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# FOOD SECURITY SITUATION OF SELECTED HIGHLY DEVELOPED COUNTRIES AGAINST DEVELOPING COUNTRIES

Karolina Pawlak

Uniwersytet Przyrodniczy w Poznaniu

**Abstract.** The aim of the paper is to present the food security situation in selected highly developed countries and to identify consumption disparities between them and developing countries. The research is based on the data from the United Nations Food and Agriculture Organization (FAO), the Statistical Office of the European Union (Eurostat), the United Nations Statistics Division, the Organisation for Economic Co-operation and Development (OECD), World Food Programme (WFP) and selected measures used by the Economist Intelligence Unit (EIU) for the construction of the Global Food Security Index. It has been showed that to the greatest extent the problem of maintaining food security occurs in developing countries which are characterized by low *per capita* income, while in developed countries the scale of hunger is marginal and it afflicts less than 1% of the population. On a regional scale the daily dietary energy supply is greater than the minimum dietary energy requirement in all regions of the world, but the extent to which the dietary needs are satisfied increases along with the growth of national income. In order to reduce the problem of hunger it is necessary to solve the problem of asymmetrical distribution of global income, e.g. by taking actions to accelerate the economic growth in less developed regions and increase the purchasing power of the population.

**Key words:** food security, consumption, hunger, undernourishment, developed countries, developing countries, food aid

## INTRODUCTION

Ensuring food security is one of the greatest challenges to the contemporary world and simultaneously, it is a priority of the economic policy in many countries with different degrees of economic development. It chiefly results from the systematic growth of the world population, which causes increasing demand for food. Although the Malthusian theory of population<sup>1</sup> formulated in the late 18th century was proved to be wrong and the supply of food has almost always increased more rapidly than the population (Dowd, 2009), there were more than a billion undernourished people all over the world in the early 1990s. At present, in spite of multidirectional actions taken to reduce the problem of global hunger, nearly 800 million people are still undernourished (FAO, n.d.). Although over the last 35 years the number of undernourished people all over the world has dropped, the decrease has been insufficient to eliminate the problem of hunger or at least reduce it by half (in absolute terms until 2015 vs 1990) as had been resolved at

<sup>1</sup> In *An Essay on the Principle of Population, As It Affects the Future Improvement of Society* published in 1798 Malthus stated that unchecked population growth was exponential while the growth of the food supply was expected to be arithmetical (Malthus, 1798). The conclusion was that the growth of population exceeded the food production capacity and thus it was impossible to improve people's living standard (Knutson et al., 1995).

✉ dr hab. Karolina Pawlak, Katedra Ekonomii i Polityki Gospodarczej w Agrobiznesie, Uniwersytet Przyrodniczy w Poznaniu, ul. Wojska Polskiego 28, 60-637 Poznań, Poland, e-mail: pawlak@up.poznan.pl

the Earth Summit (World Food Summit) in 1996. As it soon turned out that it was impossible to achieve the goal and reduce the number of undernourished people to about 500 million, in 2001 under the Millennium Development Goals the UN approved the task of hunger reduction which was formulated slightly less strictly. This time it was measured with the share of undernourished people in the total world population. According to the goal, the number of undernourished people was expected to be reduced by half or to less than 5% of the population in a particular country/region. This meant that by 2015 the percentage of undernourished people was supposed to be reduced to 11.8% worldwide (Paszowski, 2015). We can say that the goal was achieved on a global scale but the achievement of the goal in individual countries/regions was diversified (FAO, 2015).

The food security situation in highly developed countries is incomparably better, where according to the FAO estimates, only 1% of the population is afflicted by the problem of undernutrition. On the other hand, in developing countries every eighth citizen is undernourished (FAO, n.d.). Considerable diversification in the food security situation in different countries around the world can be proved by the fact that between 2006 and 2008 2.9 million EU citizens had limited access to food, i.e. less than 1% of the total population, whereas in the least developed countries (LDC) – 263.8 million people, i.e. 33% of the population (Pawlak, 2012). In view of this fact we can say that in highly developed countries the problems of undernutrition, in terms of the consumption of required amounts of energy and protein, do not have great social or economic significance (cf. Paszowski, 2015)<sup>2</sup> and their role is to provide food aid to developing countries, which are struggling with the problem of hunger. Hence, the aim of the article is to present the food security situation in selected highly developed countries and to identify consumption disparities between them and developing countries.

<sup>2</sup> However, it is necessary to remember that generalised estimates of consumption for entire regions or continents do not credibly reflect the scale of undernourishment and they cannot be used to indicate the countries and types of households where the problem of maintaining continuous access to adequate amounts of food satisfying dietary needs can be observed on a relatively largest scale. For more information about food security in households in the US and EU see Pawlak (2011, 2012).

## MATERIAL AND METHODS

The research is based on the data from the United Nations Food and Agriculture Organization (FAO), the Statistical Office of the European Union (Eurostat), the United Nations Statistics Division, the Organisation for Economic Co-operation and Development (OECD), World Food Programme (WFP) and selected measures used by the Economist Intelligence Unit (EIU) for the construction of the Global Food Security Index. On a regional scale the number of people undernourished and the prevalence of undernourishment, as well as the extent to which the minimum daily dietary energy requirement is satisfied were analysed. At the country level the analysis covered consumption of basic nutrients, selected determinants of consumers' ability to purchase food (*GDP per capita*, the share of food expenditure in total expenditure of households) and indicators of food availability (value of food production *per capita*, the sufficiency of food supply), as well as contributions to the World Food Programme (WFP) and the level of aid under Official Development Assistance (ODA)<sup>3</sup> provided by selected developed countries to developing countries.

