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# Socio-Economic Transformations in Ukraine towards the Sustainable Development of Agriculture

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**Abstract:** The social and economic conditions of all market participants are incentives and constraining factors influencing the levels of food, social, economic and ecologic security. The purpose of the article lies in the presentation of the author's concept of the social and economic conditions where the transformation of economic relations between agrofood market participants is happening—in particular, the livestock products market of Ukraine—and the assessment of the state of food security of the country, as well as a comparison, by the same criteria, of the conditions of agrofood market participants in Ukraine and in four European countries: Germany, France, Italy, and Poland. This research was based on the application of empirical knowledge methods: observation, comparison, description, measurement, statistic methods, etc. So far, the participant functioning conditions in the agricultural market in Ukraine are unfavorable for the sustainable development of agriculture, especially the livestock industry. The debt burden of external creditors is growing, the amount of direct investments from the countries of the world decreases, and the growth of capital investment in terms of calculation per one employee is slowing down. The food security of Ukraine is unstable. The “market” itself is not capable of remedying all the negative phenomena. Therefore, it is necessary to apply the weighted power of the state.

**Keywords:** agrofood market; ecologic security; food security; livestock products; sustainable agriculture; Ukraine; Europe

## 1. Introduction

The speed and abruptness of changes (transformations, metamorphoses) in the market conditions of all markets' economic agents results in discord in the development of both economic relations between their members and the whole social and economic system of each country. This is particularly related to the development of the agrofood market—in particular, the livestock products market; the participants of economic relations, of which are agricultural products producers (households of all the categories); food processing enterprises (meat and milk); the representatives of wholesale and retail trade; population (as an end consumer, as an agrofood sector employee, and as a rural community); and the state (as a guarantor of food, social, economic, and ecologic security). The livestock products

market participants' efficiency regulates the food, social, economic, and ecologic security of any country. Ukraine is not an exception.

Economic relations are inseparably associated with the dynamic economic environment, being the totality of economic processes, market entities, and economic relations between them in the unified institutional environment and information field as to the formation of economic activity results. Change in the indicated environment is guided by economic processes and transforms economic relations that, in turn, also impact change in the economic space.

In our opinion, a new notion to achieve the inclusive steady (sustainable) development of social, ecologic, and economic systems shall become the process for the harmonization of economic system elements—in particular, economic relations between the market subjects. The main components of the “harmony” category, discussed in different sciences, make the co-ordination of inconsistent, sometimes contradictory elements or unity in diversity. The economy defines the following features of the stated category: concordance, conformity, consistency, stability, coordination, sustainability, equilibrium, controllability, efficiency, productivity.

We consider harmony as the entire economic category, as a state of system functioning and the interconnection of its elements, with their features being simultaneously a condition, a purpose, and a result of the harmonious existence of the system itself. Economic system harmonization is a process of coordination of interconnections arising between the main elements of the system with the purpose to provide the well-coordinated functioning (in space) and balanced development (in time) of the system itself. It is the disharmonies that activate the formation of different mechanisms for overcoming inconsistencies in future.

Thus, only a systemic, complex analysis of the main social and economic criteria for the market conditions of all markets' economic participants—in particular, the livestock products market—will allow us to discover the problems of discord in the development of economic relations between the indicated participants. At the same time, it is necessary to determine the place of agriculture in Ukraine—in particular, the livestock industry—in the country's economy, and research the criteria of food security and the influence of the livestock industry on the ecological state of the agricultural lands and land uses.

## 2. Literature Review

In Ukraine, the issue of the social and economic system of the state in the context of the food security of the country has been researched by the following authors: Babych M. [1] in “Criteria and indicators of food security at the global level”; Batiuk L. [2] in “Debt dependence and devaluation cycle in the Ukrainian economy”; Karazin V. [3] and Nebrat V. [4] in “Historical dimension of trends in foreign economic policy”; Shcherbyna S. [5] in “An analytical study of the state of food security in Ukraine in the context of the introduction of targeted assistance in food for the poor”; Strashynska L. and Gretska G. [6] in “Main criteria for assessing the food security level of Ukraine and strategic directions to improve it”; Onegina V. [7] in “Marginal product of labour as a criterion of efficiency for labor pricing in agricultural enterprises”. Ukrainian researchers also publish their scientific results as to the state and development of the agrofood market of the country in international publications—namely, the following authors: Samarets N. and Nuzhna S. [8]; Onegina V., Vnukova N., Gusiatsynskyi M., Mayorova T., et al. [9–11]; Chemerys V. et al. [12]; Heldak M. and Kucher A. et al. [13,14]; Kononenko O. [15]; Lavruk V. and Lavruk O. [16,17]; Patika N. [18]; Ostapenko R., et al. [19]. The joint work of Ukrainian and Polish researchers deserves consideration, such as “Relations between Agri-Environmental, Economic and Social Dimensions of Farms' Sustainability” [20] and “Environmental determinants of a country's food security in short-term and long-term perspectives” [21].

Many of the processes of land evolution and transformation are almost imperceptible when viewed over shorter periods [22].

The correlation between agriculture, ecosystems, and the environment was proposed by some authors [23,24] as a new contribution to territorial planning and management. The size of employment

in the industry reflects, among other things, the state of economic development. According to Przybyła et al. [25,26], significant spatial differences, manifested both by the fundamentally different unemployment rate observed in various areas and also the diversified structure of employment in particular economy sectors, are the characteristics of the Polish market as production factors.

A wide range of laws and regulations of different levels was developed in Ukraine and other countries as to the conditions, objectives, and criteria of sustainable development, food security, the development of the agrofood sector of economics, and the livestock industry [27–30].

