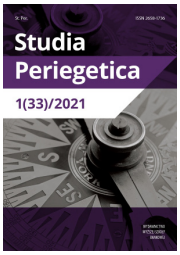
Studia Periegetica
WYŻSZA SZKOŁA BANKOWA w Poznaniu

ISSN 2658-1736, www.studia-periegetica.com
no. 1(33)/2021, pp. 125-139, DOI: 10.5604/01.3001.0015.0495



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The use of payments for environmental services in the development of sustainable tourism in the Arganeraie Biosphere Reserve in Morocco

Abstract. The Arganeraie (forests of argan trees) is one of the most important natural resources of Morocco but it faces a serious risk of degradation or even extinction. It is therefore essential to develop a model of sustainable tourism that can help to preserve this natural heritage, especially given the ever growing number of tourists. The purpose of this article is to analyze the concept of "payments for environmental services" (PES) as a method of collecting revenue to create a sustainable and structured touristic offering and to preserve the natural heritage in the region of Souss-Massa. This exploratory study is based on qualitative data collected during interviews with 80 tourists visiting Souss-Massa. It was found that the respondents were interested in the natural attributes of sites they visited and expressed their willingness to protect this natural heritage by paying for environmental services.

Keywords: the Arganeraie Biosphere Reserve, sustainable tourism, payment for environmental services

JEL Codes: Q13, Z32, Q57

Suggested citation: Fakir, F. Z, Erraoui, E. (2021). The use of payments for environmental services in the development of sustainable tourism in the Arganeraie Biosphere Reserve in Morocco. *Studia Periegetica*, *1*(33), 125-139. https://doi.org/10.5604/01.3001.0015.0495

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1. Introduction

Today, tourism faces several challenges, such as globalization, changes in tourist behavior, technological development, etc., all of which have intensified competition between tourist destinations. Consequently, to retain their market positions and remain competitive, destination managers have started to develop and create diversified offerings to meet expectations of modern tourists, even to the detriment of the environment and without due respect for nature. However, despite the emergence of the concept of sustainable and responsible tourism, there is a very timid awareness of this phenomenon among tourists. The development of sustainable tourism involves three different aspects to be considered: economic, social and environmental. This last aspect ecological, however, is the most neglected one and requires special attention, especially since tourists' level of environmental awareness is rather low.

In this context, Morocco, like other destinations, has decided to integrate the pillars of sustainable development into its tourism strategies by implementing local projects associated with accommodation, catering, local products, tourist guides, etc. in rural and natural environments. However, this decision to launch projects involving rural communities was slowed down due to the absence of a real sustainable management policy. Indeed, the majority of tourist sites of scenic interest are undergoing constant degradation because of the uncontrolled influx of tourists, which is in contradiction with the main principles of sustainable tourism (Lehmer & El Abbadi, 2021).

Thanks to its geographical location, the region of Souss Massa benefits from plenty of opportunities for various kinds of tourism including seaside, cultural and rural. These opportunities are exploited in the form of multiple local tourist attractions, which are considered to be part of the region's brand and identity, especially the Arganeraie, which is known as a unique tourism product. In fact, thanks to the favorable climatic and soil conditions, the Souss region in Morocco is the only place in the world where argan trees, whose seeds are the source of precious argan oil (Sguenfle & Sadki, 2018).

However, the richness of the natural heritage of the Souss-Massa region, especially the eco-tourism potential of its Argan forest, has not been sufficiently exploited by the region's authorities to develop a tourism offering that is seen as distinct from seaside attractions that the region's tourism relies on.

Argan, practices and know-how concerning the argan tree have been inscribed on the list of the on the Representative List of the Intangible Cultural Heritage of Humanity and the Argan Forest Biosphere Reserve, also known as RBA (Réserve de Biosphère Arganeraie) by its French acronym, is recognized by the UNESCO as a terrestrial ecosystem of global importance. Also, the valleys, the mountains

and the irrigated oases in the region are living museums of ancestral practices. This competitive advantage certainly has an impact on the territory brand image and meets the demand for other types of tourism, (eco-tourism, agro-tourism, mountain tourism, cultural tourism, etc.) and could be used to promote the sustainable development of the entire Souss-Massa region as a tourist destination.

