

Sustainability in Food Services

Yemek Hizmetlerinde Sürdürülebilirlik

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ABSTRACT

The concept of food service encompasses the task of preparing and distributing food. Changes to food systems at a global, national, and local level are required to reorient processes and operations to ensure they are sustainable. Considering the general characteristics of sustainable diets, it is seen that they are richer than vegetables and fruits and more limited than meat and meat products. The excessive presence of foods of animal origin in the menu causes an increase in water footprint and greenhouse gas emission levels. By providing cultural diversity and awareness in the menus, they should organize promotional celebrations with various activities. They should design health and sustainability elements according to operations, menus, and dining areas. The need to dispose of wastes in an environmentally friendly and economical way, and the fact that they are seen as a resource to be destroyed, has led to the emergence of the concept of sustainable waste management. In our review, we highlighted current research gaps and aimed to examine the sustainability in food services.

Keywords: Food services, nutrition, sustainability



Ö Z E T

Yemek servisi kavramı, yemek hazırlama ve dağıtma görevini kapsar. Sürdürülebilir olmalarını sağlamak için süreçleri ve operasyonları yeniden yönlendirmek için küresel, ulusal ve yerel düzeyde gıda sistemlerinde yapılan değişiklikler gereklidir. Sürdürülebilir diyetlerin genel özelliklerine bakıldığında sebze ve meyvelerden daha zengin, et ve et ürünlerinden daha kısıtlı olduğu görülmektedir. Menüde aşırı hayvansal gıdaların bulunması, su ayak izinin ve sera gazı emisyon düzeylerinin artmasına neden olmaktadır. Menülerde kültürel çeşitlilik ve farkındalık sağlanarak çeşitli etkinliklerle tanıtım kutlamaları düzenlenmelidir. Sağlık ve sürdürülebilirlik unsurları operasyonlara, menülere ve yemek alanlarına göre tasarlanmalıdır. Atıkların çevreye duyarlı ve ekonomik bir şekilde bertaraf edilmesi ihtiyacı ve yok edilmesi gereken bir kaynak olarak görülmesi, sürdürülebilir atık yönetimi kavramının ortaya çıkmasına neden olmuştur. Derlememizde, mevcut araştırma boşluklarını vurguladık ve yemek hizmetlerinde sürdürülebilirliği incelemeyi amaçladık.

Anahtar Kelimeler: Yemek hizmetleri, beslenme, sürdürülebilirlik



1. Introduction

Due to reasons such as the increase in industrialization and developments in work life, the need for eating out is increasing day by day. The need for eating out is met in places providing food services, such as restaurants, cafes, and institutional cafeterias [1,2]. Food service is the art of providing food and beverage to people in places where people work collectively or in places where people such as the elderly, sick, and children live [3]. The concept of food service encompasses the task of 'preparing and distributing food'. It is a set of planning the menus, determining all kinds of food and beverage types, quantities, and it involves all kinds of related tools and equipment, purchasing, storing, preparing, cooking, serving, removing garbage and waste, washing dishes, ensuring hygiene, sanitation and occupational safety, personnel management, and cost control [4-6]. In addition to the effort to provide quality service, businesses providing food services aim to provide service that can generate the most revenue with the least product waste. In order to achieve this goal, the food to be presented to the customer must have the desired qualities with its taste and appearance, without causing loss of energy and nutritional elements at all stages from preparation to service [7]. For the food service sector, whose mission is to provide meals outside the home, providing a service that protects environmental health while protecting consumer health becoming a new responsibility and a new challenge. In recent years the researches are focus on the alarming rise of both economic and environmental negative impacts of food services within the scope of sustainability [8]. Food systems capture the food supply chain and its related elements and activities, including socioeconomic and environmental outcomes. Changes to food systems at a global, national, and local level are required to reorient processes and operations to ensure they are sustainable [9].

