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### Toward a Food Service Quality Management System for Compliance with the Mediterranean Dietary Model

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# **Toward a Food Service Quality Management System for Compliance with the Mediterranean Dietary Model**

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*The traditional diet of Cretan people in the 1960s is the basis of the Mediterranean dietary model. This article investigates the potential of this model to inspire proposals of meals by food-serving businesses, and suggests a methodology for the development of a quality management system, which will certify the delivery of food service according to this dietary model. The proposed methodology is built upon the principles and structure of the ISO 9001:2008 quality standard to enable integration with other quality, environmental, and food safety management systems.*

**KEYWORDS** *certification of food service, Mediterranean dietary model, quality management systems*

The term “traditional Mediterranean diet” is used to describe the dietary habits that were typical in certain regions of the Mediterranean in the early 1960s, such as Crete, some areas in the rest of Greece, and southern Italy (Keys 1980; Willett et al. 1995; Trichopoulou and Lagiou 1997; Wahlqvist et al. 1999; Trichopoulou et al. 2003; Trichopoulou et al. 2006). Variations

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of the Mediterranean diet exist in different areas of the Mediterranean, such as in France, Spain, Lebanon, Morocco, Portugal, Syria, Turkey, Tunisia, and elsewhere, but they have not been studied in detail (Amorim Cruz 2000).

Research and epidemiological results associating the Mediterranean diet with good health (Trichopoulou and Lagiou 1997; Wahlqvist et al. 1999; Trichopoulou et al. 2003; Trichopoulou et al. 2006; Mitrou et al. 2007; Sofi et al. 2010) has boosted the desire of consumers, especially in tourist areas, to follow this dietary model and has led professionals in the food-serving sector to advertise the delivery of such services providing to the Mediterranean diet model an economic aspect too. However, the incomplete knowledge of the dietary model, as well as any misuses can hamper and demote its value in the eyes of the public, and the model can become the object of profiteering.

The benefits that a business can earn from the certification of this dietary model and the wider system of quality assurance of its services become apparent in a short time. A business that adopts such systems becomes more competitive and its products and services become more useful, which results in a remarkable boost in client confidence. At the same time, this contributes to the safeguarding of an important cultural legacy, which can enhance the sustainability of the tourism sector (Amorim Cruz 2000; Kafatos et al. 2000). However, our literature review, as summarized in the next section, has shown that, up to this day, no effort has been made to include the certification of the Mediterranean dietary model in a single quality assurance system in the food service industry. It is the aim of this article, therefore, to develop a methodology and define the necessary requirements and processes towards the development of a food-serving services quality management system for compliance with the Mediterranean dietary model based on the principles and the structure of the ISO 9001:2008 quality standard (ISO 2008).

The article consists of four more sections. The next section provides the background of this study. The certification efforts of the Mediterranean–Cretan diet in Greek restaurants, as well as other dietary and food related efforts worldwide are reviewed and discussed setting off the necessity and purpose of a more standardized food service quality management system. The two sections following the background outline the fundamental elements of such a system and discuss in more detail its processes. Finally, the conclusions section summarizes the findings of the study and outlines future perspectives.

## BACKGROUND

### Toward More Healthy Foods and Dietary Habits

Public interest in nutrition and food safety has increased dramatically. As a consequence, public policies all around the world shift from increasing food

quantity towards food quality, and this shift is supported through regulations, recommendations, standards, and other means developed by government agencies, and other national and international bodies (Becker and Staus 2008).

In European Union (EU) for example, the aforementioned policy shift is supported by several ministerial and presidential decrees, laws, acts, and regulations. Among all these, the following three regulations constitute the cornerstone of EU agriculture and food quality policy:

- Council Regulation (EC) No. 510/2006 of March 20, 2006 on the protection of Geographical Indications and Designations of Origin for agricultural products and foodstuffs (Official Journal of the European Union 2006b),
- Council Regulation (EC) No. 509/2006 of March 20, 2006 on agricultural products and foodstuffs as traditional specialties guaranteed (Official Journal of the European Union 2006a), and
- Council Regulation (EC) No. 834/2007 of June 28, 2007 on organic production and labeling of organic products (Official Journal of the European Union 2007).

Products protected by the aforementioned EU quality schemes have a privileged position, not only with respect to the legal protection, but also with respect to EU financial aid and the eligibility of Member State financial aid for the promotion of these products (Becker and Staus 2008).

In addition, the International Organization for Standardization (ISO) launched in 2005 the standard series ISO 22000:2005, which specifies requirements for a food safety management system where an organization in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption. More specifically, ISO 22000:2005 integrates HACCP (Hazard Analysis and Critical Control Points) principles and specifies requirements to enable an organization (ISO 2005):

- to plan, implement, operate, maintain and update a food safety management system, which will provide products safe for the consumer according to their intended use;
- to demonstrate compliance with food safety statutory and regulatory requirements;
- to enhance customer satisfaction relating to food safety;
- to effectively communicate food safety issues to its suppliers, customers and relevant interested parties in the food chain;
- to ensure conformation to its stated food safety policy, and demonstrate such conformity to the relevant interested parties;

- to seek certification or registration of its food safety management system by an external organization, or make a self-assessment or self-declaration of conformity to ISO 22000:2005.

ISO 22000:2005 is applicable to all organizations involved in any aspect of the food chain that want to implement systems that consistently provide safe products.

Another important effort refers to the voluntary standards developed by GLOBALG.A.P. (Global Good Agricultural Practice; GLOBALG.A.P. 2011). GLOBALG.A.P. is a private sector body that sets voluntary standards for the certification of production processes of agricultural products around the globe. The GLOBALG.A.P. standards are primarily designed to assure consumers that their food is produced according to Good Agricultural Practice (GAP), which:

- minimizes the risk of microbiological contamination;
- lessens detrimental environmental impacts of farming operations;
- ensures a responsible approach to worker health and safety as well as animal welfare.

GLOBALG.A.P. standards serve as practical manuals for GAP anywhere in the world based on an equal partnership of agricultural producers and retailers who wish to establish efficient certification standards and procedures.

Despite their significance, and their contribution in human health and welfare, the aforementioned efforts, regulations and standards focus mainly on the agricultural products and their production processes, as well as on food safety. There is however, an additional aspect with a significant contribution to the human health and welfare, the dietary habits.