## REGIONAL DIVERSIFICATION OF THE FOOD SECURITY SITUATION IN THE WORLD

According to the FAO data, in 2014–2016 there have been nearly 795 million undernourished people, with nearly 15 million living in developed countries and about 780 million living in developing countries (Table 1). It is important to note that since the early 1990s both the number of undernourished people and their percentage in the total population have been systematically decreasing worldwide. In absolute terms, in comparison with the 1990–1992 period the number of undernourished people worldwide has decreased by more than a fifth in 2014–2016, whereas the prevalence of undernourishment has dropped by nearly 8 percentage points,

<sup>3</sup> Official Development Assistance (ODA) is provided by donor government agencies and multilateral institutions to promote economic development and to reduce poverty, which is the direct cause of hunger and malnutrition in developing countries. Together with food aid and humanitarian interventions, ODA plays an important role in reducing hunger in the world.

from 18.6% to 10.9%. During the whole period under analysis the problem of undernutrition and hunger has been the most noticeable in the least developed countries, where it has afflicted nearly 27% of the total population in 2014–2016, whereas in the 1990s even 40% of the population was afflicted by the problem.

As far as the regional distribution is concerned, the highest undernourishment level could be observed in Africa, especially in the Sub-Saharan region, and in Asia. At present, in Africa every fifth inhabitant has been afflicted by undernutrition and hunger, whereas in the Sub-Saharan region – every fourth inhabitant (Table 1). It is noteworthy that although since the 1990–1992 period the prevalence of undernourishment in Africa has decreased, the number of undernourished people has increased by nearly 30%, to 232.5 million. The status quo has chiefly been caused by the climatic conditions which are unfavourable to agricultural production, low fertility of soils and their desertification, disappearance of pastures, natural disasters, high rate of natural increase, the lowest GDP *per capita*, low development of agriculture<sup>4</sup> and political instability (Cf. Pawlak, 2012).

In Asia, depending on the region, the percentage of people afflicted by the shortage of food varies from 7% (the Caucasus and Central Asia) to 16% (Southern Asia). Achieving food security is the biggest problem for the inhabitants of the southern, eastern and south-eastern regions of the continent, where in 2014–2016 a total of 487 million people have been afflicted by undernutrition (Table 1). However, it is noteworthy that in comparison with the 1990–1992 period, the problem of undernourishment has been considerably reduced on the entire continent, especially in Eastern and South-Eastern Asia, both in absolute and relative terms. During the period under analysis the number of people without constant access to sufficient amounts of food has decreased by 230 million, 150 million and 77 million in all Asia, Eastern Asia and South-Eastern Asia, respectively. During the same period the percentage of undernourished population in these regions has dropped by 11.5, 13.6 and 21 percentage points, respectively. Thus, we can see that although the prevalence of the problem of hunger and undernutrition is greater in Africa than in Asia, despite the noticeable progress in the struggle with hunger the

greatest number of undernourished people can be found in Asia. The food insecurity in this region of the world is mostly determined by the high rate of natural increase, urban overpopulation, political instability, poverty and unequal distribution of food, low productivity of agriculture. Apart from that, especially in South-Eastern Asia the food security situation is determined by the occurrence of monsoons and accompanying rainfalls (Cf. Pawlak, 2012).

A lower scale of undernourishment has been observed in Oceania, Latin America and in the Caribbean. In 2014–2016 1.4 million people have been suffering from undernourishment in Oceania, i.e. every sixth inhabitant of the region. Food security has been a problem to every fifth inhabitant of the Caribbean, i.e. 7.5 million people living in the region (Table 1). Apart from Eastern and South-Eastern Asia, Latin America is the region where the goal set by the Earth Summit has been successfully achieved and the number of undernourished and starving people has been reduced by half. Furthermore, at present the number of people without constant access to food satisfying the minimum daily dietary needs is lower than 5% of the total population in the region, i.e. nearly 27 million. This means that the first of the eight Millennium Development Goals has been achieved. It was possible to improve the food security situation in Latin America by increasing the productivity of agriculture. It resulted in increased production and export of food and in consequence, in a higher rate of economic growth. This improved the affordability of food.

If we assume that hunger, which is identified with chronic undernourishment, refers to the situation when a daily level of food intake is insufficient to meet the minimum energy requirement to live a healthy and active life (Sapa, 2012), we can risk the statement that the problem of hunger does not exist on a regional scale. Both on a global scale and the scale of individual regions the daily dietary energy supply is greater than the minimum dietary energy requirement (Table 2).

According to the FAO estimates, during the periods of 1990–1992 and 2014–2016 the minimum dietary energy requirement in highly developed countries reached about 1,940 kcal per head and it was satisfied in about 170–175%. In developing countries the minimum dietary energy requirement was satisfied to a lesser extent and it ranged from 136% in 1990–1992 to 153% in 2014–2016. In the latter period the greatest surplus of energy supply in relation to the minimum requirement

<sup>4</sup> For more information about the relations between the food security situation and development of agriculture in individual regions of the world see Dec et al. (2008).

**Table 1.** Number of undernourished people and prevalence of undernourishment in the world in 1990–2016  
**Tabela 1.** Liczba i odsetek ludności niedożywionej na świecie w latach 1990–2016

