Multifunctional farms in Greece: a new business model need assessment tool for their activities

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Abstract

Multifunctional Farms, as a practical implementation of Multifunctional Agriculture, offer services and products enhancing Sustainable Development. Current policy lacks a practical tool to assess impact of activities in Multifunctional Farms. In our research we propose and test an assessment tool able to reveal main environmental and non-formal learning indicators in tourism-education-recreation activities, regarding visitors' opinions. This tool can be used by practitioners, farm managers and other stakeholders, to assess their activities. Also, the tool can help Multifunctional Farms, to find their niche market, profiles of future visitors. This tool covers a huge gap between theory and practice of Multifunctional Agriculture, the tourism-recreation-education activities.

Keywords: *Assessment, environmental education, farm education, instrument, multifunctional agriculture, non-formal learning, open farms, psychography, policy, tool*

JEL classification: Q13, Q16, Q18, P46

Introduction

Sustainable Development and Multifunctional Agriculture directives have a parallel evolvement, according to their main goals (Dalampira and Nastis, 2019). The post-productivism transition to modern agriculture encapsulate different the functions besides the production of fiber and food (Wilson and Burton, 2015), such as on-farm production and sales, environmental services and tourism-recreation-education activities (Heringa, Van Der Heide and Heijman, 2013). This is known as Multifunctional Agriculture. Although its conception is diversified between studies and countries, a common implementation of Multifunctional Agriculture are farms, specified in bibliography with different terms, such as multifunctional farms or care farms (Kizos et al., 2011; Hassink, Hulsink and Grin, 2012).

Multifunctional Farms can offer activities such as tourism-recreation-education activities which can be an additional income to the farm (Kizos et al., 2011; Heringa, Van Der Heide and Heijman, 2013). In a learning spectrum, these activities are characterized as non-formal learning, which can lead visitors gain experiences, knowledge, change their attitudes and behaviors in a non-formal way, like with work, family and other activities in their daily lives (Williams and Chawla, 2016). Multifunctional Farms impact their consumers' identities (Dalampira et al., 2019) and

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use this function of tourism-recreation-education to learn about the environment, the rural society and the products of the farm and change attitudes and behaviors (Seuneke and Bock, 2015; Manson et al., 2016; Dalampira et al., 2019).

Although, theory of Multifunctional Agriculture had started to shape directives in the last 30 years, in International (United Nations, 1992) and European policy (European Union, 1999), literature studying, there are no indicators about tourism-education-recreation activities effectiveness to the people visiting these farms (Brown, Goetz and Fleming, 2012; Marzban, Allahyari and Damalas, 2016; Sangkapitux et al., 2017). More specifically Current European policy, even though promotes Multifunctional Agriculture (KIZOS et al., 2011) is not able to provide clear operating directions to Multifunctional Farms and each member-state adopts a state legislation of these farms in a different way (Morgan et al., no date; Andersson, Eklund and Lehtola, 2009; Heringa, Van Der Heide and Heijman, 2013; Ragkos, Theodoridis and Batzios, 2015; Rovai and Andreoli, 2016; Hrabák and Konečný, 2018). This creates a huge gap between theory of Multifunctional Agriculture and its practical implementation in farms. More specifically, there is a lack of assessment about the tourism-recreation-education activities in these farms. Previous research, used assessment tools with statements or questions to indicate knowledge, attitudes and behaviors of consumers (Vukasovič, 2015; Annunziata, 2012) or reveal environmental and learning indicators of people (Pitman and Daniels, 2016).

The aim of this research is to create an assessment tool able to reveal the most important environmental and non-formal learning indicators in tourism-education-recreation activities, regarding visitors' opinions (Figure 1).

Figure 1. Conceptual framework the assessment tool: visitors' opinions about the environment and non-formal learning in Multifunctional Farms

Afterwards, we are going to test this tool in a case study, by looking into visitors' knowledge, attitudes and behaviors, after their visit and experience in Multifunctional Farm's activities.

The results can cover the gap between policy and practice of Multifunctional Agriculture, in the unexplored field of tourism-recreation-education activities occurred

in the farms. This tool can be used from policy makers to practitioners in order to give directions to stakeholders for more effective tourism-recreation-education activities.

