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PERCEPTION ABOUT THE APPLICATION OF ENVIRONMENTAL MANAGEMENT SYSTEMS AT GOLF COURSES IN SPAIN

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Abstract

A wide variety of environmental management systems (EMSs) exist today that can be implemented at golf courses in Spain, yet their implementations are not known. The objective of this paper was to conduct an exploratory study to learn about the perception of the present state of EMS applications at Spanish golf courses. An exhaustive study was conducted using a multi-question paper-based survey that was given to the greenkeepers at 428 Spanish golf courses, and the survey achieved a 13.7% response rate. Greenkeepers are responsible for managing EMSs at 89% of Spanish golf courses. The EMSs that are known by most of them are ISO (International Organization for Standardization)-14001 (96%), Q-PLUS (83%), and GEO (Golf Environment Organization) (68%). Only two certifying bodies have made a policy of actively offering to implement their EMS: Q-PLUS (64%) and ISO-14001 (62%). The EMS implemented most at Spanish golf courses is ISO-14001, at 38%; ISO-14001 also attracts the most interest in being implemented, at 71%. The principal reason for not implementing any EMS is a lack of funding. The most important items for the Spanish greenkeepers among environmental elements normally utilised in EMSs are nature conservation (4.80), water resource management (4.80), and waste management (4.71). The conclusions are that only ISO-14001 is important, and the remainders are merely nominal. Nevertheless, Spanish golf courses possess significant interest in implementing an EMS, but economic considerations are a major constraint. Despite this, golf courses should inform society more about their environmental actions, which would result in greater effective reconciliation between golf courses and the environment.

Keywords: environmental management systems, golf courses, greenkeepers, perceptions, Spain

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1. Introduction

Golf has enjoyed a period of remarkable growth over the past 40 years, but has recently been subject to some criticism questioning the sustainability of the game and the often negative environmental and social impacts it carries (Wheeler and Nauright, 2006). Efforts have been made in some parts of the world to lower the overall impact a golf course has on its surroundings, and have been successful, like St. Andrews Links in Scotland and

the Valderrama Golf Club in Spain. Economic principles will continue to compete strongly with environmental interests, but the real challenge will be in attempting to adapt ideas about construction, maintenance, and operation in a way that suits those people who are concerned about the environment (Wheeler and Nauright, 2006). Also the adoption of environmental management in golf courses has political implications because it “protects” them from more radical environmental alternatives (Millington and Wilson, 2015).

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As Correia et al. (2006) and Videira et al. (2006) said the golf courses will have future if their development meets four conditions at the same time: competitive in the market, environmentally responsible with the natural resources, producing positive socio-economic impacts and, finally, integrated in community development.

If there are concerns about environmental risks, then under the precautionary principle promulgated for sustainable development, approval for a golf course should only be given if projected socioeconomic benefits outweigh the identified environmental risks (Warnken et al., 2001).

According to Hammond and Hudson (2007): *“the golf industry has the unique potential to be a catalyst for environmental stewardship and there are a lot of examples that show many golf courses to be environmentally aware, and to some extent, proactive.”*

Consequently, golf courses must adopt a perspective about environmental integration in order to reconcile golf and the environment (Dávila and Sobrini, 2004), which is obtained with three tools: Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), and Environmental Management Systems (EMSs). This paper's aim will focus on the third of the aforementioned tools, EMSs, by asking about their actual implementation in Spain.

SEA assesses and modifies proposed policies, plans, and programs in the planning phase of golf courses for pursuing sustainable development. The positive and negative impacts on ecology, society, and the economy are simultaneously considered in the planning (including policy generation and evaluation), implementation, and control phases of the procedure for golf course installation policy (Ching-Ho et al., 2009).

An EIA (MES, 2001) for golf courses consists in an administrative procedure for project control that, supported by a technical study concerning a project's environmental implications (environmental impact study) and a public participation process, allows the competent environmental authority to issue an environmental impact statement that can reject, approve, or modify the project.

EMSs are Voluntary Environmental Programs (VEPs) and these were defined by Minoli and Smith (2011) as *“any non-statutory environmental initiative, program, label, code, agreement, commitment, benchmarking and award”*. For golf courses, these can be classified into two groups (Minoli and Smith, 2011): one generic, applicable to all types of organizations and widely used at golf courses; the other is specific to golf courses, which have developed exclusively in order to improve compatibility between golf courses and the environment. This paper focuses on both groups.

