Research Article

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Functional Foods for elderly people: new paths for multi "functional" agriculture

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Abstract: Nowadays a growing interest in how agritourism could be able to promote alternative nutrition stands out. The increase in the number of elderly has determined a desire for quality of life improvement; consequently, more attention has been paid to the role of food and their contents. A diet comprising Functional Foods could help not only to improve life quality of an aging population, as these foods are potentially capable to improve health and well-being; but they could also reduce health risks or delay the onset of serious pathologies. Moreover, scientific evidence of the correlation between diet and health for the elderly population, having a sedentary lifestyle and even a constant increase in healthcare costs, have addressed the interest in healthier food products. The aim of this paper was to design new food-based paths for agritourism farms that could promote health, nutritional and cultural values. To define these paths, a two steps analysis was carried out: (1) opinion collection from elderly and agritourism operators and (2) definition of a logical framework.

Results highlighted that differentiating what is offered could increase health levels of elderly and create new multi "functional" shapes for agritourism farms aimed at both offering local and Functional Foods for elderly and at spreading social-tradition values.

Keywords: Agritourism, Elderly people, Functional Food, Logical Framework, Elderly care, Italy

1 Introduction

Over the past 30 years, rural areas and inner areas, have experienced problems related to demographic dynamics. The gradual absence of essential services in these territories has increased trends that have shifted the healthcare sector, schools, postal and financial services into large urban centres. In the health field, current regional policies, characterized by the reduction of local hospital districts, has defined a supply of health services as very remote and difficult to access for the populations of the inner areas. The importance of the rural hospitality sector has increased over time both for growing the economic value for farmers and for supporting health and social policies in marginal areas (Bartoli 2015; Di Iacovo et al. 2014). The use of the agricultural and agri-touristic resources could make many rural areas (full of cultural and natural heritages) a place where it is possible to find and discover a link between health and tourism, nutritional values and well-being within a context full of cultural and natural heritage. On the other hand, EU and national statistics data highlight a growing ageing rate over the EU countries (Bengtson 2003; Eurostat 2017; World Population Ageing 2017). The increase of elderly populations has determined a desire for improvement in the quality of life; consequently, more attention has been paid to the role of foods and their quality and contents. Currently, the crucial role of Functional Foods (FFs) stands out: this kind of food not only improves the quality of life of the elderly but can also decrease the risk or delay the onset of severe pathologies (Wichansawakun and Buttar 2018). The scientific evidence of the correlation between diet, health and a continuous healthcare costs has highlighted the crucial role of healthier food products (Darmon and Drewnowski 2015; Mozaffarian et al. 2018). In this sense, local agritourism farms could promote a healthy lifestyle through the supply of FFs for senior citizens.

There are sound evidences supporting the search for multifunctionality based on alternative tools aimed at improving quality of life for farmers, the preservation of nature, and consumers' health, on which the food chain is based (Schneider et al. 2016; Marsden and Sonnino 2008;

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Madarász et al. 2009). Over the last 10 years, rural and alternative tourism increased more than the conventional tourism industry (Cox 2006).

On the other hand, consumers have great responsibility in shaping food systems: their attention and awareness towards food products and their qualities such as taste, health properties or freshness, represent the starting point for designing new paths and for reaching broader policy goals (health, education, and environmental objectives) (EIP-AGRI 2015).

According to a recent research (Ravoniarison 2017) that proposes a segmentation of French senior consumers of health-enhancing products, FFs seem to have a multidimensionally perceived value, which is not only utilitarian. In light of this, FFs could be considered as a "new sustainability tool" to promote innovative services through agritourism, differentiating offer and at the same time, alleviating some of the healthcare aging people-related costs (Sevieri et al. 2017).

Most of the world'stop diseases are diet-related (Christou et al. 2018). Indeed, consumer aspirations for healthier and safer food is increasing. Nutrition, health and lifestyle are the buzzwords of a "sustainable diet" that must include low environmental impacts, optimizing natural and human resources, and contributing to food and nutrition security and to healthy life for future generations (CIHEAM/FAO 2015).

FF ingredients include organically beneficial elements such phytosterols, carotenoids, fatty acids, alkaloids, flavonoids, dietary fibre, phytoestrogens and phenolic acids. Some functional components play a major role in health improvement for the elderly (He et al. 2016). As average life expectancy increases, the elderly can afford the cost of effective ways to become healthier and attain a better quality of life. The FFs were developed as a suitable solution to prevent and cure some of the chronic health problems especially for the most exposed people, like the elderly (Wilson et al., 2017). These foods fight disease, boost the immune system, increase energy, maintain healthy skin, maintain joints and strong bones, improve healthy digestion and promote longevity (Pem and Jeewon 2015).

The rationale for this study was to give some insights to the agritourism farms operators to find out the new possibility of creating an elderly customers-dedicated offer in the form of innovative menu supplied in rural areas. The main objectives were the following: 1. to investigate the awareness and knowledge of elderly consumers about FFs and the factors influencing their use in a daily diet; 2. to investigate the willingness to add FFs in an agritourism' menu. In particular, two different questionnaires were submitted to evaluate respectively the satisfaction of people over 65 to find a specific menu within the agritourism offer and, the willingness of farmers to add FFs in their menu.