Methodological framework

The assessment tool was created by a combination of literature and theories about knowledge, attitudes and behaviors for the environment and non-formal learning. One of the main functions of Multifunctional Agriculture is the holistic perception about the environment by a form of non-formal farm learning (Crivits et al., 2017). This was the reason we created two groups and two separate analyses about visitors' opinions: environment and non-formal learning. Our two groups, included psychographic statements which have been used it the past for revealing lifestyle characteristics, interests, activities, values and opinions (Fatima, Khan and Goh, 2016; Prati, Albanesi and Pietrantoni, 2017; Pitman, Daniels and Sutton, 2018b). More specifically, psychographics about the environment and learning used in the past to reveal main indicators or cluster people in the field of Multifunctional Agriculture (Ortega-Egea et al., 2014; Marzban, Allahyari and Damalas, 2016; Rodríguez-Ortega, Bernués and Alfnes, 2016). The objective of this tool was to reveal the most important environmental and non-formal learning indicators in tourism-education-recreation activities, regarding visitors' opinions. We created an assessment tool based on the above, by using psychographic statements (Table 1).

Table 1. Two groups of psychographic statements used for the assessment tool in the Multifunctional Farm: Environment and non-formal learning

Facet	**Environment**
Nature contact behavior	Nature contact makes me love it more.
Nature contact behavior	Nature activities help my personal development.
Nature contact behavior	My emotional status is improved in nature.
Anti-anthropocentrism	I care about environmental problems.
Anti-anthropocentrism	I care about the future generation.
Anti-anthropocentrism	Human activities have destroyed the planet.
Anti-anthropocentrism	Environmental protection, social collaboration, and economic prosperity lead to sustainable development
Farmer's role	Farmer can protect the environment
Farmer's role	Farmer is a social work because it produces food
Farmer's role	Farmer in a non-formal learning space help positive the awareness about sustainable development
Environmental attitude change	Today's experience raised my inquiry to environmental problems
Environmental attitude change	Today's experience changed my environmental attitude
Environmental attitude change	Today's experience changed my willingness to be an environmental volunteer
Environmental attitude change	Today's experience raised my willingness to pay a volunteer organization about the environment
Facet	**Non-formal learning**
Life-long	I like learning new things
Life-long	I like learning though new experiences and I am searching them
Life-long	Humans learn throughout their lifetime
Life-long	On vacation I want to rest and do nothing
Interactive	Using different senses help me learn better
Interactive	Non-formal learning places should have guided tours and activities for the participants
Interactive	Non-formal learning places should provide interactive-inquiry learning

Non-formal/formal learning connection	Non-formal learning places contribute to difficulties in science interpretation
Non-formal/formal learning connection	Connecting school with society is important
Non-formal/formal learning connection	Non-formal learning spaces contribute significantly to environmental education
Non-formal/formal learning connection	Knowledge is provided only at school
Non-formal/formal learning connection	Non-formal learning places change knowledge, attitudes, behavior about the environment
Multifunctional agriculture knowledge	I am familiar with the term multifunctional agriculture
Multifunctional agriculture knowledge	I am familiar with the term Non-formal learning places
Multifunctional agriculture knowledge	I knew what I heard/saw during my visit
Multifunctional agriculture knowledge	Non-formal learning places highlight the multifunctionality of agriculture
Multifunctional agriculture knowledge	Todays' experience affected me on searching similar places to visit
Multifunctional agriculture knowledge	Non-formal learning places should have specialized staff

The theory for creating statements about the environment was the "New Ecological Paradigm" of Dunlap (2000), which represents peoples' perceptions of seeing the world ecologically, which often leads to enhanced environmental identities (Walton and Jones, 2018). This theory was not tested before for Multifunctional Farms, but it was widely used in similar cases for measuring knowledge, attitudes, opinions, behaviors of people. We transformed the facets and statements of Dunlap properly to fit in a Multifunctional Farm case study.

