

# Regional and national food security: a case of Ukraine and Russia

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**Abstract.** We consider three levels of food security – national, regional and global. In our paper we will concentrate on first and second, because the global level depends on national food security of producing and consuming countries, as well as consist on regional food securities of different parts of the World.

**Key words:** Food Security, National, Regional, Global, Indexes of Food Security.

## INTRODUCTION

The problem of food security is actual for the World economy since early '90s, when the food supply were faced on society together with huge increasing of population in some parts of the world. There are a lot of different approaches and definitions we can found in literature. Here is the most frequently used of them:

- the capacity at all times to provide the world with staple products to support increased food consumption, while controlling price fluctuations;
- the capacity to reach the desired levels of consumption on an annual basis;
- a given capacity to finance import requirements to meet the desired consumption levels;
- assuring every individual at all times of physical and economic access to the food they need;
- access at all times by all people to the food they need for an active and healthy life (World Bank, 1994);
- a country and a people have food security when the food system works in such a way that no-one is afraid of not having sufficient food;
- when every person has, at all times, physical and economic access to meet their basic food needs. A national food security strategy cannot be contemplated without guaranteeing food security at the level of the home;

- the capacity to ensure that the food system provides the whole population with nutritionally adequate food supplies over the long term (STAATZ, D'AGOSTINO&SUNDBERG, 1990);

- food security exists when the viability of the household, defined as both a production and a reproduction unit, are not threatened by a food deficit.

Two commonly used definitions of food security come from the UN's Food and Agriculture Organization (FAO) and the United States Department of Agriculture (USDA):

- Food security exists when all people, at all times, have physical, social [1] and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [2].
- Food security for a household means access by all members at all times to enough food for an active, healthy life.

## RESEARCH

Food security includes at a minimum (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability of acceptable foods in socially acceptable ways (with the exception of resorting to emergency food supplies, scavenging, stealing, or other coping strategies – USDA) [3].

All the definitions emphasize four types of development:

- from macro-level to the micro-level concern; from the notion of evaluating national food stocks, the concept has developed to the household level based on the perception of means of access [23] to the food resources created by the population;
- from concern to ensure an adequate level of supply, towards concern to meet the demand. Are the

physical and economic conditions of access adequate? In this stage, there is a shift away from a perception of food as such, towards a consideration of household living standards;

- the breakdown of household consumption reveals the vulnerability of certain sections of the population (women, children, the old) and have driven the search for household level security through the individual's food security;

- from a concern for short-term food security (one year) towards long-term food security (permanent). This development is the consequence of the emergence of the concept of sustainability linked to respect for the environment. [4]

Over these years, most of the definitions have converged towards a number of key words: satisfaction, access, risk, sustainability.

Following different authors, the level of risk for a household or a community depends on the modalities of access to food and on available capital. To minimize risks, the people use adaptation or reaction mechanisms at three levels:

- production (diversification, staggering, storage) for the rural population, changing the structure of the diet in case of urban dwellers (buying cheap food items);

- economic activities: increasing revenues by working in the formal, but above all the informal sector, or investing in non-productive assets (jewellery, clothing, livestock, liquid cash), exchanging humanitarian aid products for liquid cash or other assets;

- social relations: borrowing in cash or kind, mutual aid and support, multiple registration of the family with humanitarian aid agencies.

When these adaptation mechanisms are inadequate and threaten the household's food security, various things are done to deal with this unfavourable situation, in three stages:

- minimized risk strategy: informal activities by children, changing feeding patterns (urban gardening, reducing food rations, reducing the number of people that eating at home, consumption of cheap food away from home (Akindès, 1995), seeking support (from the family, relations, the community), selling unproductive assets;

- selling productive capital assets: tools, livestock or land in case of the rural population, and selling reserves, renting or selling house relating to urban dwellers;

- temporary migration of certain family members, followed by the permanent migration of the whole household.

## DISCUSSION

The vulnerability of a population in a region suffering from crises depend both on the measures that can be implemented in a given context and on the

households capacity to be able to respond to these events. The vulnerability of a population may be estimated by analysing the adaptation and reaction mechanisms and the way of they responding to a difficult situation. When the mechanisms are not effective the household becomes chronically vulnerable.

Sustainability: insecurity is temporary when the household is temporarily incapable of meeting the food requirements of the members of the family. It may be due to unexpected events occurring (insecurity for political reasons) or be seasonal because of logistical difficulties or high prices.

We do propose to measure the national and regional food security level proceeding from two main conditions, mentioned above. For first condition – ready availability – we propose to evaluate the quantity of produced and imported products (market capacity) at the national and regional level. Differentiation for national and regional level gives us an opportunity to estimate the level of diversity and complementary for single product market.

Definitely, it is impossible to evaluate the full list of products, FAO make it accordingly to the quantity of grain storage. In our opinion in this research it would be useful to enlarge the number of products due to nutrition preferences for analysed region or country. The list of items is: cereal, potatoes, sunflower seeds, rice, sugar beet, vegetables, meat, cow milk.

