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Services sector in terms of changing environment

Global and regional food consumption patterns and trends

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Abstract

Promoting healthy diets and lifestyles to reduce the global burden of non-communicable diseases requires a multisectoral approach involving the various relevant sectors in societies. The agriculture and food sector figures prominently in this enterprise and must be given due importance in any consideration of the promotion of healthy diets for individuals and population groups. Food strategies must not merely be directed at ensuring food security for all, but must also achieve the consumption of adequate quantities of safe and good quality foods that together make up a healthy diet.

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1. Introduction

The dietary changes that characterize the "nutrition transition" include both quantitative and qualitative changes in the diet. The adverse dietary changes include shifts in the structure of the diet towards a higher energy density diet with a greater role for fat and added sugars in foods, greater saturated fat intake (mostly from animal sources), reduced intakes of complex carbohydrates and dietary fibre, and reduced fruit and vegetable intakes (Drewnowski A., 1997). These dietary changes are compounded by lifestyle changes that reflect reduced physical activity at work and during leisure time (Ferro-Luzzi A. 1996). At the same time, however, poor countries continue to face food shortages and nutrient inadequacies.

Diets evolve over time, being influenced by many factors and complex interactions. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape dietary consumption patterns. Data on the national availability of the main food commodities provide a valuable insight into diets and their evolution over time.

Food consumption expressed in kilocalories (kcal) per capita per day is a key variable used for measuring and evaluating the evolution of the global and regional food situation. A more appropriate term for this variable would be "national average apparent food consumption" since the data come from national Food Balance Sheets rather than from food consumption surveys. Analysis of FAOSTAT data shows that dietary energy measured in kcal per capita per day has been steadily increasing on a worldwide basis; availability of calories per capita from the mid-1960s to the late 1990s increased globally by approximately 450 kcal per capita per day and by over 600 kcal per capita per day in developing countries (see Table 1). This change has not, however, been equal across regions (*World agriculture: towards 2015/2030*, 2002). The per capita supply of calories has remained almost stagnant in sub-Saharan Africa and has recently fallen in the countries in economic transition. In contrast, the per capita supply of energy has risen dramatically in East Asia (by almost 1000 kcal per capita per day, mainly in China) and in the Near East/North Africa region (by over 700 kcal per capita per day).

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Table 1. Global and regional per capita food consumption (kcal per capita per day)

Region	1964-1966	1974-1976	1984-1986	1997-1999	2015	2030
World	2358	2435	2655	2803	2940	3050
Developing countries	2054	2152	2450	2681	2850	2980
Near East and North Africa	2290	2591	2953	3006	3090	3170
Sub-Saharan Africa ^a	2058	2079	2057	2195	2360	2540
Latin America and	2393	2546	2689	2824	2980	3140
East Asia	1957	2105	2559	2921	3060	3190
South Asia	2017	1986	2205	2403	2700	2900
Industrialized countries	2947	3065	3206	3380	3440	3500
Transition countries	3222	3385	3379	2906	3060	3180

In short, it would appear that the world has made significant progress in raising food consumption per person. The increase in the world average consumption would have been higher but for the declines in the transition economies that occurred in the 1990s. It is generally agreed, however, that those declines are likely to revert in the near future. The growth in food consumption has been accompanied by significant structural changes and a shift in diet away from staples such as roots and tubers towards more livestock products and vegetable oils (Bruinsma J. 2003).

Table 1 shows that current energy intakes range from 2681 kcal per capita per day in developing countries, to 2906 kcal per capita per day in transition countries and 3380 kcal per capita per day in industrialized countries. Data shown in Table 2 suggest that per capita energy supply has declined from both animal and vegetable sources in the countries in economic transition, while it has increased in the developing and industrialized countries.

2. Situation and trends in the world

Aligning varying sources and types of data to generate overall estimations of unhealthy diet prevalence is not possible. For that reason, estimates of specific elements of unhealthy diets are presented separately in this text.

2.1. Fruit and vegetable consumption

Approximately 16.0 million (1.0%) disability adjusted life years (DALYs, a measure of the potential life lost due to premature mortality and the years of productive life lost due to disability) and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption.

