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Role of Processing Industry in Ensuring Food Safety in Uzbekistan and Ways of its Further Development

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Abstract

In this section, the role of the processing industry in ensuring food safety in Uzbekistan is explained in detail. In particular, the dynamics of the volume of agricultural and livestock products grown in the country and their trend of change, the volume and growth rates of industrial products by types of economic activity, and the composition of food industry products were analyzed based on statistical methods. Also, the interaction of these indicators was quantitatively evaluated based on econometric models, and ways of further development of the network were proposed.

Keywords: food safety, food industry, processing industry, food products, agricultural and livestock products.

Introduction

According to the UN Sustainable Development Goals Report 2023, in 2022 the number of global population facing chronic hunger will be 9.2 percent or 735.1 million. established a person. This figure is 122 million compared to 2019. increased per person (due to the pandemic). Also, 29.6 percent of the world's population or 2.4 billion. people experience moderate to severe food insecurity (ie, they do not have access to regular and adequate food) [7].

One of today's global problems - hunger and food security - has certainly not left our country behind. According to data, in 2022, less than 2.5 percent of the population of Uzbekistan will not have the opportunity to eat regularly and adequately. In other words, they faced the problem of hunger and food insecurity. It is noteworthy that the number of people facing this problem in our country has decreased compared to previous years. In particular, their share in the total number of individuals was 18.0 percent in 2001, 5.8 percent in 2010, and less than 2.5 percent in 2012-2022.

However, the above trend does not mean that our country has a guaranteed "sustainable food system" (compared to the world).

According to the Food and Agriculture Organization (FAO) of the United Nations, a Sustainable Food System (SFS) is the sustainable economic, social and environmental foundations for food security and food security for future generations for all. is a food system that ensures food safety and nutrition. There are three main indicators of whether a food system is sustainable or not [8]:

- economic stability is useful everywhere;
- social stability - it brings a wide range of benefits to society;
- ecological sustainability - it has a positive or "neutral" effect on the natural environment.

Therefore, the food industry does not only ensure food safety. Perhaps, it is important to ensure economic, social and environmental stability in the country.

Literature review

Of course, food raw materials have a great impact on the quality of food production, which in turn plays a big role in ensuring food safety.

According to J.Davídek [1], high-quality food can be produced from high-quality raw materials, so cooperation between producers and processors of raw materials should be given serious attention. The main raw materials for the food industry are agricultural products.

As mentioned above, the main raw material for the food industry is agricultural products, and it is no exaggeration to call it the traditional raw material of food. So, what is the non-traditional raw material of food?

According to A. Dabija and others, an important source of non-traditional raw materials that can be successfully used for the production of food products today are secondary products resulting from various technological processes of the food industry [2].

The increase in the level of use of such secondary products in the food industry, in turn, increases the level of danger of food products.

Therefore, the issues of rational use of traditional (natural) raw materials of available food, development of production of food products for general and functional purposes with their use [3].

According to the International Finance Corporation (IFC), the food industry is divided into two sub-sectors [9]:

1) Packaging of food products;
2) Processing of food products (raw materials).

It should be noted that processing of food products (raw materials) is carried out on the basis of other processes such as diversification of these products, extension of storage period (by cooking), steaming and drying.

Matthew N.O. According to Sadiku et al., the food industry is not a single industry at all, but rather a collection of several types of industries that produce a variety of food products. It covers farming, food production, food processing, storage, packaging, distribution, retail and catering [4].

Therefore, the food industry plays an important role in meeting the needs of society for the availability, distribution and quality of food products. The food processing industry has its own characteristics of perishable, large-volume and seasonal food products [5].

That is why, in many countries, at the current stage of the development of the agricultural raw materials and food market, intensive work is being done to improve the system of ensuring the quality and safety of food products.

Research Methodology

Analytical comparison, logical and comparative analysis, grouping and expert evaluation methods were widely used in this research. Also, the research works of foreign and domestic scientists on the topic were widely studied and analytical conclusions were presented.

Analysis and Results

So, to what extent is the state of the food industry in our country, its composition and role in ensuring food safety?

