



UNIVERSITÀ DEGLI STUDI DI PADOVA  
Dipartimento Territorio e Sistemi Agro-forestali  
Department of Land, Environment Agriculture and Forestry

Corso di laurea magistrale/Second Cycle Degree (MSc)  
in Food and Health

## Highlights and Criticalities of Food Labeling on Consumer's Health

Relatore/Supervisor  
Prof. Francesco Marinello  
Co-supervisor  
Prof. Valeria Paganizza

Laureanda/o /Submitted  
by  
Gaelle Safar  
Matricola n./Student  
n.2072558

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## ABSTRACT

Food labeling plays a crucial role in guiding consumer choices, influencing dietary habits, and ultimately impacting public health. Properly designed food labels can empower consumers to make informed decisions by providing essential information about the nutritional content, ingredients, and sourcing of food products. However, while food labeling has the potential to promote health, sustainability, and cultural preservation, its effectiveness is often compromised by factors such as consumer understanding, socio-economic barriers, and misleading claims. The complexity of food labels can confuse consumers who lack sufficient nutrition knowledge, while individuals from lower socio-economic backgrounds may face challenges in accessing healthier options, despite clear labeling. Moreover, certain labeling practices can be misleading or incomplete, leading to consumer confusion or poor dietary choices. This paper explores the positive impacts of food labeling on health promotion, along with the critical issues that can undermine its effectiveness. It highlights the importance of clear and consistent regulations for food labeling, as well as the need for comprehensive nutrition education to ensure that all consumers can fully benefit from the information provided. By addressing these challenges, food labeling can become a more powerful tool in preventing chronic diseases and promoting healthier eating habits.



# CHAPTER 1

## INTRODUCTION

Life before food labels was normal back in the days when the consumer had direct contact with the seller, without passing through an intermediate. The customer himself used to choose the product after seeing it, and sensing it, the quantity was up to him as well. Therefore, seeing the amount and the quality on the spot, created a bound of trust between the two ends of the purchase.

Through the years, the market started to expand thanks to concepts like refrigeration and canning.

However, these discoveries in food production and preservation led to have food labels as a requirement since the consumer had lost at this point his relationship with the merchant and therefore was incapable to tell the quality and the parameters of the product received.

In Europe, when talking about food labeling currently from a legal framework, we have to refer to the Regulation (EU) no 1169/2011<sup>1</sup> on the provision of food information to consumers. This act covers areas that were previously regulated by two different directives which were consequently repealed. First, Directive 2000/13/EC on labeling, presentation and advertising of foodstuffs and second, Directive 90/469/EEC<sup>2</sup> on nutrition labeling for foodstuffs. Being a regulation, it has an immediate implementation as law in all member states (Article 288 TFEU), which avoids different national interpretation.

According to Article 1 of Regulation (EU) no 1169/2011, the Act sets the basis for the assurance of a high level of consumer protection, and it establishes the general principles, requirements and responsibilities governing food information.

According to Article 7, food information shall not be misleading, and it shall be accurate, clear and easy to understand for the consumer.

Under Regulation (EU) No 1169/2011 the obligation to provide nutrition declaration applies since 13 December 2016.

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<sup>1</sup> Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004, in OJ L 304, 22.11.2011, pp. 18-63.

<sup>2</sup> Directive 2000/13/EC of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs, OJ L 109, 6.5.2000, pp. 29-42.

This Regulation provides in particular clearer and harmonized presentation of allergens (e.g. soy, nuts, gluten, and lactose) for prepacked foods (emphasis by font, style or background color) in the list of ingredients and mandatory allergen information for non-prepacked foods, including products sold in restaurants and cafes. It also foresees certain nutrition information for the majority of prepacked processed foods, the mandatory origin information for fresh meat from pigs, sheep, goats and poultry, milk, milk used as an ingredient in dairy products, unprocessed foods, single ingredient product and ingredients that represent more than 50% of a food according to Article 26, and the same labelling requirements for online, distance selling or buying in a shop.

The Regulation clarifies the responsibilities of food business operators with respect to food information.

In the US, on the other hand, food labeling is regulated by the code of federal regulations, currently by Chapter I of Title 21 of Part 101 and was last amended in May 2023<sup>3</sup> (21 CFR Part 101).

Food labeling has progressed over the years, going from a simple marker for food producers to an essential product panel that endows the modern consumer to make informed decisions about their health<sup>4</sup>.

Through the years, and with the help of the medias, lately social media, the consumer is becoming more and more aware and concerned about his health<sup>5</sup>.

The healthiness of the product is gaining interest as one of the main criteria when it comes to choosing a product over the other.

And in order to do the right choice and have enough information, food labeling is the key tool to protect consumer health in terms of food safety and to promote nutritional well-being.

It helps the consumer to be the most informed as long as it is well disposed by the seller and well interpreted by the consumer without creating situations of fraud and misleading information which protects consumers as well.

At the Second International Conference on Nutrition (ICN2), held in Rome 19-21 November 2014, governments affirmed that *«empowerment of consumers is necessary through improved and evidence-based health and nutrition information and education to make informed choices*

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<sup>3</sup> <https://public-inspection.federalregister.gov/2023-10602.pdf?1684845914>.

<sup>4</sup> VV.AA., *Handbook on food labeling to protect consumer*, FAO, Rome 2016, p. 1.

<sup>5</sup> Dwivedi Y.K. – Ismagilova E. et al., *Setting the future of digital and social media marketing research: Perspectives and research propositions*, in *International Journal of Information Management*, 2021, vol. 59, 102168.

*regarding consumption of food products for healthy dietary practices»* (FAO/WHO, 2014a). Food labelling was included among the recommendations in the ICN2 Framework for Action (FAO/WHO, 2014b).

Therefore, food labeling should be delicately handled by both the seller and the consumer in order to enhance health and thus decrease the disease burdens held by the governments simply by transmitting the right information that should be perceived accurately by the consumer. In order to achieve this goal, that would hold only positive impacts for all parties, including the seller, which will make financial gain, the consumer, which will preserve or enhance its health status, and the government, which is linked to both parties.

The food labeling should be governed by some regulations and standards that we will discuss subsequently.

All aspects of the life of a product should be covered, starting from production to consumption, including packaging, packing, distribution and conservation while keeping traceability based on the Regulation (EC) No 178/2002<sup>6</sup>.

Some concepts have been harmonized by the Codex Alimentarius to facilitate worldwide trade of food products while having always as a main goal the health of the consumer.

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<sup>6</sup> Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, Official Journal L 031, 01.02.2002, pp. 1-24.





## CHAPTER 2

### FOOD LABELING

#### 2.1) FAO definition of food labeling

The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations for agriculture handling livestock, forestry, fisheries and aquaculture and food, that leads international efforts to defeat hunger. It is an intergovernmental organization, and it was founded in 1945, made out of 195 members - 194 countries and the European Union, thus works in over 130 countries worldwide<sup>7</sup>.

Its goal is to reach food security for everyone and make sure that people have regular access to enough high-quality food to lead active and healthy lives.<sup>8</sup>

Its headquarters currently is Rome, in Italy, since 1951<sup>9</sup>.

Its members have three main goals; the first one is to raise the levels of nutrition and the standards of living of their people, the second is to improve the production and distribution of all food and agricultural products, and the third is to improve the condition of the rural population<sup>10</sup>.

This organization produces also guidelines and supports governments in the formulation and implementation of agricultural and food policies. It also interferes in humanitarian emergencies, to rehabilitate the agricultural production system and fight against animal diseases and crop pests special in third world countries<sup>11</sup>.

Therefore, when talking about food labeling, it is interesting to check how it is defined by the FAO.

According to the FAO, a food label is defined as the information presented on a food product, it is one of the most important and direct means of communicating information to the consumer<sup>12</sup>.

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<sup>7</sup> <https://www.fao.org/about/about-fao/en/>

<sup>8</sup> <https://www.fao.org/about/about-fao/en/>

<sup>9</sup> <https://digital-media.fao.org/archive/Italy--1951--The-permanent-headquarters-of-FAO-are-established-at-Rome-2A6XC58ZXHBV.html>

<sup>10</sup> <https://www.fao.org/4/ac621e/ac621e03.htm>

<sup>11</sup> <https://www.fao.org/about/about-fao/en/#:~:text=The%20Food%20and%20Agriculture%20Organization,to%20lead%20active%2C%20healthy%20lives>

<sup>12</sup> <https://www.fao.org/food-labelling/en>

The internationally accepted definition of a food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stenciled, marked, embossed or impressed on, or attached to, a container of food or food product. This information, which includes items such as ingredients, quality and nutritional value, can accompany the food or be displayed near the food to promote its sale<sup>13</sup>.

FAO endorses «*Food Labelling as an effective tool to protect consumer health in terms of food safety and nutrition. Food labels convey information about the product's identity and contents, and on how to handle, prepare and consume it safely with the increase in global trade and a shift away from the traditional face-to-face food producer and buyer relationship, there is a greater need to create food labels that are clear and can be trusted*»<sup>14</sup>.

## 2.2) International food labeling standards

At the Second International Conference on Nutrition (ICN2) in 2014<sup>15</sup>, governments emphasized the importance of empowering consumers by providing improved, evidence-based information and education on health and nutrition. This support aims to help individuals make informed choices about food consumption and adopt healthier dietary practices<sup>16</sup>.

The FAO collaborates with the WHO to provide guidance to the Codex Alimentarius Commission on technical and policy issues related to food labeling. The Codex Committee on Food Labelling (CCFL) is the designated body responsible for establishing standards and guidelines applicable to all food labels. The Codex General Standard for Labelling of Prepackaged Foods (CXS 1-1985) serves as the primary instrument for conveying food information to consumers. Countries utilize this Codex standard to harmonize their labeling practices and as a foundation for developing new food labeling policies.

According to the Codex Alimentarius, Section 1, basic texts and definitions, food means any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of “food” but does not include cosmetics or tobacco or substances used only as drugs.