Adequate consumption of fruit and vegetables reduces the risk for cardiovascular diseases, stomach cancer and colorectal cancer. There is convincing evidence that the consumption of high levels of high-energy foods, such as processed foods that are high in fats and sugars, promotes obesity compared to low-energy foods such as fruits and vegetables (Popkin BM., 2001).

2.2. Salt intake

The amount of dietary salt consumed is an important determinant of blood pressure levels and overall cardiovascular risk. A population salt intake of less than 5 grams per person per day is recommended by WHO for the prevention of cardiovascular disease. However, data from various countries indicates that most populations are consuming much more salt than this.

It is estimated that decreasing dietary salt intake from the current global levels of 9–12 grams per day – to the recommended level of 5 grams per day – would have a major impact on blood pressure and cardiovascular disease.

2.3. Fat intake

High consumption of saturated fats and trans-fatty acids is linked to heart disease; replacement with polyunsaturated vegetable oils lowers coronary heart disease risk. Higher unsaturated fatty acids from vegetable sources and polyunsaturated fatty acids have also been shown to reduce risk of type 2 diabetes.

In the absence of comparable data on individual dietary intakes around the world, the availability of food for human consumption derived from national Food balance sheets are shown in the figure below. However, these may not accurately reflect actual consumption and should be treated as indicative only.

There were large variations across WHO regions in the amount of total fats available for human consumption. The lowest quantities available were recorded in the South East Asia Region, and the highest availability in the European Region. For saturated fatty acids (SFA), the lowest rates were in the African Region, and the highest was in the European Region and the Region of the Americas, with very high values observed in some of the Pacific Islands. Energy from SFA usually accounts for a third of the energy from total fat, with the notable exception of the South East Asia Region, where SFAs account for over 40% of total fat intake (*Fats and oils in human nutrition*, 1994).

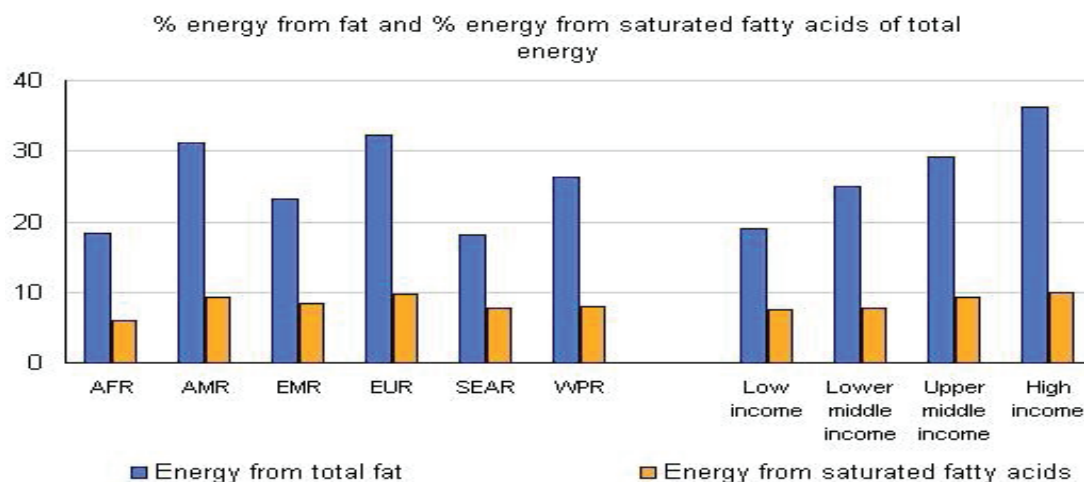


Fig.1. Percentage share of energy from fat and energy from saturated fatty acid of total energy

The availability of total fat increases with income level, while the availability of saturated fats clusters around the value of 8% in low and lower middle income countries and 10% in upper middle income and in high income countries.