The development of sustainable tourism in the region based on Argan forests could certainly attractvisitors and improve the socio-economic development of the region's rural communities. It is, however, connected with a higher risk of degradation of this natural heritage if tourist traffic and environmental protection are not properly managed.

Nevertheless, the contribution of policymakers to intangible heritage and the development of sustainable tourism in rural areas is becoming problematic, the preservation of the Arganeraie Biosphere Reserve requires the use of economic tools. In this article, we consider the option of payments for environmental services by posing the following research question: **How could payments for environmental services contribute to the development of sustainable tourism and improve the standard of living of indigenous people in biosphere reserves?**

We believe that when implemented, payments for environmental services (PES) could help to prevent the negative effects of the excessive influx of tourists to this heritage site. Besides, PES can provide the necessary revenue to create a sustainable and structured tourism offering that could benefit local communities and businesses in the tourism sector. The article aims to address this issue by defining the concepts of sustainable tourism and payments for environment services as a new method to preserve the natural heritage of the Arganeraie Biosphere Reserve. In the second part, we present results of a survey of tourists visiting the Arganeraie Biosphere Reserve in the region of Souss Massa.

2. Literature review

2.1. Biosphere reserves

Launched in 1971 as part of UNESCO's MAB program, the world network of biosphere reserves includes 714 biosphere reserves in 129 countries. These reserves are "*sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity. They are places that provide local solutions to global challenges. Biosphere reserves include terrestrial, marine and coastal ecosystems. Each site promotes solutions reconciling the conservation of biodiversity with its sustainable use*" (UNESCO, n.d.).

By placing human beings at the center of the preservation and development of protected areas, the BR concept aims "*to establish a lasting balance between these often conflicting goals of the conservation of biological diversity, the promotion of human development and the preservation of the cultural values associated with them*" (UNESCO, 1996, p. 5).

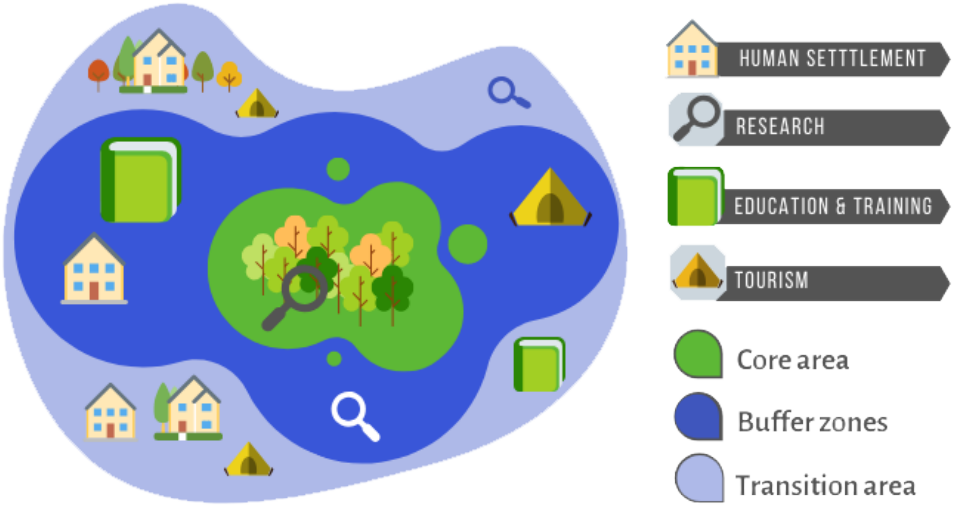
According to the Seville Strategy for biosphere reserves (1995), each reserve must fulfill three objectives:

1. Contribute to the conservation of landscapes, ecosystems, species and genetic variation;

2. Encourage sustainable economic and human development, both socio-cultural andecological;

3. Support exemplary projects, environmental education and research activities on local,regional, national and global conservation and sustainable development issues.