Such international works are worth noticing: “Sustainable Consumption and Production”, elaborated within the framework of United Nations Environmental Program [31]; “United Nations Transforming Our World: The 2030 Agenda for Sustainable Development” [32]; “The State of Food Security and Nutrition in the World (SOFI) 2019: Safeguarding against economic slowdowns and downturns” [33]; “A Literature Review on Frameworks and Methods for Measuring and Monitoring Sustainable Agriculture” (literature review made under the authority of the Food and Agriculture Organization of the United Nations) [34].

Among contemporary foreign scholars, the issues of agrofood market development are studied by the following Canadian and American scientists: R. Canning et al. [35]; the Polish and Ukrainian researchers, Sulewski R. et al. [20]; researchers from Iran, S. Fallah-Alipour et al. [36]; researchers from Germany, Schoof et al. [37]; researchers from India and China [38,39]; researchers from Bulgaria, Bachev H. and Terziev D. [40]; and many others. Swedish researchers quite deeply study the problems of synergy and compromise for sustainable food production [41]. They also resolve the problems of combination of the ecologic and economically sustainable production of meat and milk products [42] and analyze the risks and possibilities of scaling up yield in organic farming agriculture [43].

Thus, a versatile analysis of research results of different levels aimed at the clarification of factors influencing the sustainable development of the country, including the agrofood market—in particular, the livestock products market—leads to the conclusion that the social and economic market conditions of all the market participants are incentives and constraining factors influencing the levels of food, social, economic and ecologic security.

### 3. Materials and Methods

The purpose of the article lies in the presentation of the author’s concept of the social and economic conditions where the transformation of economic relations between agrofood market participants is happening—in particular, the livestock products market of Ukraine—and the assessment of the state of food security of the country, as well as a comparison, by the same criteria, of the conditions of the agrofood market participants in Ukraine and in four European countries: Germany, France, Italy, and Poland.

The information sources of the data being researched include analytic reports of the representatives of the executive authority in Ukraine [44,45]; data from the State Statistics Service of Ukraine [46]; data from the United Nations Economic Commission for Europe [47]; data from the world and regional statistics on the World Data Atlas platform [48].

The methodology for assessing the harmony of economic relations between the participants of the agrofood market is described in detail in our previous article [49]. In general, the research was based on the application of empirical knowledge methods, including observation, comparison, description, measurement, statistic methods, etc., which were used to get current knowledge about structural and dynamic events in the development of economic relations between the livestock products market participants. Namely, using the indicated methods, the following stages of scientific work have been completed; the market conditions of the participants have been studied by analyzing the main social and economic criteria of Ukraine and the place of the agriculture—in particular, the livestock field—in the country’s economy. The received Ukrainian criteria indicators have been compared with such countries as Germany, France, Italy, and Poland. The unified economic environment was determined where all the agrofood market participants (subjects) function; the system of criteria of the social,

economic, and ecologic assessments of the level of food, social, economic, and ecologic security of the country has been formalized.

The work stages have been as follows:

- identification of the research problem and outlining the area of research;
- concept analysis of the literature;
- research on economic growth in the harmony and harmonization of economic relations categories and the internal definition of categories;
- description of dynamics in key parameter changes of food, social, and economic and ecologic security;
- comparison of the social and economic conditions of the economic management of agrofood market participants in Ukraine with such countries as Germany, France, Italy, and Poland;
- justification and proposal as to the further development of the livestock market in Ukraine;
- generalization of conclusions.

#### 4. Results and Discussion

The analysis of the existing economic environment of Ukraine in the context of the agrofood market development will help substantiate the mechanisms of the harmonization of relations between agents of the same market—in particular, their interests, which are often contradictory. Thus, over nine years (2010–2018) and comparing the last year with the year 2010, we can see the following changes (Table 1): the resident population of Ukraine has been decreasing annually by 400 thousand people on average to 42 million (as of 1 January 2019); the size of the gross domestic product (GDP) in per capita terms makes 84.2 thousand hryvnias, which has been increased by 3.4 times for the period of research; the size of the purchasing power parity GDP per capita, as a measure to manufacture the products in US dollars of the constant purchasing power and level out the influence of inflation processes, has been somewhat increased, but the rate of growth makes it 20%, to the level of 9287 USD per person. In Germany, this indicator makes 52,386 USD and the growth rate is +29%; in France—45,893 USD (+23%); in Italy—39,676 USD (+14.1%); in Poland—32,005 USD (+51.8%). The unemployment level in Ukraine slightly overcomes the average European level and makes 8–9% against, for example, 3.4% in Germany, 9.1% in France, 10.6% in Italy, and 3.8% in Poland. The positive phenomenon is the increase in the average monthly nominal salary of staff employees in Ukraine by almost 4 times in hryvnias up to 8865 Ukrainian hryvnias (UAH) in 2018 or only by 15.5% in US dollars up to 326 USD. By the information of the Ministry of Finance of Ukraine, the average salary in the Eurozone countries (those which have the euro as their currency) was 1868 EUR per month, or 2127 USD or 55,536.09 UAH (Ukrainian hryvnias) [1,45].

At the same time, the remuneration level in Ukraine by the types of economic activity (within the framework of the agrofood complex) ranges from 64% of the country level in agriculture to 114% in industry. It is worth noticing that there is some approximation of the stated indicator in 2018 to the country level. Thus, in agriculture the average salary made 81% of the country level; in industry, it made 109 %; in particular, in the food industry it made 94%; and in wholesale and retail trade it made 106%.