It is also important to answer the question about the country-exporter's social responsibility for forming a stable proposition on the national, regional and world industrial markets. There exists a priority to supply the domestic markets with available and quality food products. Balance of interests of different countries-suppliers of resources and benefits is rather important. It is necessary to develop energy renewable resources. It could influence on the industry proposition formation.

We need to estimate the market situation, poverty and habits of consumers to define the ability on acquire foods in socially acceptable ways.

Here we also have to distinguish the availability, accessibility (which depends on supply) and necessity (which affects on demand).

The problem of self-reliant food security strategy was a key for many countries, especially in the last decade. Food strategy was perceived as an ideal way of attaining a high degree of self-sufficiency by adopting an approach guaranteeing consistency, integration and synergy between actions that had hitherto been piecemeal [7].

Food self-sufficiency can be achieved in two ways: through self-reliant development, or development with an opening-up to the international market. The former is a protectionist approach, because it aims at meeting national needs through selective imports and a policy to set prices independently of world markets. The latter is based more on the theory of comparative advantages,

and has given rise to the concept of food security. It is founded on three principles:

- each country must seek to establish an agrifood trade balance by encouraging international specialization;
- each country must encourage national food production under sound economic conditions;
- each country must ensure that the disadvantaged sections of the population retain adequate access to food.

The gained results will be of great importance from the side of social value (considering the food security problem that is becoming more crucial for the world community); political importance (considering the existing tendency for transformation of the world political view for joint responsibility in making important decisions and selection of direction for the further development of economical and social relations and meeting the social demand); and economical grounding (solving an important problem of counting the interests of consumers, producers, state, and in our situation also separate regions, and the respective influence on the world stability).

Here is one of examples of social-oriented activity of main food producing countries. Developed by regional economic integration organizations in response to the World Food Summit, with support from FAO, Regional Programs for Food Security promote integration and agricultural development among neighboring countries. Regional programs seek to:

- support food security activities in participating countries;
- promote investment to improve rural infrastructure; and
- harmonize food quality standards and trade regulations to enable local producers and traders to gain access to cross-border and global markets. [8]

The output of the global food crisis found its solution through increased funding, "World Food Program" (World Food Program-WFP). The budget of

this humanitarian organization's activity is aimed at combating hunger in the world, formed by voluntary contributions and donations of the world, some businesses and individuals in 2009 was about \$ 6 billion., approximately the cost of Ukrainian grain exports (Table 1).

It is important to note that the cost of food, which in 2009 exported from Ukraine in the framework of this program, which is wheat, peas, corn and peas was \$ 64 million (5.1%) and is more than share of Russia, France and Belgium.

The shifting of self-reliant self-sufficiency strategies towards free market strategies can be put down to three causes [12]:

- loss of financial independence by governments, which was an essential condition for implementing a self-sufficiency policy. Export revenues have fallen back while the prices of foodstuffs and goods and services bought on the international market have soared. This upheaval in the terms of trade has had serious repercussions on governments' financial equilibrium;

- subsidies and demographic growth led to an increase in demand, but the inelasticity in the supply of agricultural products and the failure to control technology have pushed up food and technology imports. This has entrenched another kind of dependency, with repercussions on the national debt;

the difficulty of managing a self-sufficiency policy, which requires a consensus between the conflicting interests of different social groups. "Nothing could be further from the truth than the idyllic image of African societies based on community and mutual support and aid. These are certainly societies based on redistribution and on relationships, but they are run through with a number of oblique strategies, family, ethnic or personal rivalries and clan in-fighting, as well as unspoken opposition between the young and the old" [14].

**Table 1.** Participating countries in the World Food Programme - WFP, 2009

Country	'000 U.S. dollars.	share, %
1. Pakistan	214356	17.15
2. Ethiopia	88416	7.07
3. South Africa	65739	5.26
4. Ukraine	63644	5.05
5. Indonesia	60234	4.82
6. Russian Federation	56378	4.51
7. France	54870	4.39
8. Belgium	51272	4.10
9. Turkey	40492	3.24
10. Italy	34386	2.75
11. Uganda	33445	2.68
12. Palestine	30856	2.47
13. India	29489	2.36
14. Malaysia	23454	1.88
15. Canada	22077	1.77
Total of 15 countries	869109	69.53

Source: www.fao.org, FAO Statistical Yearbook 2010.

For now the food production is one of the most essential global problems requiring solution not only on the level of a separate country or region, but also on the global level. Combination of such factors as increase of population in some countries or some regions, increase of purchasing power, decrease of land usage for agricultural purposes, decrease of water resources tend to make production of the necessary amount of food products problematic. At the same time number of countries, net-exporters ("large" countries) are rather limited. Therefore value for each of these countries is gradually growing on the world food production market.

At the same time the issues of food security production, provision of enough amount of food products, of the relevant quality and for relevant price are becoming more and more important for every country in the world. Very often, during the period of rapid increase of the world prices, some countries introduce export reduction instruments, namely quotas or export taxes (mainly for grain) with the aim to stabilize the domestic prices.