The term “dietary habits” refers to the dietary customs and concerns food types, food consumption frequencies, food consumption and cooking methods, cooking utensils, number of meals per day, duration, and conditions of the meals. The study of dietary habits nowadays is particularly important as it constitutes one of the main instruments, together with a healthy diet, for setting national strategies aiming at the population’s good health (Birch and Fisher 1998; Baranowski, Cullen, and Baranowski 1999; Muris et al. 2005).

In the beginning of humanity’s dietary course, the dietary habits and choices of groups of people residing in a particular area were dictated by climate, indigenous flora and fauna. Later on, the progress of societies and the development of commerce enabled food choices to overcome geographical limitations as travel and the exchange of products brought people in touch with new types of food and with different dietary habits in general (Birch 1999). However, national dietary models can be seen even today. The dietary guidelines, prepared by the Department of Agriculture (USDA) and

the Department of Health and Human Services (DHHS) of the United States of America (USA) provide such an example.

Based on recent scientific evidence, USDA and DHHS developed recommendations (USDA and DHHS 2010) that accommodate the varied food preferences, cultural traditions, and customs of the many and diverse groups who live in the United States. The USDA and DHHS dietary guidelines inform and advise on how to choose a healthy eating pattern (i.e., an eating pattern focusing on nutrient-dense foods and beverages, and contributing to achieving and maintaining a healthy weight; food safety principles are also embodied, to avoid food-borne illness). The guidelines are intended to be used in developing educational materials, in aiding policymakers in designing and carrying out nutrition-related programs, and in aiding nutrition educators and health professionals in developing nutrition messages and consumer materials for the general public and specific audiences, such as children.

In Europe also, the European Food Safety Authority (EFSA), and more specifically, the EFSA's Panel on Dietetic Products, Nutrition and Allergies (NDA) has established dietary reference values for the intake of carbohydrates, dietary fiber, fats, and water. EFSA's advice on nutrient intakes provides an important evidence base to underpin nutritional policies, the setting of diet-related public health targets and the development of consumer information and educational programs on healthy diets. The opinions published by EFSA were adopted by the aforementioned Panel after consultation with Member States, the scientific community, and other stakeholders to ensure that EFSA has benefited from the widest range of views. Based on all the aforementioned views, the NDA Panel of EFSA published three series of opinions (EFSA 2010):

- one laying down dietary reference values (DRVs), which indicate the amount of an individual nutrient that people need for good health depending on their age and gender,
- one laying down the general principles for establishing DRVs, and
- one providing advice to policy makers on how to translate nutritional recommendations into messages about foods, called food-based dietary guidelines (FBDGs). FBDGs can guide consumers on what to eat and help them make healthy dietary choices.

Finally, another sound example is the Mediterranean diet, first identified in the seven countries study in the 1960s (Keys 1980), and then defined by the Oldways Health Organization (2013), the World Health Organization, and the Harvard School of Public Health (Willett et al. 1995). Nowadays, it is known as the dietary model that enhances good health. It is also a dietary model that is thirty five hundred years old. It is worth mentioning that most

of the studies, starting from the first seven countries study of 1960s, which show the benefits of the Mediterranean diet, have been based on the diet of Greek people during that time period (Estruch et al. 2006; Mitrou et al. 2007; Sofi et al. 2010); therefore, the Greek Mediterranean diet, and especially the Cretan diet, has been studied more extensively and constitutes the basis of what we now call the Mediterranean diet (Oldways 2013). Moreover, the Cretan diet has a historical background and can be certified as a healthy diet model. Therefore, if food-serving businesses wish to offer services and products that follow the Mediterranean model, they could include the largest part of the elements that constitute the Cretan diet.

Although the focus of this article is not on the reviewing and presentation of the Mediterranean Greek-Cretan dietary model but on the development of a methodology that would allow its certification by food-serving business, for completeness purposes, its basic principles are outlined below prior to the presentation of the certification efforts and the proposed certification methodological approach.

### General Principles of the Mediterranean Greek–Cretan Dietary Model

According to the seven countries study, the Mediterranean diet is characterized by (Keys 1980; Willett et al. 1995; Kafatos et al. 2000; Trichopoulou et al. 2003; Trichopoulou et al. 2005;):

- higher consumption ratio of monounsaturated fatty acids to saturated fatty acids
- high consumption of pulses
- high consumption of grains (bread)
- high consumption of fruit
- high consumption of vegetables
- moderate to high consumption of fish and seafood
- moderate to high consumption of milk and dairy products
- low consumption of alcohol (wine)
- low consumption of meat and meat preparations

The above characteristics, translated into food quantities, are represented in the food pyramid that was prepared by the Greek Supreme Special Scientific Council of Health. More specifically, according to the food pyramid, the quantities summarized in table 1 are suggested on a daily, weekly, and monthly basis (Ministry of Health and Welfare of Greece 1999).

In addition, during the preparation of the meals, the following should be taken into account (Ministry of Health and Welfare of Greece 1999):

**TABLE 1** Suggested Food Consumption Quantities According to the Mediterranean Dietary Model

Consumption period	Suggested food quantities
Daily	8 micro-portions of coarsely processed cereals and cereal products such as whole grain bread, whole grain pasta, husked rice, etc. 3 micro-portions of fruit 6 micro-portions vegetables and greens Olive oil as the main additive fat 2 micro-portions of dairy products
Weekly	5–6 micro-portions of fish and seafood 4 micro-portions of poultry 3–4 micro-portions of pulses and dried fruits 3 micro-portions of potatoes 3–4 of eggs 3 micro-portions of sweets
Monthly	No more than 4 micro-portions of red meat

- 1 micro-portion corresponds to half the portion described by market control regulations
- People should consume daily, approximately 23 micro-portions of food in at least three meals

Given the above, to follow the Mediterranean dietary model, menus should be prepared following the aforementioned principles of the model and including the groups of foods summarized in table 2 (Ministry of Health and Welfare of Greece 1999).