Finding an answer to this question requires statistical analysis at the macro and meso levels through the main economic indicators of the country.

According to the Statistics Agency under the President of the Republic of Uzbekistan, in 2023 the country's gross domestic product (GDP) will total 1066569.0 billion. amounted to soum. In this case, the gross added value of the industries is 1008423.1 bln. soums and net taxes on products 58145.9 billion. amounted to soum. Out of this, agriculture, forestry and fisheries 245222.5 bln. soums, industry 262824.2 bln. construction 62554.2 billion soums. soums and services 437822.2 billion contributed soum.

In other words, the gross added value of industries in the formation of GDP during 2023 was 94.5 percent and the share of net taxes on products was 5.5 percent. On the other hand, the share of agriculture, forestry and fisheries in the gross added value of sectors (100.0 percent) was 24.3 percent, the share of industry was 26.1 percent, the share of construction was 6.2 percent, and the share of services was 43.4 percent.

According to the analysis, the GDP growth rate in 2023 was 106.0 percent (106.1 percent on average during 2010-2023), the gross added value of industries was 105.9 percent (106.3 percent on average), and net taxes on products were 107 increased by .4 percent (104.8 percent on average). Including, the gross added value of agriculture, forestry and fisheries is 104.1 percent (104.5 percent on average), the gross added value of industry (including construction) is 106.1 percent (107.0 percent on average) (hence, the gross added value of industry added value of 106.0 percent (average 105.8 percent) and gross added value of construction 106.4 percent (average 111.5 percent)) and gross added value of services increased by 106.8 percent (average 107.1 percent).

As mentioned above, the main composition of food products consists of the following:

1) Agricultural, forestry and fishery products (food for direct consumption);

2) Industrially produced products and consumables:

- processed food products;
- food additives and biochemical agents.

The main raw material base of the food industry is agriculture and animal husbandry (fishery) products.

In 2023, 8,426.6 thousand tons of cereals and legumes, 3,574,1 thousand tons of potatoes, 11,553,7 thousand tons of vegetables, 2,553,5 thousand tons of edible pulse crops, 3,121,7 thousand tons of fruits and berries and 1,737,6 thousand tons of grape products were grown. Also, 2833.3 thousand tons of cattle and poultry bred for slaughter (in live weight), 11968.7 thousand tons of milk, 8487.5 mln. eggs and 15,620.6 tons of honey products were grown (Table 1).

Table 1 Dynamics of the volume of agricultural and livestock products grown in the Republic of Uzbekistan [10]

No	Products	2010	2015	2020	2021	2022	2023
1	Cereals and legumes, thousand tons	7 504,3	8 173,5	7 636,0	7 634,6	7 990,5	8 426,6
2	Potatoes, thousand tons	1 694,8	2 586,8	3 143,8	3 285,6	3 443,2	3 574,1
3	Vegetables, thousand tons	6 262,4	9 390,0	10431,4	10850,2	11162,9	11553,7
4	Food policy, thousand tons	1 182,4	1 853,6	2 134,4	2 285,3	2 420,7	2 553,5
5	Fruits and berries, thousand tons	1 676,3	2 467,9	2 812,6	2 852,6	2 999,3	3 121,7
6	Grapes, thousand tons	979,3	1 518,2	1 606,9	1 695,3	1 760,6	1 737,6
7	Cattle and poultry raised for slaughter (in live weight), thousand tons	1 461,4	2 033,4	2 519,6	2 635,1	2 725,9	2 833,3
8	Milk, thousand tons	6 169,0	9 027,8	10976,9	11274,2	11627,2	11968,7
9	Eggs, mln. piece	3 061,2	5 535,4	7 781,2	7 788,4	8 129,2	8 487,5
10	Honey, tons	3 171,9	10157,0	13 57,8	14066,9	14700,4	15620,6

According to the analysis, during 2010-2023, production of agricultural and animal husbandry (fishery) products in our country increased in all directions. In particular, in 2023 (compared to 2010), grain and leguminous products will be 922.3 thousand tons, potato products will be 1879.3 thousand tons, vegetables will be 5291.3 thousand tons, edible pulse crops will be 1371.1 thousand tons, fruit and berry products for 1445.4 thousand tons, grape products for 758.3 thousand tons, cattle and poultry grown for slaughter (in live weight) for 1371.9 thousand tons, dairy products for 5799.7 thousand tons, eggs for 5426.3 million. grains and honey products increased by 12448.7 tons.