Non-formal learning statements were based on the grounded theory and policy of the European Center for the Development and Vocational Training (CEDEFOP). There are yet not clear directives from the Greek legislation Multifunctional Farms about this aspect. Also, there is lack of research on psychographic statements about non-formal learning, since this is a method mainly used in marketing, tourism, psychology and other fields of study. According to CEDEFOP, non-formal learning embedded planned activities not explicitly designated as learning in terms of learning objectives, learning time or learning support (CEDEFOP, 2014). Hence, non-formal learning place (i.e. botanic gardens, protected areas, farms) places are not certified in a learning context (EOPPEP, 2016), but they offer basic elements of non-formal learning. For these reasons, we search in recent literature about non-formal learning main elements in order to create facets of this group of statements. Life-long facet is supported as an element of non-formal learning by many organizations (Werquin, 2010; Björnavåld). Outdoor and non-formal learning spaces should also include the interactive factor in their activities' program, since it offers a different way of out-of-school formal learning (Dieser and Bogner, 2016a; Jose, Patrick and Moseley, 2017; Mackenzie, Son and Eitel, 2018). Also, in our tool non-formal/formal learning connection facet was added because there is a growing literature of connecting school with society and non-formal implementation from theory to practice (Wochowska, 2015; Serrano-Iglesias et al., 2019).

In the second step, we tested our assessment tool to a farm business operating under the theory of Multifunctional Agriculture. But Multifunctional Farms are agricultural businesses operating under each country's policy. For example Dutch multifunctional farms diversified their activities to green care, tourism-recreation-education, on farm sales and green services (Heringa, Van Der Heide and Heijman, 2013), whereas in Greece' policy divide activities in arable land and/or plant or livestock and has at least one activity of catering and/or demonstration and/or monitoring of the production process and/or education-learning space and/or farm products space and/or sports and health activities and/or retail and cultural activities and/or environmental protection and/or rooms for rent (Greek Parliament, 2014). Due to the lack of literature in Greek cases studies but also for the creation of an international tool, we followed Heringa (2013) division of farms activities and we chose a Greek case study. We investigated tourism-recreation-education activities in the farm and visitors' opinions about the environment and non-formal learning after these activities

Our case study was carried out on a private small-scale farm business located at peri-urban area of Thessaloniki, Prefecture of Central Macedonia, Northern Greece. This was chosen because it is tourist attraction (in the thematic area of environment, bees and beekeeping), near one of the biggest touristic and agricultural areas of Northern Greece, Halkidiki. Also, this business is in the process of certification as a Multifunctional Farm (Greek Parliament, 2014), whereas it fulfils the criteria according to Greek legislation. It includes a building (shop, café/catering) and an outdoor space (cultivation of beekeeping plants, area of demonstration of beekeeping processes, educational-learning area). It is open to the public in the past 2 years.

An innovative in design structured questionnaire was designed under the above concept with two parts: 1) Environment (14 statements), 2) Non-formal learning (18 statements). A 5-point Likert-type scale (from 1 = strongly disagree to 5 = strongly agree) was used by visitors to rank their opinions about the most important environmental and non-formal learning indicators in tourism-education-recreation activities.

The learning program with the activities, included a guided tour in the outdoor space, with expert scientists using signs, constructions and other supporting educational material to offer visitors an interactive learning experience, in order to combine non-formal and formal learning (facets of non-formal learning in the assessment tool). In this way visitors understood the importance of bees and beekeeping for the environment and finally the nutritional value of beekeeping products (facets of the environment in the assessment tool). Afterwards, visitors tasted beekeeping products from many regions of Greece (honey, pollen, propolis, traditional sweets, ointments etc.) and gain a spherical view of the connection environment-agriculture-products.

The research used all population of adult visitors (n=150) for one year, which were interviewed after attended the above program. We do not used a sample of visitors, but each one visiting the farm and attended the program was interviewed. So, all visitors interviewed had an appropriate knowledge background to answer. Visitors were interviewed after the program inside the park. This research does not have statistical characteristics of a sample, indicating that the samples were representative, because our aim was to research the population of visitors which chose to visit and attend a program in a Multifunctional Farm.