The paper starts with a literature review to understand how the science of nutrition, FFs and multifunctional agriculture can correlate to bring benefits to the elderly. Then, the applied methodology and the obtained results are described. The conclusions close the paper by drawing some recommendations and implications.

2 Literature review

2.1 Nutrition for elderly

The continuous phenomenon for every system is aging, in terms of changes that takes place in a system's entire existence (Tosato et al. 2007). If the human being is considered to be similar to a car, the best preservation of the body is based on supply of the right fuel in both a quantitative and qualitative way. Besides providing energy, the "fuel" lets the body, or car, function very well over a long period of time with a sense of well-being. In other words, this means healthy aging (Cunnane et al. 2011, 2016). This acts as a basis to support not only healthy growth during the earliest phases of human life but also for a feeling of wellness during senility, where the fuel is the food. Basically, healthy aging for humans is completely related to eating right. A healthy eating pattern is, thus, fundamental to preserving a healthy condition in each stage of life. The quality of eating, with proper amounts of calories and nutrients, must be based on basic metabolic and dietetic requirements to control and protect cognitive and physical functioning (Laparra and Sanz 2009). The lack of basic nutrients could both reduce human health and cause the appearance or progression of diseases (Canella et al. 2009). On the other hand, diets, such as the Mediterranean diet, positively influence health and give a strong contribution to reducing problems like vitamin deficiency, skeletal and cardiovascular problems that particularly trouble seniors (Tyrovolas and Panagiotakas 2010).

Krondl et al. (2008) assert that nutrition is the principal component of healthy aging and can be pursued by following three crucial behaviors: decrease the risk of falling ill and to contract ill-related disability, to evolve and accelerate mental and physical functioning and keeping constantly busy in life. Among many societal effects of population aging, the health status of the elderly is the most important (Hee et al. 2013). Physiological changes

are the earliest diversities that occur for biological aging and they make it more difficult to obtain all the nutrients that the elderly need from a balanced diet (Gariballa and Sinclair 1998). Indeed, they are mainly exposed to malnutrition and efforts to provide the right way to eat finds several obstacles for different reasons (Youn-Jung and Eun Kyeung 2013). First, nutritional needs for the elderly are not well identified because they are in constant evolution (WHO 2019). Several studies have revealed that basal metabolic rate decreases with advancing age (Shimokata and Kuzuya 1993) and even if the caloric requirement per body weight reduces for older people, the consumption of certain fundamental nutrients has to increase in later life (Academy of Nutrition and Dietetics 2018).

Socio-economic factors also largely influence the nutrition of the elderly. Aloneness and depression are elements contributing to reduced interest in food, increasing the risk of malnutrition (Krondl et al. 2008). Moreover, if the amount of the retirement pension is low, food accessibility decreases, creating an inestimable loss for the elderly health. Such a spiral has a direct effect on health care expenditures.

To this end, insights and strategies to help them ensure healthy aging should be implemented, one of which could be the use of FFs.

FFs provide nutrients that ensure improved biological activities and physiological benefits to protect senior citizens from illnesses, reducing risk rate of contracting chronic ageing-related diseases such as diabetes, cardiovascular disease and osteoporosis (He et al. 2015). The metabolic activity progressively decreases in the elderly population of over 65 years (Kim et al. 2015). For this reason, balancing drug therapies with healthy eating patterns and performing regular exercise, are the fundamental actions to ensure longevity. Selective FFs facilitate the elderly to cut down or eradicate drug use by improving their physiological functions (Gollapudi et al. 2016). Many seniors are unwilling to take medicine and unintentionally or consciously avoid using them. In such cases, FFs should become an integral part of a daily diet (Institute of Food Technologists 2005).

Hasler et al. (2000) and Messina et al. (2008) identified FFs as potentially useful for reducing healthcare costs due to chronic aging-related diseases and suggesting that these innovative foods area valid alternative to combine healthy nutrients into a specific eating pattern for the elderly. Lastly, even if FFs cannot be perceived as a panacea for each nutrition-related complication, they can satisfy some elderly needs, which aim towards disease prevention and a healthy lifestyle (Ferrari 2007).

2.2 Benefits of functional foods

Numerous academic articles have highlighted the ability of food components of bringing significant health benefits as well as ensuring the ordinary needs of nutrients (Tapsell et al. 2016). Modifying eating habits is possible to prevent those pathologies spread over the last decades in the populations of rich countries. In this context, FFs play a fundamental role in the continuous change in the demand for foods.

In the early 90s, the labels "functional foods", "designer foods" and "nutraceuticals foods" were coined to indicate all those products or food ingredients that offer physiological benefits for the improvement of health. But between 1995 and 1999 a scientific definition was created by a group of more than one hundred experts who worked on the *Functional Food Science in Europe project* (FUFOSE), a concerted action between the International Life Science Institute (ILSI) and the European Commission. In 1999, in the British Journal of Nutrition, the definition of "functional food" appeared in the document "Scientific Concepts of functional foods in Europe, Consensus Document" (Action E.C. 1999).