The primary stage is generalization of the existing data base and selection of the research instruments. The next stage is a consequent analysis of the proposition formation in Ukraine, in Central and Eastern Europe and in the world containing the influence on consumption indexes, prices and availability of Ukrainian food industry. Furthermore, it is necessary to calculate the potential amount of industry production, coordinate the amount with the world demand production prognosis and calculate the amount of the resources necessary for the food industry production. Comparing the potential amount with the existing and potentially available in Ukraine it is possible to analyze the necessity and

practicality of selecting the diversification and specialization of Ukraine's agri-industrial production and estimate the relevant economic effects for both producers and consumers.

The following research will need applying different instruments depending on the stage and achievement of a separate task. Modeling is used to determine Ukraine's influence on the regional and world agri-industrial markets. The modeling stipulates analysis of separate countries' markets and specifically the world market; a set of products (both complementary and substitute goods); trade terms or conditions, presence and amount of tax, quotas, export subsidies, application of interventions and either existing or planned level of state support.

As the research is based on the necessity of influence on the supply, the results of this research will be applied for the following stage: determining the level of effective resources usage, the main criterion of which will be non-economic efficiency.

Determination of the advantages of either specialization or diversification of the country's agri-industrial production exclusively relates to considering producers and consumers' interests. The following aspect of the research should use economic estimate of each of the directions of strategy formation and their influence on the social well-being.

The main indexes we use in our research are Indicators of regional specialization and geographical concentration of industry (The indicators used in this paper to analyze regional specialization and concentration of industries are defined in a way that is similar to Aiginger [3]. The dissimilarity index is a modified version of the index proposed in Krugman [21].

**Table 2.** The main exporting countries (by 6 main crops), 1999-2008

COUNTRIES	(US\$ '000)				
	1999-2001	2003-2005	2006	2007	2008
United States of America	10.039.729	11.798.336	13.575.475	21.255.229	29.096.897
France	4.151.339	4.980.965	5.015.145	6.686.403	10.025.642
Canada	2.971.431	2.924.720	3.982.985	5.602.992	8.577.653
Argentina	2.375.862	2.608.085	2.993.295	4.914.761	7.216.026
Thailand	1.758.139	2.365.300	2.659.948	3.597.938	6.350.902
Australia	2.886.061	3.085.593	3.522.895	4.560.333	4.571.315
Germany	1.514.356	1.585.853	1.893.585	2.483.345	3.870.204
Ukraine	472.084	878.392	1.356.697	1.066.807	3.828.273
India	863.587	1.744.283	1.706.547	3.588.086	3.493.220
Russian Federation	169.336	1.078.979	1.595.427	4.178.160	3.455.644
Viet Nam	774.468	1.033.454	1.276.265	1.490.208	2.900.400
Kazakhstan	421.032	513.394	741.313	1.635.086	2.483.075
Brazil	183.527	481.042	608.775	2.044.428	1.933.427
Hungary	291.783	476.049	756.906	1.636.071	1.855.557
Pakistan	579.872	817.279	1.247.384	1.331.729	1.738.998
Belgium	406.758	590.414	627.938	955.970	1.418.398
Italy	516.872	576.990	640.850	783.732	1.235.182
United Kingdom	549.288	649.637	554.552	746.580	1.117.467
World	36.009.771	44.585.839	51.913.148	79.283.905	108.542.060

Source: www.fao.org, FAO Statistical Yearbook 2010.

**Table 3.** The main importing countries (by 6 main crops), 1999-2008

COUNTRIES	(US\$ '000)				
	1999-2001	2003-2005	2006	2007	2008
Japan	3.753.506	4.721.895	4.729.272	6.636.852	10.366.315
Mexico	1.642.497	1.929.275	2.442.928	3.106.248	4.563.281
Korea, Republic of	1.509.461	1.973.381	2.073.722	2.854.524	4.370.049
Iran, Islamic Republic of	1.397.523	884.016	785.122	1.069.568	4.054.894
Saudi Arabia	1.077.861	1.523.270	1.978.735	3.266.150	4.040.148
Spain	949.182	1.786.860	2.015.545	3.106.985	3.884.051
Algeria	990.848	1.310.094	1.385.953	1.829.017	3.623.707
Netherlands	873.582	1.278.531	1.588.185	2.780.442	3.584.093
Italy	1.317.013	1.771.605	1.893.495	2.803.324	3.523.666
Egypt	1.268.680	1.290.307	1.550.840	2.541.672	3.509.878
United States of America	994.594	913.042	1.218.715	1.734.667	2.934.005
China	1.627.809	2.661.436	2.150.668	2.229.982	2.831.137
Germany	622.985	928.210	1.102.182	2.039.088	2.754.144
Belgium	818.122	1.100.685	1.199.962	1.957.414	2.701.933
Brazil	1.284.900	1.174.551	1.491.186	2.007.410	2.672.114
Indonesia	1.219.599	1.125.625	1.372.348	1.985.046	2.471.205
Morocco	686.439	728.998	614.152	1.727.639	2.253.767
Turkey	324.383	468.515	167.492	973.273	2.137.842
Malaysia	625.803	732.952	975.821	1.315.944	2.009.613
United Arab Emirates	462.214	434.667	657.931	971.601	2.007.471
Iraq	931.035	749.549	1.090.419	1.147.005	1.915.482
United Kingdom	722.027	842.312	878.946	1.343.258	1.732.320
Colombia	411.536	605.582	868.657	1.192.858	1.654.349
Philippines	628.627	705.927	1.150.867	1.393.966	1.581.808
Yemen	278.825	433.861	587.125	910.127	1.320.004
France	457.365	581.662	560.847	978.804	1.286.437
Tunisia	293.005	353.040	433.234	932.034	1.216.742
Portugal	435.146	571.368	599.487	863.481	1.176.326
Peru	339.752	440.716	523.939	817.275	1.159.319
Venezuela	317.355	364.041	417.870	564.947	1.156.435
Canada	339.287	471.371	451.726	732.708	1.035.639
World	40.467.071	50.482.238	58.660.047	85.187.634	120.091.261

Source: www.fao.org, FAO Statistical Yearbook 2010.