The data gathered from the personal interviews and a questionnaire was coding and transcribed to an SPSS25 matrix. Firstly, we used Categorical Principal Component Analysis (CATPCA) to transform statements into dimensions, reduce multidimensionality and reveal the main indicators according to visitors' opinions. We chose this analysis because Dunlap's (2000) tool of the New Ecological Paradigm reduced the multidimensionality of his statements also with CATPCA. Also, CATPCA was used in other studies to reveal the most important environmental factors or creating groups of factors (Burton et al., 2018; Finisterra do Paço, Barata Raposo, & Filho, 2009; Weaver, 2012). In this way, linearity of relationships between Likert-type qualitative variables reduced the large number of variables into smaller set, in order to create dimensions of visitors' opinions (Woods and Edwards, 2007; Linting and van der Kooij, 2012). We implemented CATPCA in two-separate analysis (Liltsi et al., 2014; Loizou et al., 2014; Michailidis et al., 2013) for the two groups of the tool (environment and non-formal learning).

Results

3.1 Main indicators for the environment

Our proposed tool related statements for the environment and reduced their multidimensionality with CATPCA. CATPCA summarized a reliable model of 14 statements about the environment, with a high total coefficient of Cronbach's Alpha (0.939) and high variance (78.337%) based on eigenvalue for 1st (5.240) and 2nd (2.576) dimension respectively.

In a two-dimensional space, the biplot of statements and visitors, revealed the correlation of visitors' opinions about the environment. Statements are clearly separated in two groups by a clear separation angle in dimension 2 axis (Figure 2) revealing two main indicators of visitors' opinions about the environment.

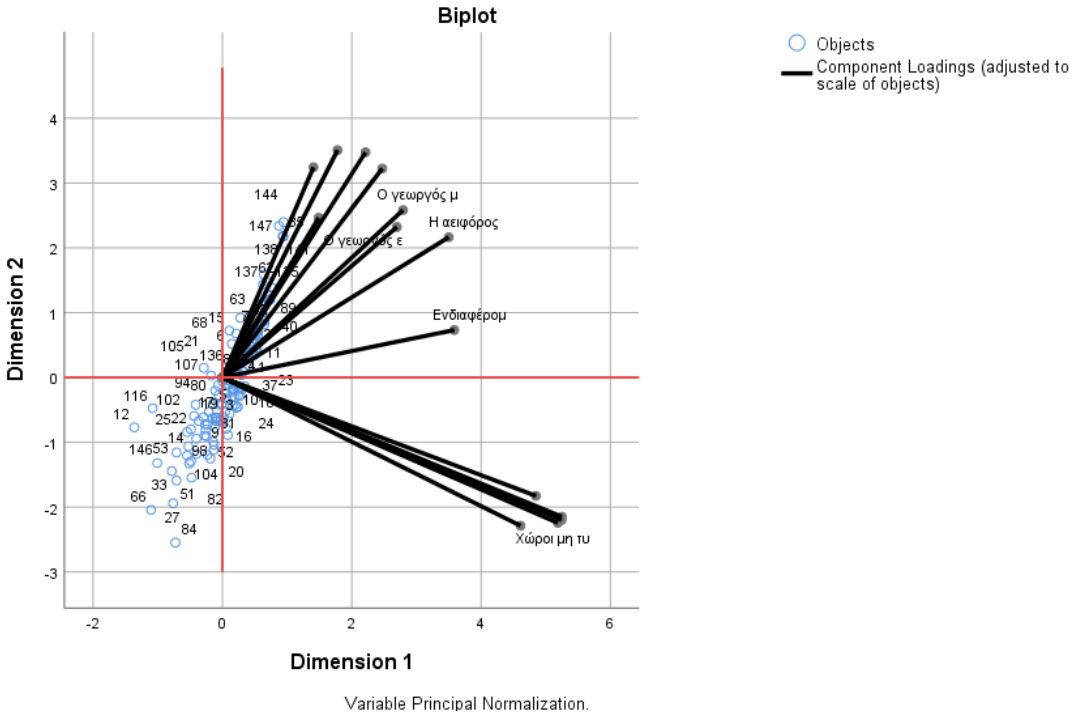

Figure 2. Categorical Principal Component Analysis of environmental psychography statements. Vectors represent transformed variables (component loadings) and circles are the participants (objects) of the analysis

Dimension 1 is characterized mainly with nature contact behavior, farmers' role and anti-anthropocentrism facets. Visitors' opinions supported more the improvement of emotional status in nature, personal development in nature and the love by contacting nature. Dimension 2 is characterized more with the facet of environmental attitude change. According to visitors' opinions, their experience with the activities changed their willingness to be an environmental volunteer, raised their inquiry to environmental problems and raised their willingness to pay an organization about the environment (Table 2).