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<sup>13</sup> <https://www.fao.org/food-labelling/en#:~:text=The%20internationally%20accepted%20definition%20of,of%20food%20or%20food%20product>

<sup>14</sup> <https://www.fao.org/food-labelling/en>

<sup>15</sup> <https://openknowledge.fao.org/server/api/core/bitstreams/9f8386ce-0d8a-4e82-9e8e-30f6d4dd9a34/content>

<sup>16</sup> <https://www.fao.org/food-labelling/en>

## 2.3) European food labeling rules

Regulation (EU) No 1169/2011<sup>17</sup> is the horizontal act on food information to consumers. Its aim is to ensure consumers have the right to information by setting out the fundamental principles, requirements, and responsibilities for food labeling. The framework allows for adaptability to future changes in the food industry. Additionally, it repeals the earlier legislation, including Directives 2000/13/EC<sup>18</sup> on food labeling and 90/496/EEC<sup>19</sup> on nutritional labeling.

The scope of this legislation applies to businesses across all stages of the food chain and encompasses all foods intended for final consumption, including those provided to or supplied by mass caterers according to Article 1 of Regulation (EU) No 1169/2011.

According to Article 9 of this regulation, the list of mandatory particulars includes:

- (a) the name of the food.
- (b) the list of ingredients.
- (c) any ingredient or processing aid listed in Annex II or derived from a substance or product listed in Annex II causing allergies or intolerances used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form.
- (d) the quantity of certain ingredients or categories of ingredients.
- (e) the net quantity of the food.
- (f) the date of minimum durability or the 'use by' date.
- (g) any special storage conditions and/or conditions of use.
- (h) the name or business name and address of the food business operator responsible for information.
- (i) the country of origin or place of provenance were provided for in Article 26.
- (j) instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions.

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<sup>17</sup> Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004, in OJ L 304, 22.11.2011, pp. 18-63.

<sup>18</sup> Directive 2000/13/EC of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs, in OJ L 109, 6.5.2000, pp. 29-42.

<sup>19</sup> Council Directive 90/496/EEC of 24 September 1990 on nutrition labelling for foodstuffs, in OJ L 276, 6.10.1990, pp. 40-44.

(k) with respect to beverages containing more than 1,2 % by volume of alcohol, the actual alcoholic strength by volume.

(l) a nutrition declaration.

The Regulation contains a general provision also on voluntary information. According to Article 36, Food information provided on a voluntary basis shall meet the following requirements:

- (a) it shall not mislead the consumer, as referred to in Article 7;
- (b) it shall not be ambiguous or confusing for the consumer; and
- (c) it shall, where appropriate, be based on the relevant scientific data.

## CHAPTER 3

### CONSUMER'S HEALTH

#### 3.1) Definition of health

The WHO constitution<sup>20</sup> states: *«Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. »*

According to the WHO, *«well-being is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic and environmental conditions. Well-being encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose. Focusing on well-being supports the tracking of the equitable distribution of resources, overall thriving and sustainability. A society's well-being can be determined by the extent to which it is resilient, builds capacity for action, and is prepared to transcend challenges»* (Glossary of Terms 2021)<sup>21</sup>.

The word 'complete', in the definition, holds a bit of controversy around it. It is unclear whether complete means perfect in a quantitative way or in a qualitative way.

In a quantitative way, complete would indicate perfection and would subsequently correlate it to happiness. However, complete in a qualitative way, would indicate that is complete in terms of all features of well-being, adopting then a holistic<sup>22</sup> approach.

For serving the WHO goals and attaining the state of health that would be desirable and attainable for everyone it is more likely and logical to adopt the holistic point of view (Schramme, 2023).

Physical health refers to the correct state of the body's organs and systems (e.g., immune, cardiovascular, and endocrine) (Koipysheva et al., 2018).

Mental health according to the WHO, *«mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well»*.

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<sup>20</sup> The Constitution was adopted by the International Health Conference held in New York from 19 June to 22 July 1946, signed on 22 July 1946 by the representatives of 61 States (Off. Rec. Wld Hlth Org., 2, 100) and entered into force on 7 April 1948. Amendments adopted by the Twenty-sixth, Twenty-ninth, Thirty-ninth and Fifty-first World Health Assemblies (resolutions WHA26.37, WHA29.38, WHA39.6 and WHA51.23) came into force on 3 February 1977, 20 January 1984, 11 July 1994 and 15 September 2005 respectively and are incorporated in the present text.

<sup>21</sup> <https://www.who.int/publications/i/item/9789240038349>

<sup>22</sup> The term holistic has been used in relation to health by Lennart Nordenfelt (see Nordenfelt, 1995: 12ff., 35ff.). By using this term, this does not mean that Nordenfelt endorses the WHO definition.

On the other side, *«the social determinants of health (SDH) are the non-medical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems»* according to the WHO.

### **3.2) Impact of Nutrition on health**

According to the WHO, Nutrition is *«a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes and cardiovascular disease), and longevity.*

*Healthy children learn better. People with adequate nutrition are more productive and can create opportunities to gradually break the cycles of poverty and hunger»<sup>23</sup>.*

Starting with the impact of nutrition on the physical well-being, non-communicable diseases (NCDs) like cardiovascular disease, cancer, chronic respiratory conditions, diabetes, obesity, and cognitive impairment are major contributors to death and disability globally, impacting both developed and developing nations<sup>24</sup>.

Recognizing the crucial role of diet in influencing disease risk, the World Health Organization (WHO) Global Action Plan for the Prevention and Control of Noncommunicable Diseases incorporates strategies aimed at combating unhealthy dietary patterns as part of its initiatives to reduce behavioral risk factors<sup>25</sup>.

Also, the Sustainable Development Goal (SDG) target 3.4 aims to reduce premature deaths from non-communicable diseases (NCDs) by one-third by 2030, relative to 2015 rates, along with other related initiatives<sup>26</sup>.

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<sup>23</sup> [https://www.who.int/health-topics/nutrition#tab=tab\\_1](https://www.who.int/health-topics/nutrition#tab=tab_1).

<sup>24</sup> Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020; World Health Organ: Geneva, Switzerland, 2013.

<sup>25</sup> [https://apps.who.int/gb/ebwha/pdf\\_files/wha57/a57\\_r17-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/wha57/a57_r17-en.pdf)

<sup>26</sup> Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, Official Journal L 031, 01.02.2002, pp. 1-24.

A healthy diet consists of macronutrients consumed in the right proportions to meet energy and physiological needs without excess intake. It should also provide adequate micronutrients and hydration to fulfill the body's physiological requirements<sup>27</sup>.

Healthy dietary patterns are typically characterized by a high intake of health-promoting foods, such as plant-based items, fresh fruits and vegetables, antioxidants, soy, nuts, and sources of omega-3 fatty acids. These diets are low in saturated fats, trans fats, animal-derived proteins, and added or refined sugars<sup>28</sup>.

The dietary pattern may provide a better prediction of overall health status and disease risk compared to the analysis of individual nutrients or specific foods<sup>29</sup>.

Aggarwal et al.<sup>30</sup> recently emphasized the strong evidence supporting adherence to whole food plant-based diets, Dietary Approaches to Stop Hypertension (DASH) patterns, and the Mediterranean diet, while cautioning against the risks associated with Paleolithic and very low carbohydrate/ketogenic diets. To further clarify this topic, Ge et al.<sup>31</sup> conducted a network meta-analysis comparing the macronutrient patterns of 14 popular dietary regimens regarding cardiovascular risk factors and weight loss in adults. Their findings indicated moderate evidence that most of these diets led to significant improvements in cardiovascular risk factors, particularly blood pressure, over six months, along with modest evidence for weight reduction. All the above proves the importance of nutrition on physical health, and therefore the importance of the food choices made. Thus, choices made at the supermarket that will impact the overall physical health sooner or later should be well labeled in order to ensure that the consumer will make the most informed and responsible choice.

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<sup>27</sup> Stark C., *Guidelines for Food and Nutrient Intake*, in Stipanuk M.H. - Caudill M.A. eds., *Biochemistry, Physiology and Molecular Aspects of Human Nutrition*, 3rd ed.; Elsevier Saunders, St. Louis, MO, USA, 2013, pp. 34–47.

<sup>28</sup> Pistollato F. - Iglesias R.C. - Ruiz R. - Aparicio S. - Crespo J. - Lopez L.D. - Manna P.P. - Giampieri F. - Battino M., *Nutritional patterns associated with the maintenance of neurocognitive functions and the risk of dementia and Alzheimer's disease: A focus on human studies*, in *Pharmacol. Res.*, 2018, 131, pp. 32–43.

<sup>29</sup> U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020–2025*, 9th ed.; U.S. Department of Agriculture and U.S. Department of Health and Human Services: Washington, DC, USA, 2020.

<sup>30</sup> Aggarwal M. - Ros E. - Allen K. - Sikand G. - Agarwala A. - Aspry K. - Kris-Etherton P. - Devries S. - Reddy K. - Singh T. et al., *Controversial Dietary Patterns: A High Yield Primer for Clinicians*, in *Am. J. Med.*, 2022, 135, pp. 680–687.

<sup>31</sup> Ge L. – Sadeghirad B. - Ball G.D.C. et al., *Comparison of Dietary Macronutrient Patterns of 14 Popular Named Dietary Programmes for Weight and Cardiovascular Risk Factor Reduction in Adults: Systematic Review and Network Meta-Analysis of Randomised Trials*, in *BMJ*, 2020, 369, m696.



Additionally, a recent systematic review and meta-analysis of randomized studies by Cecchini and Warin<sup>32</sup> support the effectiveness of nutrition labeling as a strategy to empower consumers to make healthier choices.

Moving on to mental health, recent estimates indicate that mental, neurological, and substance-use disorders, such as schizophrenia, depression, epilepsy, dementia, and alcohol dependence, represent 13% of the global burden of disease. This positions mental illness as the leading contributor to health burden, surpassing both cardiovascular disease and cancer.<sup>33</sup> Nutritional psychiatry is an emerging field that explores the connection between nutrition and mental health, offering a promising approach to prevention.

