

INCREASING FOOD SECURITY BY REDUCING FOOD OVERCONSUMPTION

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Abstract: Food security is a matter of great importance for the survival of human species and is currently threatened by numerous factors: food loss and waste (FLW), conflicts, global disruptions in the food chain, climate change, loss of agricultural land (desertification, landslides etc.). Consumers have a major contribution to the current situation, considering the share of household FLW in the global amount of FLW. However, one aspect that has been overlooked until recently is the loss of value in the food chain caused by overconsumption. The authors of this paper use both primary data – provided by consumers through a questionnaire – and secondary data regarding nutritional needs and sustainable nutrition patterns, to determine the level of overconsumption and to argue that overconsumption must be considered waste, and corrective actions for this behavior must be implemented.

Key words: Food loss and waste (FLW), household FLW, overconsumption, sustainable nutrition, corrective actions

INTRODUCTION

The recent events unfolding worldwide- political turbulence, climate change etc.- put great pressure not only on physical safety of population, but also threaten food security at global level, due to disruptions in the food chain (from production to distribution). As food is one of the basic needs for survival, food security is a matter of utmost importance, extending from individual to global level and vice versa. Despite extensive global effort to alleviate and reduce the prevalence of food insecurity, poverty hotspots still exist, even in developed nations. In the EU, 21,7% of the total population (95,4 million people) were at risk of poverty and social exclusion in 2021. In 2021, the risk was higher for women (22,7%) than for men (20,7%) and for households with dependent children (22,5%) [1].

On the other end, an increasing range of population faces health issues caused by overconsumption: overweight, obesity and non-communicable diseases associated with dietary patterns. In the EU, the estimated proportion of adults registering a Body Mass Index (BMI) higher than 25 – associated with overweight – was 52,7% in 2019 [2,18].

The present study brings to light the double facets of malnutrition: under- and over-nutrition, aiming to highlight the correlations and causation between them. Overnutrition is a hidden determinant of food security, as dietary patterns of population influence and can be influenced by production, market strategies, policy and last but not least- financial interests.

Overconsumption was previously categorized as food waste, being considered Metabolic Food Waste (MFW) in 2019, by researchers from Italy [11]. They determined the ecological impact of overconsumption by calculating the amount of food consumed that leads to excess body fat, expressed in kilograms of food: MFW(kg of food), and its impact on the environment, expressed in carbon footprint: MFW(kgCO₂eq), water footprint: MFW(×10l) and land footprint: MFW(×10m²). However, overweight and obesity have many determining causes, and are not solely dependent on food intake. This is one of the reasons the authors of this study chose to determine the level of overconsumption based

on nutritional guidelines that also take into account the sustainability of nutritional choices [5,6,7,17].

The authors aim to demonstrate that food security can be improved by reducing overconsumption and by educating consumers to adopt a more sustainable dietary pattern, by highlighting the benefits derived from this choice, for both human and environmental health.

MATERIALS AND METHODS

For the purpose of the present paper, authors relied both on tertiary data regarding optimal nutrient intake [1,6,7,14,15,17], structure of sustainable diets [1,5,6,7,8,17], effects of diet on human health and present patterns of consumption [1,4,6,7,8,11,13], and on primary data, collected through a questionnaire survey, that reveals the level of overconsumption of Romanian population.

The survey providing primary data took place between 2021 and 2022, reaching 1.053 respondents. The sampling method used for the survey was simple random sampling, each member of the population having equal chances of being selected. The questionnaire was created using Google Forms, being structured in 8 sections and 32 questions. The first section provides information regarding the purpose of the questionnaire and notifies the respondents in regard to data protection policy and the non-compulsory nature of the questionnaire. The next sections are dedicated to data collection about consumption habits of the following foods and food groups: whole cereals and pseudo-cereals; fruits, vegetables, nuts, and seeds; animal products; fats and sugars. The last section collects data about the age and level of physical activity of the respondents. The structure of the respondents is presented in Table 1.

Table 1.

Age and level of physical activity of the respondents

Age group	Number of respondents	
	Absolute Value [-]	Relative Value [%]
15 – 20	117	11.1
21 –40	732	69.5
41 - 60	198	18.8
>60	6	0.6
Level of physical activity		
<i>Level 1</i> (no or low intensity exercise)	849	80.6
<i>Level 2</i> (moderate intensity exercise)	162	15.4
<i>Level 3</i> (high intensity exercise)	42	4.0

Source: authors' study, 2021

The data collected through the questionnaire was analyzed by the authors' and compared to the aforementioned guidelines and recommendations for healthy and sustainable diets [14,15,17], to determine the nutritional pattern of the respondents, to formulate conclusions regarding the sustainability of the current dietary habits and to articulate the impact of small dietary changes on increasing food security.