As to the investment climate, it is worth noticing that the absolute size of the direct investment from the world countries into the Ukrainian economy for 9 years decreased by 20%, and compared to 2014 it decreased by 1.7 times (from 54 to almost 32 billion USD). Instead, we can observe an increase per one employee by 7% up to 5.4 thousand USD. In particular, in agriculture it increased by 14% up to 1.1 thousand USD; in the food industry, it increased by 1.8 times up to 8.5 thousand USD; in trade, it increased by 1.4 times to the level of almost 5 thousand USD of direct investment per one employee. Such increases happened due to the major decrease, namely by quarter, in the number of employees of all industries, without exception for the types of economic activity of the agricultural sector of economics. Thus, for 9 years the number of employees in the country has decreased by 2 million

people. In particular, in agriculture it decreased by 184 thousand people; in industry, it decreased by almost one million employees; particularly in the food industry, it decreased by 95 thousand people; in trade, it decreased by 207 thousand employees.

**Table 1.** Dynamics of the market conditions of the agrofood products market participants of Ukraine by the social and economic criteria.

Criterion	The Meaning of the Criterion of the Market Conditions by Years						Changes: 2018 in % Compared to:	
	2010	2014	2015	2016	2017	2018	2010	2016
1. The number of resident population (by the end of the year), mln. of people	45.6	42.8	42.6	42.4	42.2	42.0	92.1	99.1
2. The purchasing power parity (GDP) per person UAH (Ukrainian hryvnias)	24,429	36,904	46,413	55,899	70,210	84,190	344.6	150.6
USD (on the grounds of purchasing power parity) <sup>1</sup>	7709	8 756	8 014	8330	8 741	9287	120.5	111.5
3. The part of government and guaranteed government debt in GDP, %	39.9	70.2	79.4	81.0	71.8	60.9	+21.0 p.p. <sup>2</sup>	−20.1 p.p.
4. The government debt of Ukraine per person UAH (Ukrainian hryvnias)	9478.8	25,714.1	36,905.6	45,513.2	50,750.6	51,634.0	544.7	113.4
USD	1194.5	2163.3	1689.5	1781.2	1908.2	1898.3	158.9	106.6
5. Average monthly nominal salary of full-time employees: UAH (Ukrainian hryvnias)	2 239	3 480	4 195	5 183	7 104	8 865	395.9	171.0
USD	282.1	292.8	192.0	202.8	267.1	325.9	115.5	160.7
including by the types of economic activity in percent to the level across the country, %								
agriculture	63.9	71.1	74.9	75.6	81.1	80.8	+17.0 p.p.	+5.3 p.p.
industry, total	114.8	114.6	114.2	113.9	107.4	108.7	−6.1 p.p.	−5.2 p.p.
where the manufacture of food, drinks and tobacco	95.5	95.9	99.7	100.0	95.1	94.1	−1.4 p.p.	−5.9 p.p.
wholesale and retail trade	83.8	98.8	111.8	112.1	107.4	106.1	+22.2 p.p.	−6.0 p.p.
6. Actual salary index, %	110.5	86.5	90.1	109.0	119.1	112.5	x	x
7. Unemployment rate (ILO methodology), %	8.1	9.4	9.1	9.3	9.5	8.8	+0.7 p.p.	−0.5 p.p.
8. Direct investments from the countries of the world into the economics of Ukraine: total, billion USD	39.8	53.7	38.4	32.1	31.2	31.6	79.4	98.4
per one employee, USD	5082.0	8671.7	6638.3	5621.8	5465.0	5441.3	107.1	96.8
including by the types of economic activity per one employee, USD:								
agriculture	938.2	1303.5	1083.6	860.8	1050.3	1070.5	114.1	124.4
industry, total	5391.0	7308.5	5540.9	4562.6	4512.1	5040.0	93.5	110.5
where the manufacture of food, drinks and tobacco	4604.7	9238.7	8470.7	7740.8	7851.4	8542.6	185.5	110.4
wholesale and retail trade	3588.0	6853.0	6709.2	5748.7	5257.4	4918.5	137.1	85.6
9. Capital investments per one employee, thous. UAH (Ukrainian hryvnias)	24.1	35.4	47.3	62.9	78.5	99.6	413.0	158.5
including by the types of economic activity:								
agriculture	17.5	34.6	58.3	96.4	129.2	136.6	781.8	141.7
industry, total	18.4	35.6	39.1	54.3	66.9	95.6	519.2	176.0
where the manufacture of food, drinks and tobacco	20.7	38.6	42.4	68.1	58.7	93.6	451.3	137.3
wholesale and retail trade	15.5	20.9	23.0	32.8	34.7	51.4	331.1	156.6

Note: <sup>1</sup> the size of the purchasing power parity GDP per capita in USD by the information of the International Monetary Fund. URL: World Economic Outlook (WEO), April 2020. <sup>2</sup> p.p.—percentage points; source: author's calculation according to the information of the State Statistics Service of Ukraine [46].

The amount of capital investment per one employee in 2018 ranges from 51 thousand UAH in the field of trade (which has increased by 3.3 times over 9 years) to 137 thousand UAH in agriculture (increased by 7.8 times). The average country level makes almost 100 thousand UAH of capital investment per one employee, which has increased since 2010 by 4.1 times. Although, if the analysis of the increase rates of the capital investment amount is made in terms of USD, we will observe an increase rate of only 20%—in particular, in agriculture by 2.3 times, in the food industry by 31%, and in trade we will observe a decrease only of 3%.

As to debt burden, we can observe an increase in the state debt amount in the percent of GDP from 40% (2010) to 81% (2016) and 61% in 2018, which exceeds the border level of the country debt security indicator and evidences the dynamic decrease in the country debt security level. In absolute numbers, the state debt for 9 years increased by 5.4 times in national currency up to 51.6 thousand UAH per one person or by 1.6 times in foreign currency, namely up to 1898 USD per person. Therefore, the increase rate of the state debt per capita substantially exceeds the rate of GDP and salary increase in Ukraine.