Extensive research exists about EMSs and their applications in different business sectors, but very little has been done relating to sports. According to Mallen et al. (2011), only 17 papers were

published about environmental sustainability in sports between 1987 and 2008. More specifically, there is a scarce presence in the literature about the application of EMSs to golf and only the following can be cited: Limehouse (2003) who analysed the economic aspects of EMSs in golf, Minoli and Smith (2011) who explored the growing application from the 1980s onward of EMSs and Minoli et al. (2015) who analyse the market consequences of applied an EMSs to a golf course. However, great efforts in environmental management of golf courses have been made, principally by the pioneers at the Sports Turf Research Institute of the United Kingdom.

In relation to the technical and human challenges of adopting an EMS at a golf course, very important works include Daily and Huang (2001), who, based on the similarities existing between EMSs and quality management systems, proposed a theoretical framework in order to analyse the human resource factors that affect the implementation of an EMS system that conforms to the ISO (International Organization for Standardization) - 14001 standard. Later, Jabbour and Santos (2008) created a model to measure the effectiveness of the EMS in function of human resource dimensions. And finally, Dominguez et al. (2016) conclude that the commitment of top managers and the setting of precise environmental objectives are the most important factors to ensure the effectiveness of an EMS.

According to Minoli and Smith (2011), golf presents important social and economic benefits, yet at the same time produces a significant environmental impact that must be reconciled in order for the game to continue to prosper and develop. Along the same line of thought, Feng et al. (2016) revealed a positive relationship between EMSs and financial performance and Massoud et al. (2017) concluded that some non-environmental benefits, like market expansion and financial profitability, were aggregated after the implementation of an EMS (in particular ISO 14001).

Consequently, there is an internationally emerging tendency towards golf course participation in EMSs, and these authors have identified that determining the role and importance of EMSs in golf is a line of research to follow.

As for Spain, no in-depth research concerning EMSs at golf courses exists, and only one conference regarding environmental certifications at golf courses, by Rodriguez Nagy (2011), has taken place. The scarcity of literature about EMS and golf courses can be improved with the results of our study.

Spain has seen a spectacular development of golf courses in the last 20 years; their numbers have tripled, and in 2012 reached 424 courses (Real Federación Española de Golf - RSGF, 2012). This important growth is due to an increase in Spanish golfers (a six-fold increase, reaching 325,310 in 2012) and to golf tourism development. It is important to note that in Spain tourism is one of the most important economic sectors, but it is mainly concentrates on summer season due to *“sun and*

beach” model. Therefore, golf tourism can help to deseasonalize tourism demand in Spain as the largest flow of players occurs in spring and autumn. If we add to this the high quality of the Spanish golf courses, the great increase in golf tourism that has occurred in Spain is evident. However, if this development is not well planned, economic, environmental and social problems could appear that affect its sustainability. Del Campo et al. (2010) defined the following aspects from the social and economic points of view to analyse the development of golf courses: “*socioeconomic profitability, existent infrastructures, land property structure, and capital structures*” and the next natural aspects: “*climate, landscape, topography, soil type, hydrology, readiness of water resources, natural protected spaces, and historical and cultural places*”.

The objective of this paper is to conduct an exploratory study to learn about the perception of the present state of EMS applications at Spanish golf courses. For this, the paper is structured in 4 sections: case studies-a review of the literature, methodology, results and discussions, and conclusions. In literature, the different EMSs that can be applied in Spain and the diverse environmental actions taking place at golf courses are explained. Methodology covers the contents of the survey that was given to those responsible for EMSs at the courses and how the survey was made. Results and discussions shows the research about the wide variety of EMSs existing today that can be utilised at Spanish golf courses and their applications, or more specifically, the extension of their use, who is responsible for them, the interest in implementing them, the reasons for not implementing them, communication efforts made to society about them, EMS assessments given by players, and the importance that different environmental elements that make up EMSs hold for the individuals responsible for their management. Finally, the paper’s most important findings are stated in conclusions.

2. Case studies - A review of the literature

2.1. Overview of golf and the environment in Spain

Complicated legislation that requires incessant adaptation and updating, the consolidation of the concept of sustainable development, the internalisation of ever more socially widespread environmental problems in all their manifestations, and the expansion of ecological ethics have aroused the emergence of a concern in organizations to diminish, or in any case, control the environmental impact from activities they engage in. Thus, an emergence of EMSs integrated into the general management of organizations has resulted at golf courses, and therefore, according to Minoli and Smith (2011), VEPs potentially offer multiple environmental opportunities for business and government environmental agencies.