Regions of the world Regiony świata	Number of undernourished people (million) Liczba ludności niedożywionej (mln)				Prevalence of undernourishment (%) Odsetek ludności niedożywionej w populacji ogółem (%)			
	1990–1992	2000–2002	2010–2012	2014–2016	1990–1992	2000–2002	2010–2012	2014–2016
World Świat	1 010.6	929.6	820.7	794.6	18.6	14.9	11.8	10.9
Developed countries Kraje rozwinięte	19.9	21.2	15.7	14.7	<5.0	<5.0	<5.0	<5.0
Developing countries Kraje rozwijające się	990.7	908.4	805.0	779.9	23.3	18.2	14.1	12.9
Africa, including: Afryka, w tym:	181.7	210.2	218.5	232.5	27.6	25.4	20.7	20.0
Northern Africa Afryka Północna	6.0	6.6	5.1	4.3	<5.0	<5.0	<5.0	<5.0
Sub-Saharan Africa Afryka Subsaharyjska	175.7	203.6	205.7	220.0	33.2	30.0	24.1	23.2
Asia, including: Azja, w tym:	741.9	636.5	546.9	511.7	23.6	17.6	13.5	12.1
Caucasus and Central Asia Kaukaz i Azja Środkowa	9.6	10.9	7.1	5.8	14.1	15.3	8.9	7.0
Eastern Asia Azja Wschodnia	295.4	221.7	174.7	145.1	23.2	16.0	11.8	9.6
Southern Asia Azja Południowa	291.2	272.3	274.2	281.4	23.9	18.5	16.1	15.7
South-Eastern Asia Azja Południowo-Wschodnia	137.5	117.6	72.5	60.5	30.6	22.3	12.1	9.6
Western Asia Azja Zachodnia	8.2	14.0	18.4	18.9	6.4	8.6	8.8	8.4
Latin America and the Carib- bean, including: Ameryka Łacińska i Karaiby, w tym:	66.1	60.4	38.3	34.3	14.7	11.4	6.4	5.5
Caribbean Karaiby	8.1	8.3	7.3	7.5	27.0	24.4	19.8	19.8
Latin America Ameryka Łacińska	58.0	52.1	31.0	26.8	13.9	10.5	5.5	<5.0
Oceania Oceania	1.0	1.3	1.3	1.4	15.7	16.5	13.5	14.2
Least developed countries Kraje najsłabiej rozwinięte	209.3	244.3	237.8	250.9	40.0	36.5	27.7	26.7

Source: FAO, n.d.  
Źródło: FAO, b.d.

**Table 2.** Minimum dietary energy requirement and dietary energy supply by regions of the world in 1990–1992 and 2014–2016  
**Tabela 2.** Minimalne dzienne zapotrzebowanie na energię oraz jej rzeczywiste spożycie według regionów świata w latach 1990–1992 i 2014–2016

Regions of the world Regiony świata	Minimum dietary energy requirement (kcal/caput/day) Minimalne zapotrzebowanie na energię (kcal/osobę/dzień)		Dietary energy supply (kcal/caput/day) Spożycie energii (kcal/osobę/dzień)		Extent to which the minimum dietary energy requirement is satisfied (%) Stopień zaspokojenia potrzeb energetycznych (%)	
	1990–1992	2014–2016	1990–1992	2014–2016	1990–1992	2014–2016
	World – Świat	1 807	1 844	2 597	2 902	144
Developed countries – Kraje rozwinięte	1 936	1 942	3 257	3 408	168	175
Developing countries – Kraje rozwijające się	1 771	1 824	2 415	2 795	136	153
Africa, including: – Afryka, w tym:	1 726	1 755	2 320	2 577	134	147
Northern Africa – Afryka Północna	1 765	1 834	3 058	3 452	173	188
Sub-Saharan Africa – Afryka Subsaharyjska	1 717	1 739	2 139	2 412	125	139
Asia, including: – Azja, w tym:	1 775	1 837	2 398	2 813	135	153
Caucasus and Central Asia Kaukaz i Azja Środkowa	1 769	1 836	2 542	2 885	144	157
Eastern Asia – Azja Wschodnia	1 836	1 900	2 489	3 148	136	166
Southern Asia – Azja Południowa	1 723	1 793	2 293	2 503	133	140
South-Eastern Asia Azja Południowo-Wschodnia	1 750	1 809	2 197	2 757	126	152
Western Asia – Azja Zachodnia	1 753	1 831	3 104	3 156	177	172
Latin America and the Caribbean, including: Ameryka Łacińska i Karaiby, w tym:	1 807	1 862	2 669	3 069	148	165
Caribbean – Karaiby	1 818	1 866	2 321	2 758	128	148
Latin America – Ameryka Łacińska	1 806	1 862	2 693	3 089	149	166
Oceania – Oceania	1 730	1 762	2 454	2 542	142	144
Least developed countries Kraje najsłabiej rozwinięte	1 701	1 747	2 000	2 305	118	132

Source: own calculations based on FAO, n.d.

Źródło: obliczenia własne na podstawie FAO, b.d.

was consumed in Northern Africa and Western Asia. Moreover, in the latter region the amount of calories in the daily food intake was more than 250 kcal lower than in developed countries, whereas in Northern Africa the amount of kilocalories provided in food was slightly greater than the amount consumed daily by the inhabitants of highly developed countries. The minimum

dietary energy requirement was satisfied worst in the LDC group. In 2014–2016 the daily dietary energy supply in these countries amounted to 2,305 kcal per head and it was more than 1,100 kcal lower than in developed countries and nearly 600 kcal lower than the average global consumption. However, it was sufficient to satisfy the minimum dietary energy requirement in 132%.

We can see that in comparison with the early 1990s the minimum daily energy requirement increased in all regions of the world and simultaneously, there was improvement in the state of food security, which was assessed according to the extent to which the minimum dietary energy requirement was satisfied.

However, food security is a more complex problem and it is not limited to the consumption of sufficient amounts of energy. In 1996 a definition of food security was presented at the World Food Summit. It emphasised new aspects of the concept, such as: food safety, nutritional value (health quality) and people's preferences. The current definition of food security was supplemented with the social aspect and it refers to the situation "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Obiedzińska, 2012 as cited FAO, 2002). This means that there are three aspects of achieving food security. First of all, it is necessary to ensure sufficient quantities of safe and nutritious food not only on a national scale but also in a household. Second of all, it is necessary to maintain stable supplies of food during the year and every year. Third of all, it is necessary to ensure that each household should have physical, social and economic access to sufficient amounts of food satisfying its dietary needs. In view of this fact, we can say that the sine qua non for food security is that each household should have sufficient knowledge and ability to produce or acquire food guaranteeing an appropriately balanced diet, providing all necessary nutrients and energy (Cf. Obiedzińska, 2012). When we interpret food security in this way, we can clearly see the dichotomy of the problem of feeding people all over the world. On the one hand, we have highly developed countries with excessive food production. The scale of the problem of hunger is marginal and it is not caused by the impossibility to produce food due to insufficient access to the resources of factors of production or the impossibility to use them. It results from the unequal division of income, which causes the situation where there are groups of people who are unable to satisfy their minimum dietary needs (Cf. Kraciuk, 2015). On the other hand, there are developing countries, where due to unfavourable conditions of agricultural production, shortage of infrastructure and political instability on average one out of eight people is unable to produce or purchase sufficient amounts of food for an active and healthy life.