The term sustainability and sustainable development was first used by the Brundtland Commission in the report titled 'Our Common Future' in the late 1980s. The Brundtland Commission defines sustainable development as meeting the needs of present generations without compromising the ability of future generations to meet their own needs [7]. While sustainability is expressed as 'the protection of assets required by social, economic, and ecological systems, at least at the level needed', in another definition it is 'the sparing and reproducible use of renewable resources.' Agriculture and food systems are at the center of discussions on sustainability, as sustainability is a fundamental principle and guide for human development [8,10]. The EAT-Lancet Commission's 2019 report defines targets for healthy diets and sustainable food production, considering each step of the food supply chain. Strategies proposed to achieve these targets include an international commitment

to healthy diets, reorientation of agricultural priorities, sustainable intensification of food production, coordinated governance of land and oceans, and reduction of food loss and waste [11]. For this reason, sustainability is of great importance in food services. In our review, we highlighted current research gaps and aimed to examine the relationship between sustainability in food services.

1. Sustainability in Food Services

1.1. The Relevance of Sustainability and Nutrition

The term “sustainable nutrition” was first used by Gussow and Clancy in 1986. In this definition, ‘sustainable nutrition’ involves not only the sustainability of health, but also the sustainability of agricultural systems. Sustainable nutrition is a concept that includes changes in nutritional preferences and transition to nutritious diets with lower environmental impacts to reduce overconsumption, as well as reducing losses and waste in food systems [12]. It is thought that sustainable nutrition can be adopted and activated with appropriate policies and incentives. International organizations, especially Food and Agriculture Organization (FAO), have concentrated on sustainable nutrition [13,14]. The Livewell Plate for Low Impact Food in Europe (LIFE) project carried out by World Wide Fund for Nature (WWF) is one of the approaches that associates healthy nutrition with sustainability. The LIFE project is based on 6 basic principles: increasing the consumption of vegetables and fruits, providing nutritional diversity, reducing meat consumption to reasonable levels, preventing food waste, purchasing certified food, and reducing the consumption of foods with high fat, salt, and sugar content and sugary drinks [15]. Considering the general characteristics of sustainable diets, it is seen that they are richer than vegetables and fruits and more limited than meat and meat products. [16]. In studies, the Mediterranean diet, lacto-ovo-vegetarian or plant-based diets have been accepted as sustainable diets and a 100% plant-based diet (e.g., vegan) has the least environmental impact [17,18].

Adopting sustainable dietary patterns is one of the complementary approaches to limiting the environmental impact of food production [19]. Food production systems are among the biggest drivers of global and environmental change due to their contribution to climate change, biodiversity loss, fresh water use, global nitrogen and phosphorus cycles, and soil system changes. Unhealthy and unsustainably produced foods pose a global risk to humans and the planet. As a result, increasing global population growth and climate change pose a threat to the world’s limited energy resources. Consumption is increasing, which increasingly consumes energy resources and raises the question of what people will eat in the future. In order for the concept of sustainable nutrition to have an impact on society, it is necessary to take measures on an individual and social basis and to develop administrative policies [20].

1.2. Sustainability As An Emerging Domain in Food Services: What Is Sustainable Food Services?

While the food services sector is in a unique position to drive sustainability in both the production and consumption side of the food system, research to date is still relatively scarce on how this sector can manage resources efficiently and replace carbon intensive operations to mitigate climate change and other negative environmental and social impacts of the food system [21,22]. Food produced sustainably minimizes the effects on the environment and climate, protects biodiversity and ecosystems, and ensures nutrition security for present and future generations [9]. The recent European Union’s “Farm to Fork Strategy” states that to promote sustainable food consumption and to facilitate the shift to healthy and sustainable diets, one action should be “to determine the best way of setting minimum mandatory criteria for sustainable food procurement in order to improve the availability and price of sustainable food and to promote healthy and sustainable diets, including organic products, in food services” [23]. In the UK, for example, various procurement strategies (e.g., purchasing seasonal produce, obtaining certain percentages of organic and local food, etc.) and resource management strategies (e.g., reducing food waste and improving energy efficiency) are considered best practice in the food services sector, and organisations are encouraged to follow such practices [24].