According to Jacka et al.<sup>34</sup>, both cross-sectional and longitudinal studies have demonstrated that a higher consumption of Western or highly processed diets is associated with an increased risk of developing psychiatric symptoms, including depression and anxiety. In contrast, individuals who follow a Mediterranean-style diet tend to have a lower risk of developing mental disorders. Also, a randomized controlled trial published in 2017 in BMC Medicine revealed significant effects of a three-month dietary intervention on moderate-to-severe depression. The results showed notably greater improvements in the dietary intervention group, with remission achieved in 32% of participants in that group.

It is also important to point out that mental health issues can be the consequence of bad physical health. For instance, a 27-year longitudinal study found that obesity in mid-life significantly doubles the risk of developing dementia later in life<sup>35</sup>.

Therefore, based on these studies, once again, nutrition has demonstrated its impact on mental health as well, whether it is in a direct or in an indirect way.

Last but not least, comes the impact of nutrition on social well-being. Investing in good nutrition can yield social and economic benefits, especially when grounded in effective community participation. The advantages include an improved quality of life, enhanced productivity, and strong economic returns<sup>36</sup>. In other words, an overall well-being should combine mental, physical and social health, and for that to be achieved proper nutrition is necessary.

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<sup>32</sup> Cecchini M. - Warin L., *Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies*, in *Obes Rev*, 2016; 17, pp. 201-210.

<sup>33</sup> Vigo D. - Thornicroft G. - Atun R., *Estimating the true global burden of mental illness*, in *Lancet Psychiatry*, 2016, 3, 2, 171-178.

<sup>34</sup> Jacka F.N. – Mykletun A. - Berk M.. *Moving towards a population health approach to the primary prevention of common mental disorders*, in *BMC Med*, 2012, 10, 149.

<sup>35</sup> Whitmer R.A. – Gunderson E.P. - Barrett-Connor E. et al., *Obesity in middle age and future risk of dementia: a 27-year longitudinal population-based study*, in *BMJ*, 2005, 330, 1360.

<sup>36</sup> <https://www.fao.org/4/y5343e/y5343e04.htm>.

## CHAPTER 4

### HIGHLIGHTS OF FOOD LABELING AFFECTING THE CONSUMER'S CHOICE

Food labeling is crucial for consumers when making decisions during grocery shopping. Numerous studies have shown that the information provided on food labels can have a significant impact on consumer choices<sup>37</sup>.

Furthermore, this information helps consumers make more informed decisions, promoting illness prevention and supporting overall health and well-being<sup>38</sup>.

Consumers frequently check food labels to ensure that products meet their personal preferences, dietary requirements (such as vegetarianism), or health conditions (like diabetes).

#### 4.1) Health Promotion

To begin with, it is inevitable and crucial to mention food safety whenever it comes to the mentioning of overall health.

This notion was fortunately well established and handled in Europe under Regulation (EC) No 178/2002 and aims according to Article 1 to ensure a high level of protection regarding the health of the consumer when it comes to food and feed in stages of production, processing and distribution. According to this regulation and to Article 14 specifically about food safety requirements, a product present in the market should be considered safe for human consumption, therefore it cannot be either injurious to health or unfit for human consumption. Although the regulation ensures food safety for the consumer, safe food can be responsible in part for the development of some health conditions and chronic diseases if consumed in an irresponsible matter.

According to the WHO, «*Chronic diseases are diseases of long duration and generally slow progression. Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in Europe, representing 77% of the total disease burden and 86% of all deaths. These diseases are linked by common risk*

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<sup>37</sup> Grunert, K. G., & Wills, J. M. (2007). A review of European research on consumer response to nutrition information on food labels. In *Journal of Public Health* (Vol. 15, Issue 5, pp. 385–399).

<sup>38</sup> Kozup, J. C., Creyer, E. H., & Burton, S. (2003). Making Healthful Food Choices: The Influence of Health Claims and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items. In *Journal of Marketing* (Vol. 67, Issue 2, pp. 19–34)

*factors, underlying determinants and opportunities for intervention»* (Chronic disease & Policy - European chronic disease alliance).

One of the most prevalent and modifiable risk factors is poor nutrition according to the US Centers for Disease Control and Prevention (CDC).

Poor nutrition often stems from an excess deficiency of essential required nutrients; therefore, from the perspective of medical nutrition therapy, adopting a balanced diet and leading a healthy lifestyle is a crucial intervention in the treatment and prevention of chronic diseases.

Promoting health is not only useful for people that have a disease, but it is also essential for healthy people to avoid the occurrence of a disease. This process begins with making lifestyle changes and therefore changing habits, which requires as a base the change of usual choices. Taking a decision and making a choice is a process that happens often on a daily basis, and when it comes to food selection, choices would impact the overall health both in the short and long run. Grocery shopping is the first radical change needed in order to opt for a healthier lifestyle, and changes in decision-making should start there.

These conversions could be done by consulting the nutrition declaration regulated by Article 30 of the Regulation (EU) No 1169/2011 on the provision of food information to consumers (FIC Regulation), found on packaged food products. It “simply” requires comparing the nutrition declaration of the products, ideally comparing nutritional values of the components in 100g of the foods in question leading to the withdrawal of the “worse” product while keeping the “best” one. In order to come up with a final decision, the best product should be the one that has a lower energy, fat, saturated fat, carbohydrate, sugars content compared to the worse product while having at the same time a higher content of proteins, mono-unsaturated, polyunsaturated fats, fibers, minerals, and vitamins. All that reasoning should be done by being mindful about the portion sizes, the required and the recommended daily intake.

Therefore, making the right choice is not as simple as it sounds, especially in a generation where expansion, marketing and advertising are hitting their peak with an integration of subliminal messages and nudge effects that condition the consumer even without his realization. Moreover, the consumer tends nowadays to always be in a rush for the fast pace of life and hence leading mostly to opt for the first product that comes across or by sticking to his habitudes.

Fortunately, according to Article 35 of Regulation (EU) No 1169/2011 on the provision of food information to consumers (FIC Regulation), packaged food products can be supplemented with a front-of-pack (FOP) label where additional forms of expression and/or presentation of the nutrition declaration are presented in the front pack of the food product, allowing consumers to quickly access key nutritional information when shopping. This kind of labeling spares the time

to the consumer and presents like a summary of the nutrition declaration in order to facilitate his choice while being mindful of his health. The words and numbers found on the nutrition declaration are rather represented by a graphical form or a symbol.

On the other side, these labelling systems also push the food industry to reformulate products to improve their nutritional profile since food business operators can only use this additional form of expression if it is scientifically based, objective and does not mislead the consumer. Plus, member states are responsible for the monitoring of stakeholders.

However, some FOP fall under Article 36 of the Regulation (EU) No 1169/2011 on the provision of food information to consumers (FIC Regulation) and are considered voluntary information since they do not highlight information already present on the nutrition declaration, yet they emphasize the overall nutritional quality of the food product.

These labels differ from a country to another in Europe; they could take different forms like the Green Keyhole symbol used in Sweden and Denmark, the “traffic light” label used in the United Kingdom, the color-coded 'Nutri-Score' system used in France, and the “NutriInform Battery” recommended for use in Italy.

It has been shown that highly interpretive, color-coded spectrum labels on food products are likely to be most effective in both encouraging consumers to choose healthier options and discouraging them from selecting unhealthier ones.

In the same spectrum, it is also important to mention nutrition and health claims which are regulated by the Regulation (EC) 1924/2006. A nutrition claim, according to the regulation, specifically Article 2, is: *«any claim that states, suggests or implies that a food has particular beneficial nutritional properties due to:*

- (a) the energy (calorific value) that it:*
  - (i) provides,*
  - (ii) provides at a reduced or increased rate, or*
  - (iii) does not provide; and/or*
- (b) the nutrients or other substances that it:*
  - (i) contains,*
  - (ii) contains in reduced or increased proportions, or*
  - (iii) does not contain. »*

Whereas the health claim is: *«any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health. »*

This regulation exists in order to guarantee the operational and effective side of the internal market whilst providing the highest level of protection to the consumer. In order to not create ambiguity, there is a specific list annexed for the claims that can be opted.

Therefore, going back to the initial health problem, which was cardiovascular diseases, the food labeling, and more specifically nutrition declaration, nutrition and health claims and FOP role were shown to be helpful for the consumer when it comes to making mindful decision and choosing a healthier product, which could hence influence their physical status and emotional and social well-being since they are all connected. This highlights the importance of food labeling and how a small change like adopting additional forms of expression or voluntary information could impact the overall health of the consumer when he is able to recognize the best option without being misled.

Another concern for consumers when it comes to overall health, is the use of pesticides and antibiotics in feed and food production and the presence of their residues in food or feed that impacts by then the human health. This cycle highlights the importance of the One-Health approach launched by the WHO in order recognize and balance between the health of animals, people and the ecosystem at once.

When it comes to pesticide use, the issue is handled by Regulation (EC) No 396/2005<sup>39</sup>, tackling maximum residue levels of pesticides in or on food and feed of plant and animal origin in order to protect not only human health, but also animal health. However, when it comes to labeling, it is not well pronounced since all food products should respect this limit in theory, therefore stakeholders and companies do not consider usually pinpointing this property. However, when it comes to antibiotic use in food production, this matter is rather regulated by Regulation (EC) No 470/2009<sup>40</sup>, tackling residues of veterinary medicinal products in foodstuffs of animal origin. Although, the issue of antibiotics is also regulated by the law, food manufacturers tend to add “the antibiotic-free” claim of animal-derived products like eggs for example since the antimicrobial resistance issue is more well-known and feared in population.

Therefore, producers aim to indicate and highlight the abstention of use of antibiotics in their final food product to reassure the consumer and to push him to select the product without having second thoughts, trying to gain back his confidence once again, like during old times when similar issues were not even present.