3. Analyses of food consumption in R. Macedonia

According to the data of the National Statistics Institute regarding food intake in the Republic of Macedonia households, an evaluation has been made regarding the average population consumption of food products for the population in 2007 (*Fats and oils in human nutrition*, 1994).

Table 2. Average daily intake of food products in RM in 2007

Food product	%	g/day
Flour, bread, pasta, oats etc.	26.6	427
Potato	5.0	80.3
Fruit and products	14.1	226.3
Vegetable and products	20.4	326.9
Milk and milk products	13.8	221
Meat, fish, eggs and products	10.1	162.3
Legumes	1.8	28.3
Nuts and seeds	0.5	8.7
Oils and fats	4.2	67.6
Sweets	3.6	57.5

The obtained data for the daily intake imply of a satisfactory combination of food products in terms of cereals, bread and similar products, as well as the group of milk, meat and fruit and vegetables. Nevertheless, the broader analysis shows that there is a lack of fish intake (only 11,2g), fresh products of fruit and vegetables, wholegrain cereals and the group of nuts and seeds. The meat group includes approximately 21% processed meat products of a day. The fats and oils group takes a higher percentage in the daily intake.

The drinks have a daily account of 3 ml brandy, 6 ml wine, 40 ml beer, 90 ml fizzy drinks and 60 ml mineral water. The average daily energetic intake in RM is 2841 Kcal. Taking into account the qualitative composition of food, the average protein intake is 85.9 grams, of which 37.8 grams are of animal origin and 48 grams of vegetable origin. The carbohydrate daily intake reaches to 363.4 grams a meal, of which 106 grams go to mono and disaccharides and 257 grams to polysaccharides. There is an average daily intake of 45.6 grams of pure saccharose. The total fats intake is 116 grams. The fats content in a daily meal accounts for 36.7% (recommended <30%). The total cholesterol food intake ranges within the recommended values (0.27 g/individual) which should be less than 300 mg a day.

Table 3. Macronutrients content percentage in the daily meal of the population in RM in the course of 2007

Nutrient	g/ person	Kcal	%
Proteins	85,9	343,6	12,1
Fats	116	1044	36,7
Carbohydrates	363,4	1453,6	51,2

Table 4. Fatty acids proportion in a daily meal in RM population in 2007

Types of fats	g/ person	Kcal	%
Saturated	29,9	268,8	9,5
Mono-unsaturated	35,9	323	11,4
Poly-unsaturated	49,9	449,2	15,9
Cholesterol	0,27	2,5	0,09

Table 5. Vitamins content in a daily meal in the RM population in the course of 2007

	A µg	B1 mg	B2 mg	PP mg	C mg
Average	908	1,14	1,38	14,3	161

Table 6. Mineral matter content within the daily meal in RM population in the course of 2007

	Na mg	K mg	Mg mg	Ca mg	Fe mg	Cu mg	P mg
Average	9148	3018	243,6	608,7	13,5	1,08	1268

The mineral vitamin content of an average daily meal in RM can fulfill the daily needs and there are no significant with the exception of natrium which arises in significant elevated concentrations of 9148 mg (recommended doses of 500-2500 mg). This is due to the high intake of processed salty food products such as processed meat products, canned vegetables and a higher intake of kitchen salt.

4. A summary of population nutrient intake goals

The population nutrient intake goals for consideration by national and regional bodies establishing dietary recommendations for the prevention of diet-related chronic diseases are presented in Table 7. These recommendations are expressed in numerical terms, rather than as increases or decreases in intakes of specific nutrients, because the desirable change will depend upon existing intakes in the particular population, and could be in either direction.

In Table 6, attention is directed towards the energy-supplying macronutrients. This must not be taken to imply a lack of concern for the other nutrients. Rather, it is a recognition of the fact that previous reports issued by FAO and WHO have provided limited guidance on the meaning of a "balanced diet" described in terms of the proportions of the various energy sources, and that there is an apparent consensus on this aspect of diet in relation to effects on the chronic non-deficiency diseases.