According to the document, a food can be defined functional if, beyond the nutritional properties, its ability to positively influence one or more physiological functions is scientifically proven to contribute to improving or preserving the health and well-being and / or reducing the risk of occurrence of diseases related to the diet. FFs are neither tablets, nor capsules, but foods as part of a normal diet. Therefore, technologically advanced foods, can be considered "functional foods". Examples include: enrichment with polyunsaturated fatty acids (w3 and w6); adding biologically active substances (plant sterols); enrichment with probiotic ferments (live cultures with beneficial properties); and the more conventional ones, like garlic (for hydro and lipo-soluble substances which give anti-cancerogenic and anti-cholesterol properties), olive oil (for carotenoids, phenolic substances and about another 200 minor components that make it up). Some of the functional characteristics of these foods have been known since ancient times (IGI Global 2017). Indeed, it is well known that citrus fruits (especially lemon and mandarins) are rich in vitamin C, banana are rich in potassium, carrots in carotenoid, and each element has the ability to prevent pathological states or improve the state of health. Definitely, FFs improve physiological function beyond their role in the body for growth and development. They can contribute to:

– slowing down cellular aging (oxidative stress) by fighting free radicals,

- strengthening the immune system,
- improving intestinal functions, and
- reducing the risk factors for diseases affecting the cardiovascular system (Brambilla et al. 2008).

2.3 Nutrition economics

Chronic and degenerative diseases represent the most common illnesses distressing the elderly. The particular aspect of these pathologies is that they are all diet-affected. In a recent committee of the United Nations to discuss the prevention of non-communicable disease (NCD), the definition of diet-related health strategies have been identified as the main objective to pursue in a short term. Such recognition denotes that if the main risk factors for chronic disease were removed, 75.0% of cardiovascular and mental disease, as well as type 2 diabetes and 40.0% of carcinoma would be prevented, generating benefits in terms of health system cost savings (WHO 2013).

Nutrition is certainly a modifiable factor of diseases and the *Nutrition Economics* (*NE*) is the principal discipline devoted to defining health and economic aspects of feeding for the wellness of society (Lenoir-Wijnkoop et al. 2011). *NE* is a sub-branch of health economics; it was launched in 2010 to highlight the importance of the relationship between food and its economics aspect with human affairs.

In many industrialized countries, healthcare organizations strongly promote the daily use of healthy food. In line with these recommendations, the industries have begun to both decrease unhealthy ingredients in most of the common foods used in a daily diet, reducing salt, sugar and lipids and to incorporate healthy ingredients and bio-active nutrients such as vitamins, omega-3, fibers, probiotics, plant-sterols (Rudkowska 2010; Plourde 2011; Anderson et al. 2009). Nutrition/illness discussion is based on the fact that micronutrients are the main actor for preventing chronic disease. In senior citizens, often these nutrients are limited because they reduce food intake and therefore lose a variety of important food supplements. Daily eating pattern changes seem to have implications on risk-factor levels to developing diet-related illness and may have a greater impact on the elderly. Even little reductions in fat and salt intake, reducing blood pressure and cholesterol, could have a strong effect on decreasing the burden of cardiovascular disease on healthcare expenditure (WHO 2019). Increasing the use of fruits and vegetables by one to two servings daily could decrease cardiovascular risk by 30.0% (WHO 2019).

Considering all these aspects, the deepening of *NE* studies shows that a good influence of food on nutrition-related disorders can have a positive impact on healthcare costs, contributing to general improvement in public health and the sustainability of health systems (Freijer et al. 2014). The clear definition of the area of the *NE* is fundamental to characterize the health and economics findings ensuring a healthy society. The execution of the economic analysis for the different targets of young people, adults, elderly to identify costs in perspective, cost savings and health benefits, will be essential to address the future policymaking to achieve the main goal of the *NE* discipline.

2.4 Agritourism farms and multifunctional agriculture

This study defines agritourism in line with both, sociological and tourism approaches available in the literature (Barbieri, 2009). From a sociological point of view, it is defined as one type of entrepreneurial venture developed to enhance farm revenues (Che et al. 2005; Barbieri et al. 2008), while the tourism approach defines agritourism as farms welcoming visitors for different recreational purposes (Evans and Ilbery 1992).

Around the world, agritourism is defined in different ways, and is sometimes associated specifically with farm stays, as in Italy.

A recent study by Gil Arroyo et al. (2013) aimed to develop conceptual understanding of agritourism in the American context while Flanigana et al. (2014, p. 1) define some key characteristics of agritourism: 'a working farm; contact with agricultural activity; authenticity of tourists agricultural experience'. Then, agritourism farm refers to any agriculturally-based activity that involves visitors to a farm. Elsewhere, agritourism includes a wide variety of activities, such as directly-buying product from a farm stand, picking fruit, slopping hogs, feeding animals or relaxing on a farm (Biuso 2007). Moreover, agritourism is seen as niche tourism that reveals an industrial escalation all over the world, such as in Italy, Australia, Canada, United States and Philippines (The Hollow Log Country Retreat 2012; Manitoba Agritourism 2019; Wesvarrdec 2010). Such aspect highlights that agritourism operators believing in this form of business, can produce a new form of multifunctional agriculture promoting and offering foods both local and functional for elderly people.