## THE LEVEL OF SATISFYING DIETARY NEEDS

In 2009–2011 the consumption of energy in developed countries amounted to 3,366 kcal per head daily. It was nearly 20% greater than the average global consumption of energy and 45% greater than in the least developed countries (Table 3). There were even greater proportions in the consumption of protein and fat. In developed countries 30% more protein and 65% more fat was consumed than the average global consumption. It respectively amounted to 80% more and over three times more protein and fat than in the least developed countries (LDC). Meals with the highest calorific value, which was almost two times greater than the minimum requirement, were consumed by people living in the US (3,639 kcal per head daily), Switzerland (3,487 kcal per head daily), Norway (3,484 kcal per head daily) and the EU countries (3,416 kcal per head daily). As far as the latter are concerned, the most calorific diet (3,500 kcal per head daily) was noted among the inhabitants of France, Germany, Italy, Luxembourg, Ireland, Austria and Belgium, who typically consume large amounts of animal fat, butter and vegetable oil and who also consume relatively high amounts of meat and milk<sup>5</sup>. The diet of the inhabitants of Cyprus, Bulgaria, Slovakia and Hungary contained the lowest amount of energy (less than 3,000 kcal per head daily). It is noteworthy that the real consumption of energy in Cyprus (2,661 kcal per head daily) and in Japan (2,719 kcal per head daily) was slightly lower than the average consumption in developing countries. Simultaneously, the diet of the inhabitants of these countries was more balanced and it contained more protein and fat than in less developed countries.

In 2009–2011 in highly developed countries one person consumed 103 g of protein daily. The daily food intake of the inhabitants of Australia, Canada, most EU countries, Norway and the US contained more protein than the average amount in this group of countries (Table 3). The highest content of protein in meals was consumed by people in the US, Italy, Luxembourg, Finland, Greece, France, Portugal and Lithuania. The amount of protein consumed in these countries ranged from 110 g to 124 g per head daily, i.e. about three times more than the amount recommended in the rules of healthy

<sup>5</sup> For more information about the models of consumption of basic food products in the EU countries see Poczta and Pawlak (2005).

**Table 3.** Consumption of basic nutrients in selected developed countries and around the world in 2009–2011

**Tabela 3.** Spożycie podstawowych składników odżywczych w wybranych krajach wysokorozwiniętych i na świecie w latach 2009–2011

Specification Wyszczególnienie	Energy – Energia		Protein – Białko		Fat – Tłuszcz	
	kcal/caput/day kcal/osobę/dzień	World = 100 Świat = 100	g/caput/day g/osobę/dzień	World = 100 Świat = 100	g/caput/day g/osobę/dzień	World = 100 Świat = 100
1	2	3	4	5	6	7
World – Świat	2 868	100.0	79	100.0	81	100.0
Developed countries Kraje rozwinięte	3 366	117.4	103	130.4	134	165.4
Australia – Australia	3 265	113.8	104	131.6	149	184.0
Japan – Japonia	2 719	94.8	88	111.4	87	107.4
Canada – Kanada	3 419	119.2	104	131.6	148	182.7
Norway – Norwegia	3 484	121.5	109	138.0	149	184.0
Switzerland – Szwajcaria	3 487	121.6	94	119.0	157	193.8
The US – USA	3 639	126.9	110	139.2	161	198.8
EU, including: UE, w tym:	3 416	119.1	104	131.6	143	176.5
Austria	3 784	131.9	106	134.2	173	213.6
Belgium – Belgia	3 793	132.3	102	129.1	159	196.3
Bulgaria – Bułgaria	2 877	100.3	82	103.8	95	117.3
Croatia – Chorwacja	3 052	106.4	83	105.1	113	139.5
Cyprus – Cypr	2 661	92.8	79	100.0	120	148.1
Czech Rep. – Czechy	3 292	114.8	92	116.5	139	171.6
Denmark – Dania	3 363	117.3	107	135.4	131	161.7
Estonia	3 214	112.1	96	121.5	91	112.3
Finland – Finlandia	3 285	114.5	112	141.8	134	165.4
France – Francja	3 524	122.9	113	143.0	164	202.5
Greece – Grecja	3 433	119.7	112	141.8	153	188.9
Spain – Hiszpania	3 183	111.0	105	132.9	156	192.6
The Netherlands – Holandia	3 147	109.7	108	136.7	122	150.6
Ireland – Irlandia	3 591	125.2	108	136.7	130	160.5
Lithuania – Litwa	3 463	120.7	124	157.0	100	123.5
Luxembourg – Luksemburg	3 568	124.4	112	141.8	141	174.1
Latvia – Łotwa	3 293	114.8	97	122.8	127	156.8
Malta	3 389	118.2	109	138.0	114	140.7
Germany – Niemcy	3 539	123.4	103	130.4	144	177.8
Poland – Polska	3 485	121.5	101	127.8	118	145.7
Portugal – Portugalia	3 456	120.5	114	144.3	143	176.5

**Table 3 cont. – Tabela 3 cd.**

1	2	3	4	5	6	7
Romania – Rumunia	3 363	117.3	106	134.2	107	132.1
Slovakia – Słowacja	2 902	101.2	74	93.7	109	134.6
Slovenia – Słowenia	3 173	110.6	100	126.6	122	150.6
Sweden – Szwecja	3 160	110.2	108	136.7	130	160.5
United Kingdom Wielka Brytania	3 414	119.0	102	129.1	140	172.8
Hungary – Węgry	2 968	103.5	82	103.8	137	169.1
Italy – Włochy	3 539	123.4	111	140.5	155	191.4
Developing countries Kraje rozwijające się	2 721	94.9	74	93.7	70	86.4
Least developed countries Kraje najsłabiej rozwinięte	2 324	81.0	57	72.2	41	50.6

Source: own calculations based on FAO, n.d.