1.3. Adopting Sustainable to Food Services Processes

2.3.1.Reducing the Carbon and Water Footprint in Food Supply Chain

The excessive presence of foods of animal origin in the menu causes an increase in water footprint and greenhouse gas emission levels [25]. Current dietary trends suggest an increase of 95% in global demand for meat and animal-based food products, which will escalate food-related GHGE from 30% to 80% by 2050 [26]. It is thought that choosing meat-fish-chicken, legumes and vegetable dishes on a weekly basis in a balanced way and in the months when food is abundant will significantly reduce greenhouse gas emissions [27]. It has been reported that a decrease in meat consumption will cause a decrease in water footprint levels, and that diets such as the Mediterranean diet, which is dominated by vegetables and fruits, may help reduce water footprint levels [28]. Consequently, reducing meat consumption and energy intake will reduce dietary greenhouse gas emissions and water footprint [27,28].

A study conducted in the USA examined greenhouse gas emissions associated with food waste using the life cycle analysis approach. It determined the total emissions resulting from the production, processing, packaging, distribution, retail sale, and disposal of food as 112.9 million metric tons (MMT) CO₂ equivalent. Beef has been identified as the largest source of loss-related emissions, accounting for 16.0% of loss-related emissions, and accounting for 22.0% of nutrient losses per kilogram [29]. In another study conducted in Turkey, it was shown that the greenhouse gas emission level was the highest in the spring season (227.5 CO₂ equivalent/kg) and the lowest (178.9 CO₂ equivalent/kg) in the winter season. Similar results were obtained in the water footprint levels according to the seasons: it was determined that the sum of the average values of the meals given in the spring season is the highest (167662.6 m³/ton), while this total is the least (146732.8 m³/ton) in the winter season [25].

In a study conducted in India, 5 different diets were evaluated in terms of water footprint: low in rice variety, rice and fruit, wheat and pulses, wheat, rice and oils, and rice and meat. Rice-based diets have a higher green water footprint, while wheat-based diets have a higher blue water footprint. As a result, it was determined that the environmental impact of the rice and meat nutrition model was higher than the other models [30]. In a study in Turkey, it was calculated that the food group that increased the water footprint the most was in small pieces of meat dishes, similar to greenhouse gas emissions. It was shown that meat and vegetable meals (11.9%) greatly increase the water footprint level in summer, and the frequency of large pieces of meat (11.4%) and meatballs (11.3%) affects water footprint levels at similar rates, although they are less common than meat and vegetable dishes [25].

2.3.2.Sustainability in Menu Planning

The process flow in food services starts with the planning of the menu [31]. For food services, the menu is a 'production plan' [32]. However, it is critical that appropriate menus be prepared by experts, and it can be difficult to ask these experts to include sustainability criteria in their menus because they have a complex task of planning a varied and nutritious menu within an allocated budget [25,27,30]. With up-to-date support, menu concepts and general business operations can be arranged to comply with sustainability principles. However, businesses should be transparent about their sourcing and preparations. They should buy fresh, seasonal, and local produce and reward better farming practices. They should take advantage of earth-inspired, plant-based culinary strategies and use minimally processed food. They should reduce portions, emphasizing quality over quantity. By providing cultural diversity and awareness in the menus, they should organize promotional celebrations with various activities. They should design health and sustainability elements according to operations, menus, and dining areas [33,34]. The planning of the menus that shape the choices of the consumers who receive food service should be redesigned within the framework of the sustainability trend and the choices of the consumers should be triggered in line with this trend. Preferring meat-fish-chicken, legumes, and vegetable dishes on a weekly basis in portions suitable for the menus in a balanced way and in the seasons when these nutrients are abundant will seriously affect sustainability [30-34].

In terms of sustainable practices, it was stated in the study carried out by Legrand Sloan and Simons-Kaufmann [35] that it is important to include diet products, vegetarian products, and organic or local wines, and not to include GMO products in the menus. In the results of the study carried out by Jang Kim and Bonn [36], it was stated that the preference of foods that do not harm the environment, and local and organic foods for sustainability purposes in general terms is an important trend in menu designs due to issues such as ecological footprint in food and beverage businesses.

2.3.3. Waste Management For Sustainability

One of the application areas of sustainability is waste management, and the concepts of 'sustainable waste management' are frequently encountered in the literature. The need to dispose of wastes in an environmentally friendly and economical way, and the fact that they are seen as a resource to be destroyed, has led to the emergence of the concept of sustainable waste management [35,36].