These goals are achieved through the MAB Strategy 2015-2025, which aims to preserve and enhance ecosystem services, building a society based on principles of humanity and an equitable economy, and sharing biodiversity science and



Legend:

Core area: It comprises a strictly protected zone that contributes to the conservation of landscapes, ecosystems, species and genetic variation

Buffer zones: It surrounds or adjoins the core area(s), and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.

Transition area: The transition area is where communities foster socio-culturally and ecologically sustainable economic and human activities.

Fig. 1. Zoning of a biosphere reserve

Source: UNESCO (n.d.).

education for sustainable development (UNESCO, n.d.). In addition, the MAB strategy 2015-2025 attempts to:

– Identify changes in the biosphere due to human and natural activities and assess the impact of these effects on humans and nature, especially in the context of climate change.

– Compare the dynamic interactions between natural ecosystems and the socio- economic process in order to find a compromise that allows the preservation of this ecosystemwithout affecting human well-being.

– Improve human well-being and provide them with an enabling environment in acontext of urbanization and energy consumption causing environmental changes.

– Encourage the exchange of knowledge on environmental problems and solutions, and promote environmental education for sustainable development.

Biosphere reserves are large representative areas of natural and cultural landscapes, benefiting in most cases from legal protection. Model concepts for protection, maintenance and development are implemented in these reserves, in collaboration with rural communities living in these areas.

2.2. The Arganeraie Biosphere Reserve

The argan tree is said to have evolved several million years ago in northern Africa, during a time when the Moroccan coasts and the Canary Islands were part of the same land mass.

The evolution of the climate towards warm and temperate strongly contributed to the development of argan trees, which started first on the lands of Morocco and, to a lesser extent, in Algeria and Brazil (Aydacosmetics, n.d.).

There have been attempts to cultivate the argan tree outside Morocco, in places such as California, Mexico, and Israel, but with relatively low yields.

The argan tree (*Argania spinosa*) is a source of argan oil, which is widely known for its medicinal and cosmetic properties and is used in cooking.

The high demand for argan oil has given rise to many cooperatives, made up entirely of women living in rural areas. Today, there are around 150 argan cooperatives, which provide employment to more than 4,500 women. Because it is a rare and endemic species, the argan tree forests have been included in the UNESCO list of world heritage.

On December 8, 1998, the Arganeraie was acknowledged by UNESCO as the first Biosphere Reserve of Morocco with an area of approximately 2.5 million hectares. It covers the provinces and prefectures of Agadir Ida Outanane, Inzeguane Ait Melloul, Chtouka Ait Baha, Taroudant, Tiznit and Essaouira (Fig. 2).

2.3. Sustainable tourism in the Arganeraie Biosphere Reserve

Sustainable tourism is associated with many aspects of the ecology of natural areas thanks to the diversity of climates, geography, and geology. Sustainable tourism, also knowns as ecotourism, alternative or responsible tourism, is an attempt to change the face of modern tourism by according to the principles of sustainable development.

The idea of sustainable tourism appeared in the 1990s and refers to forms of tourism that respect, preserve, and sustainably enhance heritage resources (natural, cultural, and social) of a territory while trying to minimize the negative impacts caused by visiting tourists. In practice, sustainable tourism involves actions undertaken in three different areas:

– From an ecological point of view, programs aiming to preserve and enhance the environment, the landscape, historical and architectural heritage.

