

## DYNAMICS OF FOOD WASTE IN GEORGIA FROM 2014 TO PRESENT

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*Abstract: Food waste includes all food produced for human consumption that is lost or discarded from the place of production until it reaches the plates. This paper assesses different aspects from Georgia regarding its food waste, such as: domestic production, imports and exports, seed, feed, processing, food and waste. The analyzed products are: wheat, maize, potato, vegetables, grapes, meat, milk and milk dairies.*

*Key words: food, waste, import, export, production*

### INTRODUCTION

Georgia is a country located at the crossroad of Europe and Asia with a population of 3,7 million people. The country's main economic activities are agricultural cultivation, mining and production of drinks. Its economy had a strong evolution over the last ten years, the GDP per capita measured \$5,015 in 2021. Also, Georgia's main export locations in that year were EU, China, Russia, Azerbaijan and Turkey. The main import locations were the same as the export ones, plus the United States. [1, 2, 3]

Georgia is an exemplary country for food processing, with approximately 41,000 farms. The problem is that where processing exists, the wasted food also exists. It is estimated that 12% of the landfill is represented by food residuals. This amount of food residuals is equal to over 2 million pounds per year. The phenomenon of food waste represents a global problem, because almost 8 billion people suffer of hunger while 1.3 billion tonnes of food is lost per year. [5, 8, 9]

Food waste has profound effects on our economy, environment and health. In other words, by throwing away food, we lose money, we harm the environment, we unbalance the demand for food, and we deepen the social differences between those with surplus food and those who can barely afford a warm meal a day. [11, 13]

### MATERIALS AND METHODS

The study presents a research based on external data, pertaining to food supply, utilization and waste from 2014 to present, provided by the National Statistical Office in Georgia. Those second-party external data were analyzed and interpreted by the authors, using established methods of economic analysis and interpretation.

The main foods consumed in Georgia were analyzed, respectively their raw materials, including their consumption as such, without being processed into other foods. The objective of the study is to identify the level of food waste, by food category and total, in relation to the total population in Georgia, as well as per capita, in the last eight years.

### RESEARCH RESULTS

Regarding wheat, from 2014 to 2021 took place some important changes. The domestic production has majored during these years, the biggest difference happened from 2014 to 2015 when it increased with 78 ths tons. In 2021 it measured a three time bigger quantity than 2014. Talking about imports, the quantity decreased from 2014 to 2021, the difference of them is 181 ths tons. The quantity of seed didn't suffer significant changes,

from 2014 to 2021 it measured between 12 to 14 ths tons. About feed, it can be mentioned the fact that is decreased 8 ths tons during these 8 years. In the processing of wheat, quantity measured between 4 to 5 ths tons from 2014 to 2021. The quantity of food decreased from 2014 to 2021 by 16 ths tons, but 2017 was the year with the biggest value. The quantity of waste floated between 12 to 15 ths tons, 2021 was the year with the most favourable quantity. In the end, talking about exports, there can be mentioned some important changes. From measuring 42 ths tons in 2014, it decreased to 12 ths tons in the next year and in 2017 it had the biggest value, 49 ths tons. From 2018, it began to decrease, 2020 being the year when no amount of wheat was exported. In the last year, 2021, the exported quantity increased and it measured 5 ths tons. (Table 1)

**Table 1.**

**Wheat supply, utilization and waste in Georgia from 2014 to present**

WHEAT Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	48	126	127	98	107	101	102	136
Import	663	649	556	593	660	597	570	482
Seed	14	15	14	13	12	12	13	14
Feed	26	23	20	19	22	21	20	18
Processing (into alcohol)	5	5	5	5	5	5	4	4
Food	640	635	623	645	642	638	643	624
Waste	13	15	13	13	15	14	13	12
Export	42	12	18	49	25	6	0	5

Source: GEOSTAT, 2021

Regarding maize, the domestic production measured in 2014 the biggest quantity, which was 292 ths tons and in 2017 the lowest one, which was 143 ths tons. In 2021 it measured 233 ths tons. Talking about import, from 2014 to 2020 it increased with 64 ths tons and then, in 2021 it decreased to 83 tons. About seed, we can mention that it decreased by 2 ths tons from 2014 to 2021. The quantity of feed measured 144 ths tons in 2014, suffered little changes and in 2021 measured 152 ths tons. Concerning to the quantity of food, it floated between 130 ths tons and 152 ths tons. The waste of maize had the most favourable value in 2017, measuring 7 ths tons. The exports suffered big changes, from measuring 27 ths tons in 2014 to 0 tons in 2017. (Table 2)

**Table 2.**

**Maize supply, utilization and waste in Georgia from 2014 to present**

MAIZE Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	292	185	244	143	194	207	255	233
Import	57	72	71	82	80	90	121	83
Seed	5	5	4	3	3	3	3	3
Feed	153	129	130	126	123	134	169	141
Food	144	136	142	132	130	135	138	152
Waste	10	7	9	7	8	9	11	9
Export	27	17	6	0	1	1	1	2