The economic impact of regional integration can largely be classified under two categories: static and dynamic impacts. Two of the impacts are static: one is a trade creation effect, which argues intra-trade expansion due to the removal of trade barriers within the regions (GL index of Intra-Industry) and the other is a trade diversion effect, which argues that imports of efficient production from outside regions would be replaced by imports from inside regions (The dissimilarity indexes of specialization (DSR) and concentration (DCR)).

GL index of Intra-Industry (WOLFMAYAR-SHNITZER, 1998; BRUNHALT, 2001) - The size of intra - industry trade indicates the extent of the economic integration of one country. To this effect, we use in our analysis the Grubel-Lloyd (On theoretical considerations concerning intra-industry trade and the Grubel-Lloyd index, respectively, see [14, 15,26].

The dissimilarity indexes of specialization (DSR) and concentration (DCR) [4, 16, 20–21]. The main indexes we use in our research are Indicators of regional specialization and geographical concentration of

industry (The indicators used in this paper to analyze regional specialization and concentration of industries are defined in a way that is similar to [4].

The overall welfare impact of trade liberalization will be a result of complex interactions that include both effects. Those indexes concern the substitution of goods between internal and external markets. Reductions in the price of imported goods from certain economies - for example, those due to a bilateral FTA - could lower the average price of imported goods from the world market. This would stimulate the aggregated imports of those goods from abroad, substituting domestic products. On the other hand, it concerns the source of generic substitutes among different origins of economies. Removal of the tariff on imports from certain economies would stimulate those imports to substitute those from the other economies. The overall impact on the imports from outside regions would be determined by the relative significance of these two substitution effects. In fact, it is estimated that imports from outside regions would often increase in certain sectors.

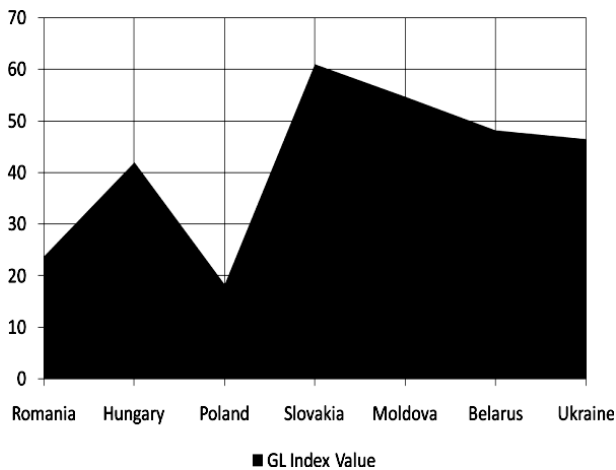


Fig. 1. GL Index of intra-industrial trade

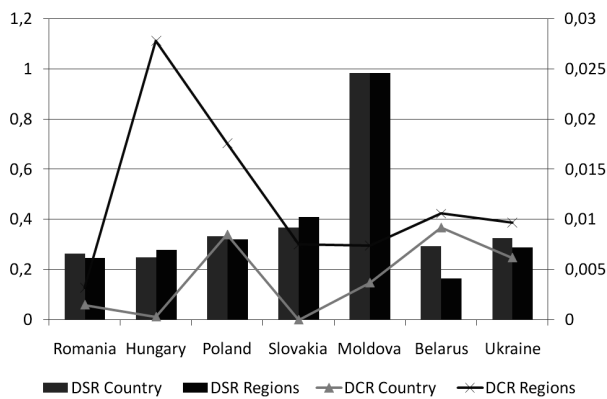


Fig. 2. The dissimilarity indexes of specialization (DSR) and concentration (DCR), 2000 - 2004

Regional specialization and geographical concentration of industries are defined in relation to production structures (Overviews of different measurements for specialization and geographic concentration of industries include [5,6]). Our research shows the important role of agriculture in economic development in all contributed countries. For some of them (such as Ukraine, Poland, Slovakia and Moldova) this is one of the most important branches. The manufacturing structure of all region is 'highly specialized', where a small number of industries have a large combined share in the total manufacturing.

Other side of the position of Ukraine at the European market is competition between producers, processors and traders. Increasing competition from the European companies definitely will lead to strong pressure on the Ukrainian agricultural industry. It can stimulate to modernize and improve production technologies. It can caused substantial reductions in employment in agriculture but increase employment in processing. In such case The Ukrainian agricultural industry will then be able to produce much more for lower prices with less input.