All around Europe, agriculture represents one of the main activities in rural areas either for land use or impact on landscapes. In the last decades, in developed countries,

agriculture was renewed moving to a more open concept, thanks also to innovation, new paradigms and consumers demand for food quality. As indicated by Marsden (2003), the concept of multifunctional agriculture is involved in the process of integrated rural development which supports farmers to expand their activities and broaden to new non-agricultural activities contributing to further incomes. Rural development is a multidimensional, multi-level and multi-actor process involving different agents, complex and often contradictory practices and strategies (Long 2015). The most common strategies are represented by agritourism, nature and landscape management, in which social farming is one type of broadening activity in rural development.

Although social farming represents quite a new concept, it is worth noting that it originates from the traditional rural self-help systems present in rural areas before modernization of agriculture.

An innovative combination between agriculture and social development has led to social farming, which is a model based on direct relationship between rural and urban areas. Some examples of social farming activities are characterized by health and healing services, education and therapy, rehabilitation and social fields (Foti et al. 2013; Todorova and Ikova 2014). As demonstrated by recent trends in Italy (ISTAT 2013), the agritourism farms offering also educational programs for schools, kids and families have been growing by 56.4% from 2010, with the aim to bring closer citizens to the daily rural life and deepen their knowledge of nature and landscapes.

According to the aforementioned importance for healthy food, a new direction for agritourism farms could be the introduction of programs that plan to host the elderly by taking care of their eating pattern by implementing the use of FFs according to their care needs. The healthy elements contained in such innovative foods, make them a useful solution to increase the well-being state of elderly people and fundamentally important to give value to agricultural areas, as a whole (Mueller and Mueller 2010). In other words, in literature there are still no evaluated experiences of agritourism farms that consider adding FFs in a classical menu to enhance the health of the elderly. Furthermore, international literature (Haubenhofer et al. 2010; Hassink and Van Dijk 2006; Sempik and Aldridge 2006) often identifies systematic studies on the types of users and specific contexts such as hospitals or specialized centers for the treatment of specific pathologies or urban contexts for the management and use of green spaces (community gardening).

For example, Adato and Meinzen-Dick (2007) and Mulder (2006) confirm the validity of horticultural therapy on the cognitive, psychological, physical and social level of the elderly. It produces benefits in terms of individual well-being and quality of life by reducing stress and improving social cohesion, which are especially needed by seniors (Foti et al. 2013). All these new perspectives define the concept of multifunctionality in agriculture, which contribute to give a strong innovative impulse to the agritourism sector by re-evaluating rural areas and laying the bases for the new concept of care farms (Haubenhofer et al. 2010; Bird, 2017).

Lastly, the role of the elderly in the agritourism is not due to the willingness to work actively in the farm, but rather to avoid the problem of loneliness and marginalization from society (Lanfranchi et al. 2015). Seniors often go to the agritourism when they have no kin or, easier, when they want to join communities to share the joy of being together in a natural landscape. In such places, people rediscover the old values and the happiness of being part of a group both involved in social activities and engaged to eat in a healthy way (Haubenhofer et al. 2010; Lanfranchi et al. 2015).

3 Methodology

The purpose of this paper was to investigate the suitability of agritourism farms to encourage health and nutritional approaches among elderly people. A combination of interviews and qualitative process were used to reveal a possible path for multi "functional" agriculture through the involvement of agritourism farms in foods for elderly. Therefore, this work tried to made use of a uniqueness and value approach: after a first data collection and analysis, a qualitative second step was followed to provide insights for the analysis with a secondary - more in depth- data collection among a selected sample.

Hence, first of all, to reveal the need to create a new path for multi "functional" agriculture thanks to the involvement of FFs for seniors in the agritourism farms, two methodology steps were used: two different *phone and e-mail interviews* (unstructured interviews with close- and open-ended questions) were administrated respectively to farmhouse operators and to elderly consumers; and the last methodological step was the definition of a *qualitative process aimed at defining a logical framework*.

3.1 Phone and e-mail surveys for consumers(1) and farmhouses(2)

To achieve the two principal objectives of the study: to investigate both the awareness of elderly consumers about FFs and the willingness to add FFs in an agritourism' menu, two separate questionnaires were prepared and data collected between April and October 2018.

The survey questions were structured according to Seechurn et al. (2009) and Arvanitoyannis and Van Houwelingen-Koukaliaroglou (2005). In addition, control questions were considered for checking the reliability of the questionnaire.