### Labeling and Certification Efforts for the Mediterranean Greek–Cretan Cuisine

The Hellenic Food Authority (EFET) was established by the Law 2741/1999 (Official Government Gazette 1999); the same law also established the Greek Cuisine Quality Label awarded by the Greek National Tourism Organization (GNTO) following a request of the interested business. More specifically, the law mentions that the food-serving and leisure business awarded this label offers a satisfactory quality of Greek cuisine dishes combined with a satisfactory quality of overall services (Official Government Gazette 1999). Consequently, the Ministerial Decision 4333/01 (amended in 2003, 2004, and 2006) defined the terms and the conditions for the award of the special label, its validity period, the special collective bodies for the control of the quality of food products and the overall provision of services, the control procedures, the reasons and the procedure for the revocation of the decision for the award of the special label, and all other relevant information (Official Government Gazette 2001).

**TABLE 2** Suggested Food Groups According to the Mediterranean Dietary Model

Food group	Description
Meat	Meat includes muscles and umbles (i.e., loin) of lamb, goat, veal, and pigs; giblets of poultry and rabbits; wild species that constitute game such as boars and hares; birds like grouse, woodcock, quail, turtle doves, pheasants, ducks, thrushes, and the like. Various meat preparations may be undertaken, such as smoked meats, delicatessen cold cuts, and the like, on the condition that they are domestic.
Fish and seafood	There is great variety in both types and sizes of fish. It is not necessary to choose the so-called "high quality fish"; small and "lower quality" fish in general play an important role and can cover people's dietary and culinary needs. The large variety in cooking methods of the small or lower quality fish, which may also be combined with greens and vegetables in many variations, offers many choices.
Vegetables and fruits	The Mediterranean diet includes many fruits, vegetables, and greens. Fruit is usually meant as dessert, whereas vegetables and greens are eaten raw in salads, boiled, grilled, in pies, or as an accompaniment to meat, fish, and pulses.
Dairy products	Dairy products include milk, yogurt, and cheeses. Milk and yogurt can be ingredients in many types of savory foods and desserts. Apart from when they are consumed in their natural state (e.g., at breakfast), they are often used in the preparation of sauces and various accompanying dips (e.g., tzatziki) as well as in various desserts.
Grains and pasta	In the Mediterranean diet, grains are most usually consumed in the form of bread. Bread (either fresh or rusks) used to be mostly whole grain wheat, barley, or mixed type. The quality of bread is mainly defined by the quality of the flour, and secondarily by its preparation procedure. However, according to the Mediterranean model, bread should be kneaded with olive oil (and not other vegetable fats) with whole grain wheat. The same principle should apply to all types of pasta and dough for pies.
Olive oil	The use of olive oil in salads, in cooking, in patisserie, even in frying, is one of the main characteristics of the Mediterranean dietary model.
Pulses	Pulses occupy a large part of the Mediterranean diet, including beans, lentils, split peas, broad beans, and chickpeas. Pulses are normally consumed with fresh salads.
Condiments	The Mediterranean diet uses a large number of condiments such as leaves, flowers, husks, and fruits of various plants. The knowledge of these plants and their uses will secure the tastiness of various dishes, given that the use of artificial flavor enhancers (e.g., monosodium glutamate, stock cubes) is not typical of the Mediterranean diet and therefore not allowed.
Honey	Honey was the main sweetener in Greece for centuries. The use of honey in cooking and in patisserie is interwoven with tradition, and its standardization prevents us from fraudulent practices (e.g., adulterated honey).
Nuts	Nuts, along with raisins and honey, were eaten as dessert and used as a coating or main ingredient in homemade sweets. The traditional Greek diet used nuts without any further treatment other than simple roasting and salting. Nowadays, nuts with different coatings can be found in the market, which strays from the Mediterranean diet model. Therefore, nuts should be used without any treatment other than roasting with salt or caramelizing with honey or sugar.
Wine	There are no limitations on the place of origin of wine, which complements and highlights a meal. Bulk wine may also be used.
Sweets and desserts	Sweets and desserts should be prepared from fruits, dried nuts, olive oil, flour, milk, eggs (not egg powder), raising agents such as baking powder, baking soda, cocoa and chocolate, and natural flavorings. Artificial pigments and other additives should not be used.

As far as the terms and conditions for the award of this special label are concerned, the Ministerial Decision, beside the conditions of hygiene required by the relevant legislation for all food-serving businesses, also mentions food products that are typical of the Greek cuisine, such as olive oil, Greek salad and feta cheese.

The Ministerial Decision has been followed in the next years by an effort to promote and establish the Greek cuisine through actions within the frame of Operational and Regional Programs. An example is the Conserving the Cretan Diet (CONCRED) program funded by the European Commission and the Region of Crete under the Regional Program of Innovative Actions CRINNO–Crete Innovative Region. The prime objective of this effort was the certification of restaurants, which serve good Cretan cuisine, while its aims include the maintenance of the gastronomic character and the healthful nature of the Cretan cuisine, and the portrayal of the Cretan cuisine as a privilege and as an essential financial resource for the island.

In order to be certified according to CONCRED, the candidate restaurants are required to meet conditions based on the respective articles of the Ministerial Decision 4333/01 for the Greek cuisine. Moreover, their owners are given detailed information on presentation, conservation, serving various food and drinks that are typical of the Mediterranean model, as well as explanations on the importance of their nutritional value and the beneficial role in enhancing man's health. Controls of the businesses, which are certified based on the CONCRED program, are quite often and include tasting, sampling of food and spectrometer analyses.

Another significant effort towards the same direction constitutes the development of a Quality Label of the Cretan Cuisine by the Cretan Quality Agreement (2013). The Cretan Quality Agreement is a nonprofit organization created by all four Prefectural Authorities of the island of Crete. The aims of this organization are to preserve, promote and disseminate the Cretan diet model as well as to proceed with the certification of food-serving businesses that offer Cretan cuisine.

To receive the Quality Label of Cretan Cuisine, a food-serving business must meet certain requirements that respect the following principles (Cretan Quality Agreement 2013):

- offer Cretan diet dishes, which will be significantly greater in number compared to other dishes offered by the business;
- use exclusively local products (apart from those which are not abundant in Crete);
- use exclusively olive oil in the overall cooking, including frying;
- comply with all hygiene and food safety requirements, pursuant to the legislation in force.

## The Way Forward

Despite their significant contribution in the recognition and promotion of the Mediterranean Greek–Cretan cuisine, none of the efforts mentioned in the previous sub-section deals with the problem of certification within the framework of a management system. This would also enable integration with other management systems such as the ISO 9001:2008 quality standard, the ISO 14001:2004 environmental standard and the ISO 22000:2005 food quality standard covering this way all aspects from food compliance with the Mediterranean dietary model, food quality and safety, environmental protection and preservation, and customer satisfaction.