Modernizing Ukrainian agriculture also has the positive social impact of improving the quality of work, working conditions and possibilities for self-employment through entrepreneurial activities in Ukraine's rural areas.

Wage increases and – in the long run – modernization of the agricultural sector will increase the disposable incomes of workers in rural areas and thus have a negative impact on the GINI coefficient (i.e. a positive effect on income equality). Whether the overall FTA impact will lead to converging incomes depends also on the FTA effects in the industrial and service oriented sectors.

An increased variety of food products, possible increases in fruits and vegetables production and better quality of food (because of higher SPS standards) are likely (in the longer run) to affect positively public health. The increase in income is correlating as well with better eating habits and a rise in the consumption of fruits and vegetables. Better health and safety standards are also likely to enhance the public health. Similarly the FTA is expected to include provisions aimed at improving the working conditions of the employees together with better equipment and new technologies. It will take time to adopt the new SPS and safety standards, so these effects would be long term effects. Improvements in the education level of the agriculture workers and producers are also expected with the implementation of new standards. The strength of these social impacts depends, of course, on the courage and decisiveness with which the FTA is implemented.

Labor migration out of the rural areas is a phenomenon that is currently happening. The FTA is likely to have negative effects on labour migration especially in the short run, with possible offsetting effects of rising earnings in the longer run. In the short run, transitional unemployment in agriculture will lead to the unemployed reallocating themselves to other sectors of the economy, i.e. construction or transport. This may also lead to geographical migration from rural areas to the cities. At the same time, many of the unemployed will not have an opportunity to leave their places of residence, which may – in the short run – aggravate the poverty problem in rural areas. These trends should be of concern to the government and FTA in developing a strategy and negotiate policy provisions to alleviate poverty and generate employment in rural areas.

Agriculture is an important economic sector for most East-European countries. Such countries as Romania, Hungary, Poland, Slovakia, Moldova, Belarus and Ukraine heavily depend on the level of agricultural production and rural development in the structure of the economy. Some of these countries produce similar types of agri-food products and, therefore, compete in the European and World markets. In addition, most of these countries have a similar structure of agricultural

production, and similar educational levels among employees in agriculture, percent of rural population, and government programs implemented in the last ten years. However, nearly every country has unique characteristics concerning agricultural production and place within the world market.

We expect that our results will be conducive to determination of the most efficient production patterns according to regional specifics and specialization. During the last 10 years, the level of specialization in different countries has changed in different directions. The new members of the EU start to differentiate the structure of the economy. On the contrary, Ukraine, Moldova and Belarus change the structure of their economies not so fast and continue to consider agriculture as one of the main sectors. On one hand, this tendency is quite negative relative to the pace of development of the neighbouring countries. On the other hand, the agricultural specialization gives Ukraine the chance to become a big player in some segments of the world market (cereal, corn, rapeseeds, etc.) and use the actual tendencies in the world market for own development of agriculture and rural areas based on business opportunities (as opposed to the supported agriculture in Europe).

Ukraine has its own commodities and market shares at the European and World markets and has very favorable conditions to improve its position. We have also obtained some positive trends in agricultural specialization of Ukraine relatively to its main competitors – neighboring countries (including Post-Soviet countries). Our research also shows that as far as long-term trends in comparative advantage are concerned, Ukraine will have a larger advantage in the production of unprocessed products (wheat, corn, sunflowers, rapeseeds, sunflower oil and rapeseed oil). Regional specialization of the Ukrainian agriculture heavily depends on the level of employment (in some regions more than 30% of capable people employed in agriculture) and on the historical trends (in some regions agriculture is the main industry, but GDP is extremely low). The same tendencies we observe in the other analyzed countries (Romania and Poland), but in Ukraine they are less observable than in other post-Soviet countries (Belarus and especially Moldova). Finally, as Ukraine is a large country with substantial differences in regional conditions, it would be useful to conduct the competitiveness analysis with regard to regions.

#### FOOD SECURITY INDICATORS

Ukraine has also developed standards physiological needs of the population of Ukraine in key nutrients and energy. Equally important are indicators of food security, quantitative and qualitative description of the state, dynamics and prospects for physical and economic

access to food for all social and demographic groups, the level and structure of consumption, quality and food safety, durability and degree of independence of domestic food market, level of development of agriculture and related industries, as well as effective use of agricultural natural resources.

Methods of calculation the key indicators of food security approved by the Cabinet of Ministers of Ukraine. Mentioned resolution provides that the indicators characterizing the state of food security calculated by the following major food groups: bread and bread products, potatoes, vegetables, melons, fruits, berries and grapes, sugar, oil and meat.

##### *Indicator 1. Sufficiency of public stocks in grain.*

As of 31.12.2010 the actual availability of food grains in the public intervention fund was 1,105 tons, the amount of average annual domestic consumption of bread in terms of grain, according to statistics, amounted to 6,803 tons. Accordingly, the indicator was sufficient grain supplies 16 percent, despite the fact that the Law of Ukraine "On State Support of Agriculture of Ukraine" stipulates that public intervention fund in 2010 should be kept 20 percent of domestic consumption of grain [10].