The survey instrument for the elderly people, was principally divided in two sections. The first part was about the general socio-demographic information, including data on gender, age, health status, household income, level of education, type of environment (nursing home / home-care) and healthy eating patterns. The second one investigated consumption patterns, purchasing behavior and awareness of FFs use by the elderly and for inserting them in a hypothetical agritourism's menu. As for the assessment of the importance given to the FFs, the respondents were asked to choose the statement which described the best solution in terms of type of FF chosen. The pilot questionnaire was pre-tested and filled in by 15 experts in food processes, medical nutrition, and other scientifically related topics. The protocol followed was in accordance with the ethical standards of the institutional committee responsible for human experimentation, as provided by the Helsinki Declaration of 1975 (1983 revision). In particular, two reminders were carried out.

The survey was pre-tested for face validity to identify any kind of problem or weakness and after considering the feedback, some questions were re-edited and re-phrased.

The sample of senior citizens was composed by men and women aged 65 or over. Recruitment took place in care homes for the elderly and at home through home care organizations. The inclusion criteria were: able to consume a normal diet composed of solid and liquid foods; sufficient visual and auditory capacity to complete a test; degree of understanding such as being able to participate in an activity for at least 30 minutes. Poor cognitive functioning was considered as an exclusion criterion.

Participants favorable to the addition and consumption of a FFs' menu were defined as the target group. The hypothesis "*favorable to a specific menu*" was evaluated using a 7-point Likert scale that ranged from "*I do not agree*" to "*I very much agree*". The questions categories examined were identified based on elderly food-preferences literature (Privitera 2009; Van der Meij et al. 2012; Van Staveren and de Groot, 2011; Wijnhoven et al. 2012; Finlayson et al. 2011) as well as on information about the knowledge of dietary patterns among the elderly with different experiences of FFs consumption. Such categories are identified as general information (e.g. gender, age, education), habits (e.g. personal point of view about personal lifestyle, use of FF), awareness (e.g. choice of healthy foods, nutritional component of menu in a restaurant) and opinions (e.g. reasons for FF's consume, feedback for farmhouses).

Regarding the questionnaire submitted to the farmhouses, the survey was conducted exclusively on the national territory taking into account the available online data (www.agriturist.it- accessed 2018, 2nd April). A total of 33 Italian farmhouses (10.0% of total population) replied to the survey both face to face or by phone and e-mail. Such farms were available to include an alternative menu with FFs (inclusion criteria). The farmhouses outside Italian territory and not available to this study were used as exclusion criteria. In the questionnaire, among the various unstructured questions being asked, the most relevant were:

- *"Among the menus offered in your farmhouse, do you have specific menus to preserve the health of the elderly? If so, why? If not, why?"*
- *"Would you be interested in proposing a menu with FFs (i.e. foods able to bring significant health benefits in addition to guaranteeing normal nutritional needs) aimed at the elderly?"*

The participants who responded affirmatively were defined as favoring the inclusion of this type of menu. The hypothesis "*favorable to a specific menu*" was evaluated using a 7-point Likert scale that ranged from "*I do not agree*" to "*I very much agree*".

General characteristics of elderly participants with attitude to consuming FFs and people without this attitude were compared using independent t-tests and chi-square tests as appropriate. General food preferences for FFs were identified by counting frequency scores of the answers to the questions posed to the elderly. For each test, outliers were excluded, and all data were analyzed using *STATA* for *Windows* (version 14.0).

3.2 Logical framework

Data collected from farmhouses, with a marked dedication to the elderly care, were further analyzed through a qualitative process to develop a logical framework (LF) following Abend (2008), Swanson and Chermack (2013),

Kauchak and Eggen (2003), and Asher and Herbert (1984) guidelines. The LF analysis includes concepts, definitions, references to relevant literature and existing theory used for a study. This approach must reveal an understanding of concepts that are significant to the issue of the research and relate to the broader fields of knowledge being considered (Asher and Herbert 1984). It permits the intellectual transition from simply describing an observed phenomenon to generalizing about various aspects of that phenomenon (Swanson and Chermack 2013; Kauchak and Eggen 2003).

The data obtained are organized in a database to allow the subsequent classification, storage and retrieval to be analyzed. After collecting data, they are examined to find the links between the research objective and the conclusions in reference to the initial questions.

Considering the information envisaged by the literature, the overview of the available definitions and existing theories reported in the aforementioned "Literature review" paragraph, the LF steps performed were the following:

- *selection of cases and determination of data collection and analysis techniques*: specifically, those proposals dedicated to the elderly were selected both from the food point of view, such as particular menus and with specific activities, and from the recreational point of view;
- *preparation for data collection*: database have been created to gather all the information relating to farmhouses; the first part was dedicated to the identification of support activities related to the elderly; the second part was dedicated to the identification of any food produced by the "farmhouses";
- *data collection "in the field":* the information was found on the web using Google and Yippy because the latter combines search results in clusters divided by category. With the aim of investigating if the farmhouses wanted to adopt a menu dedicated to the elderly and if they positively accepted this innovation, an on-line survey was conducted using Google modules application. Specifically, e-mails were sent to the Italian farmhouses and, to speed up the work, 20.0% of the farmhouses were contacted by phone;
- *data evaluation and analysis*: replies received via e-mail and phone have been cataloged and entered into a previously created database.