Moreover, golf courses cannot be an exception to this, and so the need and importance of implementing EMSs at them is an opportunity that evidently transforms itself into strength for new and existing courses. In essence, an EMS is a management tool for golf courses that strive to improve their environmental behaviour, allowing for golf course maintenance with sustainability criteria, respect for its surroundings, and rational use of natural resources, as well as making its system transparent for society and all interested parties. According to Rodriguez Nagy (2011), about 10% of the golf courses in Spain employ some EMS, which is an amount identical to that provided by Minoli and Smith (2011) for golf courses worldwide.

For Vargas et al. (2003), recognition of the importance of some of the impacts upon the environment (water consumption, pesticide use, etc.) golf (potentially) causes is drawing more attention by both governments and golf courses themselves. Therefore, EMSs are beginning to be perceived as competitive elements that reinforce the image of golf courses before society in general and their customers in particular. For example, Minoli and Smith (2011) indicate there are strategic “*green*” pressures for golf and other sports to participate in environmental management.

Standardised EMSs (that follow a previously established standard and a regulated procedure) are subject to verification following such procedure by an accrediting entity that certifies and accredits that the EMS conforms to that standard. This makes the system a point of reference for modern, transparent, and participatory environmental management.

The general advantages of implementing an EMS at a golf course are the following (Dávila and Sobrini, 2004): quality environmental management that guarantees compliance with environmental legislation; an improved global image of golf, of the club in general, and the golf course in particular; savings in natural resources, raw materials, and energy, as well as reductions in waste generation, emissions, discharges, etc., lowering maintenance costs; continuous improvement in environmental performance by those involved with the golf course, from managers and greenkeepers to players; dissemination of environmental information to society, improving dialogue with the public in general and with other interested parties, which furthermore implies a competitive advantage when attracting new clients; a reduction in costs associated with environmental harm; and fewer penalties resulting from infractions.

To learn about EMS application at golf courses better, learning about the diverse environmental actions taking place at them is important. These can be grouped into the following environmental elements (RSGF, 2003a, 2003b; Stubbs, 1997): nature conservation; landscape and cultural heritage; water resource management; turfgrass (including pest) management; waste management; energy efficiency and purchasing

policies (eco-consumption); and communication, education, and public awareness. The most important characteristics from each of these are briefly described next.

To conserve nature, golf courses provide habitat conditions for flora and fauna, and therefore they may serve as important reserves or sanctuaries countering the human presence. The ultimate aim of nature conservation at golf courses must be the adaptation of course conditions in such a way that they allow for adequate practice of the game as well as the establishment of native plants and animals in course areas that are not dedicated to the sporting activity (RSGF, 2003a; Stubbs, 1997).

In some areas where golf courses were introduced a long time ago, golf forms a portion of the landscape and cultural heritage. The landscape must be considered an additional factor in the environment that is ever scarcer, difficult to renew, and easily disregarded. In this sense, a well-designed golf course may have a significantly positive effect, but in order to do so, natural landforms must be respected: dunes, mature trees, streams and rivers, rock formations, etc. Moreover, there are historic monuments, buildings, old trails, boundaries and relics of ancient customs within golf courses; these add distinctive features providing character to the site, and therefore, their conservation must form an integral part of the preservation of our cultural heritage (RSGF, 2003a; Stubbs, 1997).

Water resource management is the most critical environmental element facing golf today in Spain, and therefore, golf courses must put effective measures in motion to reduce their water consumption and safeguard groundwater quality, so a water resource management program must be a top priority to ensure environmental protection (RSGF, 2003b; Stubbs, 1997). Tous and Borrego (2003) showed that the most important environmental aspect involved when deciding to establish a golf course in Spain will be the possibility of acquiring water for it, and taking into account that the water needs for these types of installations are as varied as the weather conditions at the different areas they are located in. Furthermore, the water needs also depend upon the types and surfaces of turfgrass to water and the irrigation system used. In Spain, although most golf courses are concentrated along the Mediterranean coast where the climate does not vary greatly, there is great variability in water irrigation consumption, fluctuating between 2,000 and 17,000 m³/ha-year. Excluding the Canary Islands, golf courses in Spain have an average consumption of 8,200 m³/ha-year (Rodríguez Díaz et al., 2007). This is consistent with estimates by Morell (2002) and Sanz Magallón (2005) of 8,000 m³/ha-year and 7,563 m³/ha-year, respectively. In Spain today, growing environmental awareness, along with scientific and technological progress in wastewater treatment, has resulted in recycled water becoming a positive environmental impact and the most suitable alternative for irrigating golf courses when facing obvious facts such as water

resource scarcity due to the substantial increase in water demand in recent years, and its capacity for fertilization and reducing percolation. The result of this is that 41% of golf courses use recycled water for their irrigation, with surface and groundwater accounting for approximately 26% each (Rodríguez Díaz et al., 2007).