##### *Indicator 2. Determine the daily energy value of human diet.*

In 2010 the average daily nutritional intake was 2933 kcal Ukrainian, almost 17.3 percent higher than the average rational criterion -2500 kcal., But compared to the year 2009 caloric value for population of Ukraine is still decreased by 0.4 percent. Thus, as in previous years, the bulk of calories consumed with the Ukrainian plant production. Instead, 27.6 percent of daily ration provided by consumption of animal products, and is almost 2 times lower than the established threshold criteria - 55 percent (as reference – in USA the recommended structure of “daily plate” is 45 % of animal production and 55 % - plant production).

In addition, the U.S. experience shows the need for a differential approach to the installation of energy intake. Specialists - nutritionists U.S. in 2010 were made by calculating the number of calories needed to maintain energy balance of different gender - age groups at three different levels of physical activity.

##### *Indicator 3. Sufficiency of the specific product consumption.*

The optimal situation is when the actual food consumption throughout the year meets the rational norm, ratio between the actual and reasonable consumption is equal to one.

In 2010 in Ukraine by the majority of main food consumption was found below the actual rational norms. Most lag the actual consumption of rational observed on fruits, berries and grapes - by 47 percent, milk and dairy products - by 46 percent, meat and meat products - by 35 percent, fish and fish products - by 27 percent. Despite lagging the actual consumption of certain food groups from rational norms, last year was marked

increase in consumption of vegetables and melons Ukraine - by 6.4 kg of meat and meat by 2.3 kg per capita and consumption eggs and egg products for the first time since independence Ukraine has reached the level of rational norms - 290 pieces per person.

Of particular concern is the preservation of the trends of previous years to a reduction of average consumption of milk and milk products from 212.4 kg in 2009 to 206.4 kg in 2010 at a rational rate of 380 kg per person per year. The reasons for this are long-term crisis

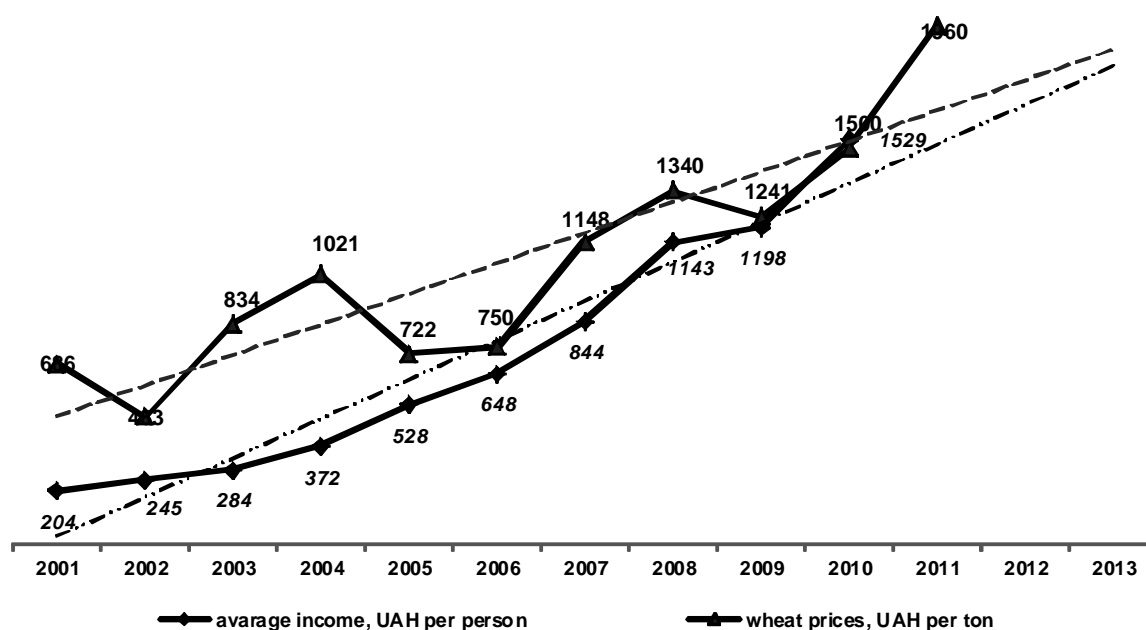
in the domestic livestock industry, especially milk, which has led to shortages of raw milk ratio in the domestic market.

Over the three food groups, namely: "bread and bread products", "potato", "vegetable oil all" actual consumption exceeded rational norm (Table 4). However, such an excess of these groups is evidence of imbalance in food nutrition, which tries to ensure its energy needs through more affordable products.

**Table 4.** Sufficiency of the specific product consumption, kg per capita / year

Food	Rational norm (calculated MH of Ukraine)	Actual consumption in 2010	Adequacy indicator of consumption	reference: actual consumption in 2009
Bread and bread products	101,0	111,3	1,10	111,7
Meat and meat products	80,0	52,0	0,65	49,7
Milk and milk products	380,0	206,4	0,54	212,4
Fish and fish products	20,0	14,5	0,73	15,1
Eggs (pcs)	290	290	1,00	272
Vegetables and melons	162,0	143,5	0,89	137,1
Fruits, berries and grapes	90,0	48,0	0,53	45,6
Potato	124,0	128,9	1,04	133,0
Sugar	38,0	37,1	0,98	37,9
Vegetative oil	13,0	14,8	1,14	15,4

Source: State Statistic Agency of Ukraine



**Fig. 3.** Comparison of wheat prices and average income in Ukraine, 2001-2011

*Indicator 4. Food Accessibility.*

According to the State Statistics Agency of Ukraine, in 2010, total expenditures of households (average household size in 2010 was 2.59 persons) amounted to UAH 3,072.72\* per month, by 11.6 percent increase against the previous year. Of the total household

spending on food per month 1639.92 UAH against 1,426.1 in 2009.

