 806–809.
- Keynes J.M. (1936): The general theory of employment, interest and money. London.
- Klimecký V. (1946): About consumption (in Czech). Orbis, Praha.

- Los V. (1964): Wstep do polityky zywnosciowej. PWE, Warszawa.
- Marx K. (1953): To critique of political economy (in Czech). Svoboda, Praha.
- Mašek J. et al. (1971): Man, society and nutrition (in Czech). Orbis, Praha.
- Norway – Om norsk ernaerings-og matforsinings-politikk (1975–1976): St. meld., Oslo.
- Orr J.B. (1936): Food, health and income. London.
- Samuelson P.A., Nordhaus W.D. (1995): Economics (in Czech). Svoboda, Praha.
- Sekavová H., Hrubý J. (1986): Utilization of household budgets for evaluation of food and nutrition situation (in Czech). Statistika, 6: 242–249.
- Schmidt H.E., Ulbricht G. (1973): Ernährungswirtschaft heute. Ernährungsforschung, 18: 55–56.
- Smith A. (1958): An inquiry into the nature and the causes of the wealth of nations. Methuen, London.
- Solnařová B., Hrubý J. (1967): Nutrition as an economic problem (in Czech). Svoboda, Praha.
- Šik O. (1962): Economy, interests, politics (in Czech). Svoboda, Praha.
- Štiková O., Chmelíková D. (1990): Dietary recommended allowances for the average inhabitant (in Czech). Výživa lidu, 45: 7–8.
- Štiková O., Sekavová H., Mrháková I., Baudisová H. (1999): Nutrition and food consumption in numbers (in Czech). Výživa a potraviny, 52, ZŠS, pp. 49–71.
- The State of Food and Agriculture (1998): FAO Rome.
- White House Conference on food, nutrition and health (1970). Washington.

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*Contact address:*

Dr. Jiří Hrubý, CSc., Podolská 38, 147 00 Praha 4, Česká republika

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