Conversely, all the aforementioned efforts try to establish rules for the use of terms such as Greek cuisine and Cretan diet, so as to ensure the quality of the services provided by the relevant food-serving businesses. Therefore, the development of a certification methodology for the setting up of a management system—which will include the entire range of food products used in the Mediterranean diet, focus on preparation methods, frequency of use of food products, and groups of food products—seems the necessary step forward. The system should also promote the adoption of the Mediterranean model by the wider population and preserve its continuation. The development of a methodology that will enable the setting up of such a system constitutes the aim of the study reported in this article.

## TOWARD THE DEVELOPMENT OF A FOOD SERVICE QUALITY MANAGEMENT SYSTEM

### The Approach

As already mentioned, the proposed methodology will enable food service businesses to assure compliance with the Mediterranean dietary model based on the principles and structure of the ISO 9001:2008 quality standard.

ISO 9001:2008 specifies requirements for a quality management system where an organization (ISO 9001:2008):

- needs to demonstrate its ability to consistently provide products that meet customer requirements and comply with applicable regulatory requirements;
- applies processes for the continual improvement of the system and the assurance of conformity to customer and other applicable statutory and regulatory requirements, aiming to enhance customer satisfaction.

All requirements of ISO 9001:2008 are generic and are intended to be applicable to all organizations, regardless of type, size, and product provided. ISO 9001:2008 has been aligned with the ISO 14001:2004 environmental standard (ISO 2004) in order to enhance the compatibility of the two standards for

the benefit of the user community (ISO 2008), while it does not include requirements specific to other management systems, such as those particular to environmental management, occupational health and safety management, financial management or risk management. However, it enables an organization to align or integrate its own quality management system taking into account its distinctive characteristics, while complying with the requirements of the ISO 9001:2008 standard. The development therefore of a food-serving services quality management system following the principles and structure of ISO 9001:2008 will enable the food-serving business to link it with other already established management systems.

To develop a management system following the principles and structure of ISO 9001:2008 requires the definition of the scope of the system, as well as the compilation of relevant specifications and requirements, processes and documentation. The methodology for the development of such a system is described in the following sub-sections.

Prior however, to the presentation of the proposed methodology, it should be mentioned that food-serving businesses have some special characteristics, which should be considered during the design and the implementation of any type of quality assurance system of the function of the business and its services, as well as of food safety. These special characteristics of food service businesses include:

- reorganization of staff at relatively short intervals (e.g., change of cooks and waiters);
- large variety of products, ingredients, menus and processing methods that may be used;
- frequent changes of suppliers and food ingredients.

### Scope of the Proposed Management System

The proposed methodology specifies requirements that will enable a food service business to:

- plan, implement, operate, maintain and update a management system aimed to consistently provide food-serving services that comply with the Mediterranean dietary model, meet customer requirements and respect relevant statutory and regulatory requirements;
- enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to the Mediterranean dietary model as well as to customer, and applicable statutory and regulatory requirements;
- effectively communicate food quality issues to suppliers, customers and relevant interested parties in the food chain;
- ensure that the organization conforms to its stated food quality policy;

- demonstrate such conformity to relevant interested parties; and
- make a self-assessment or self-declaration of conformity to the system.

The requirements are intended to be applicable to all kind of food service businesses, regardless of type (e.g., a single restaurant or a restaurant chain or even a hotel lounge) and size, which however wish to claim that they serve food following the Mediterranean dietary model. It should also be noted that such a system could eventually be certified or registered by either standard or food related organizations and bodies.

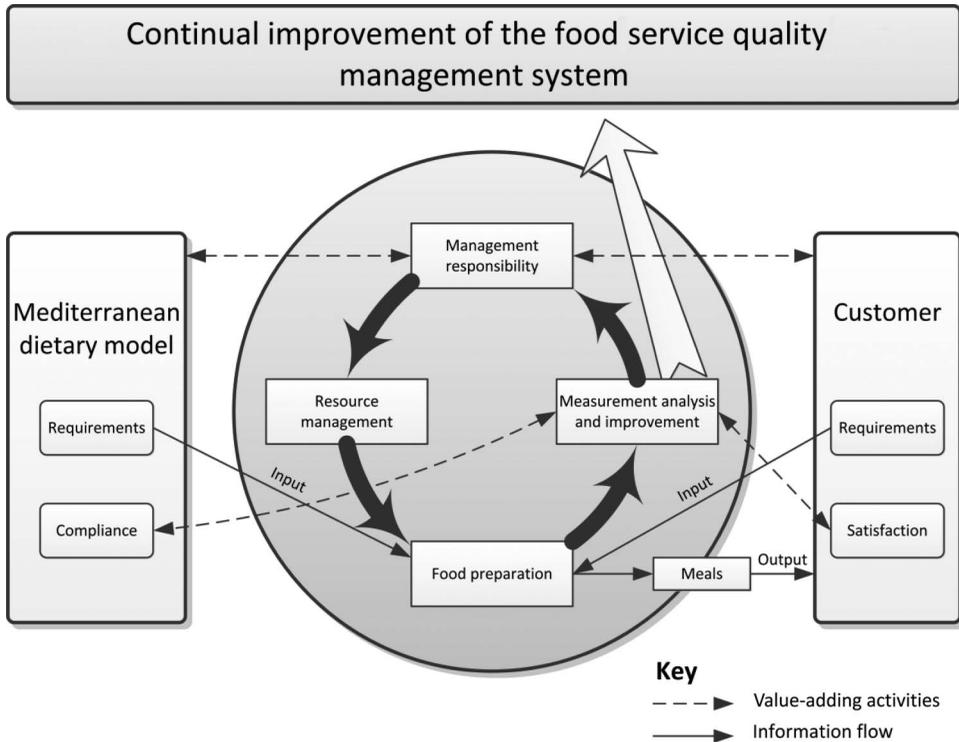
### Overview of the System

For the proposed system to be developed following the principles of ISO 9001:2008, a process approach should be followed. Process can be considered any activity using resources, and managed in order to enable the transformation of inputs into outputs, where outputs from one process often directly forms inputs to others (ISO 2008). For an organization to function effectively, it has to identify and manage numerous linked activities (i.e., processes). The application of a system of processes within an organization, along with the identification and interactions of these processes, and their management, is referred to as the process approach (ISO 2008).