Good turfgrass management is instrumental in achieving environmental harmony. For this, turfgrass varieties that provide a suitable cover for the game being played on it and adapt better to course agri-environmental conditions must be sought. Moreover, proper planning and application of fertilizers and correct phytosanitary management must take place, if possible within integrated pest management. Good turfgrass management also produces a positive environmental impact as a CO₂ sink (RSGF, 2003a; Stubbs, 1997).

Traditionally, little attention has been paid towards waste management at golf courses. However, awareness is growing every day that golf courses can significantly reduce maintenance costs and electric bills by applying a more rational focus on the use of resources. Residues a golf course generates are generally one of two types: those equivalent to any other with an urban origin (wastewater, paper, etc.), and others that are course-specific (grass clippings, pruning remains, phytosanitary packaging, etc.) (Rodríguez Díaz et al., 2007).

Energy efficiency and purchasing policies are aspects that traditionally have been paid scant attention at courses because they were thought to be separate from course management. However, there is a growing conviction that golf courses can achieve significant savings and improve ecologically (RSGF, 2003a; Stubbs, 1997).

Communication, education, and public awareness are aspects that are fundamental for good golf course environmental management. For this, a key objective is to attain a high standard of awareness and knowledge about environmental management principles and the techniques between golf course managers and their technical advisors, who fundamentally are greenkeepers. One of the tasks of any EMS is the importance that both the course users as well as its nearby populations clearly perceive the benefits and the practices taking place there (RSGF, 2003a; Stubbs, 1997).

2.2. Types of EMSs for Spanish golf courses

At present, EMSs that can be implemented at Spanish golf courses and are applicable to golf course management and maintenance are both generic and specific. The generic programs include the EU Eco-Management and Audit Scheme (EMAS) and International Organization for Standardization (ISO)-14001. Programs specific to golf courses are the Audubon Cooperative Sanctuary Program for Golf Courses, Committed to Green, Biosphere Golf, Biogolf, Golf Environmental Organization (GEO),

Q-PLUS, and UNE-1888001. Knowing the most important characteristics about each of these is important, and they are succinctly detailed next.

EMAS (2011) is an EMS whose objective is to promote continual improvement in environmental performance for all European organizations and the dissemination of information that is relevant to the public and other interested parties. It is contained within Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009. This EMS is the only one guaranteeing that the organization, once registered, ensures a high level of environmental protection through compliance with the legislation, periodic and objective system evaluation, as well as through the level of active involvement by the organization's employees in continuous improvement, and by informing the public and interested parties. Only two courses in Spain (0.5% of the total) possess this certification (Rodríguez Nagy, 2011).

Certification conforming to ISO-14001 (2011) is proof an EMS has been assessed in accordance with the standard of best practice and that it complies with the standard. An accredited organism independent of the company issues this certificate, which allows clients to know they can be confident that the business actively minimises environmental impact from the processes, products, and services deriving from its activity. This was created by the International Organization for Standardization (ISO). The European Union has recognised that the international standard for ISO-14001 EMS can constitute a phase prior to EMAS. Rodríguez Nagy (2011) indicates that some 20 Spanish golf courses (5% of the total) are certified as such.

The Audubon Cooperative Sanctuary Program for Golf Courses (Audubon International, 2011) is a program developed in the United States of America in collaboration with the United States Golf Association. This program aims to create authentic sanctuaries for native species within golf courses, promoting ecological principles for course management, and has as a priority policy the conservation of natural resources. It moreover extends these positive impacts beyond golf course limits to benefit surrounding communities. There is no obligation to generate specific documentation or establish procedures, but it does set some binding criteria. This is audited and certified by Audubon International. According to Rodríguez Nagy (2011), only two Spanish golf courses (0.5% of the total) possess this certification.

The Committed to Green program (Stubbs, 1997) was officially launched in Europe during the Ryder Cup held in Spain in 1997 as an initiative by the European Golf Association Ecology Unit and supported by the Royal & Ancient of St Andrews and the Professional Golf Association of Europe. Its objectives are to encourage every person who participates in the world of golf to improve environmental quality at golf courses. It is a flexible program, open to all types of golf installations in a

voluntary manner, and places emphasis on continual improvement. Clubs implementing it are recognised as being "*Committed to Green*". In order to ensure objectivity and credibility, establishing environmental criteria and granting recognition are subject to independent verification. This program is not used in Spain because there have been no efforts to implement it.