Summarizing the dynamics of the participants management conditions on the agricultural market of Ukraine by social and economic criteria, we can state that the decrease in the number of potential consumers in the country (population), their low purchasing capacity, further industry division by income, decrease in the direct investment flow from countries across the globe due to the serious inflation level, and the accumulation of debt burden do not allow the subjects (participants) of the indicated market to create harmonious relations, which are the key factor of sustainable development of the country on the inclusion basis.

Batiuk L. stresses that “... The dynamic of the payment balance status of Ukraine evidences that the debt load exceeds the admissible limits. Such phenomenon against the production decrease puts Ukraine into dependence from the external crediting. Financial stability that considerably depends on the amount of currency proceeds of the country, is significantly weakened as a result of loss of industrial manufactures of the eastern regions of Ukraine. But despite the indicated facts monetary policy of the government continues the course for accumulation of external loans” [2]. Such policy, in the author’s opinion, will inevitably result in considerable losses both in economic and political aspects. Thus, the debt policy in Ukraine needs transformation in accordance with the national interests.

As early as 1812, the Ukrainian educator, scientist, and inventor V. Karazin (the founder of Kharkiv National University in Ukraine) cautioned against the danger of financial and credit policy with a focus on the debt financing of budget deficit and external investment sources. “The debt generates debt, it is a great truth concerning both individuals and the whole countries” [3]; p. 26. The scientist substantiated the provision that the only reliable means to strengthen the rate of the national monetary unit and the country’s position in external economic environment is the development of proprietary manufacture, external trade policy, and institutional reforms with the aim to activate the internal factors of economic progress [3]; p. 235. Herewith, the scientist gave the active role in the development of national agriculture and industry to the state itself—in particular, its protection policy against foreign competition [4]; p. 154.

The program for national state construction and modernization developed by F. List was grounded in the complex of economic development measures that included and activated, primarily, internal productive forces.

Today, almost two centuries later, Nebrat V. stresses that “protectionism and liberalism have to equally serve the decision of economic development tasks and elevation of national well-being” [4]; p. 165.

The next task for our research is the determination of the place of agriculture—in particular, the livestock industry—in the country’s economy (Table 2).

**Table 2.** Dynamics of the agriculture share in the economy of Ukraine by social and economic criteria.

Criterion	The Meaning of the Criterion by Years						Changes: 2018–2010 +, –
	2010	2014	2015	2016	2017	2018	
1. Rural population share in the entire population of the country, %	31.6	31.2	31.1	31.1	31.0	30.9	–0.7 p.p. <sup>1</sup>
2. Share of agriculture in GDP, %	7.4	10.2	12.1	11.7	10.2	10.1	+2.7 p.p.
3. Share of agriculture in gross value added (GVA), %	8.4	11.7	14.2	13.8	12.1	11.9	+3.5 p.p.
4. Share of livestock products in agriculture gross production, %	36.1	29.3	29.7	27.3	28.0	26.3	–9.8 p.p.
5. Share of households in the production of livestock products, %	61.2	54.5	54.5	54.4	54.2	52.5	–8.7 p.p.
6. Personnel costs in livestock industry per one person per year thousand UAH (Ukrainian hryvnias)	21.3	40.9	49.6	56.0	73.5	95.5	by 4.5 times
in per cent to the level in Ukraine, %	64.4	72.6	74.4	74.7	75.0	78.3	+13.9 p.p.

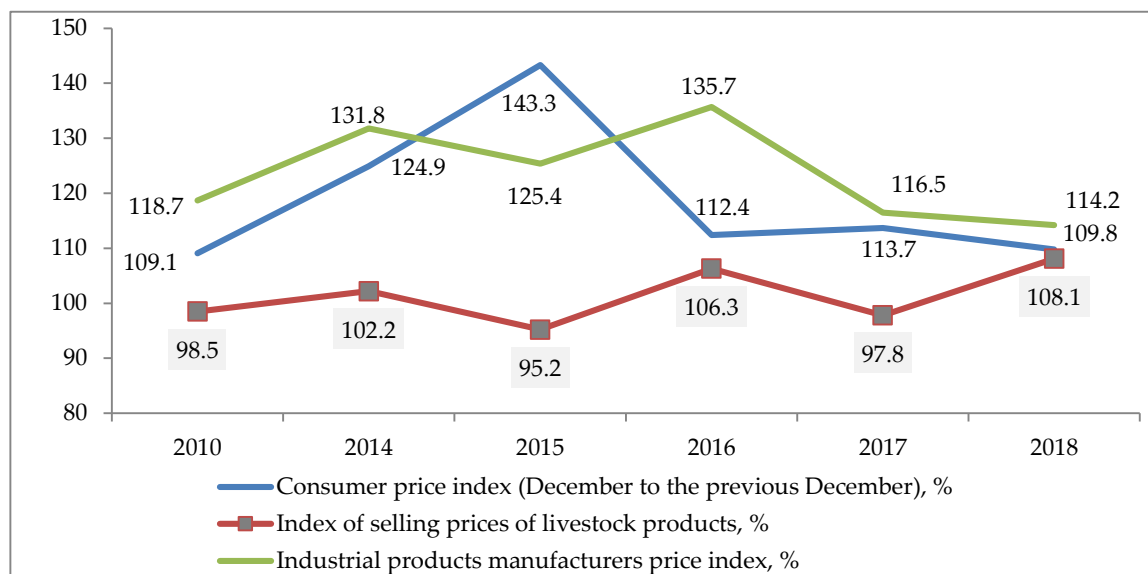
Note <sup>1</sup>: p.p.—percentage points; source: author's calculation according to the information of the State Statistics Service of Ukraine [46].