According to ISO 9001:2008, an advantage of the aforementioned approach is the ongoing control that it provides over the linkage between the individual processes within the system of processes, as well as over their combination and interaction. In addition, such an approach emphasizes how important is to (ISO 2008):

- understand and meet requirements,
- consider processes in terms of added value,
- obtain results of process performance and effectiveness, and
- continuously improve the processes based on objective measurement.

Figure 1 displays such a process-based model for the development of the food-serving service quality management system, which has been adapted from ISO 9001:2008. The illustration shows that both the principles of the Mediterranean dietary model and the customers play a significant role in defining requirements as inputs. As a consequence, monitoring of compliance with the Mediterranean dietary model requirements and of customer satisfaction requires the evaluation of information relating both to the principles of the dietary model and the customer perception as to whether the organization has met the customer requirements about its stated food quality policy.



**FIGURE 1** Model of a process-based food service quality management system (adapted from ISO 9001:2008).

The model shown in figure 1 covers all the requirements of the proposed management system, which includes four main processes:

- *Management responsibility*: Covers all sub-processes, which concern the managerial aspects of the system from the commitment to the stated food quality policy, to the focus on the customer, and the authority and communication of the system.
- *Resource management*: Covers all the sub-processes, which relate to the provision of resources either human resources or infrastructures and working environment.
- *Food preparation*: Covers all the sub-processes, which relate to the preparation of food from the compilation of the menu and the provisions supply to the cooking and serving of meals.
- *Measurement analysis and improvement*: Covers all the sub-processes, which, through monitoring and measurement, analysis of data and control of non-conformance to the standard, lead to the overall system improvement.

For the realization of the system, beyond the requirements set by the food quality policy, and the aforementioned processes, which will be detailed in the following section, several other requirements concerning its documentation should be taken into account as described below.

### Documentation Requirements

The food service quality management system documentation should include:

- documented statements of the food quality policy and the relevant objectives;
- documented procedures, which are specified ways to carry out the system activities or processes;
- documents needed to ensure the effective planning, operation and control of the processes;
- records, which are documents stating results achieved or providing evidence of conformity to requirements and of the effective operation of the system; the records can also include all the laws and the provisions, which are connected with the function of the food-serving services, as well as the laws included in the food and drinks code.

Last, but certainly not least, the documentation of the system should include a quality manual (i.e., a document specifying the system including its scope, the documented procedures established for the system, or reference to them, and a description of the interaction between the system processes).

The aforementioned documents will be used as proofs that the requirements of the system are met. To this end, a special documented procedure should be established to define the document controls needed to ensure that

- documents are approved for adequacy prior to issue;
- documents are reviewed, updated and re-approved, if and when necessary;
- the relevant versions of applicable documents are available at points of use, and remain legible and readily identifiable;
- the obsolete documents are rapidly removed from the points of their issue so that they cannot be used by mistake;
- the obsolete documents that are retained for any purpose are suitably identified to prevent unintended use.

Examples of documents, which may be found at food-serving businesses include, among others, storehouse lists, lists of approved suppliers, contract forms for suppliers, shipping invoices, catalogues of offered meals (for guests), order forms, lists of recipes (traditional recipes), lists of required

materials (e.g., lists of traditional Greek cheeses and their characteristics, herbs, varieties of fruits, vegetables, seasonal products), lists of other durable and non-durable materials (e.g., tables, tablecloths, table napkins, toilet papers, soap, pots), programs and staff training material, staff training folders, and the like.

## THE MAIN PROCESSES OF THE PROPOSED MANAGEMENT SYSTEM

### Management Responsibility and Review

The responsibility and authority of the personnel in the frame of the proposed system should be definitely defined, reported in the quality manual and communicated within the business organization.

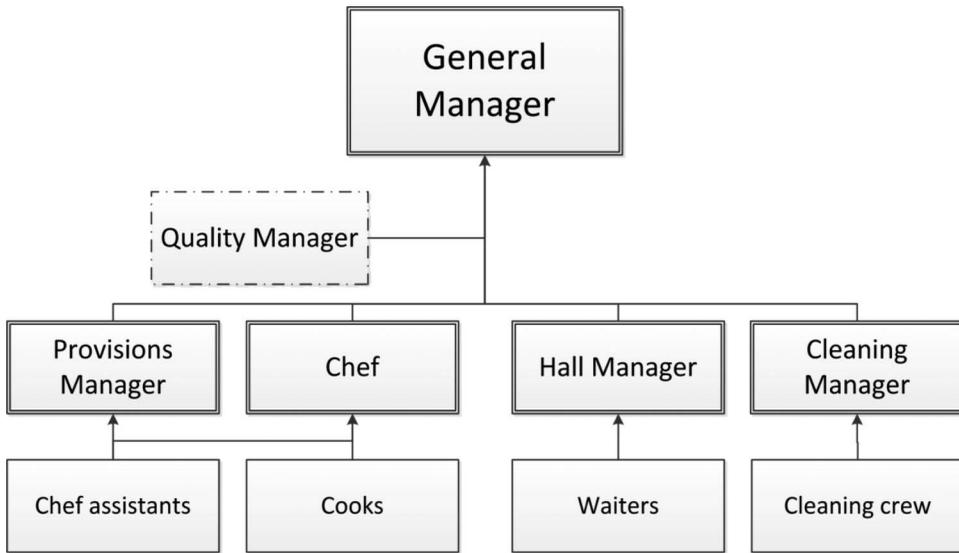
In general, personnel who deal with food-related issues, in order to ensure suitability for consumption should:

- design the production processes with safety considerations;
- organize and appropriately execute every stage of the production process;
- operate under the rules that ensure food safety at every stage of the production process;
- propose to the management alternative methods that may bring better results.

On the other hand, it is in the responsibility of the management to select and train as appropriate, the persons who will process food and allocate further responsibilities. Figure 2 displays a typical organization chart for food-serving businesses. At the top of the organization chart stands the General Manager, who runs the food-serving business with the assistance of the Quality Manager, the Provisions Manager, the Chef, the Hall Manager, the Cleaning Manager, and chef assistants, cooks, waiters, and the cleaning crew. Depending on the size of the particular business, the chart of this figure may expand or shrink as necessary since multiple roles may exist (e.g., the General Manager might identify with the business owner and act also as Quality Manager).