Biosphere Golf (Biosphere Golf, 2011) is an environmental program developed specifically for golf courses on the Spanish island of Gran Canaria. A Biosphere Golf course is integrated into its surroundings, causing minimum impact upon the landscape and constituting a natural reservoir for native animal and plant species. They minimise effects upon the environment, reducing consumption and residues produced to a minimum. Certification for these is awarded by the Institute of Responsible Tourism and there are 4 golf courses in Spain certified this way.

Biogolf certification (Biogolf, 2011) emerged in the Community of Madrid in 2010 from the idea of contributing solutions to planning, organizing, designing, constructing, and managing golf courses. The project's general idea is based on taking advantage of the environmental opportunities golf courses offer, and fostering their conversion into important spaces of biodiversity for native species of fauna and flora. This is achieved through the implementation of an EMS called Biogolf that consists in an ongoing cycle of analysis, planning, establishment, review, and improvement of the processes and activities golf course management must adopt in order to abide by environmental quality requirements. If the outcome assessment for these is positive, the golf course is awarded the Seal of Certification in Biodiversity and/or the Seal of Certification in Eco-efficiency, always with a commitment to continual improvement.

GEO Certified™ (GEO, 2013) was developed by the Golf Environment Organization, a Scottish not-for-profit organization that is widely endorsed and supported by a growing number of organizations, among which practically all European golfing institutions can be found (European Tour, European Institute of Golf Course Architects, European Golf Association, Royal & Ancient, Ryder Cup, etc.). For them, it is considered golf's ecolabel and the international brand of sustainable golf. It sets mandatory criteria regarding ecosystems, landscape, turfgrass, waste management, etc., and does not require the generation of specific documentation; however, it does expect continual improvement of actions. Presently in Spain only four golf courses hold this certification (1% of the total) (GEO, 2013).

The Q-Plus Protocol for Golf Courses (Q-Plus, 2011) is a format responding to environmental demands in golf course maintenance management in Spain via methods and ways based on applicable regulations and legislation. Through this pioneering initiative in Europe, the Spanish Greenkeeper Association developed these regulations in 2006 for

certification of golf courses yearning to apply this system with the aim of differentiating golf courses through best management practices and respect for the environment. Because this deals with such a specific system developed on a national scale by a private association without any type of subsidy or support for this certification's implementation and/or renovation, like EMAS and ISO-14001 have, this has meant that only 2 golf courses in Spain have put this in motion. The UNE-188001 standard for golf courses (UNE-188001, 2011) was produced by the Spanish Association for Standardisation and Certification (AENOR), which has worked with the Spanish Tourist Quality Institute (ICTE) to develop a tourist quality standard specific to golf courses by awarding them the "Q" seal. This standard's purpose is to establish the requirements golf courses must fulfil in terms of the services offered, the processes for delivering them, as well as their facilities and equipment, and applicable to any type of golf course. The aspects assessed in developing this standard, and which account for approximately 85% of its consideration, are the quality of services, facilities, and client satisfaction; the remaining 15% are allotted to golf course environmental management. Currently, this is going through the process of becoming an international ISO standard, which will eventually simplify many golf courses from having to work with several standards requiring specific documentation for each one of them. Ten courses in Spain are certified with this EMS by having earned the "Q" seal for tourist quality.

3. Methodology

An exhaustive study was conducted using a multi-question paper-based anonymous survey that was given to greenkeepers (or superintendents) at the 428 golf courses containing at least 9 holes that were registered with the Royal Spanish Golf Federation in 2011 (RSGF, 2012). These individuals were asked because the authors feel greenkeepers are the most suitable people for providing answers about EMS application at golf courses. The data were obtained via two routes: first through personal presence at the National Conference of the Spanish Greenkeepers' Association that took place in the city of Elche in November 2011; the second was a national postal survey in December 2011. In all, 59 forms were completed, a 13.7% response rate, which was slightly higher than that accomplished by the only investigation conducted via survey at all Spanish golf courses by Rodríguez Díaz et al. (2007) on water use at golf courses; theirs obtained a 12% response rate. For tabulation, analysis, and graphic representation of data, Microsoft Excel™ was used.