Źródło: obliczenia własne na podstawie FAO, b.d.

nutrition and nearly or over two times more than the average amount consumed in the LDC. The content of protein was relatively lowest in the diet of people in Slovakia, Cyprus, Hungary, Bulgaria and Japan. Only the people in Slovakia consumed less protein than the global average. Nevertheless, the consumption was almost two times higher than the recommended minimum and it was 30% greater than in the least developed countries. The origin of protein is important. Animal protein is particularly valuable to the human organism. In 2009–2011 in highly developed countries the share of animal protein in the total structure of consumption reached 58%, whereas in developing countries it reached nearly 34% and in the LDC group it was only 21% (FAO, n.d.). This fact confirms the noticeable dependence between the rate of economic development, the value of national income and the consumption of animal protein<sup>6</sup>.

Japan, Estonia and Bulgaria were the only countries where the average inhabitant consumed less than 100 g of fat daily, i.e. 30–35% less than the average amount of fat consumed in developed countries. However, it was 7–17% more than the average global daily consumption of fat and at least two times more than in the LDC (Table 3). In the latter fat consumption amounted only to 41 g

per head daily and it was a half lower than the average global consumption. Between 2009 and 2011 among the countries under analysis the highest consumption of fat (155 g per head daily) was noted in Italy, Spain, Switzerland, Belgium, the US, France and Austria. In these countries the GDP *per capita* was high, i.e. it was from about 2.5 to 4 times greater than the global average value of the GDP *per capita*, from 4 to 6 times greater than in developing countries and at least 15 times greater than in the least developed countries (Table 4).

As results from these analyses, in all highly developed countries the minimum daily dietary energy requirement was satisfied with excess on a national scale. The consumption of protein and fat was also higher than recommended. In consequence, in the countries with high national income, in contrast to developing countries, overweight and obesity are bigger problems resulted from the nutritional model than underweight. As results from the data published by the FAO, apart from Japan, where underweight was noted in 11.5% of the population, low body mass was observed at most in 5% of the population of highly developed countries (FAO, n.d.). Simultaneously, from 42% to 62% of the inhabitants of individual EU countries and 55% of the American population were overweight, whereas obesity was diagnosed in 8–23% of the population of the countries under analysis (Dowd, 2009; Pawlak, 2012).

<sup>6</sup> This regularity was also noted in the research conducted by Paszkowski (2015).

## SELECTED DETERMINANTS OF PHYSICAL AND ECONOMIC ACCESS TO FOOD

In view of the fact that regionally the consumption of energy is greater than the minimum daily requirement (Table 2), we can say that on a global scale the problem of hunger is not directly the problem of physical lack of food. The world produces enough food to ensure an adequate food ration to every person (Małysz, 2008). As Tangermann (1986) proves, the problem of hunger is the problem of division, which should be economically interpreted as the division of global income. In his opinion, the coexistence of hunger and excess mostly results from the coexistence of poverty and wealth around the world. Therefore, among many determinants of hunger, the lack of economic access to food should be regarded as one of the most important factors.

According to the methodology of calculation of the Global Food Security Index, consumers' ability to purchase food can be assessed through the value of the GDP *per capita* and the share of food expenditure in total expenditure of households. As results from the data in Table 4, in 2013 the value of the GDP *per capita* in highly developed countries was 36,600 US dollars and it was 2.5 times greater than the average global GDP *per capita* and it was nearly 17 times greater than in the LDC. In Switzerland, Norway and Luxembourg the values of the GDP *per capita* were respectively about 25 times, 29 times and 40 times greater than the average values in the least developed countries (LDC). As the value of the GDP *per capita* increased and in consequence, as people's disposable income increased, the share of food expenditure in total expenditure of households decreased, which was in accordance with Engel's law. On average,

**Table 4.** GDP *per capita* (USD, in purchasing power parity), the share of food expenditure in total expenditure of households (%), average value of food production *per capita* (%) and sufficiency of food supply (%) in selected developed countries and around the world

**Tabela 4.** PKB *per capita* (USD, w parytecie siły nabywczej), udział wydatków na żywność w wydatkach ogółem gospodarstw domowych (%), przeciętna wartość produkcji żywności *per capita* (%) oraz wystarczalność podaży żywności (%) w wybranych krajach wysokorozwiniętych i na świecie

Specification Wyszczególnienie	GDP <i>per capita</i> (2013) PKB <i>per capita</i> (2013)		Share of food expenditure in total expenditure (2015) Udział wydat- ków na żywność w wydatkach ogółem (2015)	Value of food production <i>per capita</i> (2011–2013) Wartość produkcji żywności <i>per capita</i> (2011–2013)		Sufficiency of food sup- ply (2015) Wystarczal- ność podaży żywności (2015)
	USD (constant 2011 prices) USD (ceny stałe w 2011 roku)	World = 100 Świat = 100		USD (constant 2004–2006 prices) USD (ceny stałe z lat 2004–2006)	World = 100 Świat = 100	
1	2	3	4	5	6	7
World – Świat	13 915.1	100.0	33.9	311	100.0	57.9
Developed countries Kraje rozwinięte	36 638.0	263.3	x	491	157.9	.
Australia	42 834.0	307.8	10.0	1 054	338.9	82.3
Japan – Japonia	35 614.3	255.9	13.7	138	44.4	64.0
Canada – Kanada	41 898.9	301.1	9.4	751	241.5	87.5
Norway – Norwegia	62 411.4	448.5	13.1	262	84.2	89.6
Switzerland – Szwajcaria	54 992.7	395.2	9.3	346	111.3	89.7
The US – USA	51 340.5	369.0	6.7	663	213.2	94.8