This report therefore complements these existing reports on energy and nutrient requirements issued by FAO and WHO (2-4). In translating these goals into dietary guidelines, due consideration should be given to the process for setting up national dietary guidelines (Diet, nutrition and the prevention of chronic diseases, 2003).

Table 7. Ranges of population nutrient intake goal

Dietary factor	Goal (% of total energy, unless otherwise stated)
Total fat	15-30%
Saturated fatty acids	<10%
Polyunsaturated fatty acids (PUFAs)	6--10%
n-6 Polyunsaturated fatty acids (PUFAs)	5-8%
n-3 Polyunsaturated fatty acids (PUFAs)	1-2%
Trans fatty acids	<1%
Monounsaturated fatty acids (MUFAs)	By difference ¹
Total carbohydrate	55--75% ^b
Free sugars ^c	<10%
Protein	10-15% ^d
Cholesterol	<300 mg per day
Sodium chloride (sodium) ^e	<5 g per day (<2 g per day)
Fruits and vegetables	5400 g per day
Total dietary fibre	From foods ^f
Non-starch polysaccharides (NSP)	From foods ^f

^a This is calculated as: totalfat - (saturated fatty acids + polyunsaturated fatty acids + trans fatty acids). ^b The percentage of total energy available after taking into account that consumed as protein and fat, hence the wide range. ^c The term "free sugars" refers to allmonosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices. ^d The suggested range should be seen in the light of the Joint WHO/FAO/UNU Expert Consultation on Protein and Amino Acid Requirements in Human Nutrition, held in Geneva from 9 to 16 April 2002 (2). ^e Salt should be iodized appropriately (6). The need to adjust salt iodization, depending on observed sodium intake and surveillance of iodine status of the population, should be recognized. ^f See page 58, under "Non-starch polysaccharides"

4.1. Total fat

The recommendations for total fat are formulated to include countries where the usual fat intake is typically above 30% as well as those where the usual intake may be very low, for example less than 15%. Total fat energy of at least 20% is consistent with good health. Highly active groups with diets rich in vegetables, legumes, fruits and wholegrain cereals may, however, sustain a total fat intake of up to 35% without the risk of unhealthy weight gain.

For countries where the usual fat intake is between 15% and 20% of energy, there is no direct evidence for men that raising fat intake to 20% will be beneficial (Stubbs J, Ferres S, Horgan G., 2000 and Dietary approaches to the treatment of obesity, 2000). For women of reproductive age at least 20% has been recommended by the Joint FAO/WHO Expert Consultation on Fats and Oils in Human Nutrition that met in 1993 (*Fats and oils in human nutrition*, 1994).

4.2. Free sugars

It is recognized that higher intakes of free sugars threaten the nutrient quality of diets by providing significant energy without specific nutrients. The Consultation considered that restriction of free sugars was also likely to contribute to reducing the risk of unhealthy weight gain, noting that:

- ✚ Free sugars contribute to the overall energy density of diets
- ✚ Free sugars promote a positive energy balance - Acute and short-term studies in human volunteers have demonstrated increased total energy intake when the energy density of the diet is increased, whether by free sugars or fat. Diets that are limited in free sugars have been shown to reduce total energy intake and induce weight loss (Saris WH, 2000)
- ✚ Drinks that are rich in free sugars increase overall energy intake by reducing appetite control. There is thus less of a compensatory reduction of food intake after the consumption of high-sugars drinks than when additional foods of equivalent energy content are provided. A recent randomized trial showed that when soft drinks rich in free sugars are consumed there is a higher energy intake and a progressive increase in body weight when compared with energy-free drinks that are artificially sweetened. Children with a high consumption of soft drinks rich in free sugars are more likely to be overweight and to gain excess weight (Ludwig DS, Peterson KE, 2001)

The Consultation recognized that a population goal for free sugars of less than 10% of total energy is controversial. However, the Consultation considered that the studies showing no effect of free sugars on excess weight have limitations.