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<sup>39</sup> Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC Text with EEA relevance, OJ L 70, 16.3.2005, pp. 1-16.

<sup>40</sup> Regulation (EC) No 470/2009 of the European Parliament and of the Council of 6 May 2009 laying down Community procedures for the establishment of residue limits of pharmacologically active substances in foodstuffs of animal origin, repealing Council Regulation (EEC) No 2377/90 and amending Directive 2001/82/EC of the European Parliament and of the Council and Regulation (EC) No 726/2004 of the European Parliament and of the Council (Text with EEA relevance ), OJ L 152, 16.6.2009, pp. 11-22.

Another arising topic that did not exist during the old times is the topic of “Genetically Modified Food” (GMO) defined as: «organisms (apart from human beings) whose genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. » GMOs are regulated by Regulation (EC) No 1829/2003<sup>41</sup>, however since it is a relatively new topic, consumer usually associates this concept with an unhealthy food product <sup>42</sup>which is not necessarily true. When it comes to food labeling, it is regulated by Regulation (EC) No 1830/2003<sup>43</sup> on the traceability and labelling of genetically modified organisms (GMOs) and the traceability of food and feed products produced from GMOs. When it comes to traceability, any product that contains GMOs and derivatives of food animal feed should be traceable throughout the whole production and distribution chain, including all stages.

Whereas when it comes to labeling, the consumer should come across a final packaged or pre-packaged product containing GMOs with a visible label stating that «This product contains genetically modified organisms [or the names of the organisms] », according to Article 4/B.

And that regulation, as any other regulation. is made to inform and orient the consumer while leaving up to him the privilege of making his own choice regarding his overall health and according to his beliefs while being completely aware of the food product purchased.

## 4.2) Sustainability promotion

The food chain contributes in a good part to the environmental crisis, and around 25 percent of the emissions produced by human beings through industrialization can be traced back to the food consumed.<sup>44</sup> Behind this environmental cost, we have several contributors like the livestock industry, the processed and carnivore diets, agricultural practices also play a role with the use of pesticides and fertilizers, without forgetting to mention the carbon food prints of the emission of processing, transportation, packaging and distribution. This is mainly notable in large-scale industries.

Nowadays, sustainability is a hot topic and is getting more and more attention from both, the consumers and the governments since it is a concept that targets different dimensions and gives

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<sup>41</sup> Regulation (EC) No 1829/2003 of the European Parliament and of the Council of 22 September 2003 on genetically modified food and feed, OJ L 268, 18.10.2003, p. 1–23

<sup>42</sup> Wunderlich S. - Gatto K.A., *Consumer perception of genetically modified organisms and sources of information*, in *Adv Nutr.*, 2015, 13, pp. 842-851. doi: 10.3945/an.115.008870. PMID: 26567205; PMCID: PMC4642419.

<sup>43</sup> Regulation (EC) No 1830/2003 of the European Parliament and of the Council of 22 September 2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC, OJ L 268, 18.10.2003, p. 24–28

<sup>44</sup> Elisabeth Rosenthal, To Cut Global Warming, Swedes, Their Plates, N.Y. TIMES, Oct. 23, 2009, at A6.

equal value to each dimension. It tackles economic, social, cultural and environmental dimensions.

According to the FAO's definition, a sustainable food system is *«a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised»*<sup>45</sup>.

From the official point of view to promote sustainability in Europe Union, the European Committee welcomes the initiative to create a sustainable food system including food labeling<sup>46</sup> which is supported legally while stressing on the concept of multidimensionality of the FAO emphasizing the role of education while pointing out the differences and the diversity in people's eating habits.

In other words, labeling forms using a scale as an FOP where the sustainability factor is included could be helpful in promoting sustainability and supporting it, while making the consumer involved in the process once he consciously chooses the more sustainable product over the least sustainable one. It is also pondered that some quality schemes like organic farming regulated by the Regulation (EU) 2018/848<sup>47</sup> and geographical indications regulated by the Regulation (EU) 2024/1143<sup>48</sup> contain already some elements that promote or support sustainability in the food system. Organic foods are usually more sustainable at different levels<sup>49</sup>. First, from the point of view of land management, it has positive soil management through protection and enhancement of soil performance.

Second, from the point of view of water footprint, it reduces the use of blue and grey water footprints. Blue water is defined as the consumption of fresh surface or groundwater. Considering water that evaporates and transpires, water that is incorporated into the product and water that does not return to the same catchment area. Whereas grey water is defined as the consumption of freshwater that is required to dilute pollutants in order to have acceptable

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<sup>45</sup> <https://www.fao.org/in-action/territorios-inteligentes/componentes/produccion-agricola/contexto-general/en>.

<sup>46</sup> Opinion of the European Economic and Social Committee on Towards a sustainable food labelling framework to empower consumers to make sustainable food choices (own-initiative opinion), EESC 2022/00878, OJ C 75, 28.2.2023, pp. 97-101.

<sup>47</sup> Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007, OJ L 150, 14.6.2018, pp. 1-92.

<sup>48</sup> Regulation (EU) 2024/1143 of the European Parliament and of the Council of 11 April 2024 on geographical indications for wine, spirit drinks and agricultural products, as well as traditional specialties guaranteed and optional quality terms for agricultural products, amending Regulations (EU) No 1308/2013, (EU) 2019/787 and (EU) 2019/1753 and repealing Regulation (EU) No 1151/2012, OJ L, 2024/1143, 23.4.2024, ELI: <http://data.europa.eu/eli/reg/2024/1143/oj>.

<sup>49</sup> Chiriaco M.V. et al., *Determining organic versus conventional food emissions to foster the transition to sustainable food systems and diets: Insights from a systematic review*, in *Journal of Cleaner Production*, vol. 380, Part 2, 20 December 2022, 134937.

concentrations in the water. Therefore, organic farming could play a vital role in reducing pests and pathogens, which in turn would decrease the reliance on chemical pesticides and fertilizers.<sup>50</sup> This shift not only helps protect the environment but also enhances the quality of crop yields and promotes more sustainable agricultural practices. By minimizing the use of synthetic chemicals, organic farming methods support healthier soil ecosystems, improve biodiversity, and contribute to better water management and reusability, all of which are crucial for long-term agricultural sustainability.

Third from the point of view of carbon footprint, it has less carbon emissions, both per unit of land and per unit of product since organic farming prohibits fossil fuel-based fertilizers<sup>51</sup>. In the fourth place, from the point of view of economic benefits, it has a net income.

In general, organic farming promotes a healthy environment, animal welfare and a plant and soil health in hope to be more beneficial for humans on the short and long run according to Article 4 of the Regulation (EU) 2018/848.

For instance, when it comes to organic farming, products containing at least 95% organic ingredients, with strict conditions applied to the remaining 5%, can hold the organic logo of the EU<sup>52</sup> according to Article 30 of the Regulation (EU) 2018/848.

This logo helps the consumer to easily identify these products visual by spotting the green and white logo that should be presented according to specific dimensions. It should also be accompanied by a code number of the control body and an address indicating the farming and agricultural procedure of the mentioned product.

This approach also aligns the Farm to Fork Strategy<sup>53</sup>, that aims to ensure sustainable food production, to stimulate sustainable food processing, wholesale, retail, hospitality and food services practices, while promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets without forgetting the reduction of food losses and wastes.

This strategy is at the heart of the European Green Deal<sup>54</sup>, which can be defined as a strategy made of a series of decisions including in particular new legislation and investments in order to make energy production and the way of life of the citizens in Europe more sustainable and less harmful to the environment.

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<sup>50</sup>Parizad S. - Bera S., *The effect of organic farming on water reusability, sustainable ecosystem, and food toxicity*, in *Environ Sci Pollut Res*, 2023, 30, pp. 71665-71676.

<sup>51</sup> <https://www.nrdc.org/bio/lena-brook/organic-agriculture-helps-solve-climate-change>.

<sup>52</sup> [https://agriculture.ec.europa.eu/farming/organic-farming/organic-logo\\_en](https://agriculture.ec.europa.eu/farming/organic-farming/organic-logo_en).

<sup>53</sup> [https://food.ec.europa.eu/system/files/2020-05/f2f\\_action-plan\\_2020\\_strategy-info\\_en.pdf](https://food.ec.europa.eu/system/files/2020-05/f2f_action-plan_2020_strategy-info_en.pdf)

<sup>54</sup> [https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF).



For instance, studies have shown preliminary evidence that eco-friendly labels, can encourage and stimulate the consumer to select, purchase and consumer more sustainable and eco-friendly food and drink products.<sup>55</sup>

Therefore, implementing the notion of sustainability in food labeling can be an impacting instrument regarding sustainable food consumption, which can start as an individual impact on the system until it becomes a social consciousness which will hence have a very powerful impact of the system. This magnificent effect can start just by promoting and highlighting its effect using food labeling.

An interesting and helpful suggestion would be incorporating the EU Ecolabel regulated by Regulation (EC) No 66/2010<sup>30</sup> in the food labeling system, since at the moment food products are currently not eligible<sup>31</sup> according to Article 6 of this Regulation. This inclusion would favor the sustainability of the food system, since EU Ecolabels endorse the European Union's shift to a circular economy<sup>32</sup>, which also is one of the main building blocks of the European Green deal, supportive of not only sustainable production, but also of the sustainable consumption.

At this point, the role of food labeling has been clearly demonstrated even experimentally showing that consumer behavior is translated into more coherent eco-friendly attitude when the eco-friendliness information of the food products is more accessible and visible on the product's label<sup>56</sup>.