**Table 4 cont. – Tabela 4 cd.**

1	2	3	4	5	6	7
EU, including:	33 192.8	238.5	x	.	x	.
UE, w tym:						
Austria	44 056.3	316.6	10.0	510	164.0	99.7
Belgium – Belgia	40 609.0	291.8	13.6	511	164.3	100.0
Bulgaria – Bułgaria	15 695.0	112.8	19.7	409	131.5	69.3
Croatia – Chorwacja	20 049.0	144.1	.	254	81.7	.
Cyprus – Cypr	27 393.9	196.9	14.2	300	96.5	.
Czech Rep. – Czechy	28 124.5	202.1	15.4	326	104.8	83.2
Denmark – Dania	42 482.7	305.3	11.3	1 084	348.6	85.6
Estonia	25 253.8	181.5	20.7	437	140.5	.
Finland – Finlandia	38 820.8	279.0	12.5	343	110.3	83.0
France – Francja	37 216.8	267.5	13.4	605	194.5	91.0
Greece – Grecja	24 305.1	174.7	16.2	582	187.1	87.9
Spain – Hiszpania	31 682.6	227.7	13.8	647	208.0	79.6
The Netherlands – Holandia	45 021.2	323.5	12.0	795	255.6	78.4
Ireland – Irlandia	44 647.2	320.9	10.2	938	301.6	93.2
Lithuania – Litwa	24 469.6	175.8	23.8	585	188.1	.
Luxembourg – Luksemburg	88 850.0	638.5	9.6	320	102.9	.
Latvia – Łotwa	21 832.6	156.9	19.1	385	123.8	.
Malta	28 821.7	207.1	13.0	170	54.7	.
Germany – Niemcy	42 883.7	308.2	11.7	404	129.9	91.5
Poland – Polska	22 835.2	164.1	18.5	461	148.2	89.7
Portugal – Portugalia	25 932.9	186.4	18.2	390	125.4	88.7
Romania – Rumunia	18 184.1	130.7	49.4	383	123.2	85.6
Slovakia – Słowacja	25 758.9	185.1	17.4	248	79.7	70.2
Slovenia – Słowenia	27 368.2	196.7	15.3	310	99.7	.
Sweden – Szwecja	43 540.5	312.9	12.2	278	89.4	78.8
United Kingdom Wielka Brytania	36 931.5	265.4	9.2	255	82.0	87.3
Hungary – Węgry	22 706.6	163.2	17.6	499	160.5	72.4
Italy – Włochy	33 923.6	243.8	14.4	480	154.3	91.5
Developing countries Kraje rozwijające się	8 900.4	64.0	x	272	87.5	.
Least developed countries Kraje najsłabiej rozwinięte	2 174.4	15.6	x	149	47.9	.

Source: own calculations based on Eurostat, n.d., FAO, n.d., Global..., 2015.

Źródło: obliczenia własne na podstawie Eurostat, b.d., FAO, b.d., Global..., 2015.

globally households spent a third of their total expenses on food. On the other hand, in the countries where the GDP *per capita* was about three times greater than the global average, food expenditure usually amounted to 10–12% of total expenditure of households.

Without minimising the role of physical access to food, it is good to analyse the value of food production *per capita* and assess the sufficiency of the supply of food (from domestic production corrected by the balance of trade exchange, including food aid) on the national scale. In 2011–2013 the value of food produced globally *per capita* amounted to 311 US dollars (Table 4). In highly developed countries the value of food production *per capita* was nearly 60% greater than the global average, nearly two times greater than in developing countries and nearly 3.5 times greater than in the LDC group. In countries such as Australia and Denmark, where the value of food produced *per capita* was greater than 1,000 US dollars, the amount of food produced was over seven times greater than in the least developed countries. We can also observe the regularity where the higher the value of the GDP *per capita* is, the higher the sufficiency of the available food supply is rated. In the countries where the GDP value was greater than 40,000 US dollars *per capita*, the supply

of food was estimated to be sufficient to meet the entire (not only the minimum) demand in about 90%. On the other hand, globally the analogical sufficiency index amounted to almost 58%.

Remembering the fact that the problem of hunger results from the asymmetrical division of global income, for many years the international community has been attempting to limit the scale of undernourishment by organising the flow of food or funds to purchase food from highly developed countries to less developed countries. Although this aid will not replace actions taken by individual countries to fight against hunger, we can risk the statement that without the engagement of international organisations and donating countries in the search for effective systems of food aid management it might be impossible to reduce the number and percentage of undernourished people worldwide.