Source: GEOSTAT, 2021

Regarding potatoes, the least favourable year for domestic production was 2017, with 143 ths tons. Talking about imports, in 2020 it measured a two times bigger quantity than in 2014. The seed, floated between 3 ths tons and 5 ths tons. About feed we can

mention that it varied between 123 ths tons and 169 ths tons during these 8 years. The food floated between 130 and 152 ths tons. The waste suffered small changes, from 7 ths tons to 11 ths tons. The exports were the most affected , from 27 ths tons in 2014, it measured 0 tons in 2017. (Table 3)

**Table 3.**

**Potatoes supply, utilization and waste in Georgia from 2014 to present**

POTATO Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	215	187	249	180	238	195	209	235
Import	31	24	40	20	24	19	24	19
Seed	34	41	37	37	35	30	29	30
Feed	3	3	3	3	3	3	3	3
Food	177	188	195	188	182	173	182	195
Waste	4	3	4	2	3	3	3	3
Export	3	1	14	41	28	4	4	50

Source: GEOSTAT, 2021

Regarding vegetables, the domestic production had the lowest value in 2017 but then it increased, measuring 176 ths tons in 2020. The imports measured 90 ths tons in 2014 and they majored to 108 ths tons in the last analyzed year. The seed had a constant value these years, precisely 1 ths tons and also the feed varied between 1 ths tons and 2 ths tons. The food had the biggest value in 2016 but then it began to decrease, so in 2021 measured 205 ths tons. The waste floated between 6 to 8 ths tons. In the end, exports increased with 4 ths tons compared to 2014, the first analyzed year. (Table 4)

**Table 4.**

**Vegetables supply, utilization and waste in Georgia from 2014 to present**

VEGETABLES Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	154	152	142	126	142	161	176	149
Import	90	95	97	92	107	109	112	108
Seed	1	1	1	1	1	1	1	1
Feed	2	1	1	1	1	1	2	2
Food	213	200	224	209	207	203	211	205
Waste	7	7	7	6	7	8	8	7
Export	10	7	11	12	13	12	10	14

Source: GEOSTAT, 2021

Regarding grapes, it can be mentioned the fact that in 2020, the domestic production measured a two times bigger value than in 2014, precisely 317 ths tons. The imported quantity had a constant value, 1 ths tons. The food had also suffered a significant change, from 133 ths tons in 2014 to 74 ths tons in 2021 and it is divided into grapes and wine. The grapes floated between 9 ths tons to 13 ths tons in these 8 years and the wine decreased from 122 ths tons in 2014 to 66 ths tons in 2021. The waste had the biggest value in 2020, but then decreased from 7 ths tons to 5 ths tons. The least favourable year for the exports was 2015 with 39 ths tons and the most favourable one, 2021 with 115 ths tons. (Table 5)

**Table 5.**

**Grapes supply, utilization and waste in Georgia from 2014 to present**

GRAPES Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	165	215	159	181	260	294	317	272
Import *	1	1	1	1	1	1	1	1
Food:	133	108	122	94	94	94	78	74
Grapes	11	13	9	11	11	10	10	9
Wine*	122	95	113	83	83	84	68	66
Waste	3	5	3	3	5	6	7	5
Export *	66	39	54	83	90	101	99	115

Source: GEOSTAT, 2021

Regarding meat, the domestic production quantity had suffered a growth from 2014 to 2021. About the imports, it can be mentioned the fact that the quantity from 2021 is with 6 ths tons bigger than the one from 2014. The feed had the same value during this 8 years. Talking about food, the quantity floated between 135,9 ths tons and 144,7 ths tons in 2019. The waste during the analyzed years was between 0,8 ths tons and 1,0 ths tons. In the end, the exports increased from 0,5 ths tons in 2015 to 16,7 ths tons in 2018, which is a significant change. (Table 6)

**Table 6.**

**Meat supply, utilization and waste in Georgia from 2014 to present**

MEAT* Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	59,3	66,7	66,1	66,2	72,6	69,5	69,4	72,6
Import	78,8	71,9	84,3	81,4	82,5	86,6	84,9	84,8
Feed	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Food	135,9	137,1	136,5	135,9	137,4	144,7	139,6	140,0
Waste	0,9	0,9	0,9	0,8	1,0	1,0	1,0	1,0
Export	1,1	0,5	13,0	10,6	16,7	10,3	13,5	16,4

\*including beef, pork, sheep and goat, poultry meat

Source: GEOSTAT, 2021

Regarding milk and dairies, the domestic production suffered some changes during these years, especially in 2017 when the quantity was with 61 ths tons lower. The imports had the most considerable quantity in 2020, when they measured 159 ths tons. The feed floated between 10 ths tons and 12 ths tons during these years. The food quantity was in 2021 with 75 ths tons bigger than in 2014. The waste in 2021 was with 2 ths tons bigger than in 2014. In the end, the exports had increased from 3 ths tons to even 27 ths tons, and in the last year to 14 ths tons. (Table 7)