Table 2. Categorical Principal Component Analysis of participants' environmental psychography

Statement	Dimension		Total variance
	1	2	
My emotional status is improved in nature.	0.883	-0.361	0.910
Nature activities help my personal development.	0.882	-0.370	0.915
Nature contact makes me love it more.	0.872	-0.377	0.903
I care about environmental problems.	0.815	-0.307	0.759
Farmer in a non-formal learning space help positive the awareness about sustainable development	0.775	-0.385	0.749
I care about the future generation.	0.603	0.123	0.379
Environmental protection, social collaboration, and economic prosperity lead to sustainable development	0.589	0.364	0.479
Farmer can protect the environment	0.470	0.434	0.409
Farmer is a social work because it produces food	0.454	0.391	0.358
Today's experience changed my willingness to be an environmental volunteer	0.299	0.590	0.438
Today's experience raised my inquiry to environmental problems	0.372	0.584	0.480
Today's experience raised my willingness to pay a volunteer organization about the environment	0.237	0.545	0.354
Today's experience changed my environmental attitude	0.416	0.542	0.467
Human activities have destroyed the planet.	0.250	0.414	0.234
Variance explained (%)	**52.403**	**25.933**	**78.337**

Statements with highest scores defined each dimension's identity. In dimension 1 visitors' opinions supported more nature contact and its impact to the visitor, hence the dimension was name "nature contact". Dimension 2 was named "environmental attitude change", because of the high-score statements of environmental attitude change due to visitors' attendance of the activities.

3.2 Main indicators for non-formal learning

In the second CATPCA we performed, 18 statements about non-formal learning according to visitors' opinions was used from our tool. Our model was reliable with a high total coefficient of Cronbach's Alpha (0.924) and high variance (78.399%) based on eigenvalue for 1st (5.089) and 2nd (2.571) dimension respectively.

Biplot revealed visitors' opinions about the non-formal learning. Again, there was a clear separation angle of statements, in dimension 1 axis (Figure 3).