Ethical approval: The conducted research is not related to either human or animal use.

4 Results

4.1 Phone and e-mail survey for consumers and farmhouses

In total 70 adults out of 100 (70.0%), aged 65 and over, participated in the study and responded to the survey on food preferences. The sample gender was 67.0% female and 33.0% male. About one third of the participants knew FFs and more than half of the sample (47 participants, 67.0%) was willing to try FFs.

According to demographic information gathered, most of the seniors had a low level of education: 69.0% primary school diploma and 31.0% middle school diploma. As for the personal lifestyle, 30.2% of them were ex-smokers and only 3.0% continue to be a current smoker. In addition, 10.3% asserted to follow a light exercise program 2 times per week instead most of the others (38.6%) would like to follow an exercise program. Another demographic information obtained thanks to the questions posed in the first section of the survey is about the health characteristics. More than half of the sample (69.2%) presented non-communicable diseases such as: cardiovascular disease (35.7%), diabetes (24.4%) and osteoporosis (9.1%).

Regarding the FFs preference and interest, the option: "*Eating FFs is very important*" was chosen by the most of the participants (65.0%); while the option: "*you would use FF to test the latest research results in the nutritional-health field*" was the second preference shown by the sample. Furthermore, several very significant answers were given to the question about the preferences to take into consideration when buying a food product. Specifically: (1) *Health aspects of the food, salt, fat and calorie content* (42.0%); (2) *Price and special offers for FFs* (28.0%); (3) *Product quality and brand* (30.0%).

As for the questionnaire submitted to the farmhouses it resulted an interest to insert an FFs menu in their offering. The most frequent answers were: (1) *"We do not have specific menu but we can adapt to the client's requests and create a personal menu"* (43.0%); (2) *"We would be very interested"* (6.0%); (3) *"It is an innovative idea that allows to increase the chances of increasing customers"* (8.0%); (4) *"There would be savings for the company because the elderly do not manage to eat everything and ask for bags to take away what they cannot eat, thus affecting costs"* (23.0%); (5) *"It would help in income at this time of particular recession"* (20.0%).

The survey with the elderly people and farmhouses' operators revealed the response rates for the following benefits related to FFs in farmhouses:

- elderly are encouraged to spend some time in more natural and relaxing environment with other people, also improving from a psychological point of view (42.3% of elderly people);
- added value for farmhouses offer generated using products enriched with nutraceutical foods in their menus (25.1% of farmhouses operators);
- opportunities for rural development and new forms of entrepreneurship trough multifunctionality of farmhouses (15.4% of farmhouses operators);
- the farmhouses increase their clientele and consequently their profits (10.2% of farmhouses operators);
- farmhouses move to a new path, not merely "feeding" customers, but offering FFs and personalized diets for elderly (7.0% of elderly people).

4.2 Logical Framework

Out of the 70 Italian farmhouses contacted, about 53.0% were not interested in improving their offerings and include menus for the elderly and, consequently, they were excluded from the survey. Some of the logos distinguishing the farmhouses subject of our investigation are showed in figure 1. Such logos are expression of the peace given by the Italian farmhouses and scenarios of rural environments.

Following the LF's methodological approach, through the selection of cases, preparation for data collection and data collection "in the field", the answers received by the farmhouses' operators and the identification of the variables to standardize the farmhouses' reviewing process for the classification that were analyzed. These elements have been inserted in Table 1 to facilitate data reading, the current reality understanding and generalizing the farmhouses' aspects linked to the elderly population.

In the following table, all the most representative information on the analyzed farmhouses has been included. Specifically, the farmhouses' identifications were listed with the respective geographical locations, individual support activities supplied and products developed and sold.

5 Discussions

Considering the results obtained, it is important to understand that the Italian social farming in its various aspects, from educational farm to agritourism for seniors, represents an important way to attract people to the agricultural world. The activities performing in such places like those mentioned in the LF, allows to enhance the country by promoting the rural world to those who have needs like the elderly (Senni 2005). To date, the agritourism sector represents a new opportunity for Italian farms, allowing both a more realistic contact with nature and a more consideration of the weaker classes of society. One of the greatest benefits provided by agritourism farms is to work in a context with "biological times" (Sznajder et al. 2009). The agricultural production processes' times are much longer than those of other work sectors. These rhythms make the primary sector the main field favorable for supporting healthy aging in which it can modify the speed of

Figure 1: The main farmhouses with elderly-dedicated activities investigated in Italy
(Source: our processing)

Table 1: Farmhouses listed according to geographical locations, individual support activities supplied and available products