Thus, the availability of food last year was 53.4 percent while its 60-percent ceiling. To describe the level of accessibility of food we can use the Fig. 2. comparison the level of income in households and wheat prices per ton.

\*1EUR=10.5UAH



Compared to the year 2009 this figure declined by 1.6 percentage points. In the general structure of the cost of food the highest proportion of costs are: meat and meat products - 24 percent (389.76 USD. Of household), vegetables, including potatoes - 15 percent (247.36 USD.), Bread and bread - almost 13 percent (209.9 USD.), milk and milk products - 13 percent (212.79 USD.).

*Indicator 5. Differentiation of the cost of food by social groups.*

In 2010, 20 percent of households with highest income on average spent on food 1942.82 UAH per month, and 20 percent of households with the lowest incomes - 1503.34 UAH. Factor differentiating the cost of food by social groups was 1.29 against 1.38 in 2009, during the study period was a slight decrease in the differentiation of social groups in terms of food costs. At the same time during the year increased the number of persons in the lowest quintile from 11.4 million to 11.7 million, and in the highest quintile number of people declined (Table 5).

The indicator of the domestic market capacity is calculated as the average annual consumption of certain products and the average population, and is an important element for making up the demand and supply of food

and determination of independence for individual products. Compared with the previous year in 2010 was a noticeable increase in capacity of the internal market in four groups of food, "meat and meat products" - by 4.1%, "eggs" - by 6.2%, "vegetables and melons" - by 4.3%, "fruits, berries and grapes" - by 4.9 percent (Table 6).

However, the reduction of average consumption has reduced the capacity of the internal market in five major groups of food, namely, by group, "bread and bread products", "milk and milk products", "fish and fish products", "vegetable oil" and "sugar" The negative trend of the past year is a reduction in the diet Ukrainian those types of food consumption are behind the rational norm (dairy and fish products).

*Indicator 7. Food independence for separate product.*

Meeting the needs of the population in food, the extent of its purchasing power in 2010 as in previous years, carried out mostly by domestic production. The most vulnerable positions in terms of import dependency positions are "fish and fishery products", "fruits, berries and grapes," "vegetable oil of all kinds," the share of imports from these groups in the total consumption respectively of 71.6, 51.3 and 46,9 percent at a 30-percentage threshold criteria for this indicator (Table 7).

**Table 5.** Differentiation of the cost of food by social groups groups(average kilo / month / person)

Item	Consumption by quintile(20%) groups depending on the size of total income		Value of higher and lower quintile
	the first quintile (lower)	the last quintile (higher)	
Bread and bread products	8,40	9,65	1,15
Meat and meat products	3,55	7,10	2,00
Milk and milk products	14,00	25,55	1,83
Fish and fish products	1,30	2,35	1,81
Eggs (pcs)	17,40	22,25	1,28
Vegetables, potato, mushrooms	13,15	17,45	1,33
Fruits, berries and grapes	3,65	8,00	2,19
Sugar	2,45	3,60	1,47
Vegetative oil	1,55	2,00	1,29

Source: State Statistic Agency of Ukraine

**Table 6.** Market capacity of individual products, thousand tons

Item	Market capacity		2010 in% by 2009
	2010	2009	
Bread and Bread products	5105,9	5145,1	99,2
Meat and meat products	2384,0	2290,0	104,1
Milk and milk products	9469,8	9780,1	96,8
Fish and fish products	667,0	696,8	95,7
Eggs(millions pcs)	13279,6	12503,6	106,2
Vegetables and melons	6581,3	6311,8	104,3
Fruits, berries and grapes	2203,2	2100,7	104,9
Potato	5913,8	6125,8	96,5
Sugar	1704,0	1745,0	97,7
Vegetative oil	680,0	711,3	95,6

**Table 7.** Food independence under a separate product, 2010

Item	Imports of products in 2010 in terms of primary product	Market capacity	The percentage of import-dependence
Bread and bread products	131,6	5105,9	2,6
Meat and meat products	378,0	2384,0	15,9
Milk and milk products	273,0	9469,8	2,9
Fish and fish products	477,6	667,0	71,6
Eggs(millions pcs)	311,0	6581,3	4,7
Vegetables and melons	1130,0	2203,2	51,3
Fruits, berries and grapes	30,0	5913,8	0,5
Potato	90,0	1704,0	5,3
Sugar	319,0	680,0	46,9
Vegetative oil	1,0	428,0	0,2
sunflower oil	428,0	450,0	95,1

Source: State Statistic Agency of Ukraine

*Indicator 6. Market capacity of individual products.*

It should be noted that a significant percentage of imports in the group "all vegetable oil" due to import of tropical oils, which are not produced in Ukraine (palm, coconut oil, etc.), but widely used in the production of food domestic food industry. Meanwhile, the local demand for sunflower oil was provided entirely by domestic production.