### 4.3) Cultural and Taste Promotion

Culture itself is a concept that connects society through social behavior, beliefs, customs, attitudes and habits through institutions and norms and is usually allocated to a specific region. Food culture is known to be one of the main interpretations of culture and also one of the oldest. Anthropologists associated food culture with other disciplines like sociology, nutrition, history, agriculture, geography and others<sup>57</sup>. At the level of the consumer, on the other side, food culture is rather associated with values, traditions, beliefs and heritage. However, in a world where

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<sup>55</sup> Potter C. et al., *The Effects of Environmental Sustainability Labels on Selection, Purchase, and Consumption of Food and Drink Products: A Systematic Review*, in *Environment and Behavior*, vol. 53, 8, October 2021, pp. 891-925.

<sup>30</sup> Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel, OJ L 27, 30.1.2010, pp. 1-19.

<sup>31</sup> [https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel/faq\\_en](https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel/faq_en).

<sup>32</sup> [https://environment.ec.europa.eu/strategy/circular-economy-action-plan\\_en](https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en).

<sup>56</sup> Vlaeminck et al., *Food labeling and eco-friendly consumption: Experimental evidence from a Belgian supermarket*, in *Ecological Economics*, 2014, vol. 108, pp. 180-190.

<sup>57</sup> Counihan C. - Van Esterik P. – Julier A. eds., *Food and Culture: A Reader*, New York-London, Routledge, 2019.

change and innovation are dominating, food culture is expanding. Through this expansion, food cultures are in a continuous and permanent transition, yet some forms of resistance are also found<sup>58</sup>. In order to protect food culture and integrate new concepts while maintaining the value of original product, legal culture is necessary and fundamental. Hence, food law necessity was noticed, handling also food labeling that is therefore seen as a twofold cultural product as it is the final outcome of an interaction between two different cultures, the legal one and the food culture one. Food has always been a crucial and main social factor, where identity is expressed, communities are recognized and emotions are shared, therefore food culture somehow influences the attitude of an individual towards food that aren't part of his culture, and this calls subsequently to regulatory and commercial consequences<sup>59</sup>.

Since food labeling depends on cultural factors, from both the food side and the legal side, food labeling systems will be diverse from one culture to another, or better said, from a region to another. As well-known examples, we can mention the differences between labeling systems in the European Union and the ones of the United States of America.

For instance, public regulators in the United States confront further limitations in comparison with the ones of the European Union when it comes to the imposition of labeling requirements on food producers<sup>60</sup>. This is explained by the fact that commercial advertising is protected by the free speech clause under the First Amendment of the US Federal Constitution<sup>61</sup>: «*The First Amendment provides that Congress make no law respecting an establishment of religion or prohibiting its free exercise. It protects freedom of speech, the press, assembly, and the right to petition the Government for a redress of grievances*».

An example to highlight an opposite approach would be the case of consumers of the EU that shows more objection to modification of foodstuffs in comparison to other goods and support the idea of preserving their dietary pattern and habits which are known to be healthy worldwide. In the US, on the other hand, the idea of modification of foodstuffs is more applaudable and tradition conservation is less relevant.<sup>62</sup>

Back to the EU, here are some specific European regulations that once advocated food culture, but were repealed by Regulation (EU) No 1151/2012 of the European Parliament and of the

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<sup>58</sup> Alvard M.S., *The Adaptive Nature of Culture*, in *Evolutionary Anthropology*, 2003, vol. 12, 3, pp. 136-149.

<sup>59</sup> Echols M., *Food Safety Regulation in the European Union and the United States: Different Cultures, Different Laws*, in *Columbia Journal of European Law*, 1998, vol. 4, 3, pp. 525-543.

<sup>60</sup> Bairati L., *Legal Culture and Food Culture in Labelling Regulation: An EU/US Comparative Analysis*, in *Global Jurist*, 2020, vol. 20, 1, 20190055, DOI: 10.1515/gj-2019-0055.

<sup>61</sup> <https://www.whitehouse.gov/about-the-white-house/our-government/theconstitution/#:~:text=The%20First%20Amendment%20provides%20that,the%20right%20to%20bear%20arms.>

<sup>62</sup> L. Bairati, *cit.*

Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs, we can first mention the Regulation (EU) No 509/2006 of 20 March 2006 on agricultural products and foodstuffs as traditional specialties guaranteed<sup>63</sup> and second, the Regulation (EC) No 510/2006 of 20 March 2006 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs<sup>64</sup>. These regulations, that were repealed by Regulation (EU) no 1151/2012 (in turn repealed by Regulation (EU) 2024/1143) have been mentioned under Article 26 of Regulation (EU) No 1169/2011 on the provision of food information to consumers which chose once again the importance given to the country of origin or place of provenance of a product. Other than being mandatory as indications, products with protected geographical indications and products with protected denomination of origin are respectively represented by the symbols PGI and the symbol PDO of food labeling when originated in Europe and may be used on those originating in third countries and sold under these designations<sup>65</sup>.

The concepts of PDO and PGI might be confusing, but the difference is quite simple. For food products other than wine and spirits, starting with PDOs, the raw ingredients requisite to originate from the region of origin where all steps of production have taken place, whereas when it comes to PGIs, it is enough to have at least one of the stages of production, processing or preparation that has taken place in the region, according to Article 46 of Regulation (EU) 2024/1143<sup>66</sup>.

Another decision under the EU, to support target cultural groups, is the Commission Decision (EU) 2018/1701 of 7 November 2018, which simply registered the proposed citizens' initiative entitled 'Mandatory food labelling Non-Vegetarian/Vegetarian/Vegan'<sup>67</sup> suggesting the adoption of provisions on simple pictorial labels for food products: Non-Vegetarian, Vegetarian, or Vegan in order to facilitate the choice of these groups.

Therefore, we can definitely see how food labeling manages to promote and support culture while enhancing food cultural beliefs while imposing some regulations in order to help the consumer to find his requisites despite the diversification over the years.

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<sup>63</sup> Council Regulation (EC) No 509/2006 of 20 March 2006 on agricultural products and foodstuffs as traditional specialties guaranteed, OJ L 93, 31/03/2006, pp. 1-11.

<sup>64</sup> Council Regulation (EC) No 510/2006 of 20 March 2006 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs, OJ L 93, 31.3.2006, p. 12-25.

<sup>65</sup> <https://eur-lex.europa.eu/EN/legal-content/summary/geographical-indications-and-designations-of-origin.html>.

<sup>66</sup> Regulation (EU) 2024/1143 of the European Parliament and of the Council of 11 April 2024 on geographical indications for wine, spirit drinks and agricultural products, as well as traditional specialties guaranteed and optional quality terms for agricultural products, amending Regulations (EU) No 1308/2013, (EU) 2019/787 and (EU) 2019/1753 and repealing Regulation (EU) No 1151/2012, OJ L, 2024/1143, 23.4.2024, ELI: <http://data.europa.eu/eli/reg/2024/1143/oj>

<sup>67</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32018D1701>

Moving on to another topic, it is important to tackle the tangible and physical part of the food, rather than its history, place and method of preparation, we are speaking about organoleptic characteristics which combine all the following: appearance, aroma, taste and texture<sup>68</sup>.

An important part of the organoleptic experience is taste which can be disseminated into five basic taste quality, which are sweet, salty, bitter, umami (also known as savory) and sour<sup>69</sup>. The concept of taste is always correlated to the ingestion of food, yet the human experience of eating actually activates the interaction of all five senses<sup>70</sup>. Therefore, also sight as a sense is involved in this experience, and the perception of food products in general and in the supermarket for instance are part of the process and could potentially alter the whole sensation.

Hence, food identity information presented as food-name labels could be in favor of the consumer, by providing him with a sort of security of having the same taste and experience again, if he purchases the same brand for example, and in that case the role of food labeling strikes again. According to Article 2 of Regulation (EU) No 1169/2011<sup>71</sup>, the term labelling means: *any words, particulars, trademarks, brand name, pictorial matter or symbol relating to a food and placed on any packaging, document, notice, label, ring or collar accompanying or referring to such food*». It has also been proven through a study that food-name labels influence the liking, familiarity of basic tastes<sup>72</sup>.

A name of a food however, again according to the Article 2 of the Regulation (EU) No 1169/2011, could be defined under three forms: legal, customary, or descriptive name yet never replaced or substituted by the trademark or the brand.

The legal name is the name of a food as prescribed by Union regulations applicable to it, or, in the absence of such regulations, the name established by the laws, regulations, and administrative provisions of the Member State where the food is sold to the final consumer or to mass caterers. The customary name on the other side is a name that is recognized by consumers in the Member State where the food is sold and does not require any further explanation.

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<sup>68</sup> <https://www.sciencedirect.com/science/article/abs/pii/B9781782422754000010>

<sup>69</sup> Lindermann B., *Taste Reception*, in *Physiol Rev.*, 1996, pp. 718-766.

<sup>70</sup> Gravina S.A. - Yep G.L. - Khan M., *Human biology of taste*, in *Ann Saudi Med.*, 2013, May-Jun, 33(3):217-222. doi: 10.5144/0256-4947.2013.217. PMID: 23793421; PMCID: PMC6078535.

<sup>71</sup> Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004, OJ L 304, 22.11.2011, pp. 18-63.

<sup>72</sup> <https://www.researchgate.net/publication/23672743>.

The choice is made under Article 17 of the same Regulation.

Last but not least, there is the descriptive name which is a name that clearly describes the food and, if necessary, its intended use, providing enough information for consumers to understand its true nature and differentiate it from other products that could be confused with it.

Once again, food labeling reinforces the connection between the seller and the consumer, creating a sort of confidence, maintaining and communicating to the consumer the same level of satisfaction he had previously, even before consuming the product. This purpose serves also Regulation (EU) No 1169/2011, since its scope according to Article 1 is the assurance of an elevated level of protection to the consumers when it comes to food information and what it provides.

With that being said, it is up to the consumer to make up his choices while having all the necessary information in hand to fulfill his needs and choose the product that suits best his lifestyle and is up to his taste.