FARMHOUSES	LOCATION	SUPPORT ACTIVITIES	PRODUCTS
"Agri-residence" for the elderly Silicanum	Gorizia	Healthy and pleasant lifestyle, garden to be cultivated, gymnastics courses, swimming pool activities, participation in trips and moments of conviviality.	
"Agrinonno - l'orto dei nonni"	Cavatore (Al)	Cut the grass or cultivate plots of vegetables whose fruits can be brought home, collect the vegetables that can then be cooked on site, give advice on how they cooked, library, fireplace, tasting room of typical local products, games room (table tennis, table football, billiards, cards, chess, checkers), gym with showers, treadmill, seated exercise bike, armchair and elliptical.	Honey, mostarda, jams, goat's cheese, hazelnuts, amaretti, native wines such as Brachetto, Dolcetto, Barbera and Moscato.
"LA VILLA" Agri-residence for the elderly	Villa Sant'Angelo L'Aquila	Continuous day and night assistance of on-site personnel. Health assistance with external specialized personnel. Full board (breakfast, lunch, dinner with organic farm products). Laundry and cleaning services. Recreational, rural, culinary, sporting and tourist activities.	
"I casali del Trebbiolo" Agritourism Residence for seniors	Firenze	Entertainment with the other guests of the residence, walk in the park, chef's kitchen of the restaurant with typical local dishes or classic but personalized. Room and board; Possibility to practice horticulture and gardening.	
"Il filo d'erba" bio-ecological farm	Monte Ceva (Pd)	Visits to farm animals, of life on the farm, visit of the bees, guide to the aromatic and wild herbs, teach how to press the grapes with the feet, ancient songs (lullabies) and nursery rhymes, old sayings, idioms and essays proverbs catering with guided tasting. Farm bingo or other board games. How to reward the products of the farm for the winners.	Salami, "sugoli", elderberry and pomegranate syrup
"Agriturismo La Castelletta"	Cupramarittima (AP)	Menu, tastings that differ depending on the seasons and the products that grow in the vegetable garden. During the summer, snacks on the lawn and tastings of extra virgin olive oil. Bed and breakfast. Cooking workshops, materials recycling, postural rehabilitation, swimming pool, art of recycling, educational workshops, emotional workshops, manual laboratories, orto-therapy, services for the elderly.	Local food and wine products extra virgin olive oil
"Vecchio gelso"	Ortezzano (Fermo)	Educational farm, heated indoor pool, traditional cuisine for celiac.	Products for celiacs
"Casa rossa"	Parma	Educational and cultural catering aimed at enhancing the territory and traditions.	Production of various types of vegetables
"Il melo rosso"	Fortunago (Pv)	Destinations and nature trails, itineraries and artistic itineraries, sports activities for health and fun.	Artisan cheeses, organic milk, cold cuts
"Il castagno"	Borgo di Biancanigi (Pv)	Nature trails, artistic and relaxing itineraries.	Apples, apricots, peaches and wines of own production
"Cascina dei peri"	Castelnuovo Magra (La Spezia)	Natural excursions for elderly.	

Table 1 continued: Farmhouses listed according to geographical locations, individual support activities supplied and available products

FARMHOUSES	LOCATION	SUPPORT ACTIVITIES	PRODUCTS
"Dal poeta"	San Benedetto Val di Sambro (Bo)	Excursions on foot and on horseback for the elderly, visits to farm animals, services for the elderly, "cammino della via Francigena".	Homemade jams, honey
"La Castelletta"	Cupra Marittima (AP)	Different tasting according to the seasons and the products that grow in the garden; menus for children, celiac, people with special allergies, vegetarians and vegans. During the summer there are snacks on the lawn and tastings of extra virgin olive oil; swimming pool, recycling art, educational farm, green pet therapy, educational, emotional and manual laboratories; vegetable garden therapy; services for the elderly; facilities for disabled.	local food and wine products, organic products
"La valle della luna bio"	Bagnone (Ms)	Natural swimming pool, recreational and rest activities, excursions, social activities.	Organic products, production of local Tuscan dishes
"Ca' del Buco"	Montepastore (Bo)	cultivation of cereal fields, fruit, vegetables; animal breeding, lavender cultivation, horse riding, bird watching, musical, creative and psychomotor workshops.	Organic products, biscuits, homemade bread
"Acero rosso"	Sacile (Pd)	Vegetable garden therapy, pet-therapy, orto-therapy, gymnastics for the elderly, aqua gym, sauna, recreation rooms for cultural events and reading.	Flower and plant nurseries
"Podere bello"	Castiglione del lago (PG)	healthy eating, personalized diet with menus prepared by expert chefs; private and common spaces, reading rooms, TV room, swimming pool, a large park for walks.	
"La vecchia stalla"	Giussago (Pv)	natural walks, paths with animals.	typical Lombard and Pavese dishes, salamis, special menus, own production of rice, homemade pasta, jam and cured meats.
"La casina"	Caprese Michelangelo (Ar)	Swimming pool, excursions on foot or by bike; tennis; fishing; pick nicking; river walking; medieval town excursions.	Typical products on sale; organic cultivation of chestnuts.
Agri-residence "Le ginestre"	Eboli	Play activities; excursions; physical exercise for the elderly.	

Source: our processing

the operations to be carried out without compromising the quality of the final product (Sznajder et al. 2009).