Food service waste has two important effects in terms of sustainability. First, the waste generated is an indicator of how effectively or efficiently the resources are used. Secondly, it is necessary to dispose of wastes in an environmentally friendly and economical manner [37]. In food services, waste occurs at every stage of the food supply chain and has many causes. It is possible to classify waste management stages in food services under four headings: menu planning, purchasing and storage, kitchen planning, and equipment, production and service stages. Throughout food supply chains around the world, 54.0% of the total loss and waste occurs in pre-processing (production and post-harvest) and 46.0% in post-processing (processing, distribution and consumption) [38,39].

Due to the size of the food wasted every year around the world and the environmental and socio-economic burden associated with it, every country works to reduce food waste [40]. One of these studies is carried out in Turkey, and the "Save Your Food" project, created in cooperation with the Ministry of Agriculture and Forestry and the Food and Agriculture Organization (FAO). It includes the strategy and action plan for the prevention, reduction and management of food losses in Turkey [41]. FAO and Turkey have joined forces to develop a guide with checklists and tips to provide foodservice workers with the right information and tools to reduce food loss and waste [42].

Shanklin and Pettay [43], stated that most of the waste occurred during the preparation and service stages in the study they conducted in the army food facilities of the USA. It was stated that 64.0% of the wastes generated in food services can be prevented, 18.0% maybe preventable, and 18.0% is unavoidable [44]. In a study, 62.0% of the participating enterprises stated that they threw their wastes in the trash, 21.0% sent them for recycling, and 17.0% answered as other way, e.g., feeding stray animals [45].

Plate waste refers to the served food that remains uneaten. Plate waste is typically measured by weighing food or by visual estimation of the amount of food remaining on the plate, with results presented as the percentage by weight of the served food, or by calculating the protein, energy, or monetary value of the waste [46]. However, little is known about why some customers are more prone to not finishing their food. Furthermore, many of the measures proposed to reduce plate waste can potentially generate a negative customer experience, yet no study has tried to ascertain whether diners actually disapprove of them [47]. Today, it is recommended to monitor and control food waste and food intake regularly by changing policies when necessary [48].

In a study performed in China, dietitians and nutrition teachers mentioned that the unbalanced nutrition and dislike of food in schools as the cause of plate waste [49]. In a study, results provide evidence for a general significant impact of behavioral intention and related personal and social determinants as well as for the relevance of environmental/situational determinants such as portion sizes and palatability of food for plate leftovers. Moreover, they find that environmental and personal determinants are interrelated and that the impact of different determinants is relative to perceived time constraints during a visit of the university food services [50]. Dinis et al. [51] found that the plate leftovers in fish menus were higher than in meat menus. Low fish intake was observed in both sexes, as plate scraps were greater than 50.0% in all fish menus. In vegetable consumption, the highest plate leftover was found in cauliflower (83.3%) by boys, and in grated carrots (82.5%) by girls. The fruits with high residual value for both sexes were pineapple (47.1%) and kiwi (53.3%). General plate waste may be probably significantly reduced by reducing portions, adjusting them to children nutritional needs and at the same time reduce social and environmental negative impacts [50].

2. Discussion and Conclusion

While choosing preparing and distributing foods in food services, in addition to affecting the health of individuals, foods' effects on the environment should not be ignored because the negative impact of agriculture on the environment is increasing day by day and this trend is expected to continue, partly as a result of population growth. For this reason, healthy nutrition and sustainability in food services are becoming increasingly important in order to leave a livable world to future generations. With the

selection of the right strategies in menu planning, waste reduction and reduction of the carbon footprint of the menus can be achieved. Waste in food services is a global problem that threatens environmental, social and economic sustainability. The different institutional and environmental characteristics of communities and countries make it possible to achieve sustainability in waste management in food services in different ways. In order to overcome the problems experienced in waste management in food services, the characteristics of countries and even regions should be taken into account and a systematic approach should be carried out. Integrated waste management and, in this direction, sustainable waste management will be realized by evaluating the basic principles of the relevant institutions and people within their own conditions. Regarding reducing plate leftovers, individuals need to understand the importance of protecting the environment and receive training on the right portion size, and food service personnel need to improve the quality of their meals.

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