## CHAPTER 5

### CRITICALITIES OF FOOD LABELING AFFECTING THE CONSUMER'S CHOICE

Food labeling has been transformed into a vital marketing tool for food manufacturers, allowing them to communicate key product attributes directly to the consumer. Food labeling at this point not only informs buyers about the product's ingredients and benefits, but also appeals to consumers' growing interest in health, sustainability, and ethical consumption. As a result, these labels have a significant influence on consumer behavior, guiding their purchasing decisions by aligning with their values, health goals, or lifestyle preferences<sup>73</sup>. The strategic use of labeling, whether it is mandatory or voluntary, regulated by articles 35 and 36 respectively of Regulation (EU) no. 1169/2011<sup>74</sup> has become a powerful method for manufacturers to differentiate their products in a crowded market, build brand loyalty, and ultimately drive sales. As food manufacturers increasingly leverage food labeling to their advantage, it has become the responsibility of consumers to fully understand and interpret these labels. While this understanding is crucial for making informed purchasing decisions, it can also be a significant challenge. For instance, with the vast array of food products on the market, each featuring different claims and nutritional information, consumers may find it difficult to discern which labels are genuinely beneficial or misleading. This abundance of options, combined with complex terminology and evolving standards, can create confusion, making it harder for individuals to make choices that align with their health goals or ethical preferences<sup>75</sup>.

#### 5.1) Food Illiteracy of the Consumer

The concept of food literacy extends beyond simply understanding nutritional guidelines or having strong cooking skills. It encompasses a broader, more integrated understanding that merges knowledge of nutrition, health, and the environment. Food literacy involves being aware of how food choices impact personal well-being, the community, and the planet, fostering a deeper connection to the food we consume. It highlights the importance of making

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<sup>73</sup> <https://doi.org/10.1093/aapp/pps028>

<sup>74</sup> Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004 Text with EEA relevance, OJ L 304, 22.11.2011, pp. 18-63.

<sup>75</sup> <http://dx.doi.org/10.33306/mjssh/206>

informed decisions that reflect not just nutritional needs, but also ecological sustainability and cultural values related to food<sup>76</sup>. According to studies by Gupta and Dharni<sup>77</sup> and Cavaliere et al.<sup>78</sup>, research indicates that consumers with higher levels of education tend to use nutrition labeling more frequently. These studies suggest that educated individuals are more likely to engage with and understand nutritional information on food labels, potentially making more informed and health-conscious purchasing decisions as a result. Therefore, food illiteracy of the consumer will most probably lead the consumer to make the “wrong” choice or will limit him from reaching the actual product that he is looking for or the food that would align with his needs, goals and his lifestyle.

The association between food literacy and purchasing behavior highlights the significant role that knowledge, particularly in human nutrition, plays in influencing consumer decisions. Studies suggest that individuals with specific education or training in human nutrition are more likely to make informed and health-conscious food choices<sup>79</sup>. This understanding of nutrition allows consumers to better interpret food labels, evaluate the nutritional value of products, and select foods that align with their health goals. As a result, people with higher food literacy tend to prioritize healthier options, avoid misleading claims, and consider the broader impact of their food choices on their well-being. This relationship underscores the importance of food education in shaping purchasing behaviors and promoting healthier eating habits.

A real life example is the one where consumers have misinterpreted the footnote on food labels that provides daily values, leading to confusion about the actual nutrient content of the product they were consuming<sup>80</sup>. They assumed that the daily value percentages listed on the label applied to the specific item in front of them, rather than understanding that these percentages represent the recommended daily intake for an average adult across all food consumption throughout the day. As a result, patients overestimated the amount of nutrients they were ingesting, believing that a single serving of a product provided a large portion of their daily nutritional needs. This misunderstanding can skew their perception of their diet, potentially leading to an unbalanced intake of nutrients, where they might believe they are meeting or

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<sup>76</sup> Perry E.A. - Thomas H. - Samra H.R. - Edmonstone S. - Davidson L. - Faulkner A. - Petermann L. - Manafo E. - Kirkpatrick S.I., *Identifying attributes of food literacy: a scoping review*, in *Public Health Nutrition*, 2017, vol. 20, 13, pp. 2406-2415, doi: 10.1017/S1368980017001276.

<sup>77</sup> Gupta K. and Dharni K., *Use and influence of nutrition labelling: an emerging market experience*, *Nutrition and Food Science*, 2016, vol. 46, no. 3, pp. 441-456, doi: 10.1108/NFS-10-2015-0129.

<sup>78</sup> Cavaliere A. - De Marchi E. and Banterle A., *Investigation on the role of consumer health orientation in the use of food labels*, in *Public Health*, 2017, vol. 147, pp. 119-127, doi: 10.1016/j.puhe.2017.02.011.

<sup>79</sup> <https://hdl.handle.net/11382/538442>

<sup>80</sup> Rothman M.D. et al., *Patient Understanding of Food Labels: The Role of Literacy and Numeracy*, in *American Journal of Preventive Medicine*, 2006, vol. 31, pp. 391-398.

exceeding their nutritional goals without considering the broader context of their overall diet. This highlights the importance of clear communication on food labels to ensure that consumers, especially those with specific dietary needs, accurately interpret the information provided. As a conclusion, governments and authorities should not only work on protecting the consumer while just enhancing food labels and nutrition claims, yet they also should work on the food literacy and education of consumer. With the combination of these two concepts, the consumer will be able to make the best decision out of the food label presented and will also be able to perceive the most out of the information presented without limitations, doubts and misinterpretations.

## **5.2) The socio-economic status of the consumer**

The term “socio-economic status (SES)” refers to an individual’s or group’s position within society, which is shaped by factors such as income, occupation, education, and social class<sup>81</sup>. It serves as a measure of an individual’s or group’s overall standing and influence within the community, reflecting their access to resources, opportunities, and quality of life. SES is often used to understand disparities in health, education, and well-being, as those with higher SES typically have more access to wealth, better employment opportunities, and enhanced social mobility compared to those with lower SES<sup>82</sup>. The prevalence of obesity is significantly higher among populations with low socio-economic status in many high-income countries, where individuals from disadvantaged backgrounds face greater barriers to healthy eating and physical activity. This disparity is often linked to limited access to nutritious food, fewer opportunities for exercise, and other socio-economic factors that contribute to poor health outcomes<sup>83</sup>. Moreover, the burden of obesity is not confined to high-income nations; it is also on the rise across all income groups in low- and middle-income countries<sup>84</sup>. As these countries undergo rapid urbanization and economic changes, they are seeing an increase in obesity rates due to shifts in dietary patterns, increased consumption of processed foods, and reduced physical activity, affecting individuals across various socio-economic strata. This growing global trend underscores the need for targeted public health interventions that address the social

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<sup>81</sup> Munir J. – Faiza M. - Jamal B. - Daud S. - Iqbal K., *The Impact of Socioeconomic Status on Academic Achievement*, in *Journal of Social Sciences Review*, 2023, 3(2), pp. 695-705.

<sup>82</sup> Encyclopedia of Creativity (Second Edition), 2011.

<sup>83</sup> Booth H.P. – Charlton J., Gulliford M.C., *Socioeconomic inequality in morbid obesity with body mass index more than 40 kg/m<sup>2</sup> in the United States and England*, 2017, vol. 3, in *SSM - Population Health*, pp. 172-178.

<sup>84</sup> Dinsa D. – Goryakin Y. – Fumagalli E. – Suhrcke M., *Obesity and socioeconomic status in developing countries: A systematic review*, in *Obesity Reviews*, 2012, 13 (11), pp. 1067-1079.



determinants of health and reduce inequalities related to obesity. Pricing policy is considered a highly effective tool for influencing dietary behavior, particularly when targeting low-income groups. By adjusting food prices, such as through subsidies for healthier options or taxes on unhealthy products, policymakers can encourage healthier eating habits. This approach can help make nutritious foods more accessible and affordable for people with limited financial resources, thus promoting better dietary choices within low-income communities. Given that price is often a significant factor in food selection, strategic pricing could play a crucial role in addressing dietary-related health disparities and improving overall public health outcomes<sup>85</sup>. Therefore, it is crucial to emphasize the importance of public health interventions that target the economic environment, not just focusing on price but also on the perceived value of food products. While clear and accurate food labels are essential for helping consumers make informed choices, even the best labels may not be enough if consumers are still drawn to cheaper, less healthy options due to price convenience. By addressing both the affordability and value of healthier foods, such interventions can help shift consumer behavior towards more nutritious choices, even for those who are financially constrained. This holistic approach is necessary to create an environment where health-conscious decisions are both accessible and appealing, particularly for lower-income populations.

### **5.3) Misleading the consumer**

Fair Information Practices (FIPs) emphasize the need for transparency and honesty in the marketing and presentation of food products. These practices ensure that all aspects of food labeling, advertising, and packaging - such as the design, shape, appearance, the materials used, the arrangement of items on store shelves, and the way products are displayed, regulated by Article 16 on presentation of the Regulation (EC) no. 178/2002<sup>86</sup> - are not misleading to consumers. Additionally, the information conveyed through various mediums, such as print, digital platforms, or in-store displays, must accurately reflect the true nature of the product. This includes the nutritional content, ingredients, sourcing, and any claims made about the product.

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<sup>85</sup> Hulshof K.F. – Brussaard J.H. – Kruizinga A.G. et al., *Socio-economic status, dietary intake and 10 year trends: the Dutch National Food Consumption Survey*, in Eur J Clin Nutr, 2003, 57, 128-13.

<sup>86</sup> Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002, laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, OJ L 031 1.2.2002, p. 1

The objective of these practices is to protect consumers from being misled or deceived by misleading visual cues, overly optimistic claims, or confusing labeling that could lead to poor decision-making. For instance, a food product might appear healthier due to its packaging design or marketing message, even though it may not meet the expectations set by those representations. By ensuring that food labeling and advertising are truthful and transparent, Fair Information Practices help consumers make well-informed choices based on the actual qualities of the product, rather than being swayed by deceptive tactics.