During the years 2010-2023, the average annual volume of cultivated products, in particular grain and leguminous crops, is 7,671.9 thousand tons, potato products are 2,701,4 thousand tons, vegetables are 9,368,5 thousand tons, and food crops are 1,884,2 thousand tons. fruits and berry products 2490.7 thousand tons, grape products 1476.6 thousand tons, cattle and poultry grown for slaughter (in live weight) 2178.8 thousand tons, dairy products 9455.0 thousand tons, eggs 6082.3 million. grains and honey products amounted to 10362.3 tons (Fig. 1).

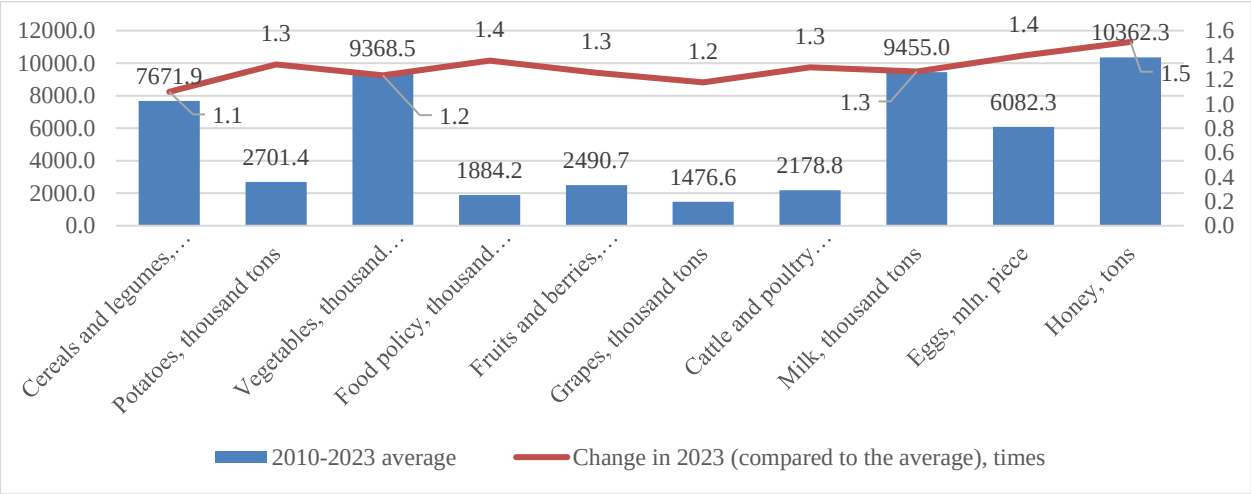

Figure 1. The volume of agricultural and livestock products and their trend of change [10]

According to statistics, in 2023, the volume of industrial products produced by the republic will be 553333.4 billion. soums (84.4% of total industrial products), production volume of food products is 65174.7 billion. soums (9.9% of the total industrial products or 11.8% of the produced industrial products) and the production volume of beverages is 17968.3 bln. amounted to soum (table 2).

Table 2 Volume of industrial products by types of economic activity [10], billion. soum

years	Volume of industrial products produced	*From this*	
		Food production volume	Production volume of beverages
2010	28742,8	5521,5	922,4
2011	37295,3	7305,8	1211
2012	44347,0	8610,6	1480,5
2013	56068,7	11373,7	1787,9
2014	68225,7	14387,2	2082,9
2015	78492,3	18511,6	2538,1
2016	91483,0	22400,5	3364,7
2017	120686,9	23217,7	3793,9
2018	189642,6	25256,0	4948,9
2019	254860,9	35337,3	6402,5
2020	305928,6	42314,9	7417,6
2021	378186,4	48643,3	10135,4
2022	460491,8	57547,3	16111,3
2023	553333,4	65174,7	17968,3

During the years 2010-2023, the average volume of industrial products produced annually is 190556.1 billion. Soums, the production volume of food products is 27543.0 billion. soums and the production volume of beverages is 5726.1 billion. amounted to 524,590.6 billion soums in 2023 compared to 2010. to soums or almost 19.3 times, and the production volume of food products is 59653.2 billion. to soums or 11.8 times and the production volume of beverages is 17045.9 billion. to soums or increased by 19.5 times (Fig. 2).