Thus, 31% of the population of Ukraine, constituting almost 13 million people, are included in the rural population, while in Germany, France, Italy, Poland, and other European countries, from 15% to 25% of the population live in the countryside. The share of agriculture in Ukrainian GDP has increased by 2.7 percent points during the studied period and makes 10.1% of the whole (or 361.2 billion UAH). In Germany, for example, this indicator makes 0.8%; in France, it makes 1.7; in Poland, it makes 2.4; in Italy, it makes 2.2 (2018) [45]. In Ukraine, the share of agriculture in gross value added makes almost 12%, making 360.8 billion UAH.

In relation to the state and weight of the livestock industry, we can observe the increase by almost 10 percent points in the indicated field share in agriculture—up to 26.3%. This phenomenon is negative, as it strengthens destructive processes in the countryside, thus weakening both food and ecologic security due to decrease in socially significant food products manufacturing and decrease in the quality of soils as a result of organic fertilizer production decrease. At the same time, the share of households in livestock products manufacturing has been decreasing up to 52.5% against 61% in 2010, which is a positive trend. However, this share—more than a half—considerably restrains the livestock industry reload and prevents the spread of innovative, high-tech production, as a consequence; we have no increase in the volume of end quality competitive (mainly by price) meat and milk products. We are convicted that the production shall be carried out on the basis of registered business entities.

In our opinion, the important criterion for the social and economic market conditions of the immediate and original producers of livestock products in Ukraine (agriculture producers) is the amount of personnel costs in comparison to the average costs amount throughout the country. This indicator in the livestock field makes only 78.3% of the country level (by way of comparison, it makes 182% in the field of finance and insurance; 161% in the field of information and telecommunication; 143% in the field of state management, defense, and compulsory medical insurance). Thus, there exists a significant differentiation of employees in different fields in the country by income. Although, during recent years, the amount of personnel costs in the livestock industry approximates the average level of costs in the country's economy, the most preferable fluctuation is considered to be from 5 to 10 per cent of the average country level.

The main criteria to evaluate the state of the livestock products market participants shall also include the index of price change, namely consumer price index, industrial products manufacturers' price index, and the index of selling prices of livestock products by agricultural producers (Figure 1).



**Figure 1.** Price indexes dynamics in Ukraine. Source: generated according to the information of the State Statistics Service of Ukraine [46].

As we can see, every year the rate of price increase by the manufacturers of such industrial products as oil products, mineral fertilizers, plant protection means, vehicles, machinery, transport means, etc. (the cost of which includes the original cost of livestock products), systematically overcomes the rate of price increase by the agricultural manufacturers of livestock products. Thus, the industrial products price index ranges from 114.2% to 135.7%, and livestock products price index from 98.5% to 108.1%.

Furthermore, the industrial manufacturers include the representatives of the food processing industry, the price indexes of which are every year bigger than the price indexes of agricultural manufacturers. Such dynamics of the price changes are the primary reason for the gradual decrease in the volume of domestic livestock products manufacturing. As a consequence, we have the following phenomena: the decrease in the consumption volume, which is the issue of food security; the deterioration of the soil quality (the issue of ecologic security); the lack of rural territories development (the issue of social and economic security and Ukrainian identity); and many other negative social and economic phenomena (the issue and national security).

As to the comparison of consumer price index (inflation level), it is worth noticing that, in Ukraine for the whole period being analyzed, the inflation level was not lower than 9%—during the period 2014–2016, it was at the level of 32–43%; in the European countries chosen by us for comparison, the inflation level was not higher than 2.5% (except 3–4% in Poland and Italy during the period 2011–2012, but in the period 2014–2016 the inflation level was equal to 0 or negative).

As to the criteria of food security, it is necessary to study the level of indicated security. Thus, the strategic target of the majority countries of the world as to the food security guarantee lies in the decision of two interconnected tasks. The first is bringing the food consumption in terms of food quantity, quality, and assortment to science-based norms. The norms are classified as necessary for the provision of human organism vital functions are approved by the Decree of the Cabinet of Ministers of Ukraine [29]. The second is the provision of the economic availability of food products in the context of the share of food expenses in the family budget.

For the majority of scientists, the share of food import in the total volume of food consumption is the criterion of food independence of the country [1,6]. However, the share of food export should be studied as well. In accordance with the law of Ukraine, “About food security of Ukraine”, the indicator of food security is the quantity and quality characteristic of the state, the dynamics and prospects of the physical and economic affordability of food for all social and demographic groups of the population,

the level and structure of their consumption, the quality and security of food, the sustainability and the degree of independence of the internal food market, the level of agrarian sector development and the associated fields of economy, as well as efficiency in agrarian natural resources' potential utilization [23]. Therefore, "... the degree of internal food market independence, the level of agrarian sector development ..." is characterized by the share of agrofood export (Table 3).

**Table 3.** Dynamics of the food security state of Ukraine by the social and economic criteria.

Criterion	The Meaning of the Criterion by Years					
	2010	2014	2015	2016	2017	2018
1. Commodity export, total, mln. USD	51,430.5	53,901.7	38,127.1	36,361.7	43,264.7	47,335.0
2. The share of agrofood goods <sup>1</sup> in the total volume of goods export, %	19.3	30.9	38.2	42.0	41.0	39.3
3. Commodity import, total, mln. USD	60,740.0	54,428.7	37,516.4	39,249.8	49,607.2	57,187.6
4. The share of agrofood goods <sup>1</sup> in the total volume of goods import, %	9.5	11.1	9.3	9.9	8.7	8.8
5. Production of livestock products per person per year, % to the rational consumption standard: meat (slaughtering weight)						
milk	56.1	68.6	67.8	68.1	68.3	69.6
eggs	64.5	68.1	65.2	64.0	63.7	62.7
	128.3	157.2	135.2	122.1	125.9	131.7

Note: <sup>1</sup> Agrofood goods: live animals, animal and plant-based products, animal and/or plant fats and oils, ready-made products. Source: author's calculation according to the information of the State Statistics Service of Ukraine [46].