In essence, FIPs seek to create a fair and trustworthy marketplace where consumers can rely on the information available to them, ensuring that they are not manipulated by misleading packaging or marketing techniques. This is especially important in the food industry, where consumer health and well-being can be directly impacted by the information presented on labels and advertisements.

Moreover, Regulation (EU) no. 1169/2011<sup>87</sup>, specifically Article 7, also establishes provisions regarding fair information practices, emphasizing that food information must not mislead the consumer. Purposely, it stipulates that all food-related information provided to consumers should be accurate, clear, and easy to understand. This ensures that consumers are not deceived by misleading or confusing claims, and can make informed decisions based on truthful, straightforward information. The goal is to provide transparency in food labeling, allowing consumers to easily comprehend the nutritional content, ingredients, sourcing, and other important details about the product, thereby supporting healthier choices and reducing the risk of misinformation.

Despite the existence of regulations aimed at preventing misleading food information and protecting consumers, such misleading practices continue to occur. This persistent issue can be attributed to various factors, including vague or ambiguous labeling<sup>88</sup>, the use of appealing but deceptive marketing tactics, and loopholes in the regulatory frameworks that allow for misleading claims. For instance, food products may use terms like “natural” or “healthy” without clear definitions, or the packaging may emphasize certain positive attributes - such as “low-fat” - while downplaying less favorable aspects, like high sugar content. Additionally, the

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<sup>87</sup> Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004, OJ L 304 22.11.2011, p. 18

<sup>88</sup> Privitera G.J. et al., *Emolabeling Effectively Reduces the Influence of Ambiguous Labeling on Food Packages Among Grocery Store Shoppers*, in *Global Journal of Health Science*, 2014 Dec 16, 7(4):12-7, doi: 10.5539/gjhs.v7n4p12.

complexity of food labeling and the overwhelming amount of information on packaging can confuse consumers<sup>89</sup>, making it difficult for them to make fully informed decisions.

In some cases, manufacturers may exploit legal gray areas in regulations to present their products in a more favorable light, often with the intention of boosting sales<sup>90</sup>. Even when regulations are in place to promote transparency, the enforcement of these rules can sometimes be inconsistent, and some companies may prioritize profit over ethical marketing practices. This highlights the ongoing challenge of ensuring that food labeling not only complies with regulations but also genuinely empowers consumers to make healthier and more informed choices. Consequently, stronger enforcement, clearer standards, and continuous education for consumers are needed to bridge the gap between regulation and actual consumer protection.

Finding the right balance between effective communication and compelling product promotion has emerged as a formidable challenge for businesses<sup>91</sup>. This complexity is particularly evident in the realm of food labeling, where the rising tide of litigation over misleading or deceptive claims serves as a stark reminder of the difficulties involved. As companies seek to engage consumers with persuasive advertisements, the line between genuine product information and marketing hyperbole becomes increasingly blurred. The growing number of legal disputes reflects not only the potential for consumer confusion but also the broader ethical concerns about how marketing strategies can manipulate perceptions. This ongoing tension highlights the need for more rigorous standards and clearer guidelines to ensure that both the interests of consumers and the integrity of advertising practices are safeguarded.

Another significant challenge could arise when food labeling is done voluntarily by manufacturers or through private certification programs, often with limited government oversight<sup>92</sup>. In these cases, the lack of robust regulatory frameworks can lead to inconsistent or misleading labeling practices. While this voluntary approach may offer a wide array of product choices to consumers, it also creates the potential for misinformation, as companies may prioritize marketing over transparency. Without a strong emphasis on ensuring the scientific accuracy and reliability of the information provided on labels, consumers may be misled about the nutritional value, health benefits, or quality of a product.

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<sup>89</sup> Bogliacino F. et al., *Less is more: Information overload in the labelling of fish and aquaculture products*, in *Food Policy*, vol. 116, April 2023, 102435.

<sup>90</sup> Meyer P., *The Crazy Maze of Food Labeling and Food Claims Laws*, in *St. John's L. Rev.*, 2018, vol. 92, 2, 233-282.

<sup>91</sup> Guarino J. - Nathani N. – Endres A.B., *What the Judge Ate for Breakfast: Reasonable Consumer Challenges in Misleading Food Labeling Claims*, in *Loy. Consumer L. Rev.*, 2023, vol. 35, 82.

<sup>92</sup> Dhyani J., *Science-Based Food Labels: Improving Regulations & Preventing Consumer Deception through Limited Information Disclosure Requirements*, in *Alb. L.J. Sci. & Tech.*, 2016, vol. 26, 1.

A more effective solution would involve a regulatory framework that focuses not only on consumer protection from deceptive claims but also on allowing for diversity in the marketplace. By enhancing oversight, particularly on the scientific validity of health claims, authorities can help curb instances of consumer deception while still maintaining the availability of a wide range of products. This approach would prevent the proliferation of misleading labels and avoid the creation of superficial solutions that fail to address underlying issues, such as misleading marketing practices or gaps in consumer education. Furthermore, such oversight could reduce the likelihood that future problems - such as deceptive claims that require more extensive regulation - rise, by proactively addressing these concerns before they become widespread.

Although regulations to protect consumers from misleading labeling are already in place, deceptive practices can still occur. This leaves it partly up to consumers to go beyond the label and make informed decisions by critically evaluating the information provided. Consumers must actively engage with product labels, paying attention to details and questioning claims in order to avoid being misled. However, responsibility should not fall solely on the consumer. Regulatory authorities must play a vital role in closing existing gaps and tightening oversight to prevent deceptive practices. Strengthening regulations and ensuring more rigorous enforcement can help eliminate loopholes that allow misleading labeling to persist. In this way, both informed consumer behavior and more stringent regulations are essential to creating a more transparent and reliable food labeling system.

## CHAPTER 6

### IMPACTS OF CONSUMER'S CHOICE OF FOOD ON HEALTH

Over 2,000 years ago, Hippocrates known as the father of medicine said, «*let thy food be thy medicine and thy medicine be thy food*»<sup>93</sup> However nowadays, 2000 years later, one of the most significant and ambitious goals that the field of Public Health is striving is still to achieve on a global scale is the widespread promotion of healthy lifestyles and the adoption of proper nutrition. Nutrition-related health issues have become a major concern, profoundly affecting individuals and communities across the world. The prevalence of these chronic diseases has been rising rapidly in recent years, affecting both developed and developing countries<sup>94</sup>. These challenges are having a far-reaching impact on both public health systems and the economy<sup>95</sup>, because of the excessive and unsustainable economic costs that such conditions impose on healthcare systems. Hence, these issues pushed public health organizations to focus increasingly on encouraging individuals to adopt healthier lifestyles and follow balanced dietary habits<sup>96</sup> since diet is one of the most readily modifiable risk factors. Diet is not only a risk factor yet it plays a critical role in determining disease risk as acknowledged by the World Health Organization (WHO) Global Action Plan for the Prevention and Control of Noncommunicable Diseases that outlined strategies aimed at addressing unhealthy dietary patterns<sup>97</sup>. These initiatives are part of a broader effort to reduce behavioral risk factors associated with chronic diseases.

Diet changes offer everyone the opportunity to take personal responsibility for their health and therefore reduce the risk of chronic diseases. This way, the focus of the organizations was shifted from treating diseases and their consequences to prevention of diseases while educating or supporting consumers in food choices that would affect their health sooner or later<sup>98</sup>.

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<sup>93</sup> Graham T. - Ramsey D., *The Happiness Diet: A Nutritional Prescription for a Sharp Brain, Balanced Mood, and Lean, Energized Body*, Rodale. 2011.

<sup>94</sup> World Health Organization. Global status report on noncommunicable diseases. Geneva: WHO; 2014. 298.

<sup>95</sup> Cawley J. - Meyerhoefer C., *The medical care costs of obesity: an instrumental variables approach*, in *J Health Econ*, 2012, 31, pp. 219-230.

<sup>96</sup> Provencher V. - Jacob R., *Impact of perceived healthiness of food on food choices and intake*, in *Curr Obes Rep*, 2016, 5, pp. 65-71.

<sup>97</sup> Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020. World Health Organ; Geneva, Switzerland: 2013.

<sup>98</sup> <https://www.cdc.gov/nutrition/php/public-health-strategy/index.html>.

To encourage individuals to take greater responsibility regarding their diet and to make informed choices - ideally opting for higher-quality food - several communication strategies have been implemented. One of the most straightforward approaches involves the use of food labels<sup>99</sup>. These labels provide essential information that can help consumers better understand the nutritional content of products, enabling them to make healthier decisions and better control their diet<sup>100</sup>. By clearly displaying key details regarding the product, food labels serve as a valuable tool in guiding consumers toward healthier eating habits. For instance, evidence suggests that the use of nutrition labels by consumers is primarily influenced by their belief in the importance of maintaining a healthy diet<sup>101</sup>.

In other words, consumers interested in a healthy lifestyle would seek nutritional information through the consultation of the food label in order to choose the best product which will therefore promote their health and protect them from chronic diseases.

On the other side, bad dietary choices have a profound impact on the development of various health conditions, such as hypertension, hypercholesterolemia, overweight/obesity, and chronic inflammation. These conditions are not only interrelated but also serve as key risk factors that significantly increase the likelihood of developing serious diseases, including cardiovascular disease, type 2 diabetes, and certain types of cancer<sup>102</sup>. The long-term effects of poor dietary habits can contribute to a cascade of health issues that not only reduce quality of life but also lead to substantial morbidity and premature mortality.

Back to the idea of Hippocrates, food choices can also treat diseases rather than just preventing them. A representative example in this case would be obesity or over-weight. In that case lifestyle changes is considered the first line of therapy<sup>103</sup>. Consequently, when mentioning lifestyle changes, a healthy diet and the right food choices comes on top of the list, and that also is the case of type 2 diabetes which is often correlated with obesity<sup>104</sup>.