The contemporary food aid was initiated by the US and Canada in the 1950s (Sapa, 2010). These countries still remain some of the largest food aid providers. In 2014 the US sent more than 2.2 billion dollars' worth of aid to developing countries under the World Food Programme (WFP). It amounted to 40% of the total aid provided under the WFP. Simultaneously, by allocating 32.7 billion dollars the US was the world's biggest

**Table 5.** Contributions to the World Food Programme (WFP) and the level of aid under Official Development Assistance (ODA) provided by selected developed countries in 2014

**Tabela 5.** Wysokość pomocy pod auspicjami Światowego Programu Żywnościowego oraz oficjalnej pomocy rozwojowej (ODA) świadczonej przez wybrane kraje wysokorozwinięte w 2014 roku

Specification <sup>a</sup> Wyszczególnienie <sup>a</sup>	Contributions to the World Food Programme Pomoc w ramach Światowego Programu Żywnościowego		Official development assistance Oficjalna pomoc rozwojowa	
	thousand USD tys. USD	%	million USD mln USD	%
1	2	3	4	5
Australia	112 790.7	2.0	4 203.4	3.1
Austria	1 183.0	0.0	1 144.4	0.8
Belgium – Belgia	25 545.3	0.5	2 384.5	1.8
Bulgaria – Bułgaria	138.7	0.0	.	x
Cyprus – Cypr	10.6	0.0	.	x
Czech Republic – Czechy	151.1	0.0	209.0	0.2
Denmark – Dania	68 462.1	1.2	2 996.0	2.2
Estonia	188.7	0.0	.	x

**Table 5 cont. – Tabela 5 cd.**

1	2	3	4	5
Finland – Finlandia	34 864.5	0.6	1 634.6	1.2
France – Francja	22 990.5	0.4	10 370.9	7.7
Greece – Grecja	37.8	0.0	248.4	0.2
Spain – Hiszpania	7 717.6	0.1	1 893.3	1.4
The Netherlands – Holandia	88 710.8	1.6	5 572.0	4.1
Ireland – Irlandia	21 336.6	0.4	808.8	0.6
Japan – Japonia	156 544.1	2.8	9 188.3	6.8
Canada – Kanada	350 085.6	6.3	4 196.5	3.1
Lithuania – Litwa	40.4	0.0	.	x
Luxembourg – Luksemburg	12 136.3	0.2	426.8	0.3
Germany – Niemcy	301 183.7	5.4	16 248.7	12.0
Norway – Norwegia	74 562.1	1.3	5 024.3	3.7
Poland – Polska	-	x	437.1	0.3
Portugal – Portugalia	10.0	0.0	419.0	0.3
Slovakia – Słowacja	15.0	0.0	81.2	0.1
Slovenia – Słowenia	41.4	0.0	61.5	0.0
Switzerland – Szwajcaria	88 458.2	1.6	3 547.6	2.6
Sweden – Szwecja	93 462.7	1.7	6 222.6	4.6
The US – USA	2 248 057.5	40.4	32 728.6	24.2
United Kingdom – W. Brytania	409 315.8	7.4	19 386.5	14.3
Hungary – Węgry	50.7	0.0	.	x
Italy – Włochy	31 638.6	0.6	3 342.1	2.5
Total – Ogółem	5 567 070.0	100.0	135 164.2	100.0

<sup>a</sup> Excluding Croatia, Latvia and Malta, that in 2014 did not provide these types of food aid.

Source: own calculations based on WFP, 2014; OECD, n.d.

<sup>a</sup> Z wyjątkiem Chorwacji, Łotwy i Malty, które w 2014 roku nie świadczyły tego rodzaju pomocy.

Źródło: obliczenia własne na podstawie WFP, 2014; OECD, b.d.

donator of official development assistance (ODA; Table 5). Apart from the US, the UK, Canada, Germany, Japan and Australia belonged to the group of the largest food aid providers. In 2014 these countries both bore 65% of the cost of financing the WFP and they were involved in the ODA. In these countries the value of the GDP *per capita* amounted to at least 35,600 US dollars and usually it exceeded 40,000 US dollars per head. The sufficiency of the food supply necessary to meet the

demand was estimated at about 90% or more (except for Australia and Japan; Table 4). To sum up these considerations, we can agree with the statement made by Tomczak (2005), who referred to the five-stage model of development of the world agriculture and said that limiting the problem of hunger involved the need to move individual countries to higher stages of development. An appropriate level of socioeconomic development is necessary in order to achieve this goal.

## CONCLUDING REMARKS

The number and percentage of undernourished people is diversified in individual regions of the world. It is related both with differences in the size of the regions and their socioeconomic development. The problem of maintaining food security is the most serious in developing countries, which are characterised by low income *per capita*, usually unfavourable conditions of agricultural production, shortage of infrastructure and political instability. In the least developed countries on average every fourth inhabitant is afflicted by the problem of undernutrition. On the other hand, in highly developed countries, where it is often a problem to handle the surplus of food rather than accelerate the rate of agricultural production, the scale of hunger is marginal and it afflicts less than 1% of the population.

It is noteworthy that on a regional scale the daily dietary energy supply is greater than the minimum dietary energy requirement in all regions of the world, but the extent to which the dietary needs are satisfied increases along with the growth of national income. Thus, we can conclude that the real cause of the lack of food security is the unreliability of food distribution (both on a global scale and in households) and the unaffordability of products rather than the insufficient supply of food, which does not meet people's demand. Thus, difficulties in feeding the population are largely caused by limited economic access to food rather than its physical inexistence. In view of this fact, in order to reduce the problem of hunger it is necessary to solve the problem of asymmetrical distribution of global income, e.g. by taking actions to accelerate the economic growth in less developed regions and increase the purchasing power of the population.

In view of this fact, it is necessary to develop and implement socioeconomic development strategies in developing countries, with a priority to ensure food security on a regional and national scale and in individual households. If we refer to Nurkse's considerations and note that economic development requires multilateral and simultaneous investments in different branches of economy and if we simultaneously bear in mind the fact that in less developed countries there may not be enough stimuli of development both in terms of demand and supply (the theory of the big push by Rosenstein-Rodan), we need to stress the fact that reducing the problem of global hunger requires the engagement of

the international community, which should provide developmental assistance. This assistance, which is complementary to traditional food aid, should be targeted not only at the consequences of the lack of food security but also at its causes.