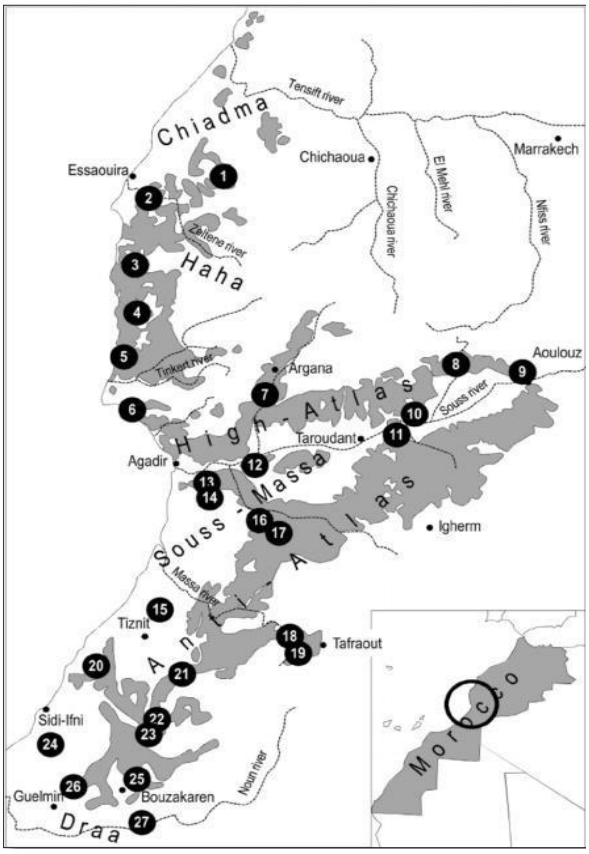


Fig. 2. The geographic distribution of *Argania spinose* in Marocco

Source: Mateille, & al. (2016).

– From an economic point of view, developing strategic plans for the distribution of the wealth generated by tourism products.

– From a social-cultural perspective, sustainable tourism is committed to respecting the socio-cultural values of local communities.

According to the document entitled *Ecotourism and Nature Tourism in Quebec, 2003-2008 Orientations and Action Plan* (Ministère du Tourisme du Québec, 2012), sustainable tourism meets the needs of tourists and their host regions, while protecting and improving resources for the future. Sustainable tourism leads to integrated management of all resources to meet economic, social and aesthetic needs while preserving cultural integrity, essential ecological processes, biological diversity and the environment.

Developing sustainable tourism in the Souss-Massa region by exploiting the potential of *Argania spinosa* will help to attract visitors, improve the socio-economic development of local rural communities by creating jobs, promoting and enhancing traditional activities, as well as helping to combat the rural exodus. However, tourism and environmental mismanagement could ruin and destroy this heritage. Aboutayeb (2014, p. 4) lists potential obstacles to the development of tourism based on a biosphere reserve:

– **The human aspect:** a decline in cultural values, internal conflicts or conflicts with tourists (reduction of useful agricultural area, hunting, noise, and visual pollution, increase in the cost of living, pressure on natural resources (water, wood, etc.).

– **The economic aspect:** densification of tourism: "attracted by eminent qualities of a site, massiveand reckless frequentation can lead to degradation or permanent disappearance"risks associated with competitiveness, seasonality, and volatility ofthe sector.

– **The biodiversity aspect:** degradation of plant cover and erosion, disturbance of wildlife, pollution, modification of the area's original ecological values, increased risk of fire etc.

In view of the above risks, the introduction of a system of payments for environmental services (PES) could help to prevent the overexploitation of this tourism heritage by providing the revenue to create a sustainable and structured tourism offering that could benefit localcommunities and businesses in the tourism sector. The rationale for employing this mechanism in the tourism sector is the fact that each ecosystem has a set of services related to the recreational component of discovering nature, in other words, a non-market value that is part of the tourism value. In addition, PES will make it possible to attribute an economic value that tourism stakeholders and managers can set to enable tourists to discover this natural space while contributing to its preservation. However, despite the national and international demand for natural areas, there is little awareness of the environmental services associated with them. In this context, the industry of

sustainable tourism and ecotourism can be considered as the main consumers of environmental services linked to the preservation of these natural areas (Lehmer & El Abbadi, 2021).