Thus, the share of exported agrofood products in the total volume of the goods export increases considerably from 19.3% (2010) to 42% (2016) and 39.3% in 2018. In Germany, food export makes only 5.3% from the goods export; in France, it makes 12.2%; in Italy, it makes 9%; in Poland, it makes 12.9%. Meanwhile, an optimal, safe, non-critical, share in world practice makes up to 30%. That is why it is essentially important to increase the total volume of export, which is also stipulated by the negative balance of trade of Ukraine.

The agrofood import share ranges within 8–11 per cent, which seems to be not dangerous for the food security of Ukraine. In Germany, this indicator makes 7.7%; in France, it makes 9.4%; in Italy, it makes 10%; in Poland, it makes 8.3%. According to the research of L. Strashynska and G. Gretska, "... according to Keynes J. M., if the import exceeds 20%, the cumulation effect stops, i.e., the field is not able to influence the economy as to its support and growth" [6]. In other words, the food security of the country can be considered secured if the specific weight of domestic agricultural food makes at least 80% of the total volume of consumption.

In our case, if the state government succeeds and the consumption volume is adjusted to science-based (rational) standards as declared in the National Report [27], the domestic meat and milk products manufacturing today covers only 60–70 per cent of such norms. Thus, 30–40% of livestock products shall be imported. Therefore, the danger exists that under certain unfavorable conditions, such import level will transform from supplementing the internal manufacture into the factor narrowing the recreating possibilities of the livestock industry that will potentially result in the industry liquidation.

In Ukraine, by the results of 2018, the share of agrofood products in the total volume of goods makes 8.8% only because the food consumption sufficiency indicator of eight from ten food products is less than 100% (Table 4). Thus, in relation to livestock products, meat and meat products consumption on average comes to 53 kg per one person per year, or 66% of the rational standard of 80 kg; milk

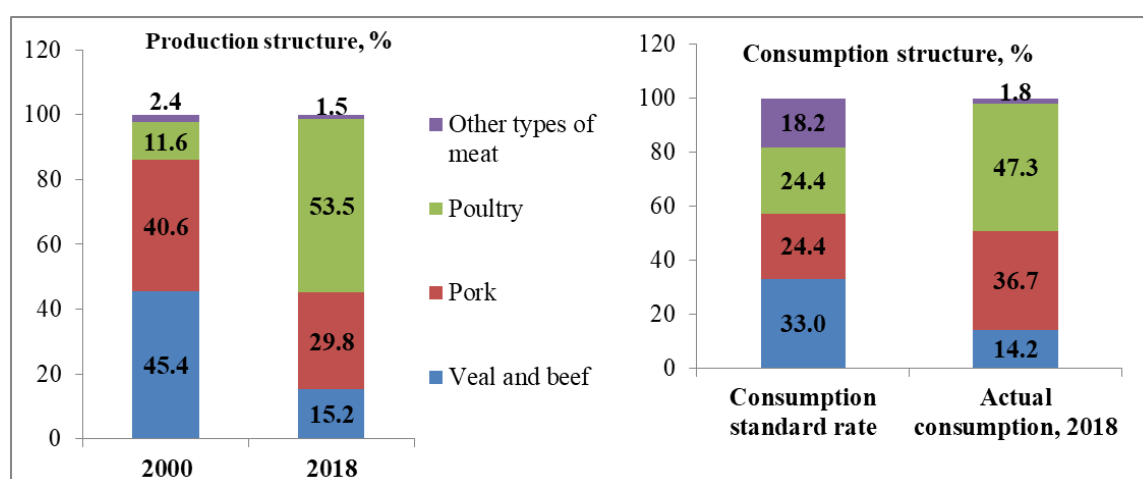
and milk products comes to 198 kg (52%); eggs come to 275 pcs. (94.8%); fish and fish products come to 11.8 kg (59%). Thus, the issue of the underconsumption of the number of food products and, in particular, the problem of their type balancing affects all the population of Ukraine.

**Table 4.** Analysis of food product consumption sufficiency in Ukraine in 2018.

Food Products	Rational Standard, kg per Person per Year	Actual Consumption in 2018, kg per Person per Year	Consumption Sufficiency Indicator, %
Meat and meat products	80.0	52.8	66.0
Milk and milk products	380.0	197.7	52.0
Eggs, pcs.	290.0	275.0	94.8
Bread products (bread and pasta in terms of flour, grains, legumes)	101.0	99.5	98.5
Potatoes	124.0	139.4	112.4
Vegetables and gourds	161.0	163.9	101.8
Fruits, berries and grapes (without processing into wine)	90.0	57.8	64.2
Fish and fish products	20.0	11.8	59.0
Sugar	38.0	29.8	78.4
Oil	13.0	11.9	91.5

Source: generated according to the information of the State Statistics Service of Ukraine [46].

Except for the quantity and quality of food, the important factor of food security is the rationality of food consumption structure—i.e., its assortment. As for livestock products, it is the structure of consumed meat and meat products by types. Thus, by the estimates of experts, the physiological norms of annual consumption of meat by types are as follows: veal and beef—20.3 kg (33%); pork and poultry—15 kg each (24.4% of each type); and other types (lamb and by-products)—11.2 kg (18.2%) (Figure 2).

