Towards a More Sustainable Nutrition

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The concept of sustainable nutrition considers different fields: from human health to environmental, economic and socio-cultural aspects. Currently, in Europe, the diets that reflect the assumptions of the sustainable diet are the Mediterranean Diet and the New Nordic Diet. They both encourage the consumption of vegetable, organic and minimally processed foods, as well as regional, seasonal and Fair-Trade products, reducing the ecological impact of the production chain. These eating habits could be established starting from the prenatal period and from infancy during the complementary feeding stage, aiding children to accept of a more variable diet in terms of flavor, taste and texture. In particular, the positive parental role model is an effective method for improving a child's diet and behaviors. Two healthy plates representing a sustainable diet in early infancy, at 6 and 24 months, are here proposed, in line with the "Planetary Health Diet" approved by the EAT-Lancet Commission.

Keywords: sustainability ; nutrition ; environment ; Mediterranean Diet ; New Nordic Diet ; complementary feeding ; nutritional habits

1. Introduction

The concept of sustainable nutrition has evolved over the years and is based on a holistic approach that now considers different fields: from human health to environmental, economic and socio-cultural aspects (**Figure 1**).

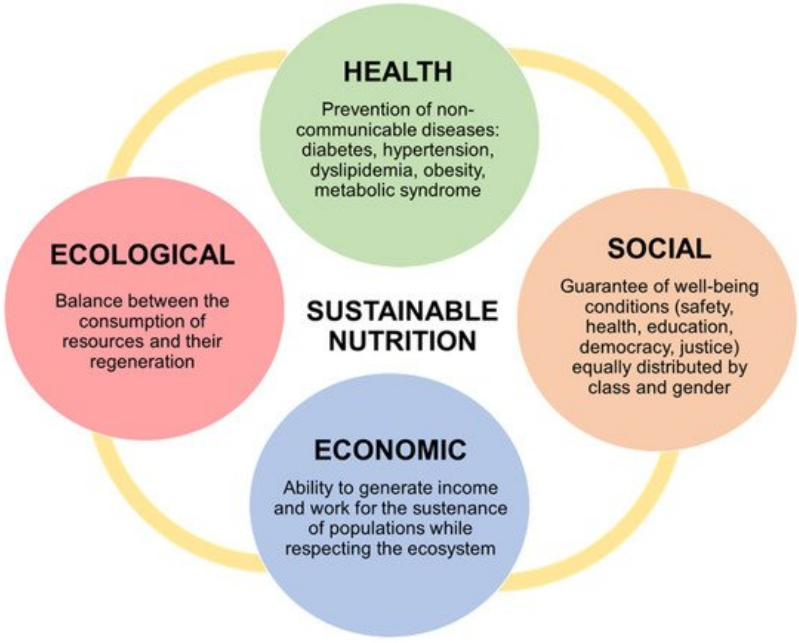

Figure 1. Characteristics of sustainable nutrition in the various areas.

In 2010, the Food and Agriculture Organization of the United Nations (FAO) presented the following definition: "Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy, while optimizing natural and human resources" [1].

A safe diet should provide all nutrient and energy requirements to avoid both insufficient food supply (leading to undernutrition and communicable diseases) and overeating (leading to obesity and non-communicable diseases) [2].

Besides, the food system has a big impact on the natural environment. At the global level, the use of 48% and 70% of land and water resources derives from the food production system. Specific types of diets and eating habits contribute to greenhouse gas (GHG) emissions, affecting climate change and biodiversity in different ways [3]. The concept of "Sustainable Nutrition" considers the food supply chain at all phases, from primary production to processing, distribution, preparation, consumption and waste disposal [2].

Globalization and the growing population size led to a transition toward an urban lifestyle, accompanied by a nutritional transition. In this context, the greater food demand implies a major competition for soil, water and energy threatening food security. In addition, the trend toward the increased consumption of animal-based and processed products impacts health and the environment [4].

The leading principles of "Sustainable nutrition" are, basically: a predilection for vegetable, organic and minimally processed foods, for regional, seasonal and Fair-Trade goods, a for a reduced environmental impact of the production chain [2]

Currently, there is no unique model of a green food system. In some countries, specific dietary guidelines are available for the maintenance of public health and are affected by the local food culture, agriculture and native cuisine. In Europe, the regionally defined diets that reflect the assumptions of the sustainable diet are the Mediterranean Diet (MD) and the New Nordic Diet (NND) [5].