Last year, the dependence of the domestic market from imports of fish and fishery products increased by 6.3 percentage points, due to a decrease in fishing and extraction of other aquatic resources in inland waters, the volume of which in 2010 compared with the previous reduced by 14.9 percent.

Significant volumes of imports of fruits and berries fall on exotic types of fruits citrus fruits, bananas and more. At the same time is the growth of imports and of the fruits and berries, which are characterized by growing and Ukraine.

The whole research divided in several stages due to the fact that the study of this particular problem contains different aspects of agrarian economy and various agrarian economy instruments influence on the industry proposition in a separate country, region and in the world. The research is also related to the analysis of resources usage and analysis of economical effects depending on the country's diversification or specialization, along with the estimation of influence of a separate market on the external surrounding.

By the FAO statistics during last few years the four main crops (soybean, rapeseeds, sunflower and corn) cover more than 20 per cent of World arable lands (table 8).

**Table 8.** World area harvested, 2006-2009, by items and total, ha

commodity	2006	% in total	2007	% in total	2008	% in total	2009	% in total
Maize	148340,84	10,07	158358,33	10,75	160814,58	10,92	158628,75	10,77
Rapeseed	27441,40	1,86	29887,78	2,03	30659,71	2,08	31120,57	2,11
Soybeans	95308,37	6,47	90155,97	6,12	96480,63	6,55	99501,10	6,76
Sunflower seed	23975,18	1,63	21280,72	1,44	25031,41	1,70	23716,84	1,61
Wheat	211835,82	14,38	216704,93	14,71	222740,35	15,12	225622,45	15,32
Barley	56373,89	3,83	55730,91	3,78	56281,08	3,82	54059,71	3,67
Total	1472853,00	38,24	1472853,00	38,84	1472853,00	40,19	1472853,00	40,24

Source: www.fao.org, FAO Statistical Yearbook 2010.

As we can see from the table 5, six main crops absorb more than 40 per cent of world arable land in use. It meant that exactly the same crops have to occupy at least 50 per cent in diet. And three of them (maize, soybeans and wheat) take over 33 per cent of arable lands. Another part of this problem appears in usage of crops in animal husbandry, means decreasing of food supply.

Also we still remember that any alternative energy sources program influents to market's demand and supply. On the other hand every country has to provide the energy security as well. Here the most important point is to use the all available resources (water, sun, wind, land, etc.) with the maximum effect.

Here is important to explain the results of table for North Africa and Near East – where the percentage of potential arable land in use more than 100 per cent – we do account the number of natural arable lands without usage of specific equipment (drop irrigation, etc.). Also we can see that the most potential is the South and Central America region, but we have to mention that those territories in agricultural usage can cause damage to ecological balance in the region.

Following the data of World Resource Institute the potential arable land exceeds the actual arable land in use more than three times. It means that land resources can be used for development for further global food balance achievement. It is also important to consider the main World food producers and exporters, as far as both group of countries influent for world food balance.

**Table 9.** Actual and Potential arable land in World

	Total area	Potential arable land	Actual arable land	% of potent. arable land actually in use
Area	'000 km <sup>2</sup>	'000 ha	'000 ha	%
Europe	6806,00	384220,00	213791,00	55,64
North America	19295,00	479632,00	233276,00	48,64
South and Central America	20541,00	1028473,00	143352,00	13,94
North Africa and Near East	11545,00	49632,00	71580,00	144,22
North Asia	20759,00	297746,00	175540,00	58,96
Sub-Saharan Africa	24238,00	1109851,00	157608,00	14,20
Asia and Pacific	28682,00	777935,00	477706,00	61,41
World	131866,00	4127489,00	1472853,00	35,68

Source: <http://www.wri.org/publication/content/8426>

## CONCLUSIONS

In modern conditions of social development, financial and food crisis, level of agri-food production doesn't depend on renewable energy. But in nearest future this problem became to influence for food supply. So we have to evaluate the necessity of increasing the number of arable lands and balance the production of crops for food and for energy production. The main resources have to be used accordingly to the interest of country and region, but also considering the global stability.

For Ukraine it is extremely important to run own agricultural policy basing the principles of political trust, macroeconomic stability, sustainable agri-food production, infrastructure and stable trade policy.

In the longer run the present situation will most likely have a positive effect on the level of earnings in the sector. This might keep the agricultural workers from migrating to other regions or sectors. As a result, working conditions of those employed will also improve which is another reason for not migrating. The restructuring of Ukraine's agriculture – that has already been initiated and will be further encouraged – can be seen as a necessary phase in Ukraine's transition and development that involves – often painful – adjustments for industries, regions and/or groups of people. Mitigating measures and development plans have to address these issues to bridge the gap between the short run pains and long run benefits.

There may be no economies that absolutely satisfy the condition of a "small" country assumption in a standard trade model. The terms of trade effects are relatively significant for determining the overall welfare improvements in partial trade liberalization like that from a bilateral FTA.

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