RESEARCH RESULTS

To determine the dietary pattern of the respondents, each food group considered in the questionnaire and the foods included in it required answers to two questions: (1) frequency of consumption – ranging from daily consumption to never consumed in the week of the reporting – and (2) the quantity consumed during the week of the reporting.

Data analysis revealed increased frequency and quantity of consumption for bread and pastry products, potatoes, and pork. Furthermore, fresh fruits and vegetables (with the

except of tubers and starchy vegetables), nuts and seeds, and fish and seafood registered very low frequency and quantity consumed in the week of the reporting. Data regarding frequency of consumption for fruits and vegetables is visually represented in Figure 1. (a) and data regarding frequency of consumption for animal products is visually represented in Figure 1. (b).

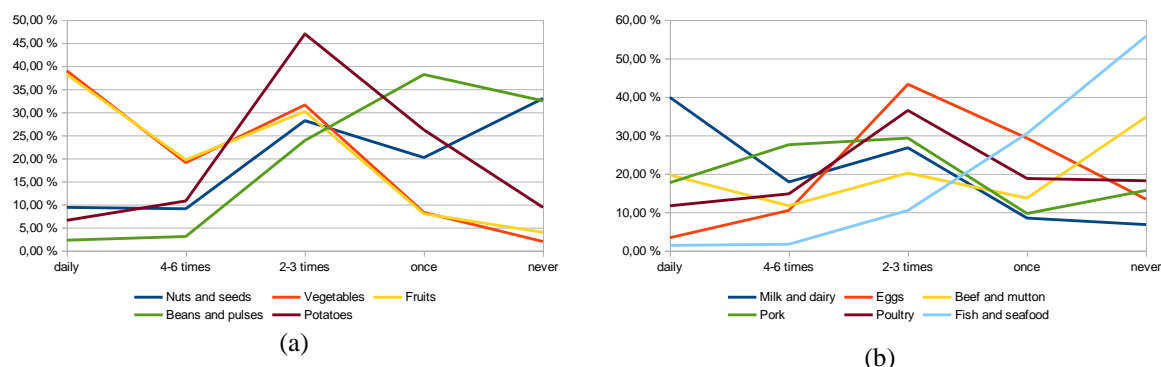


Figure 1. Frequency of consumption for fruits and vegetables (a) and for animal products (b)

Source: authors' study, 2021

The answers for quantity have been customized for each food, according to recommendations formulated by The EAT Lancet Commission [17], for healthy and sustainable diets. Based on these recommendations, the level of consumption registered through the questionnaire was classified as underconsumption, normal consumption or overconsumption.

Table 2.

Percent of respondents classified by consumption behavior, per food groups

	Under consumption	Normal consumption	Overconsumption
Whole Grains	35.33%	1.14%	63.53%
Fruits and Vegetables			
Potatoes	10.90%	38.60%	50.50%
Beans and pulses	71.79%	28.21%	0.00%
Fruits	67.80%	29.40%	2.80%
Vegetables	73.30%	7.10%	19.60%
Nuts and seeds	81.40%	18.60%	0.00%
Animal products			
Milk and dairy	76.90%	20.50%	2.60%
Eggs	26.50%	50.10%	23.40%
Beef and mutton	69.50%	12.70%	17.80%
Pork	15.40%	13.70%	70.90%
Poultry	49.00%	29.90%	21.10%
Fish and seafood	77.20%	21.70%	1.10%
Added fats			
Vegetable fats	70.46%	18.09%	10.64%
Animal fats	7.20%	29.27%	63.53%
Added sugars	0.00%	85.19%	14.81%

Source: authors' study, 2021

The data collected in regard to frequency of consumption is presented in Table 2.

The data that transpires from the responses to the questionnaire reveals that Romanians consume a very little diversified diet, with reduced intake of fruits and vegetables (except potatoes).

Consumption of grains registers higher levels than recommended, especially for bread and pastry products (63.53% of respondents), to the detriment of whole cereals (rice, wholemeal products).

The respondents favor animal protein, especially from pork (70.90% of respondents consume more than recommended) to the detriment of vegetable protein, from beans and pulses and nuts and seeds, where the majority of respondents register underconsumption (71.79% for beans and pulses, 81.40% for nuts and seeds).

Fruits and vegetables are consumed daily by almost 40% of the respondents (Figure 1(a)), but the quantity consumed is lower than the recommended intake to ensure proper intake of macro- and micro-nutrients – 67.80% respondents register underconsumption of fruits and 73.30% register underconsumption of vegetables (Table 1).

Fat consumption also registers high level of consumption for animal fat (63.81% of the respondents) and underconsumption for vegetable fat (70.46% of the respondents).