The survey's first question sought answers about the degree of EMS implementation and the interest in implementing them at golf courses. Those surveyed were asked if they knew about, if they had been offered to implement, if they had already implemented, and if they were interested in

implementing any of the nine EMSs: Audubon, Biogolf, Biosphere Golf, Committed to Green, EMAS, GEO, ISO-14001, Q-PLUS, and UNE-188001.

The second question asked for, if this were the case, their reasons for not having implemented any system. Here, those surveyed could choose between various closed-ended answers: lack of funding, lack of time, lack of personnel, there is another system implemented that I consider sufficient. Additionally, there was an open field provided hereto add any comments they deemed appropriate.

The third question wanted to find out which member of the golf course organization was responsible for managing EMSs. Here, they had to indicate who was in charge of this at their golf course, and several answers were possible: greenkeeper, manager, administrative personnel, specific personnel, external business, and others.

The fourth question inquired about the importance those surveyed gave to the various environmental elements that comprise environmental management at a golf course. The authors consider that learning about the level of involvement golf courses have with respect to the environment to be fundamental whether they have implemented an EMS or not. Therefore, they were asked to score on a Likert scale from 1 to 5 (from *Not important at all* to *Very important*) how important the different elements used in EMSs were to them: nature conservation; landscape and cultural heritage; water resource management; turfgrass (including pest) management; waste management; energy efficiency and purchasing policies (eco-consumption); and communication, education, and public awareness.

Question five asked for the opinion of those surveyed about how golfers (Spanish and foreign) value courses that have an EMS in place differently when deciding where to play. Spain receives significant numbers of foreign players who visit to practice golf tourism, so this question sought to learn whether there are behavioural differences between Spaniards and foreigners with respect to the environment at golf courses; and, therefore, how a course's player profile may influence the decision to apply an EMS.

Lastly, question six solicited information from those surveyed about the possible communication campaigns to society about their EMSs. This is because in order for golf and the environment to reconcile, it is essential for society to perceive the environmental actions occurring at golf courses.

4. Results and discussion

A descriptive analysis was carried out with the answers from all the golf courses that responded to the questionnaire regardless of whether or not they had implemented an EMS. The responses to the first question, referring to implementation of the nine types of EMSs at Spanish golf courses, are shown in Table 1.

In relation to the percentage of greenkeepers who know about each EMS, column 1 in Table 1 distributes the EMSs into three groups, and these are divided according to the degree those surveyed knew about them. EMSs known by most of them constitute the first, and these include ISO-14001 (96%), Q-PLUS (83%), and GEO (68%). In the second group there are four systems, and close to one-half claimed to know about them: Committed to Green (49%), Audubon (48%), UNE-188001 (48%), and EMAS (40%). Two not very well-known certifications comprise the third group (they are regional in character): Biogolf (21%) and Biosphere Golf (15%). In light of the results, the EMSs that are well known are so either because they are of general implementation in Spanish businesses (ISO-14001), or because they have made a great dissemination effort among Spanish greenkeepers, like the cases of Q-PLUS and GEO.

Column 2 in Table 1 indicates that among the EMSs applicable to Spanish golf courses, only two certifying bodies that have a policy of actively searching for customers and have offered to implement their EMS have actually been effective and become known to those surveyed: Q-PLUS (64%) and ISO-14001 (62%). Nevertheless, their final results differ greatly: Q-PLUS has achieved minimum implementation (arriving at a maximum of two golf courses), while ISO-14001 has a more wide spread application (20 golf courses). The remaining EMSs have not carried out effective active campaigns offering their implementation - all but one lie below 10% with the exception of UNE-188001, which at 20% has achieved a slightly higher value. Evidently, if the certifying body does not offer the possibility to implement the EMS to those responsible for the environment at golf courses, it is normal that those same responsible individuals, faced with a wide supply (nine types of EMSs), will seek out those that have had greater commercial contact with them.

In column 3 of Table 1, the survey respondents reported that the EMS implemented most at Spanish golf courses is ISO-14001, at 38%. Following this is UNE-188001 at 14%, Q-PLUS at 7%, 5% for GEO, and Audubon and Biogolf at 2%.

EMAS, Committed to Green, and Biosphere Golf were not reported to be implemented anywhere. These data set the trend for golf courses toward using an EMS that is widespread in Spanish businesses, due to it being the most profitable system for golf courses (low implementation costs and subsidies for it), as well as its easy implementation as there are many certifying bodies available for this throughout Spain. It is remarkable that Q-PLUS certification, very well known and promoted by greenkeepers themselves, has not enjoyed the expected implementation due to a lack of financial aid available for it.