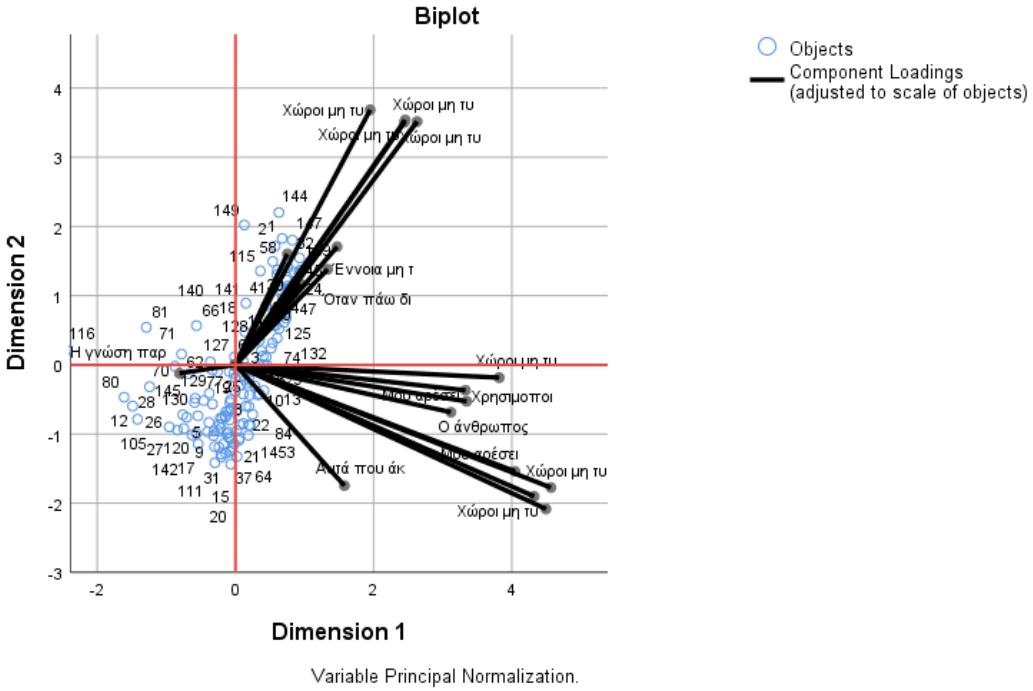

Figure 3. Categorical Principal Component Analysis of non-formal learning statements. Vectors represent transformed variables (component loadings) and circles are the participants (objects) of the analysis

Dimension 1 is characterized mainly with interactive and non-formal/formal learning connection facets of non-formal learning group of statements. Visitors' opinions supported more the interactive-inquiry learning, school-society connection and guided tours and activities in a non-formal learning space. Dimension 2 is characterized mainly with the facet of non-formal/formal learning connection. More specifically, visitors' opinion support that non-formal learning places contribute significantly to environmental education, change knowledge-attitudes-behavior about the environment and contribute to difficulties in science interpretation (Table 3).

Table 3. Categorical Principal Component Analysis of participants' perceptions of non-formal learning

Statement	Dimension		Total variance
	1	2	
Non-formal learning places should provide interactive-inquiry learning	0.841	-0.327	0.815
Connecting school with society is important	0.828	-0.384	0.833
Non-formal learning places should have guided tours and activities for the participants	0.796	-0.350	0.757
I like learning new things	0.745	-0.284	0.636

Non-formal learning places should have specialized staff	0.703	-0.034	0.496
I like learning though new experiences and I am searching them	0.617	-0.097	0.390
Using different senses help me learn better	0.613	-0.068	0.381
Humans learn throughout their lifetime	0.575	-0.126	0.346
Knowledge is provided only at school	-0.149	-0.023	0.023
Non-formal learning spaces contribute significantly to environmental education	0.359	0.679	0.590
Non-formal learning places change knowledge, attitudes, behavior about the environment	0.453	0.652	0.630
Non-formal learning places contribute to difficulties in science interpretation	0.484	0.648	0.655
Non-formal learning places highlight the multifunctionality of agriculture	0.451	0.646	0.621
I knew what I heard/saw during my visit	0.291	-0.322	0.188
Todays' experience affected me on searching similar places to visit	0.271	0.315	0.172
I am familiar with the term multifunctional agriculture	0.139	0.295	0.106
I am familiar with the term Non-formal learning places	0.246	0.254	0.125
On vacation I want to rest and do nothing	0.174	0.215	0.076
Variance explained (%)	**52.265**	**26.134**	**78.399**

Visitors' opinions about Multifunctional Farm activities, supported more interactive and inquiry learning in dimension 1, hence we named it "interactive learning". Dimension 2 have high-score statements about the connection between non-formal and formal learning, hence we named it "non-formal/formal learning connection".

Discussion

Nowadays, innovative farm businesses enhance the multifunctional role of agriculture and balance its activities towards a sustainable model (Frei et al. 2018). An environmental aware society will support the new multifunctional role of agriculture (Ragkos, Theodoridis, and Batzios 2015). In a practical level, this can be succeeded by tourism-recreation-education activities occur in a Multifunctional Farm (Heringa, Van Der Heide, and Heijman 2013). This research aimed covering the lack of an assessment tool for these activities and testing it in a Multifunctional Farm. Based on previous research about knowledge, attitudes and behaviors about the environment (Dunlap et al. 2000) and non-formal learning (Dieser and Bogner 2016; Mackenzie, Son, and Eitel 2018; Serrano-Iglesias et al. 2019), a conceptual framework lead to our proposed assessment tool. This tool could be used to investigate knowledge, attitude change and behaviors (Pitman et. al., 2018; Wilson and Burton, 2015) after learning activities in a Multifunctional Farm or another similar learning spaces.