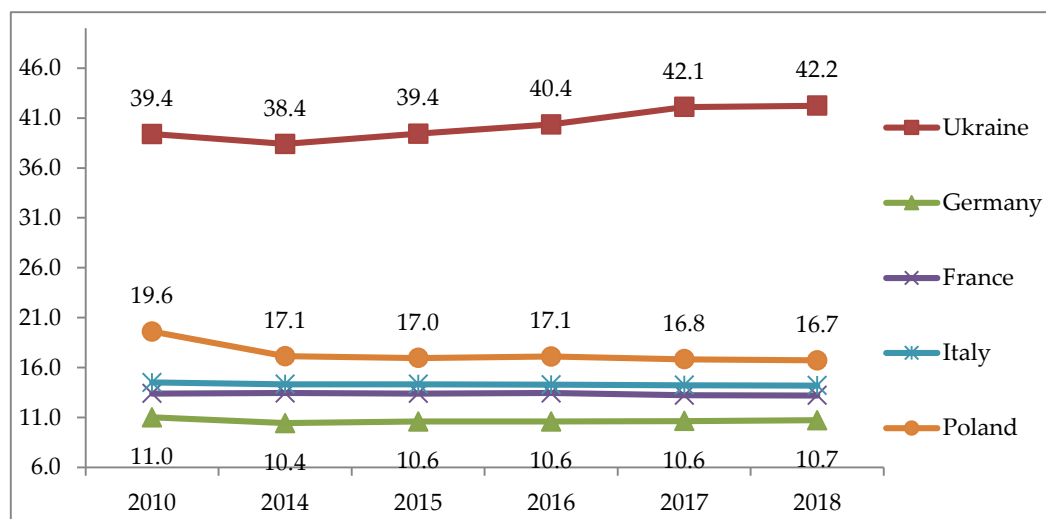


**Figure 2.** Production structure and consumption structure of meat in Ukraine. Source: generated according to the information of the State Statistics Service of Ukraine [46].

For the last almost 20 years, the meat production structure in Ukraine has changed significantly to a substantial increase in the production of economically affordable poultry—i.e., from 12% (2000) to 53.6% (2018). This is the result of a decrease in cattle stock by 2.8 times and, accordingly, veal and beef production by 2.1 times; at the same time, an increase in poultry production by 6.5 times is observed. Thus, for the last analytic year the meat production structure in Ukraine has been as follows: 15%

cattle meat, 30% pork, 53.5% poultry, and 1.5% other types of meat (lamb, goat, rabbit, horse meat, etc.) Accordingly, the consumption range is as follows: 14% cattle meat, almost 37% pork, 47 % poultry, and less than 2% other types of meat.

It should be pointed out that the second task of the food security of the majority of countries is the provision of the economic affordability of food in the context of the food expenses share in the family budget. We will only cite the statistical data of Ukraine and the countries chosen by us for comparison (Figure 3).



**Figure 3.** The average share of food expenses in the family budget of the population of different countries, %. Source: world and regional statistics, national data, maps, rankings [45–48].

We can see that the share of the nutrition expenses in the family budget of an average Ukrainian family makes up to 38–42% and has been growing year by year; the share of nutrition expenses in European countries ranges from 10% to 20%, and this has been gradually decreasing.

Summarizing the research on the state of the social and economic systems of Ukraine in the context of the agrofood market development—in particular, the livestock products market—it should be noted that the harmonization of economic relations between the market participants shall be started from the field of agriculture, namely from its structural transformations.

First, it is necessary to start with balancing the manufacturing structure of gross plant and livestock products by the significant increase in livestock products manufacturing and approaching the proportion of the fields to 50:50 against the actual 74:26 (Table 5).

Second, it is necessary to optimize the production structure by categories through the activation of entrepreneurial activity in the countryside and increase in production volumes by the enterprises, as at the moment almost 53% of livestock products and 37% of the plant industry are manufactured by households using the technologies of the 19th century. In Ukraine, the population economies are the households carrying out agricultural activity, both with the purpose of food self-sufficiency and marketable agricultural products manufacturing. Such manufacturers are not officially recognized as entrepreneurial structures, which is why they are limited in access to state support, market outlets, innovation technologies, production methods, and proper social protection. As a result, they have low competitiveness.

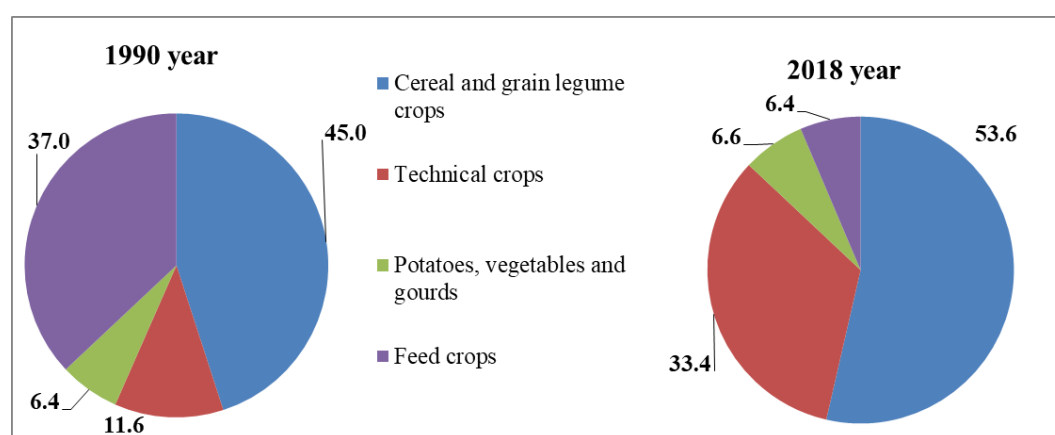
At the same time, it is necessary to increase the share of labor costs in the agricultural products manufacturing expenses structure from 5–7% (2018) to 20% and more. The purpose of such a measure is to approximate the average salary level in agriculture to the average level in the country, which will decrease population division (including urban and rural) by income.