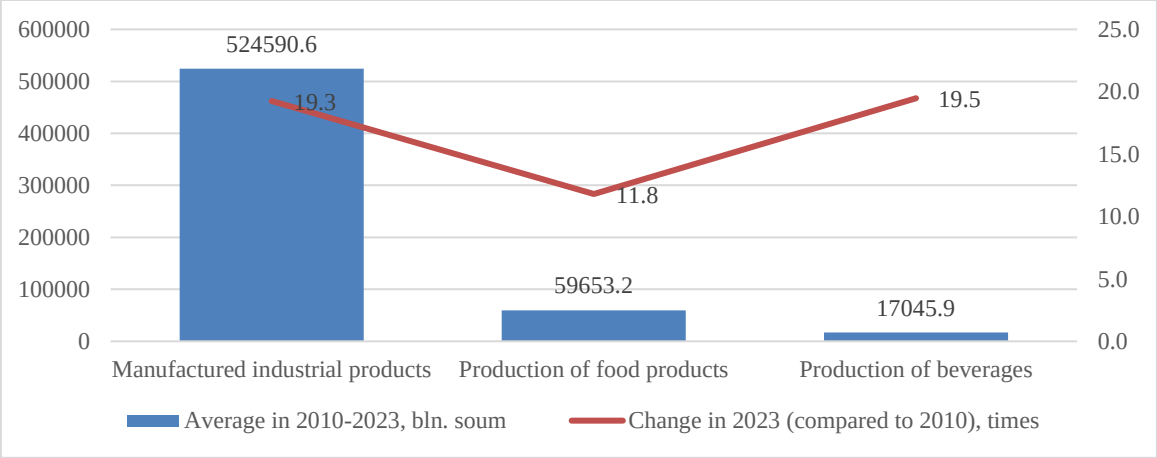

Figure 2. Volume of industrial products by types of economic activity and their trend of change [10]

According to the analysis, in 2023, 31,187.5 thousand liters will be produced by the enterprises of the food production industry in our country. (100% alcohol) vodka, 1051.2 thousand l. (100% alcohol) alcohol tinctures obtained as a result of distillation of grape wine or grape root, 262991.1 thousand l. beer, 162.9 tons. fresh or frozen meat, 1128 thousand tons. soft wheat and spelled flour, 7646.8 tons. pasta products and similar dough products, 1155.2 tons. other bakery products not included in other groups, not stored for a long time, 9611.1 tn. non-condensed and unsweetened milk and cream with a fat content of more than 6%, 1633.7 tons. cheese and cottage cheese, 138718.3 tons. vegetable oil (refined) and 32015.4 tons. margarine and spreads were produced (Table 3).

Table 3 Composition of food industry products [10]

Products	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Vodka, thousand l 100% alcohol	56991,3	57706,4	57920,1	50923,3	53726,8	40119,8	42445,5	31187,5
Spirits obtained by distillation of grape wine or grape root, thousand l 100% alcohol	773,3	792,2	800,8	976,5	994,5	756	1022,1	1051,2
Beer, thousand l	222271	185773	187413	207016	232670	232690	217299	262991
Fresh or frozen meat, tn	161,2	126,7	94,3	64	171,2	198,1	231,9	162,9
Soft wheat and spelled flour, thousand tons	1312,1	1422	1465,9	1486,1	1833,9	1813,4	1690,8	1128
Pasta and similar pasta products, tn	17111,1	18544,7	12650,1	5022,6	1607,8	976,2	15858,5	7646,8
National bread (covered bread), tn	854,6	860,9	705,6	843,4	555,9	72	4,5	
Other non-perishable bakery products, not included in other groups, tn	461,7	541,4	560,3	646,3	573,1	586	639,4	1155,2
Non-condensed and unsweetened milk and cream with a fat content of more than 6%, tn	482,4	508	530,7	379,8	313,3	4802,9	6241,8	9611,1
Cheese and cottage cheese, tn	209,4	172,5	162	153,2	179,5	109,9	2055	1633,7
Vegetable oil (refined), tn	196116	207874	185106	159473	161407	146169,7	129860	138718
Margarine and spreads, tn	9853,4	8750	6878	10223,3	28910,4	26127,2	27198,9	32015,4