The CARMEN study (Carbohydrate Ratio Management in European National diets) was a multicentre, randomized trial that tested the effects on body weight and blood lipids in overweight individuals of altering the ratio of fat to carbohydrate, as well as the ratio of simple to complex carbohydrate per se. A greater weight reduction was observed with the high complex carbohydrate diet relative to the simple carbohydrate one; the difference however was not statistically significant. Nevertheless, an analysis of weight change and metabolic indices for those with metabolic syndrome revealed a clear benefit of replacing simple by complex carbohydrates (Saris WH, 2000).

The Consultation also examined the results of studies that found an inverse relationship between free sugars intakes and total fat intake. Many of these studies are methodologically inappropriate for determining the causes of excess weight gain, since the percentage of calories from fat will decrease as the percentage of calories from carbohydrates increases and vice versa. Furthermore, these analyses do not usually distinguish between free sugars in foods and free sugars in drinks. Thus, these analyses are not good predictors of the responses in energy intake to a selective reduction in free sugars intake.

4.3. *Non-starch polysaccharides (NSP)*

Wholegrain cereals, fruits and vegetables are the preferred sources of non-starch polysaccharides (NSP). The best definition of dietary fibre remains to be established, given the potential health benefits of resistant starch. The recommended intake of fruits and vegetables (see below) and consumption of wholegrain foods is likely to provide >20 g per day of NSP (>25 g per day of total dietary fibre).

4.4. *Fruits and vegetables*

The benefit of fruits and vegetables cannot be ascribed to a single or mix of nutrients and bioactive substances. Therefore, this food category was included rather than the nutrients themselves. The category of tubers (i.e. potatoes, cassava) should not be included in fruits and vegetables.

4.5. *Body mass index (BMI)*

The goal for body mass index (BMI) included in this report follows the recommendations made by the WHO Expert Consultation on Obesity that met in 1997 (Saris WHM, 2002). At the population level, the goal is for an adult median BMI of 21-23 kg/m². For individuals, the recommendation is to maintain a BMI in the range 18.5-24.9 kg/m² and to avoid a weight gain greater than 5 kg during adult life.

4.6. *Physical activity*

The goal for physical activity focuses on maintaining healthy body weight. The recommendation is for a total of one hour per day on most days of the week of moderate-intensity activity, such as walking. This level of physical activity is needed to maintain a healthy body weight, particularly for people with sedentary occupations. The recommendation is based on calculations of energy balance and on an analysis of the extensive literature on the relationships between body weight and physical activity. This recommendation is also presented elsewhere. Obviously, this quantitative goal cannot be considered as a single “best value” by analogy with the nutrient intake goals. Furthermore, it differs from the following widely accepted public health recommendation (Rolls BJ., 1997 and Fogelholm M, Kukkonen-Harjula K., 2000)

For better health, people of all ages should include a minimum of 30 minutes of physical activity of moderate intensity (such as brisk walking) on most, if not all, days of the week. For most people greater health benefits can be obtained by engaging in physical activity of more vigorous intensity or of longer duration. This cardio respiratory endurance activity should be supplemented with strength-developing exercises at least twice a week for adults in order to improve muscle skeletal health, maintain independence in performing the activities of daily life and reduce the risk of falling.

The difference between the two recommendations results from the difference in their focus. A recent symposium on the dose-response relationships between physical activity and health outcomes found evidence that 30 minutes of moderate activity is sufficient for cardiovascular/metabolic health, but not for all health benefits. Because prevention of obesity is a central health goal, the recommendation of 60 minutes a day of moderate-intensity activity is considered appropriate. Activity of moderate intensity is found to have a preventive effect on most, if not all, cardiovascular and metabolic diseases considered in this report. Higher intensity activity has a greater effect on some, although not all, health outcomes, but is beyond the capacity and motivation of a large majority of the population.

5. Conclusion

There are several opportunities for new global and national actions, including strengthened interaction and partnerships; regulatory, legislative and fiscal approaches; and more stringent accountability mechanisms.

The broad parameters for a dialogue with the food industries are: less saturated fat; more fruits and vegetables; effective food labelling; and incentives for the marketing and production of healthier products. In working with advertising, media and entertainment partners, there is a need to stress the importance of clear and unambiguous messages to children and youths.

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