2.4. A project to implement payments for environmental services as a means of developing sustainable tourism in RBA

Several authors have proposed definitions of PES, (Corbera, Soberanis, & Brown, 2009; Muradian et al., 2010; Hiedanpää & Bromley, 2014; cited by Chervier, 2016). For example, Muradian et al. (2010) define PES as "*a transfer of resources between social actors, aimed to create incentives to redress individual and/or collective land use decisions with the social interest of natural resource management*" (Muradian et al. (2010), as cited by Chervier, 2016). Pagiola, Arcenas, & Platais (2005) regards PES as a way of encouraging nature users to manage and preserve their environment; thus ensuring the continuity of environmental services Pagiola, Arcenas, & Platais (2005). Another definition was given by the International Institute for Environment and Development (n.d.), which defines PES (also known as payments for ecosystem services), as "*payments to farmers or landowners who have agreed to take certain actions to manage their land or watersheds to provide an ecological service. As the payments provide incentives to land owners and managers, PES is a market- based mechanism, similar to subsidies and taxes, to encourage the conservation of natural resources*". As an incentive for nature conservation, payments for environmental services are increasingly recognized in the context of environmental and policies development. Their general objective is to compensate actors in return for the adoption of behaviors or practices favorable to the preservation of the environment (Karsenty et al., 2014).

In sum, PES could be an innovative instrument for preserving biodiversity and preventing the degradation of the argan ecosystem. Besides, Bourchich (2017) in his study on payments for ecosystem services linked to geotourism and ecotourism in the Idaoutanane and Azilal region, lists the advantages and disadvantages of payments for environmental services (Table 1).

The Souss-Massa region is characterized by considerable biodiversity, offering many ecosystem services including food security and livelihoods for local communities. However, erosion, over-exploitation of natural resources, climate change and desertification pose serious threats to the region's ecosystem. In this context, a project aimed at conserving the agro-biodiversity in the Souss-Massa region was implemented from 2014 to 2019 by the Agency for Agricultural Development under the supervision of the Ministry of Agriculture. With the technical supervision and financial management of UNDP, the project includes four main elements (PNUD Maroc, n.d.):

Table 1. Advantages and disadvantages of payments for environmental services

Advantages	Disadvantages
General: • Revenue from PSE is used for bioconservation (prevention rather than treatment of impacts). • PES promote direct payments between tourists andthe geosite manager. • PES can serve several purposes including development and poverty reduction through geotourism, associated with environmental objectives. • It is potentially sustainablebecause it is based on own interests of visitors and managers of geosites. • It raises awareness of the importance of the economic value of geosystem services and the loss that would be suffered if they disappeared. **For geosite managers:** • Their well-being increases in particular thanks to additionalincome. • PES can strengthen tenure rights over geosites, because well-defined rights are a prerequisite for the implementation of PES. • sustainable management of geosites becomes profitable **For visitors:** • The supply of geotourism is assured and improved. • Contracts make it possible to managegeosites according to terms defined jointly. • The costs are reduced because the establishment of geotourism activity is less expensive than alternative solutions, in particular repair of the site or its loss • Benefits in terms of a positive image: display of environmental considerations, especially since payment for ecosystem services is voluntary	**General:** • Difficulty in assessing the value of the service. • Some poor communities who used the resource for free run the risk of no longer having access to it. • Protecting one service can comeat the expense of other services. • Setting up PES requires technical skills and institutionalcapacities that are not always available locally. **For geosite managers:** • Property rights are not alwaysclearly defined. • Sovereignty over land can beseen, rightly or wrongly, as being called into question. **For visitors:** • Information asymmetry on the effort of the contractual agent to produce the environmental service • Risk of "free rider" behaviour on the part of certain users, when the service is a public good. • In developing countries, buyers may or may not have the financial capacity to participateto make the program work. • External funding sources may benecessary to supplement this.

Source: Bourchich (2017).

– Creation of an enabling environment for the introduction of PES in Morocco.