The respondents' interest in implementing the various EMSs is shown in column 4 of Table 1. Just like in the preceding question, ISO-14001, at 71%, received the greatest interest. Q-PLUS follows at 40%. The remaining systems generated little interest in those surveyed, as fewer than one-quarter of the respondents intend to implement them. The reasons argued in the previous question explain the results of this question equally. This tendency is in accordance with Hammond and Hudson (2007), who indicated an expansion in future years of the adoption of more formal and accredited environmental management systems, such as ISO-14001, at golf courses.

Once the opinion concerning the establishment or not of an EMS at Spanish golf courses became known, the interest turned toward learning the reasons for not implementing each one of them in the second question. Table 2 provides all the reasons given for each EMS, and financial considerations (direct or indirect), such as the lack of funding (43%), lack of personnel (21%), and lack of time (18%), were the most significant provided by those surveyed for not implementing an EMS. Parker et al. (2009) already detected this problem, warning that golf courses are normally small - or medium-sized enterprises, and so have limited resources, a lack of knowledge, and insufficient technical capabilities to implement an EMS. Also, Campos et al. (2016) detected similar barriers in the start up of the EMS ISO-14001: implementation cost, lack of qualified staff and the absence of consciousness about its possible benefits.

Table 1. Percentages of greenkeepers at Spanish golf courses who...

	<i>...know about each EMS</i>	<i>...have been offered to implement an EMS</i>	<i>...have implemented an EMS</i>	<i>...have not implemented an EMS but have an interest in doing so</i>
Audubon	48%	11%	2%	20%
Biogolf	21%	7%	2%	8%
Biosphere Golf	15%	2%	0%	1%
Committed to green	49%	9%	0%	19%
EMAS	40%	9%	0%	21%
GEO	68%	9%	5%	3%
ISO-14001	96%	62%	38%	71%
Q-PLUS	83%	64%	7%	40%
UNE-188001	48%	20%	14%	24%

For their part, Minoli and Smith (2011) also revealed that many golf courses lack the necessary in-house resources, such as capital, time, and technical expertise to enable them to meet the requirements of VEPs.

Table 2. Percentage of greenkeepers at Spanish golf courses who have not implemented an EMS at their golf course for the primary reason

Lack of funding	43%
Lack of personnel	21%
Lack of time	18%
Others	18%

Finding out who is responsible for EMSs at golf courses was one important aspect to learn. This was the third question, and its results are shown in Table 3. This question was multi-option as this responsibility at some courses is shared between several persons. Because of this, some of those surveyed responded by giving more than one option, and so the percentages in Table 3 are superior to 100. These results, which could have been expected from the beginning, clearly indicate that greenkeepers, who received 89% of the affirmative responses, are the individuals primarily responsible for managing EMSs at Spanish golf courses.

Table 3. Percentages that greenkeepers at Spanish golf courses think are responsible for managing EMSs at golf courses

Greenkeeper	89%
Manager	13%
Administrative personnel	4%
Specific personnel	9%
External company	6%
Others	0%

As for the importance of the environmental elements normally utilized in EMSs (this was the fourth question), Table 4 shows a prevalence towards more agronomic aspects.

Table 4. Importance of EMS tools for greenkeepers at Spanish golf courses

Nature conservation	4.80
Water resource management	4.80
Waste management	4.71
Turfgrass (including pest) management	4.55
Energy efficiency and purchasing policies	4.46
Landscape and cultural heritage	4.37
Communication, education, and public awareness	4.33

Note: Average value of a Likert scales from 1 to 5.

These generally are the duties greenkeepers deal with themselves in their course tasks: nature conservation (4.80), water resource management (4.80), waste management (4.71), turfgrass (including pest) management (4.55), and energy efficiency and purchasing policies (4.46). Elements

more distant from the agronomic aspects and more socio-cultural in nature, are usually taken care of by course management, and so are valued less than by those surveyed (the greenkeepers): landscape and cultural heritage (4.37), and communication, education, and public awareness (4.33).

The results from the fifth question, shown in Table 5, differ completely depending upon whether the respondent is giving an opinion about either a Spanish or foreign player. Of those surveyed, 76% think that Spanish players do not consider playing on a course that possesses an EMS to be a factor in the decision-making process about where to play, while for foreign players half of them (49%) do feel this is an important consideration. From these results, it is deduced that if Spanish players are a golf course's target audience, there will be little pressure to implement an EMS, but if the course opts to attract foreign players, it must consider implementing one in order to acquire more players. Minoli and Smith (2011) reached this same conclusion by discovering from a market perspective that many golf facilities rely on a largely local customer base and do not host major sporting events or attract "green tourists"; and so for them, many of the well-established VEPs, such as EMAS and ISO-14001, are largely irrelevant. But Minoli et al. (2015) when studying the application of EMSs in golf courses, in particular Audubon, found that its implementation might affect the decision making of tourism golfers.