Observations show that in 2023 (compared to 2016) vodka -25803.8 thousand l. (100% alcohol), soft wheat and spelled flour decreased by -184.1 thousand tons, pasta products and similar dough products by 9464.3 tons, and vegetable oil (refined) by -57398.1 tons. .

However, during this period, 277,900 liters of alcoholic beverages obtained as a result of distillation of grape wine or grape root. (100% alcohol), beer for 40,720.6 thousand liters, fresh

or frozen meat for 1.7 tons, other bakery products not included in other groups, not stored for a long time, for 693.5 tons, not condensed and without added sugar, fat content 6 Milk and cream production increased by 9128.7 tons, cheese and cottage cheese production by 1424.3 tons, and margarine and spreads production by 22162.0 tons.

Table 4 Growth rate of food industry products [10], %

Products	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Vodka, thousand l 100% alcohol	103,1	101	99,4	88,1	103,6	84,9	97,4	75,2
Spirits obtained by distillation of grape wine or grape root, thousand l 100% alcohol	110,5	102,5	101,1	121,9	99,2	78,9	135,2	102,8
Beer, thousand l	96,4	83,6	121,8	110,5	112,4	100,1	103,2	121
Fresh or frozen meat, tn	155,4	78,4	73,4	93,2	43,1	54,9	117,1	70,2
Soft wheat and spelled flour, thousand tons	99,4	108,4	103,1	101,5	108	93,1	90,5	64,9
Pasta and similar pasta products, tn	85,1	108	68,5	39	31,9	61,4	132,6	152,5
National bread (covered bread), tn	92,3	91,7	81,8	166,6	88,2	13	-	-
Other non-perishable bakery products, not included in other groups, tn	72,2	110,3	106,4	112,3	99,6	102,1	147,3	180,7
Non-condensed and unsweetened milk and cream with a fat content of more than 6%, tn	73,3	105,3	79,8	86	82,5	110,1	130	154
Cheese and cottage cheese, tn	117,7	81,3	93,9	93,7	112,6	46,7	195	79,5
Vegetable oil (refined), tn	98,7	105,4	88,7	86,2	88,4	86,7	89,1	106,9
Margarine and spreads, tn	80,8	90,5	78,6	101,5	90,2	90,4	78,8	117,7

The above trends in the volume of food production have been observed in recent years. Specifically, in 2023 (compared to 2022), vodka production decreased by 75.2%, fresh or frozen meat by 70.2%, soft wheat and spelled flour by 64.9%, and cheese and cottage cheese production by 79.5%.

However, the production of alcoholic beverages obtained from the distillation of grape wine or grape root is 102.8%, beer is 121%, pasta products and similar dough products are 152.5%, other non-long-storable bakery products, not included in other groups, are 180.7%. production of non-condensed and unsweetened milk and cream with a fat content of more than 6% increased by 154%, vegetable oil (refined) by 106.9%, and margarine and spreads by 117.7%.

In our opinion, among the above analyzes, it is appropriate to assess the quantitative impact of resource efficiency in the food production industry on the "number of chronically hungry population" that indicates the level of food security in our country. Because the higher efficiency of resources in the food production industry increases the volume of food production, that is, the supply of food products. This leads to an increase in the purchasing power (real income) of the population through a decrease in the price of food products. As a result, there will be a decrease in the number of people facing chronic hunger.