Regarding optimal nutrient intake, and the optimal structure of a diet that is healthy and sustainable, many international agencies created guidelines and recommendations that can be used by consumers [5,6,7,14,15,17]. Most of these guidelines associate a healthy, sustainable diet with the following attributes:

- energy input should not exceed energy consumption;
- limited intake of the following: salt, sugar, fat, and alcohol;
- plant based food should ensure a great proportion of micro- and macronutrients;
- consumption of animal foods should occur only occasionally, in reduced quantity;
- adequate intake of nutrients ensured by consuming a wide variety of foods;
- processed and ready-to-eat meals must be reduced in favor of fresh foods, and
- non-sugary drinks (water, natural fruit juices, tea etc.) should represent the main source of hydration.

Some of the dietary guidelines have been translated into graphical representations, ensuring ease on understanding regardless of age or language. Such a graphical representation, shown in Figure 2, was created by the German Consumer Information Agency, representing in the form of a pyramid the main features of a healthy diet:

- quantity expressed in color coding - green food should be eaten a lot, yellow represents food recommended to be eaten moderately, and red represents foods that are better consumed only occasionally;
- the recommended servings number for each of the foods; and
- what foods are recommended to be eaten in each group.

Comparing nutritional guidelines and the reported consumption habits of the respondents to the questionnaire, it is easy to conclude that at the moment, the dietary pattern adopted by Romanian consumers is neither a sustainable nor a healthy one. Frequent consumption of high amounts of red meat and processed meat is associated with increased health risks, such as: total mortality, type 2 diabetes, cardiovascular disease and other chronic diseases, in both men and women [4].

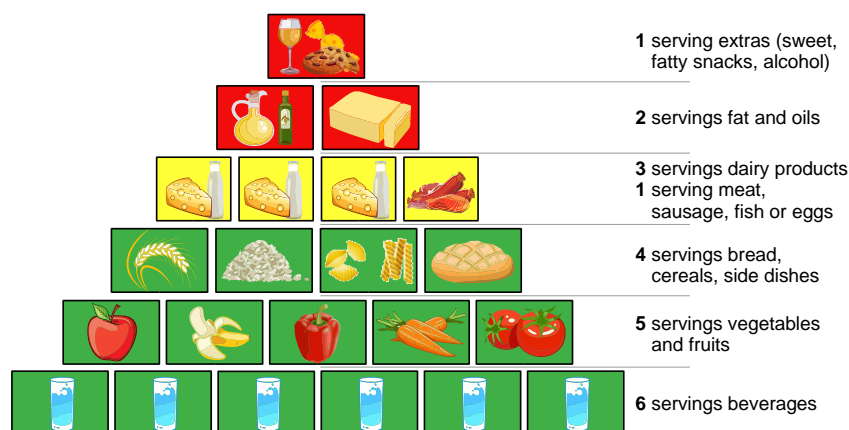


Figure 2. Recommended food intake (food pyramid)

Source: FAO, 2010 [5]

Moreover, reduced consumption of fresh fruits and vegetables, identified among the respondents to the questionnaire, is associated with increased risk of overweight and obesity, raised cholesterol, raised blood pressure, factors that increase the risk of chronic disease and mortality [13].

In regard to food security, a diet that is unsustainable for the environments only endangers the future security of food sources. Intensive animal farming is associated with intensive damage to the environment, being responsible for:

- 18% of greenhouse gas emission, in CO₂ equivalent;
- 8% of total freshwater use (mostly for feed-crop irrigation);
- and
- reduction of biodiversity – animal farming occupies 30% of land surface (previously occupied by wildlife) [10].

Intensive vegetable farming is characterized by monocultures, requiring intensive use of chemical inputs that degrade the soil, freshwater sources, negatively impact the biodiversity and reduce the natural resilience of crops when faced with natural events (floods, droughts, winds etc.). A reduction of natural resilience of crops translates into increased artificial support, that further determines an increase in the cost of production. All these interventions finally reflect in the growing prices paid by consumers for food, reducing accessibility and therefore the security of food [10, 16].

The natural environment represents for now the most important determinant in ensuring the necessary food for the 7.98 billion human inhabitants, with a predicted growth rate of around 1% per year. Food waste and loss is already an irrational behavior, depleting the limited resources of our planet [9,12], but until recently food overconsumption was not categorized as food waste. If measures to adapt and adopt a more sustainable diet in present are not implemented, the risk of food insecurity increases exponentially for future generations.

CONCLUSIONS

The current nutritional pattern of developed nations is characterized by irrational consumption, representing a major risk for human and environmental health. Overconsumption of animal products, correlated with underconsumption of vegetables increases the risk of chronic diseases and mortality, and has negative impacts over the environment, that endanger food security of the future generations.

Measures to educate the consumers in adapting and adopting healthy sustainable dietary patterns should represent top policy for developed nations, correlated with

strategies to increase sustainable agricultural practices, that can contribute to the regeneration of the environment.

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