2. The Mediterranean Diet: Characteristic, Health and Ecological Outcomes

The MD is not a defined diet available in one single version; there are many variations adapted to the local food systems and the cultural, geographical and lifestyle contexts [3].

In general, the term "*Mediterranean diet*" denotes some common dietary characteristics including seasonal vegetables and fruits, unrefined cereals, nuts, legumes and extra virgin olive oil as the primary source of fat. This pattern implies a moderate intake of fish, dairy products and a lower to mild eating of meat, eggs, fermented beverages (mostly red wine) and sweets [6].

The literature about the favorable role of MD on physical and mental health, in particular on the risk for cardiovascular, metabolic, cancer and neurodegenerative diseases is abundant [7][8][9][10][11][12][13]

In 2010, the United Nations Educational, Scientific and Cultural Organization (UNESCO) recognized the MD as an Intangible Cultural Heritage of Humanity both for its important health and nutritional outcomes and for its environmental impact [14]. Within this definition, the MD becomes a model of sustainable diet.

This nutritional pattern has a low ecological footprint, being rich in plant-based foods [15]. Local, traditional, fresh and minimally processed foods are preferred and recommended to be consumed daily. In this way, health is preserved because products maintain a greater quantity of vitamins, minerals and other nutrients contributing to the general well-being. Furthermore, the high fiber supply confers a good satiety value and promotes body weight maintenance, blood glucose and cholesterol control [16]. At the same time, a more vegetable food production reduces the use of natural resources in terms of land and water and decreases GHG emissions, unlike livestock production. The ecological benefits derive not only from the quality of food but also from the whole food chain system, including production, transformation, distribution, cooking and disposal consumption. The preference toward plant-based, territorial, seasonable (and organic) foods aids to maintain biodiversity, preserves the landscapes and the sea and sustains the local economy [16].

Recently, a new graphical illustration of the MD pyramid has been conceived, empathizing the concept of sustainability and encouraging the consumption of biodiverse, eco-friendly and traditional foods. The aim was to highlight the role of MD for its benefits not only for a single individual, but also for the whole planet and the future generations [16].

3. The New Nordic Diet: Characteristic, Health and Ecological Outcome

The NND was developed within the Danish research project OPUS according to the same crucial values of health, gastronomic potential, Nordic identity and sustainability [17]. It is focused on the consumption of fruit and vegetables from the Nordic regions, with a particular emphasis on the health benefits of native berries, cabbages, root vegetables and legumes. It also implies a high content of fresh herbs, potatoes (not fries), wild plants and mushrooms, whole grains and

nuts (unsalted and non-oiled). Lastly, regular fish consumption is recommended, alternating between fatty and lean species and between sources (Atlantic, Baltic, freshwater), but also seaweed, free-range animals and wild game [17].

Studies on the NND are mostly on adult populations and have demonstrated positive results on weight, metabolic and cardiovascular disease [18][19][20][21][22], leading to a lower total mortality [23][24]. This pattern has also been assessed in a greater crossover intervention study among Danish school children, where the results showed a better dietary intake at the food and nutrient levels when their usual meals followed the principles of the NND and beneficial effects on blood pressure, blood lipid profile and insulin sensitivity [25][26]. Lastly, in the context of identifying optimal and evidence-informed diets, a report from the World Health Organization (WHO) identified both the MD and the NND as region-specific healthy diets [27].

Within these two dietary scenarios, a recent study by Ulaszewska et al. [5] presented the “environmental hourglass (EH) approach”, trying to explain dietary advice in terms of food categories, their frequency and the portion of consumption indicated in light of their environmental consequences. The results highlighted that the total GHG emission impact was similar (23.56 Kg CO2 eq/week for the MD and 25.8 Kg CO2 eq/week for the NND).

Thus, food choices according to healthy dietary patterns as those typical of the Mediterranean basin and the Nordic countries, could be preferred also from an eco-friendlier perspective. These eating habits could be established starting from the prenatal period and from infancy, aiding children to accept a more variable diet in terms of flavor, taste and texture.

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