The Quality Manager is responsible for the quality control of the business. In addition, at planned intervals, the Quality Manager in cooperation with the other business managers undertakes the review the organization's food-serving services quality management system to ensure its continuing suitability, adequacy and effectiveness. Such responsibilities and authorities should be held by a person with knowledge on diet and food as well as the Mediterranean diet model, so that quality principles can be controlled and responsibilities and tasks in production flow are properly allocated.

The Provisions Manager is responsible for the selection, supply, delivery and storage of provisions. The management of the business should



**FIGURE 2** Typical organization chart of a food service business.

provide all the necessary resources so that the Provisions Manager is able to select provisions appropriate for the preparation of food that follows the Mediterranean dietary model. To this end, he/she should have catalogues of selected suppliers, manuals with fruit and vegetables per season, and characteristics and names of specific types of food varieties.

The Chef, who is in fact the “Production Manager,” is responsible for the preparation, cooking, conservation and serving of food, which is the “product” in the case of a food-serving business. The Chef should be a graduate of a relevant school and should be assisted in his/her work by people with at least some seminar training on Mediterranean food and the preparation of relevant dishes.

The Hall Manager is responsible for the service of and communication with the customers. He/she needs at least good organization and communication skills, as well as knowledge of the particular characteristics of the “product” offered to the customers. Finally, the Cleaning Manager has the main responsibility and authority for the preservation of the cleanliness in all the facilities of the business settlement.

### Resource Management

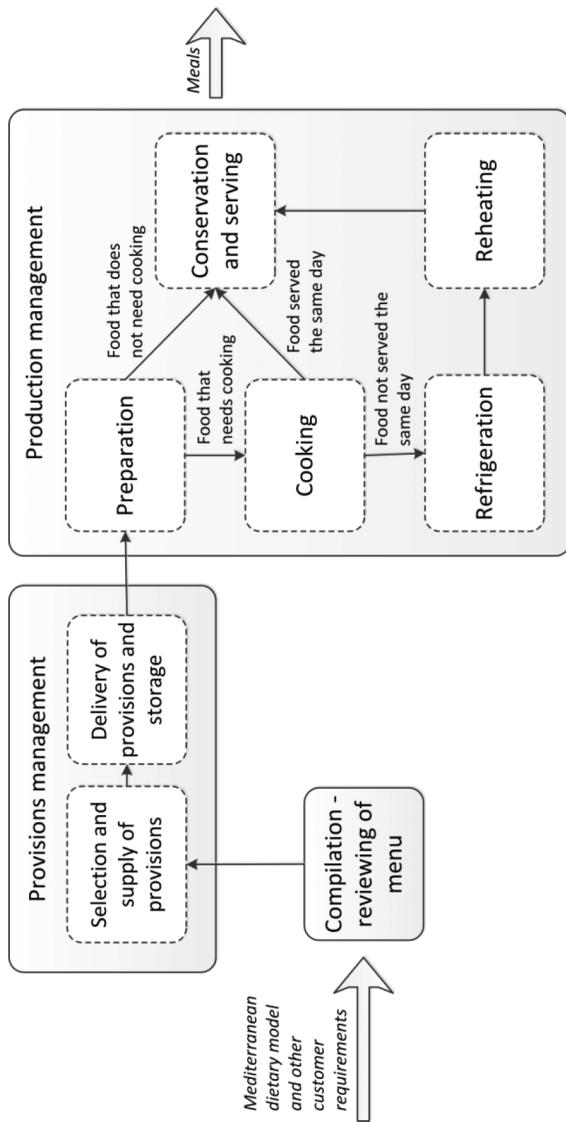
The business management should offer all the resources necessary for the accomplishment of the business objectives. Usually, resources refer to the human resources, the infrastructure (i.e., the buildings, workspace and associated utilities), the process equipment (i.e., both hardware and software),

and the supporting services (e.g., transport or communication), and the working environment (ISO 2008). In the case of the proposed management system, however, these resources refer mainly to the human resources, since there are no, additional to the common, requirements on the infrastructure and the work environment in order to accomplish the business objective, that is to offer dishes and meals following the Mediterranean dietary model. On the contrary, there are specific requirements for the personnel, which should be or become, through appropriate training, familiar to the Mediterranean cuisine.

In addition, personnel and especially those with superior responsibilities and authorities should be chosen based on their qualifications and experience, as well as on their expertise in the particular position, which they will occupy. For the hiring and training of the staff, appropriate documented procedures should be developed such as the one summarized in table 3.

**TABLE 3** Example Procedure for the Hiring of Staff and Training Process

Purpose and scope	The purpose of this procedure is to identify and fulfill any needs for staff recruitment, and to define the ways through which any training needs are identified and fulfilled so that the personnel of the business can accomplish its tasks in the best possible way.
Responsibility and authority	Usually, the recruitment of staff is carried out by the General Manager. However, all recruitments should be checked by the Quality Manager, who should certify their knowledge of the dietary pattern and encourage their training.
Description of activities	<p>As far as the hiring of staff is concerned, depending on the intended tasks allocation, specific qualifications and expertise should be required.</p> <p>Nutritionists and dieticians, graduates of departments of nutrition and dietetics of universities and technological educational institutions, have been taught the Mediterranean diet and foods that compose it. Moreover, they have the necessary knowledge and experience to prepare a Mediterranean diet menu. It is recommended that Quality Managers possess relevant degrees that certify their knowledge of the Mediterranean dietary model as well as the necessary experience and skills.</p> <p>Similar requirements apply to the Chefs. The rest of the staff, namely chef assistants, cooks and waiters should be trained on the typical characteristics of the Mediterranean dietary model.</p> <p>New staff should be trained by the Quality Manager on the general requirements of the quality system; it should also work with more experienced staff so as to acquire all necessary knowledge on the special demands of their positions.</p> <p>Training material (seminar material, books, and journals) should be part of the documents and records of the business together with all of training records (training staff tabs).</p>