Table 5. Percentages of greenkeepers at Spanish golf courses who believe that golfers place value on a golf course having an EMS in their decision about where to play

	Spanish golfer	Foreign golfer
Yes, they consider it	18%	49%
No, they do not consider it	76%	35%
Does not know/Did not answer	6%	16%

The survey's sixth question asked greenkeepers at Spanish golf courses whether their golf course had undertaken some communication campaign to publicise their EMS. The responses to this indicate that only 36% had in fact done so, and there was a large variety of activities: posters displaying protected flora and fauna, press articles, pamphlets promoting all the environmental corrective measures and information about fauna, press conferences, web pages, and visits by schools and/or other groups etc. This result endorses the third question's final position regarding communication, education, and public awareness. It is clear that no matter how many environmental actions Spanish golf courses carry out, if they go unnoticed by society (because those responsible for golf course environmental management do not bother to communicate them), the pressure felt related to the reconciliation between golf courses and the environment cannot subside.

5. Conclusions

One of the most important aspects for golf courses viability over the world is their reconciliation with the environment in every vital process using diverse environmental tools, namely SEA in their planning, EIA in their design and construction, and EMSs in their day-to-day management and operations. Spain is not immune to this tendency and, therefore, development and operation of its golf courses inexorably proceed by being respectful of the environment. Of these three tools, the application of EMSs at Spanish golf courses was analysed. Then, the objective of this paper was to conduct an exploratory study to learn about the perception of the present state of EMS applications at Spanish golf courses. To accomplish this, a survey was given to greenkeepers at all the golf courses in Spain.

Extensive research exists about EMSs and their applications in different business sectors, but very little has been done relating to sports, and more specifically, there is a scarce presence in the literature about the application of EMSs at golf courses.

There are nine EMSs that golf courses can opt for in Spain: two generic (ISO-14001 and EMAS) and seven that are specific to them (Audubon, Biogolf, Biosphere Golf, Committed to Green, GEO, ISO-14001, Q-PLUS, and UNE 1888001). The most well known to those surveyed were ISO-14001, Q-PLUS, and GEO, mainly because these have engaged in a policy of actively seeking customers by offering certification to implement. ISO-14001 is the EMS implemented most at Spanish golf courses due to reasons of financial profitability and ease of certification, which is corroborated as the majority of the remaining golf courses in Spain are interested in implementing it. However, although many golf courses express an interest in implementing an EMS, there are many direct or indirect economic reasons, like the lack of funding, lack of personnel and/or lack of time, which limit the implementation of EMSs at Spanish golf courses. It is important to point out that if the golf course targets Spanish players, there will be little pressure to implement an EMS, but if it seeks foreign golfers, then the course should consider acquiring one to acquire more players.

Greenkeepers are those primarily responsible for managing EMSs in golf course maintenance at practically all golf courses in Spain, but all people within the organization of a golf course must be committed with the environment, principally its owners and directors.

The elements normally used in EMSs and that are more important to the greenkeepers surveyed are those placing emphasis on more agronomic aspects, which are those that the greenkeepers normally tend to occupy themselves with in their golf course duties. Only one-third of those surveyed have carried out some communication campaign about their EMS, which means that little can be done to diminish the

pressure they feel concerning the balance between golf courses and the environment.

To conclude, this study highlights that too many options exist in Spain for implementing an EMS at golf courses, but on a national level, only ISO-14001 is important; the remainder are merely nominal. Nevertheless, Spanish golf courses, starting with their greenkeepers as those primarily responsible for EMSs there, possess significant interest in implementing an EMS, but economic problems are a major constraint. Although this, does not preclude golf course managers (directors, greenkeepers,...) from informing society more about their environmental actions, which would result in greater effective reconciliation between golf courses and the environment.

The perspectives for future development of EMSs at golf courses in Spain will depend first on the economic situation and second on the demand for EMSs by golfers, but this item must be promoted and communicated principally to golfers by golf course managers to differentiate among other competing golf courses.

Future research could be done to learn about the opinion that other important stakeholders involved in the golf industry hold on this topic, like golf club managers, directors of golf, and owners.

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