– Reinforcement of technical capacities for the implementation of PES models in the region. (Exchange of experiences with other projects and programs).

– Promotion of organic production, sustainable and respectful of biodiversity through a scheme of labeling and marketing adapted to the products of the argan ecosystem.

– Establishment of a PES pilot project as a means of promoting, conserving and sustainably exploiting biodiversity and the associated ecosystem services in the argan ecosystem.

Developing sustainable tourism in the Arganeraie Biosphere Reserve will diversify the tourism offer of the destination, which is in a state of saturation, and has become less and less adapted to tourists' expectations. This development will also help to target a new clientele that is more aware of the environmental issues and can contribute by their visits to fight against poverty in rural areas and improve the living standard of the local populations. Besides, according to Nielsen-Pincus et al. (2017), understanding the consumer's willingness to pay is very important given that the reported results can be a source for managers to define an acceptable price for non-market environmental services.

To this end, it is necessary to put in place a set of actions allowing socio-economic development as well as the preservation of the tangible and intangible heritage of this territory.

3. The exploratory study

3.1. Methodology

Given the importance of nature conservation and the environmental challenges faced by the Arganeraie Biosphere Reserve, qualitative data were collected during interviews with 80 tourists who visited the Reserve in order to determine their attitudes to the idea of implementing a system of payments for environmental services for the conservation of the natural heritage in the area. It was an exploratory, pilot survey intended to provide a general idea about the level of acceptance for PES and respondents' willingness to pay a premium for the opportunity to benefit from an authentic experience of nature. After analyzing the results of the pilot survey, we will intend to repeat it on a large sample to validate the initial findings.

The interviews included the following questions:

– the main reason for travel,
– type ofaccommodation used,
– level of satisfaction with the quality of the environment,
– attitudes towards PES.

After collecting the data in the field, we proceeded to a descriptive analysis of the content. Therefore, the texts resulting from the interviews were analyzed carefully to bring out all the necessary information for our research investigation.

3.2. Results and discussion. Sample description

a. Socio-economic characteristics of respondents

The respondents were aged between 28-50 years, including 55% of men and 45% of women. In terms of nationality, the sample's composition was as follows: French – 45%, German – 22%, Belgian – 8%, Spanish – 16%, American – 7%, and Russian – 2%. 65% of the respondents were couples and 35% are single. In terms of the level of education, 70% of the respondents had higher education, while 30% had completed secondary education. As regards respondents' household incomes, they ranged from 1000 to 2000 euros per month.

Respondents' behavior as tourists and their attitudes towards environmental protection

63% of respondents had already visited the Souss Massa, while for the others it was their first visit. As regards accommodation, 56% chose rural lodgings, 30% stayed at hotels and 14% – on campsites. Asked about their main motivation for visiting the Souss Massa, 73% of respondents indicated the desire to discover nature. Other reasons included discovering new cultures and gastronomy (15%), getting to know the local population and enjoying sports activities (12%). All tourists said that nature was an important factor in the choice of their recreational activities. While 61% believed that recreational practices had a rather negative impact on nature, 39% thought that they had either no effect or had a positive effect. 22% were satisfied with the quality of the environment, while 78% believed that that it was necessary to take measures in order to improve its quality. With respect to attitudes towards payments for environmental services and nature protection measures, 75% of respondents strongly agreed or agreed with the idea of paying a charge when visiting natural sites, and 25% responded that they would most likely provide financial support for any initiative to protect nature.