**FIGURE 3** The sub-processes of the food preparation process.

**TABLE 4** Example Procedure for the Compilation/Reviewing of Menu Process

Purpose and scope	The purpose of this procedure is to establish weekly menus so that the Mediterranean dietary model may be better approached.
Responsibility and authority	Involved persons in this procedure are the Quality Manager, who can take suggestions from the Chef, as well as outside partners.
Description of activities	<p>Usually, restaurants offering Mediterranean Greek cuisine offer on a daily basis dishes that constitute Sunday or festive meals in the Mediterranean dietary model.</p> <p>Food-serving services that are certified for implementing the Mediterranean dietary model could offer menus that include, for example, fish and poultry together with vegetables and wild greens, as well as dishes of pulses on week days (standard Mediterranean meal) and meat dishes on weekends.</p> <p>Beside the Mediterranean menus, customers should be able to choose meat dishes on week days as well, if they wish to do so. However, it would be useful if the customer is informed about the special characteristics of the Mediterranean cuisine with reference to the consumption frequency and quantity of various dishes. This could be achieved, for example, by printing the Mediterranean pyramid on disposable tablecloths, with dietary tips printed on placemats.</p> <p>Moreover, it is possible to introduce new elements (new dishes and combinations, novel food products, foods from different countries) but without disrupting the basic characteristics of the dietary model. Besides, the Mediterranean cuisine was molded throughout 35 centuries by taking many culinary risks and trying new foods and cooking techniques. It assimilated new elements without losing the slightest of its identity and its basic characteristics. This is what helped build its reputation as the healthiest dietary model nowadays.</p> <p>When compiling a Mediterranean-style menu, the Quality Manager should include:</p> <ul style="list-style-type: none"> <li>● at least 3 micro-portions of vegetables in appetizers and side dishes;</li> <li>● at least 1 micro-portion of dairy products, usually some kind of cheese;</li> <li>● at least 2 micro-portions of fish, poultry or pulses for the main dish.</li> </ul> <p>Dessert should complete the menu on a dietary level.</p> <p>The combinations of appetizers and main dishes are particularly rich in the Mediterranean Greek cuisine and therefore allow for a daily option of at least three different menus that follow the Mediterranean dietary model.</p>

## Food Preparation

The most common production flow at a restaurant includes the sub-processes displayed in figure 3 for food preparation.

The whole process starts with the compilation of new or reviewing of the existing menu based on the principles of the Mediterranean dietary

**TABLE 5** Example Procedure for the Provisions Management Process

Purpose and scope	<p>This procedure concerns the supply of provisions and accessories that are necessary for the preparation of the product (food) by the business.</p> <p>Its purpose is to establish and maintain a system that secures:</p> <ul style="list-style-type: none"> <li>● the supply of provisions that are necessary for the preparation of food according to the requirements of the Mediterranean dietary model, which the business seeks to adopt;</li> <li>● the selection of appropriate suppliers, who can provide products according to the requirements of the model;</li> <li>● the preparation of orders with sufficient documentation (e.g., order, delivery, control of materials and products); and</li> <li>● the supply of cooking utensils, table cloths, napkins, and the like.</li> </ul>
Responsibility and authority	<p>The persons involved in this procedure are the General Manager, the Quality Manager, the Chef, and probably some external partners (e.g., professional decorator).</p>
Description of activities	<p>Once or twice a week or on some occasions even on a daily basis, the Chef makes a list of shortages in food provisions (raw food) and forwards it to the Provisions Manager either via a software program or in writing, depending on the size and the infrastructure of the business.</p> <p>The Provisions Manager prepares the order form which describes the kind, quantity, and desired delivery time of the food products required, and selects from the list of approved suppliers those who can deliver the specific provisions.</p> <p>The delivery of the provisions can be made at the seat of the business or even at the shop of the supplier or at the farm.</p> <p>The Provisions Manager verifies the quantities of the provisions delivered at the business by comparing them with all the supporting documentation (shipping invoices) that accompany them. At the same time, the quality control takes place.</p> <p>The supply of utensils and other durables is of minor importance compared to the provision of food provisions but equally important as to the quality of the services provided by the business.</p>

model as well as any other customer requirements. Based on the compiled menus, the selection, supply, delivery and storage of provisions, which constitute the provisions management process, as well as the preparation, the cooking, refrigeration and reheating where appropriate, and the conservation and serving, which constitute the production management process, take place. For the accomplishment of all these processes, documented procedures such as those summarized in tables 4, 5, and 6, respectively, should be developed.

**TABLE 6** Example Procedure for the Production Management Process

Purpose and scope	<p>The purpose of this procedure is to establish and maintain a system which will enable:</p> <ul style="list-style-type: none"> <li>● the production of dishes in a controlled manner;</li> <li>● the control and tasting of the product;</li> <li>● the conservation and serving of the dishes in the appropriate manner.</li> </ul> <p>All of the above include the establishment of a proper working environment and the proper maintenance of the equipment.</p>
Responsibility and authority	<p>The persons involved in this procedure are the Quality Manager, the Chef, and the Cleaning Manager with the assistance of the chef assistants, the cooks, the waiters, and the cleaning crew.</p>
Description of activities	<p>The production of the dishes offered at the food-serving business is concluded by the Chef and his/her assistants, according to the menu and is controlled by the Quality Manager.</p> <p>Cooking can be a control point as to which diet model is followed. Cooking utensils, cooking method of specific foods (braising of wild greens, stuffing of boiled guts, adding of wine), the combination of foods in order to form main dishes or desserts and the use of olive oil are basic points that can be controlled.</p> <p>The use of olive oil is necessary even when frying (a laboratory testing might be necessary); a sample should be taken from the oils used in the kitchen as well as from the oils used in frying pans in order to assess whether they are frequently changed. Moreover, any condiments used in cooking should be natural (fresh or dried).</p> <p>The cleanliness in every cycle of production ensures hygienic conditions as well as maintains the good state of the equipment.</p>

### Measurement, Analysis, and Improvement

In the frame of the proposed management system, the food-serving business shall plan and implement the monitoring, measurement, analysis, and improvement processes needed to:

- demonstrate compliance of its products with the Mediterranean dietary model;
- ensure conformity of the management system;
- continuously improve the effectiveness of the management system.