**Table 7.**

**Milk and dairies supply, utilization and waste in Georgia from 2014 to present**

MILK AND DAIRIES SUPPLY Supply and Utilization (ths. tons)	2014	2015	2016	2017	2018	2019	2020	2021
Domestic production	589	566	540	528	555	562	569	588
Import	71	93	125	119	134	143	159	155
Feed	12	12	11	11	12	10	11	12
Food	632	634	644	625	664	679	681	707
Waste	7	8	8	7	8	8	8	9
Export	8	4	3	4	4	9	27	14

Source: GEOSTAT, 2021

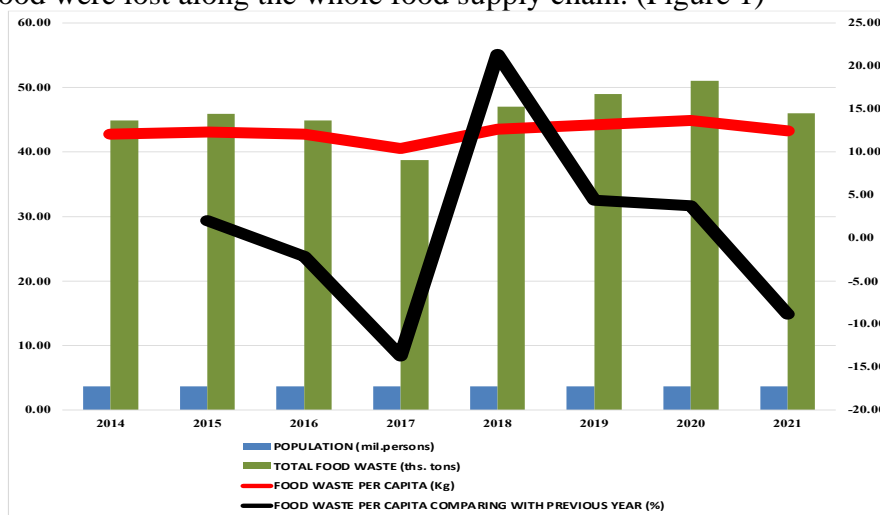
The population in Georgia in 2021 comparative to 2014 decreased by 0,3 million person but the total food waste from the country majored with 1,1 ths tons in 2021 comparative with 2014. It has to be mentioned the year 2020, when the total food waste had the biggest value, 51,00 ths tons. The year with the lowest waste products was 2017, with 38,80 ths tons. (Table 8)

**Table 8.****Food waste in Georgia from 2014 to present**

SPECIFICATION	2014	2015	2016	2017	2018	2019	2020	2021
POPULATION (mil.person)	3,72	3,73	3,73	3,73	3,72	3,72	3,73	3,69
TOTAL FOOD WASTE (ths. tons)	44,90	45,90	44,90	38,80	47,00	49,00	51,00	46,00
FOOD WASTE PER CAPITA (Kg)	12,06	12,31	12,05	10,40	12,62	13,18	13,68	12,47
FOOD WASTE PER CAPITA COMPARING WITH PREVIOUS YEAR (%)		2,04	-2,10	-13,68	21,36	4,42	3,75	-8,83

Source: GEOSTAT, 2021

From 2014 to 2020, the population varied between 3,72 million person and in the last year, 2021, it had a lower value, 3,69 million person. While the number of person was relatively constant, the total food waste from the country was modifying. In 2017, the quantity of the wasted products decreased but it was not a stable process, so in the next year the number is with 8 ths tons bigger. The most unfavourable year was 2020, when 51 ths tons of food were lost along the whole food supply chain. (Figure 1)

**Figure 1. Dynamics of food waste****CONCLUSIONS**

The food waste phenomenon during these 8 years has not been constant, but has had changes. While the number of person was relatively constant, the total food waste from the country was modifying. There was a more favourable year, 2017, when the population of the country managed to generated a less quantity of food waste, precisely 38,80 ths tons. Talking about Georgia and its economy, 2017 was a prosperous year, the country experienced 4.7 % growth. On the other hand, in 2020, the wasted food measured the biggest quantity, 51 ths tons. In that year, Georgia was affected by the COVID-19 pandemic, like all the other countries from the world. [4, 6, 7]

Also, in Georgia, 1 of 8 people is living in condition of food insecurity, but the population of the world is increasing and it is estimated it will reach 9,1 billion people by 2050, so is expected that the Georgian population to increase, too. [12, 14] The country do not have food banks and there is no system that would help with food donations and redistribution. Another fact to be mentioned is that businesses that want to donate products, still have to pay the taxes of the products. All of these inefficient actions create an obstacle in the process of reducing food waste. [10, 15]

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