The results suggest that tourists are attracted by travel agencies and tour operators specializing in mountain tourism and nature-based tourism. Interest in these natural siteshad encouraged tourism operators to develop an ecotourism offering in order to attract more tourists to discover this natural heritage. However, the development of this type of tourism has caused a massive influx of tourists, which has resulted in poor land management and degradation of the natural environment. As a result, the idea of implementing a payment for environmental services was viewed favorably perceived by the majority of respondents in our sample. Furthermore, the tourists we interviewed were more concerned about environmental issues and made suggestions concerning ways of protecting this

natural wealth, such as improving accessibility and providing traffic signs to the site, training local guides to get more information about the visited site, offering more sustainable tourist activities, improving the condition of hiking trails and solving the waste problem.

b. Respondents' willingness to pay: contingent valuation method[1]

The range of amounts respondents were willing to pay for environmental services ranged from 0 to 12 euros, with the majority being ready to pay 5 euros on average (50 dirhams). This is precisely what was confirmed in a study by Bourchich (2017) on the establishment of a contingency scenario for a geosite in the Agadir-Ida Ou Tanane region (Morocco). In his study on payments for environmental services, Bourchich demonstrated that ecotourism and geotourism are promising segments of sustainable development for the Moroccan High Atlas. He found that more than 90% of tourists were interested in making additional payments for the preservation of the environment but on the condition they could benefit from a local tourist animation offering, which is consistent with the spirit of ecotourism and geotourism. According to another very recent study carried out by Lehmer & El Abbadi (2021), which addressed payments for environmental services in another argan biosphere in Morocco, the minimum price that tourists were willing to pay was 38.10 dirhams (around 3 euros), while the maximum amount was 69.8 dirhams (about 6 euros). They calculated the weighted average price the tourists were willing to pay to be around 5 euros per visit, which would guarantee the implementation of a conservation program. However, in the same study, the authors cited a study by Landell-Mills & Porras (2002) who studied 51 payment systems for landscape preservation services. They found that "*this market has not matured and has serious shortcomings; among other things, the ecotourism industry may be willing to pay for the provision of these services and there are no sophisticated payment mechanisms.*" (Lehmer & El Abbadi, 2021).

4. Conclusion

Sustainable tourism is a responsible approach that helps to minimize environmental damage and fights against the over-exploitation of natural resources, and

[1] The methodology of the study is described in the doctoral thesis of one of the authors: *Evolution de la demande touristique dans les stations balnéaires à la lumière du développement de nouveaux produits: le cas des destinations Agadir et Majorque* (Fakir, 2021) to calculate the willingness to pay of tourists.

the development of tourism in the Arganeraie Biosphere Reserve is a major issue. The protection of this intangible heritage requires measures which will enable the tourism sector to become an attractive local product that symbolizes the development of sustainable tourism in the Souss Massa region. Therefore, the implementation of a payment for environmental services project is an opportunity for professional actors as well as for local rural communities to improve their living conditions and develop new activities for tourists that will bring benefits to all stakeholders.

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Wykorzystanie opłat za usługi środowiskowe w celu rozwoju zrównoważonej turystyki w Rezerwacie Biosfery Arganeraie w Maroku

Streszczenie. Lasy drzew arganowych to jeden z najważniejszych zasobów naturalnych Maroka, ale obecnie istnieje poważne ryzyko ich degradacji, a nawet groźba całkowitego wyginięcia. Dlatego konieczne jest opracowanie modelu zrównoważonej turystyki, który może pomóc w zachowaniu tego dziedzictwa naturalnego, biorąc zwłaszcza pod uwagę stale rosnącą liczbę turystów. Celem niniejszego artykułu jest analiza koncepcji płatności za usługi środowiskowe jako metody uzyskiwania dochodów w celu stworzenia zrównoważonej i zorganizowanej oferty turystycznej oraz zachowania dziedzictwa przyrodniczego w regionie Souss-Massa. Opisane w artykule badanie eksploracyjne opiera się na danych jakościowych zebranych podczas wywiadów z 80 tu-

rystami odwiedzającymi Souss-Massa. Stwierdzono, że respondenci są zainteresowani walorami przyrodniczymi odwiedzanych miejsc i wyrażają chęć ochrony tego dziedzictwa przyrodniczego poprzez uiszczanie opłat za usługi środowiskowe.

Słowa kluczowe: Rezerwat Biosfery Arganeraie, turystyka zrównoważona, opłata za usługi środowiskowe