As one of the measurements of the performance of the proposed system, the food-serving business shall monitor information relating to customer perception as to whether the business has met customer requirements. The methods for obtaining and using this information need to be determined through appropriately developed and documented procedures such as the one summarized in table 7. Moreover, special procedures, such as the one

**TABLE 7** Example Procedure for the Customer Satisfaction Surveying Process

Purpose and scope	<p>Every action of the business that affects the final product (offered dishes) as well as any overall services provided by food-serving services (those related to the configuration of dining halls, table spots, lighting, decoration, waiters' behavior etc.) is mirrored in customer satisfaction.</p> <p>Customer satisfaction and information on any additional customer needs constitute the compass by which the business may configure its goals. In this case, the first step is to establish a communication channel between customers and the business.</p>
Responsibility and authority	The persons involved in this procedure are the Hall Manager with the assistance of the waiters and the Chef, the Quality Manager and the General Manager.
Description of activities	<p>Measuring customer satisfaction requires the collection of information related to the opinion of the customer for the services and products provided. To collect this kind of information, the business can use a review book, which can be located in a conspicuous place or offered to customers just before their departure, or short questionnaires offered to customers during the dessert. Moreover, the offering of a souvenir and the personal interaction of the Hall Manager and the waiters, the Chef, and the General Manager may help establish this procedure.</p> <p>Data collected through the aforementioned means are evaluated by the Quality manager, the Chef and the General Manager so that useful conclusions can be drawn and decisions made.</p>

summarized in table 8, should be developed and applied for the handling of complaints received by the customers and the nonconformity to the defined food quality principles.

Finally, the business organization should conduct internal audits at planned intervals to determine whether the management system

- conforms to the planned arrangements and to the food quality management system requirements established, and
- is effectively implemented and maintained.

The responsibilities and requirements for planning and conducting audits, and for reporting results and maintaining records should be defined in a documented procedure such as the one summarized in table 9.

## CONCLUSIONS AND FUTURE PERSPECTIVES

The widely acknowledged association of Mediterranean diet with health, based on scientific studies, has led to a demand of products and services that

**TABLE 8** Example Procedure for the Complaints and Nonconformity Handling Process

Purpose and scope	<p>The purpose of this procedure is to determine the manner in which the causes of the customers' dissatisfaction and complaints or the causes that led to non-conformity of the offered services and products with the quality principles set in the quality manual can be resolved so that their re-emergence can be avoided and that continuous improvement can be achieved.</p> <p>This procedure may be applied in every process developed by the food-serving business.</p>
Responsibility and authority	<p>Every employee may be involved in this procedure as appropriate under the guidance and recommendations of the Quality Manager.</p>
Description of activities	<p>The quality manager takes into account customers' complaints, problems with co-workers, staff reports related with the supply of raw materials and suggestions of other persons to the business, and examines the need to take corrective or preventing measures.</p> <p>A written report can be submitted where all the causes that have led to the need for corrective action or preventing measures are substantiated, which is then forwarded to the manager in charge of the business sector where the anomaly appeared. Determining the necessary action can be decided jointly by this manager and the Quality Manager.</p> <p>The decided action is performed and its results are measured. If necessary, the action is redesigned.</p>

are connected with the Mediterranean dietary model, especially by people in developed countries.

The providers of such products and services should be able to certify their appropriate delivery and ensure their quality. Hence, their food-serving businesses become more competitive, and their products and services become more useful, which in turn results in a remarkable boost in customer confidence. At the same time, this contributes to the safeguarding of an important cultural legacy that promotes good health of citizens, which can enhance the sustainability of the tourism sector.

Based on the fact that the certification of the Mediterranean diet model has not been attempted yet, this study highlights the necessity as well as the possibility to develop a relevant methodology. More specifically, this study proposes a methodology for the development of a food-serving services quality management system for compliance with the Mediterranean dietary model, following the principles and structure of ISO 9001:2008 quality standard. This way the proposed management system could also be integrated with other quality, environmental and food safety systems such as ISO 9001:2008, ISO 14001:2004, and ISO 22000:2005, respectively, covering all aspects from quality, environment protection, food safety, and compliance with the principles of the Mediterranean dietary model.

A follow-up of the same matter, could involve an investigation of the bodies that could undertake the certification process, the control and

**TABLE 9** Example Procedure for the Internal Audit Process

Purpose and scope	<p>The purpose of this procedure is to establish interval reviews so as to identify whether</p> <ul style="list-style-type: none"> <li>● the management system responds to the business needs;</li> <li>● the management system is effective;</li> <li>● the available resources are appropriate and adequate.</li> </ul>
Responsibility and authority	<p>This particular procedure applies to all the activities covered by the management system.</p> <p>The persons involved in this procedure are the Quality Manager, and probably some external partners (e.g., quality management system specialists, tasters, etc.).</p>
Description of activities	<p>The Quality Manager develops the plan for the internal audits which should be approved by the General Manager. The plan is developed taking into account the significance of the business activities as well as the findings of previous audits and possible changes both in the management system and the business objectives and activities. Exceptional audits may also take place in case of repetitive non-conformance to the quality standards, customer complaints or delays in the implementation of defined corrective actions.</p> <p>The Quality Manager prepares the check list for the audit, and selects the auditors, who may be persons either internal or external to the business. The check list may include but not be limited to items such as:</p> <ul style="list-style-type: none"> <li>● check of the progress in the implementation of previously defined corrective and/or preventing actions;</li> <li>● check of the fulfillment of the documentation requirements;</li> <li>● check through discussions that all employees understand the requirements and application of the system;</li> <li>● check of conformity to the procedures of the system through monitoring of selective activities;</li> <li>● check of conformity to the standards of the Mediterranean dietary model through inspection of supplies, food preparation, and the like.</li> </ul> <p>After the audit, the auditors prepare their internal audit report including in detail any identified deviation, and the report is submitted to the Quality Manager who informs the General Manager as well as all involved persons of the audit outcomes. In case of deviations identification, corrective actions are defined and applied.</p>

inspection system of the food-serving services as well as their promotion. At a second level, the selection of food could be further investigated and enhanced with the use of organic foods or GAP certified food products. This may secure quality and increase the value of the food-serving services.

Finally, it is worth mentioning that the adoption of an approach and a management system such as the one proposed herein may lead to the certification of food-serving businesses according to the Mediterranean cuisine, the communication of which may lead to the increase of public awareness on

the advantages of this particular dietary model. It does not guarantee though, that people who will visit certified food-serving businesses will adopt and follow in their everyday lives this dietary model. In other words, the adoption and communication of such food quality systems, despite their potentially significant contribution, can by no means diminish or replace the value of other increasing awareness efforts such as public campaigns and education programs.

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