**Table 5.** The structure of agricultural products manufacturing in Ukraine.

Indicator	1990			2018		
	Total	Including:		Total	Including:	
		Plant Industry	Livestock Industry		Plant Industry	Livestock Industry
1. The structure of gross products manufacture, %	100	51.5	48.5	100	73.7	26.3
2. The structure of products manufacturing by household categories:						
agricultural enterprises	70.4	81.1	59.2	58.8	62.8	47.5
households	29.6	18.9	40.8	41.2	37.2	52.5
3. The share of personnel expenses with deduction for social measures in the structure of products manufacture expenses, %	37.8	43.9	32.9	5.7	5.2	6.9

Source: author's calculation according to the information of the State Statistics Service of Ukraine [46].

Third, the consistency of the cultivation areas of the main agricultural cultures is important (Figure 4).



**Figure 4.** The structure of cultivation areas in the agriculture of Ukraine, %. Source: author's calculation according to the information of the State Statistics Service of Ukraine [46].

The production of feed crops in Ukraine in 2018 took only 6.6% of the agricultural land area: technical crops—33.4%; cereal and grain legume crops—53.6%. The share of the cultivated area of potatoes, vegetables, and gourds remains unchanged, at the level of 6–7%. The stability of soils and agricultural lands being the peculiarity of land as a production means is provided only by the ecologically and economically science-based structure of cultivated areas with the observance of crop rotation. As a consequence, we will have promoted ecologic security by preserving the fertility of lands and the sustainable production of agricultural products.

If the manufacturing structure of the gross products approximates the proportion of plant and livestock industries 50:50, then the share of technical crops in the structure of cultivated areas will not exceed 15%, the area of feed crops will make up more than 35%, and cereal and grain legume crops will make up to 45%. The production of feed crops in Ukraine in 2018 took only 6.6% of the agricultural lands area, technical crops took 33.4%, and cereal and grain legume crops took 53.6%. The share of the cultivated area of potatoes, vegetables, and gourds remains unchanged, at the level of 6–7%.

Fourth, the realization of the previous three suggestions will allow us to create an exclusive Ukrainian brand in the world market—village eco-products—and realize the significant bio-energetic potential of rural territories that will considerably increase the GDP and revenues to the state budget of Ukraine and will positively influence the levels of food, social, economic, ecologic, and debt security.

Ultimately, it will fully allow us to use unified, irreplaceable, self-renewable (upon rational utilization) natural resources—agricultural land—making Ukraine the country with the biggest agriculturally used areas in Europe.

Agricultural policy represents one of the methods of state intervention in market mechanisms, which is practically observed in various forms all over the world [50,51]. Nowadays, it results more from the need to counteract undesirable processes related to excessive concentration and land use for non-agricultural purposes [52]. The market economy began to impose new rules of action on farmers and agrifood sector companies and, as a result, on economic categories such as competition, efficiency, and profit [53].

## 5. Conclusions

So far, the participant functioning conditions on the agricultural market in Ukraine are unfavorable for the extended recreation of agriculture, especially the livestock industry. The country's population and the number and quality of the working force is decreasing, and, correspondingly, so is the number of employees. The debt burden of external creditors is growing; the amount of direct investments from the countries of the world is decreasing; the growth of capital investment in terms of calculation per one employee is slowing down; the index of selling prices of livestock products by agricultural producers is lower year to year than the industrial product manufacturers price index and consumer price index.

The food security of Ukraine is unstable. The share of agrofood products in the export commodity structure makes almost 40%. The indicator of food products consumption sufficiency for eight out of ten food products is less than 100%. In particular, the consumption of meat and meat products makes 66% of the rational standard rate, or 53 kg per one person per year, while milk and milk products make 52% (198 kg), and eggs make 95% (275 pcs.). Domestic meat and milk products manufacture covers 60–70% of the rational standard rate of these food products consumption. The structure of meat and meat products by types (assortment) significantly differs from the science-based structure. The actual consumption of poultry makes 47.3% (with a norm of 24.4%), beef and veal makes 14.2% (norm of 33%), and pork makes 36.7% (norm of 24.4%). As to economic affordability, the food expenses in the family budget costs structure in Ukraine reach a level of over 40% against the level of such European countries as Germany, France, Italy, and Poland with 11–17%.

The development of agriculture and especially of the livestock industry is characterized with such deep disharmonies as: the share of livestock products in agriculture for 19 years (2000–2018) decreased from almost 50% to 26%; the share of households in agricultural products manufacturing makes over 40%; more than 52% are in livestock products manufacturing, where 99% produce honey, 73% produce milk, 45% produce eggs, and 40% produce meat; in cultivated areas, only 6.4% of the structure is planted with feed crops; personnel expenses in the livestock industry make 78% of the expenses across the country.

The “market” itself is not capable of remedying all the negative phenomena. That is why it is necessary to apply the calculated weighted power of the state as a representative of the whole community interests.

Thus, the state as a guarantor of food, social, economic, and ecologic security with its institutions shall promote the creation of such levels of consistency, sustainability, coordination, balance, optimal proportion, equability, orderliness, and manageability of economic relations between the livestock market participants that shall be the provision, objective, and result of the inclusive sustainable development of the country.

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