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<sup>99</sup> Kreuter M.W. - Brennan L.K. - Scharff D.P. - Lukwago S.N., *Do nutrition label readers eat healthier diets? Behavioral correlates of adults' use of food labels*, in *Am J Prev Med*, 1997, 13, pp. 277-283.

<sup>100</sup> Kerr M.A. - McCann M.T., *Livingstone MB. Food and the consumer: could labelling be the answer?* In *Proc Nutr Soc*, 2015, 74, pp. 158-163.

<sup>101</sup> Roberto C.A. - Bragg M.A. - Seamans M.J. et al., *Evaluation of consumer understanding of different front-of-package nutrition labels, 2010–2011*, in *Prev Chronic Dis*, 2012, 9, 120015.

<sup>102</sup> Koene R.J. - Prizment A.E. - Blaes A. - Konety S.H., *Shared risk factors in cardiovascular disease and cancer*, in *Circulation*, 2016, 133, 11, pp. 1104-1114, doi: 10.1161/CIRCULATIONAHA.115.020406.

<sup>103</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC6736799/>.

<sup>104</sup> <https://www.afro.who.int/news/healthy-diet-and-lifestyle-modification-essential-preventing-diabetes>

However, when talking about health, it is also important to mention mental, and social well-being, rather than simply the absence of disease or illness because health as defined by the WHO requires the complete presence of not only physical health, but also its social and mental aspects. For instance, it encompasses not only the absence of physical ailments but also a person's emotional and psychological health, as well as their ability to function and thrive in society. Back to the economy, the global burden of mental illness, in terms of both financial cost and disability, is comparable to that of all cancers combined<sup>105</sup>. Mental health conditions significantly impact healthcare systems, productivity, and quality of life, making them a leading public health challenge<sup>106</sup>.

Talking about mental health, diets rich in refined sugars, for instance, can have detrimental effects on brain health. In addition to disrupting the body's ability to regulate insulin, high sugar intake also contributes to increased inflammation and oxidative stress. Numerous studies<sup>107</sup> conducted by the University of Harvard have established a link between high refined sugar consumption and impaired brain function, with some research even suggesting that such diets may exacerbate symptoms of mood disorders, including depression. This highlights the broader impact of diet on mental health, showing that poor nutritional choices can affect not only physical health but also cognitive and emotional well-being.

Food choices and healthy diet in reality not only can prevent mental health problems, but also can be considered as a very important line of treatment<sup>108</sup>. Recent studies have for example proven that Omega-3 fatty acids have proven effective as both a standalone treatment and an adjunctive therapy for conditions like ADHD, major depressive disorder, bipolar depression, and PTSD<sup>109</sup>. In that case FOPs labeling can be helpful to easily detect foods rich in omega-3 fatty acids and therefore making the right food choice in order to optimize health.

Preventing mental and physical problems, the social component is easily reachable and in safe hands. For instance, studies have shown that wellness, well-being, and quality of life are becoming

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<sup>105</sup> Bloom D. - Cafiero E. - Jané-Llopis E. et al., *The global economic burden of noncommunicable diseases. Program on the Global Demography of Aging*, 2012, 8712.

<sup>106</sup> Murray C.J. - Lopez A.D., *Alternative projections of mortality and disability by cause 1990–2020 Global Burden of Disease Study*, in *The Lancet*, 1997, vol. 349, pp. 1498-1504.

<sup>107</sup> <https://www.health.harvard.edu/blog/nutritional-psychiatry-your-brain-on-food-201511168626>

<sup>108</sup> Sarris J. - Logan A. - Akbaraly T. et al., International Society for Nutritional Psychiatry Research consensus position statement: nutritional medicine in modern psychiatry, in *World Psychiatry*, 2015, 14, 3, pp. 370-371. doi: 10.1002/wps.20223. PMID: 26407799; PMCID: PMC4592666.

<sup>109</sup> Mischoulon D. - Freeman M., *Omega-3 fatty acids in psychiatry*, in *Psychiatric Clinics of North America*, 2013, 36, 1, pp. 15 - 23.

increasingly significant factors that influence consumer perceptions, shaping their preferences and choices when it comes to food and a wide range of other products<sup>110</sup>.

To wrap up, all aspects of health - physical, mental, and social - are deeply interconnected, each influencing and supporting the others in complex ways. Achieving a state of complete health requires a holistic approach that encompasses all three dimensions, recognizing that well-being is not merely the absence of illness but the presence of balanced, thriving physical, mental, and social health. To attain success in these interconnected areas, making wise and responsible food choices plays a pivotal role. The foods we consume impact on our physical health directly or indirectly, but they also affect our mental clarity, emotional resilience, and social interactions either right away or through time.

Therefore, adopting a mindful approach to nutrition - one that emphasizes whole, nutritious foods and supports long-term health - is essential in fostering overall well-being and achieving success in the various facets of life.

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<sup>110</sup> Meiselman H.L., *Quality of life, well-being and wellness: Measuring subjective health for foods and other products*, in *Food Quality and Preference*, 2016, 54 pp. 101-109.





## CHAPTER 7

### CONCLUSION

Food labeling, as regulated by Regulation (EU) No 1169/2011, serves as a crucial tool in guiding consumer behavior, particularly in the context of public health. It provides transparency about the nutritional content, ingredients, allergens, and sourcing of food products, offering valuable information that can empower consumers to make healthier choices. For example, labels indicating calorie counts, the amount of fat, sugar, salt, and fiber, or certifications like “organic” or “fair trade” can help consumers make informed decisions that align with their dietary goals, health needs, and ethical values. Furthermore, food labeling can promote sustainability by highlighting eco-friendly practices such as reduced carbon footprints, sustainable packaging, or locally sourced ingredients, thus fostering more environmentally conscious purchasing habits. In this sense, food labels not only support individual health but can also encourage a broader cultural shift towards more responsible food production and consumption.

However, the effectiveness of food labeling is not without its challenges. The key issue lies in the consumers’ ability to interpret the information provided. While food labels are designed to make nutrition information easily accessible, they can often be complex or misleading. Claims such as “low-fat”, “sugar-free”, or “natural” can be difficult for the average consumer to fully understand, especially when these terms are not rigorously defined or are used in a way that masks less healthy ingredients. Consumers without adequate knowledge of nutrition might be misled into thinking that a product is healthier than it actually is. Additionally, certain labeling practices - such as highlighting only one aspect of a product (e.g., low sugar, but high in salt or unhealthy fats) - can present an incomplete or biased picture of the product's overall nutritional value.

Beyond the issue of understanding food labels, socio-economic factors also play a significant role in how food labeling affects health outcomes. Consumers from lower socio-economic backgrounds may face barriers in accessing healthier options, despite clear labeling. Fresh, organic, or sustainably sourced foods are often more expensive, making them less accessible to individuals with limited financial resources. Even if a consumer is able to interpret food labels correctly, they may be unable to afford the healthier options those labels represent. This economic disparity contributes to health inequities, as lower-income populations are more likely to consume

processed, less nutritious foods that may be marketed as “affordable” or “convenient”, but are often higher in unhealthy ingredients like refined sugars, salts, and fats.

Furthermore, cultural and educational factors influence the extent to which food labeling can drive positive health changes. People with lower levels of education or less exposure to nutrition education may struggle to decode the detailed information provided on food labels, even if it is clear and concise. As a result, simply having better labeling regulations is not enough to ensure improved health outcomes for all consumers. Comprehensive public education campaigns about nutrition and food labeling are needed to bridge this knowledge gap and help consumers make the best choices for their health preventing or treating chronic diseases.

For instance, chronic diseases, such as heart disease, diabetes, and obesity, continue to place a heavy burden on public health systems around the world, both in terms of healthcare costs and reduced quality of life. These conditions are often linked to poor dietary choices, making nutrition a critical factor in disease prevention. Given that proper nutrition has the potential to prevent or manage many of these chronic diseases, public organizations have a unique opportunity - and responsibility - to focus on promoting healthier eating habits among the population.

One of the most effective ways to encourage healthier food choices is by enabling consumers to make informed decisions when shopping for food, which can be facilitated through clear and accurate food labeling. When food labels provide transparent, easy-to-understand information about the nutritional content, ingredients, and health benefits of a product, they empower consumers to choose foods that align with their health goals. For instance, labels that clearly indicate the levels of sugars, fats, salt, and other nutrients, as well as certifications like “organic” or “sustainably sourced”, can help individuals select healthier options and avoid products that may contribute to chronic conditions.

However, for food labeling to truly make a difference, it is essential that governments and regulatory bodies establish robust, clear, and consistent labeling standards. This includes ensuring that labels are not only accurate but also designed in a way that is accessible and easy to understand for all consumers, regardless of their level of education or nutritional knowledge. Regulatory bodies should also work to standardize nutrition claims and avoid misleading or confusing labels that might cause consumers to make choices that are not actually beneficial for their health.

In addition to creating effective labeling regulations, authorities must also focus on educating the public about nutrition and how to interpret food labels. Nutrition education plays a key role in

empowering individuals to make informed decisions and adopt healthier eating habits. Public health campaigns, school programs, and community outreach initiatives can help raise awareness about the importance of balanced diets and provide the tools needed to understand the nutritional information provided on food labels.

By focusing on both clear food labeling regulations and widespread nutrition education, public organizations can create an environment where healthy eating is not only accessible but also understood. This proactive approach can help prevent the onset of chronic diseases, ultimately reducing the need for costly medical treatments and improving the overall health and well-being of the population. In this way, efforts to promote proper nutrition and food literacy can help shift the focus of public health from treating disease to preventing it, leading to healthier communities and more sustainable healthcare systems in the future.

In summary, while food labeling can be a powerful tool in promoting health, sustainability, and cultural preservation, its effectiveness is heavily dependent on the consumer's ability to interpret the information, their access to healthier products, and their level of nutrition education. To fully realize the potential of food labeling in improving public health, it is crucial to address these gaps by ensuring that all consumers - regardless of their socio-economic status - have the knowledge, resources, and support they need to make informed, healthy food choices.



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