Regarding our results for the main environmental indicators, visitors have a two-dimensional opinion: nature contact and environmental attitude change should be key elements of the activities in Multifunctional Farms. These two clearly separated groups are also supported from Mezirows' grounded theory of adult learning: transformation of experiences into attitudes (Mezirow, 1991). In our case, visitors' nature contact in Multifunctional Farms has a key role to their visit and this experience may help to the enhancement of environmental awareness (change of experience into attitudes). Also, in our analysis, these main indicators revealed high-score statements about an intrinsic motivation of a pro-environmental profile by nature contact, which also occurred in other studies (Brooks et al. 2017; Dalampira et al. 2019; Williams and Chawla 2016).

Personal and emotional improvement by nature contact, can enhance environmental awareness of people (Marczak and Sorokowski 2018). In our case, highly ranked statements about personal and emotional enhancement in nature, are acting towards a deeply connection with nature, which can lead to a more environmental aware visitor.

Knowledge is the beginning to lead to new attitudes and raising an environmental friendly profile (Pitman, Daniels, and Sutton 2018b; Sangkapitux et al. 2017). Multifunctional Farms should offer environmental activities and a hands-on experience to visitors (Dalampira et al. 2019). In our case, the dimension of environmental attitude change is exactly the result of visitors' experience in the farm. An environmental education program should be assessed and designed in a specific way towards this direction (Bergman 2016). It reveals that the activities in Multifunctional Farms should be organized in a way that cause a change in their attitudes.

Complex learning environments like farms and botanic gardens can offer a learning experience with a better impact, of difficult science information and can change attitudes and behaviors with interactive and inquiry learning (Khalaf 2018). These learning activities can target to the environmental awareness of people (Nakagawa 2018). In our case, interactive learning and non-formal/formal connection were the main indicators of a complex learning environment, a Multifunctional Farm. Our main indicators are also supported by literature as main aspects of non-formal learning (Decker-Lange 2018; Khalaf 2018; Mierdel and Bogner 2019; Sanders, Ryken, and Stewart 2018). So, in a practical spectrum, a Multifunctional Farm should organize educational packages or activities program for adult visitors, based on the indicators of interactive learning and non-formal/formal learning connection. Non-formal learning indicators lead to the main aspects of outdoor non-formal education role in Multifunctional Agriculture and in society in general. Learning in these complex learning environments should be life-long inquiry based (Decker-Lange 2018; Mierdel and Bogner 2019; Sanders, Ryken, and Stewart 2018), as well as multidisciplinary, connecting school knowledge (formal education) with everyday life (non-formal education) which is actually the most innovative pedagogical approach (Khalaf 2018).

Conclusions

Our research covered a huge gap between MFA theory and policy needed for its implementation in Multifunctional Farms. We created an assessment tool able to reveal the most important environmental and non-formal learning indicators in tourism-education-recreation activities, regarding visitors' opinions. This tool has a methodological originality and contribute knowledge to the unexplored field of Multifunctional Farm's activities. Policy makers can use it to cover the policy gap in assessment of learning activities in Multifunctional Farms and other similar non-formal learning places. Practitioners, farm managers and other stakeholders can use it in practice to organize their activities in a more effective way to attract more visitors. Segmentation and investigation of a niche market of future certified Multifunctional Farms and help to marketing research.

In the second step we used this tool in a Greek case study, where Multifunctional Agriculture research is still in infancy. But this tool has international characteristics able to contribute in research by using it in other case studies of tourism-recreation-education activities in Multifunctional Farms. Dimensions of main indicators revealed key elements of these activities according to visitors' opinions. In our case, main indicators

of the environment were nature contact and environmental attitude change, whereas non-formal learning was characterized by interactive learning and non-formal/ formal education connection. These indicators should be covered by an experience of visitor in a Multifunctional Farm.

A limitation of our research is that main indicators of our case study cannot be generalized, but the tool could be a benchmark for future comparisons in other businesses or countries with similar interest to investigate visitors' opinions in Multifunctional Farms and other non-formal learning places. Further research to other case studies will fortify the validity of the proposed tool as well as the main indicators of visitors' opinions.

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