Therefore, the resulting factor is the number of people facing chronic hunger and the factors affecting it are the indicators of resource efficiency in the food production industry [6]. The relationship between them can be expressed as follows on the basis of a multifactor regression model.

$$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + \varepsilon$$

where, y – the number of people facing chronic hunger, % (relative to the total population),

x_1 – capital efficiency in the food production industry,

x_2 – the efficiency of fixed assets in the food production industry,

x_3 – labor productivity in the food production industry,

a_0, a_1, a_2, a_3 – unknown parameters of the model,

ε – random errors.

The relationship between the number of people facing chronic hunger (y) and the capital efficiency (x_1), fixed asset efficiency (x_2) and labor productivity (x_3) in the affected food industry was evaluated based on correlation analysis.

Matrix of correlations

Variables	(1)	(2)	(3)	(4)
(1) y	1.000			
(2) x1	0.207	1.000		
(3) x2	0.014	0.757	1.000	
(4) x3	-0.398	-0.653	-0.432	1.000

According to the results of the correlation analysis, there is a weak relationship between the number of people facing chronic hunger (y) and capital efficiency (x_1), fixed asset efficiency (x_2) and labor productivity (x_3) in the food production industry that affects it. It was found that there is a direct relationship between indicators ($r(y; x_i) < 0{,}80$), (y) and (x_1), and between indicators (x_2) and (x_3).

Therefore, the unknown parameters of the multifactor regression model were determined based on the method of least squares, and the values of the model evaluation criteria were determined using the "Stata" program.

$$y = 4{,}532756 + 0{,}0136607x_1 - 0{,}4367793x_2 - 0{,}0023411x_3$$

According to the established model evaluation criteria, in particular, the coefficient of determination ($R^2 = 0{,}1942$) shows that the model is unreliable, and according to Fisher's criterion and t-statistics criteria, the model and its parameters are insignificant.

According to the analysis, capital efficiency, fixed asset efficiency and labor productivity in the food production industry are (+) 0.014, respectively (+) 0.014; (-) can vary by 0.44 and (-)

0.0023 %.

Conclusions

The following conclusions were reached based on the state of the food processing industry in our country and its economic analysis:

one of today's global problems is food security, and this danger has not escaped our country. According to data, in 2022, less than 2.5 percent of the population of our country will not have the opportunity to eat regularly and adequately. That is, they faced the problem of hunger and food security. This indicator was 18.0% in 2001, 5.8% in 2010 and less than 2.5% in 2012-2022;

according to world experience, the stability of the food system, that is, the development of the food industry and the stability of its supply of raw materials, not only ensures food safety, but is also important in ensuring economic, social and environmental stability in the country;

In 2023, the volume of industrial products produced by the republic will be 553333.4 billion. soums (84.4% of total industrial products), production volume of food products is 65174.7 billion. soums (9.9% of the total industrial products or 11.8% of the produced industrial products) and the production volume of beverages is 17968.3 bln. amounted to soum;

According to the results of the analysis carried out during the research, in 2023, the efficiency of investments in fixed capital in the industrial sector will be 3.5 billion. soums/billion amounted to soums (1 billion soums of investment accounted for 3.5 billion soums of industrial products). 5.5 bln. in the manufacturing industry. soums/billion soums and 10.0 billion in the food industry. soums/billion amounted to soum. In addition, the efficiency of fixed assets in the industrial sector is 1.4 bln. soums/billion soums (that is, 1 billion soums of fixed assets corresponded to 1.4 billion soums of industrial products) and the efficiency of fixed assets in the food production industry was 3.1 billion soums. soums/billion amounted to soum. Also, labor productivity in the industrial sector is 358.6 billion. 358.6 billion soums per thousand people (i.e., industrial products accounted for 358.6 billion soums per thousand people employed in industry). This figure is 335.7 billion in the manufacturing industry. soums/thousand people and 584.0 billion in the food production industry. amounted to soums/thousand people. In summary, it was observed that the efficiency of each resource is higher in the food industry (compared to the general industry and the manufacturing industry); econometric analysis showed that food imports have a positive effect on food security in the country compared to exports. However, this is a one-sided approach to ensuring food security in the country, and exporting surplus food produced in the country is tantamount to investing in the country.

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