## REFERENCES

- WFP (2014). Contributions to WFP 2014. World Food Programme. Retrieved Sep 27th 2015 from: <https://www.wfp.org/about/funding/year/2014>.
- Dec, M., Pawlak, K., Poczta, W. (2008). Determinanty sytuacji żywienia ludności świata. *Wiś Roln.*, 2(139), 9–25.
- Dowd, D. (2009). *Inequality and the Global Economic Crisis*. Pluto Press: London – New York.
- Eurostat (n.d.). Retrieved Sep 24th 2015 from: <http://ec.europa.eu/eurostat/data/database>.
- FAO (n.d.). Food Security Indicators. Retrieved Sep 24th 2015 from: <http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/#.Vg3z-5cbgpl>.
- FAO (2002). *The State of Food Insecurity in the World*. FAO, Rome.
- FAO (2015). *The State of Food Insecurity in the World*. FAO, Rome.
- Global Food Security Index, <http://foodsecurityindex.eiu.com/Index>, 24.09.2015.
- Knutson, R. D., Penn, J. B., Boehm, W. T. (1995). *Agricultural and Food Policy*. Prentice Hall Education, Career & Technology: Englewood Cliffs.
- Kraciuk, J. (2015). Bezpieczeństwo żywnościowe z perspektywy krajów słabo i wysokorozwiniętych. *Rocz. Nauk. SERiA*, XVII, 3: 205–209.
- Malthus, T. R. (1798). *An Essay on the Principle of Population, As It Affects the Future Improvement of Society*. London: J. Johnson.
- Małysz, J. (2008). Bezpieczeństwo żywnościowe strategiczną potrzebą ludzkości. Warszawa: Wyższa Szkoła Ekonomiczna ALMAMER.
- Millennium Development Goals Indicators (n.d.). Retrieved Sep 24th 2015 from: <http://mdgs.un.org/unsd/mdg/Data.aspx>.
- Obiedzińska, A. (2012). Bezpieczeństwo żywnościowe. In: M. Kwasek (ed.). *Z badań nad rolnictwem społecznie zrównoważonym (17): Ocena stanu żywienia ludności w Polsce w aspekcie bezpieczeństwa żywnościowego*, Raport PW 2011–2014 nr 59. Warszawa: IERiGŻ – PIB.
- OECD (n.d.). Preliminary ODA figures 2014. Retrieved Sep 27th 2015 from: <http://www.oecd.org/dac/stats/data.htm>.
- Paszkowski, S. (2015). Problemy światowego i europejskiego bezpieczeństwa żywnościowego. In: A. Czyżewski,

- B. Klepacki (Ed.). Problemy rozwoju rolnictwa i gospodarki żywnościowej w pierwszej dekadzie członkostwa Polski w Unii Europejskiej. Warszawa: PTE.
- Pawlak, K. (2011). Bezpieczeństwo żywnościowe gospodarstw domowych w USA. *Wiś Roln.*, 3(152), 67–83.
- Pawlak, K. (2012). Bezpieczeństwo żywnościowe w krajach Unii Europejskiej. *Zesz. Nauk. SGGW Warsz. Ekon. Org. Gosp. Żywn.*, 98, 39–52.
- Poczta, W., Pawlak, K. (2005). Typologia wzorców konsumpcji podstawowych artykułów żywnościowych w krajach Unii Europejskiej. *Rocz. Nauk. SERiA*, VII, 8, 195–203.
- Sapa, A. (2010). Pomoc żywnościowa w kontekście good governance i społecznej odpowiedzialności. *Zesz. Nauk. SGGW Warsz. Probl. Roln. Świat.*, 10(XXV), 4, 90–100.
- Sapa, A. (2012). Międzynarodowa pomoc żywnościowa – kierunki zmian. *J. Agribus. Rural Dev.*, 2(24), 203–214.
- Tangermann, S. (1986). Economic factors influencing food choice. In: C. Ritson, L. Gofton, J. McKenzie (Ed.), *The Food Consumer*. London: John Wiley & Sons.
- Tomczak, F. (2005). *Gospodarka rodzinna w rolnictwie: uwarunkowania i mechanizmy rozwoju*. Warszawa: IRWiR PAN.

## SYTUACJA WYŻYWIENIOWA WYBRANYCH KRAJÓW WYSOKOROZWINIĘTYCH NA TLE PAŃSTW ROZWIJAJĄCYCH SIĘ

**Streszczenie.** Celem artykułu jest przedstawienie sytuacji żywnościowej wybranych krajów wysokorozwiniętych i określenie dysproporcji występujących w tym zakresie pomiędzy nimi i państwami rozwijającymi się. W badaniach wykorzystano dane Organizacji Narodów Zjednoczonych ds. Wyżywienia i Rolnictwa (FAO), Urzędu Statystycznego Wspólnot Europejskich (Eurostat), Wydziału Statystyki ONZ, Organizacji Współpracy Gospodarczej i Rozwoju (OECD), Światowego Programu Żywnościowego (WFP) oraz wybrane mierniki cząstkowe stosowane przez Economist Intelligence Unit (EIU) przy tworzeniu Światowego Indeksu Bezpieczeństwa Żywnościowego (Global Food Security Index). Wskazano, że największe problemy z utrzymaniem bezpieczeństwa żywnościowego występują w krajach rozwijających się o niskim poziomie dochodów *per capita*, natomiast w krajach wysokorozwiniętych głód ujawnia się w skali marginalnej, dotykając niespełna 1% populacji. W wymiarze regionalnym spożycie energii przewyższa minimalne dzienne zapotrzebowanie na nią we wszystkich regionach świata, ale stopień zaspokojenia potrzeb żywnościowych zwiększa się wraz ze wzrostem dochodu narodowego. Zredukowanie problemu głodu wymaga rozwiązania problemu asymetrycznego podziału dochodu świata, m.in. przez podjęcie działań prowadzących do przyspieszenia wzrostu gospodarczego opóźnionych regionów i zwiększenia siły nabywczej ludności.

**Słowa kluczowe:** bezpieczeństwo żywnościowe, spożycie, głód, niedożywienie, kraje wysokorozwinięte, kraje rozwijające się, pomoc żywnościowa

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