In this study, special attention was focused on the availability of FFs for elderly people as a new solution to be introduced in the social farming, specifically for agritourism business. According to the scientific information on healthy values and benefits of a diet containing FFs for human consumption (Urala and Lähteenmäki 2004; Vergari et al 2010), their use for elderly people in agritourisms, could help to differentiate the offer and, at the same time, alleviate some of the health care costs linked with aging people. Moreover, a correct communication about health foods seems certainly necessary to avoid adverse events linked to health food use (Kobayashi et al. 2018).

As it is already well developed the educational and social farming system involving kids, family, disadvantaged people and experts following them during the farming activities (Dessein et al., 2013; Berget et al., 2011), at the same way new programs could be implemented for senior citizens.

In our sample, elderly consumers consider very importantly eating FFs but also use FFs to test the latest research results in the nutritional-health field. Such statements confirm that the elderly represent a niche group in the FFs market. Indeed, they are willing to use FFs to keep themselves healthy and prefer to take into consideration when buying a food product, health aspects of the food, salt, fat and calorie content. This desire is perfectly achieved

by an agritourism supply thanks to their constant attention on the valorization of natural nutritional resources, their combination with innovative food components and integration of care activities with social inclusion actions (Sznajder et al. 2009).

According to the results from the survey on the farmhouses' operators, a general economic trend was that if there is demand for the supply of FFs product to the elderly in agritourism, there will be the possibility of creating a dedicated offer in the form of innovative menu supplies by the rural tourism. Without adequate research for elderly consumers, the farmhouses' operators stay cautious about this innovative touristic offering. However, many investigated operators are willing to provide such new services. Most of the respondents indicated that they can make available a combination of unique moments and traditions associated with the social characteristics provided by the Italian agritourism context. On the other hand, in terms of business diversification, new activities could be proposed by the farmhouses, not only to prepare meals, but also to identify personalized diets.

Given the above, it is possible to identify some insights related to new scope of messages for older people and the agritourism segment. Specifically, such findings can be implemented to promote practical activities to strengthen the agritourism context for the elderly, to develop agricultural- and cultural-tourism elderly-dedicated programs, as well as in the preparation of innovative foods that impact on the seniors' health and, in general, on the Italian agritourism development. Guaranteeing the presence of elderly vital communities means enhancing agritourism's reply to the globally expressed need to be continually modernized. Tackling a wealth of tacit knowledge, reproducing values of reciprocity, fostering intergenerational gap and open dialogue with new professional figures like nutritionists, cooks, social experts and agronomists who could be actively involved in the agritourism sector and support the production of foods enriched with functional elements, are also key messages for the policymakers to actively involve elderly people in Italian farming.

For example, as revealed in a study conducted by Fritze et al. (2008), a better understanding of the FFs effects in the field of the social agriculture could be a strategic element in the evolution of a multifunctional farming practice, to integrate care activities, social and work inclusion actions for elderly and disadvantaged people. Positive results were also obtained in a study in which a positive mental health is associated with the Mediterranean diet, if enriched with some functional nutrients. It was shown to improve cognition in elderly participants who were at high vascular risk (Salvatore et al. 2019).

As for the study's contributions to the field, to our knowledge, this research represents the first attempt in the literature to link three huge topics: FFs, elderly and agritourism to identify new paths for multifunctional agriculture. Advantages of this study include a sample representing the general community-dwelling elderly population and the adoption of validated instruments as surveys already used in previous studies and LF as well.

Although this study provides innovative information regarding farmhouses and specific preferences among elderly about FFs, some study limitations need to be addressed. First, the poor cognitive functioning for the elderly, which represented an exclusion criterion. In this sense, the study results could not be generalized to the elderly in the used settings. The gender balance in the elderly was more represented by female people. This could also be a limitation. Although women were more available to do the survey, it could also be noted that generally they are household decision makers. One more limitation is identified by the chosen study design. The survey is designed to measure relative food preferences and could not replicate the real ability to use the cited foods; often food choices may differ from actual food consumption decisions (Wansink 2004). Thus, the knowledge, preventing the generalization of results, acts as a limitation of the study.

Regarding the LF analysis carried out on the Italian farmhouses, a limitation was revealed in the way of contacting farms; most of the contacted farms did not respond to the email received. Nevertheless, given the results of the recent studies on the constant percentage increase of the elderly in Italy (ISTAT 2019), there is a clear need for urgent and global actions for preventing and/or delaying the onset of diseases, working towards the improvement of the quality of life for the aging population.

Future studies should be conducted to confirm the identified information for farms and for elderly' food preferences using the approach of the present study.

6 Conclusions

In conclusion, the research performed has shown that creating new agritourism menus for people over 65 could have a positive effect on the economy and on socio-cultural environment of the Italian agritourism sector. The activities to help the elderly not only to spend their time in a good way, but also to know the potential of the FFs in the last phase of life, will facilitate a more realistic contact with nature and the agricultural world. The vector of

development of such new paths needs to be developed in line with the aims of social farming and with the rational and careful use of FFs in an agritourism context, generating benefits to the elderly population.

Spreading initiatives to ensure healthy aging in social farming context will be a key suggestion for government policies and it will demonstrate that supporting the creation of new paths, will improve existing local food systems and support the creation of new ones.

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