

# **PROPOSAL FOR A TOURIST TAX IN LANZAROTE (SPAIN)**

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## Abstract

During the last years, there have been different initiatives oriented to contain the environmental pressures in the island of Lanzarote in Spain's Canary Islands. These pressures are mainly linked to the great increase of tourism. As a part of these initiatives the majority of the population think that it is necessary to stop the growth of tourism. This is a very costly policy that requires extra sources of funding, in order to stop ongoing urban development processes. This article sets out a proposal for a tax on tourism for the island, discusses the main alternative options, and estimates their potential revenue.

Keywords: tourist tax, ecotax, Lanzarote, Spain.

## 1. INTRODUCTION: TOURISM IN LANZAROTE, PRESENT SITUATION AND FUTURE PROSPECTS

Lanzarote is one of Spain's Canary Islands. It is characterised by an arid climate, scarce natural resources and a society traditionally adapted to such environmental conditions. Over the last few decades Lanzarote has witnessed a huge growth of the tourist industry, along with growth in all the related economic activities, particularly new urban developments. Solely between 1980 and 1990 the number of tourists visiting Lanzarote leapt from less than 200,000 per year to more than a million, being nearly two million at the moment (Cabildo de Lanzarote, 2001).

Alike it affected the economic system, tourism brought social and environmental changes to the island. Whereas the growth of tourism allowed an improvement on the economic indicators, it also encouraged a development pattern that has increased the pressure on the island's natural resources, as well as on the global ecosystem. The infrastructures built to meet the demands of the expanding tourist industry are considered as the main source of environmental pressure on the island.

Simultaneously to such tourist development, a social awareness raised regarding the necessity to guide the economic development towards a more sustainable path. Already in 1991 the Plan of the Insular Territory (PIOT) withdrew planning permission to more than 250,000 accommodation places that had been conceived on previous planning instruments, and since then no new urbanisation plans have been approved.

In October 1993 the island was declared as a Biosphere Reserve by the UNESCO, and in 1997, within the framework a LIFE Program from the European Union, the *Cabildo of Lanzarote* (the government of the island) drew up the "Lanzarote on the Biosphere Strategy", a comprehensive proposal containing 8 lines of action and 27 action programmes for a sustainable development of the island. Its main result was the application in 2000 of a partial revision of the PIOT for Lanzarote. Such revision was known as the Tourist Moratorium and established a maximum limit of 10,707 new accommodation places on the island until 2010 (some 18% of the official number of places existing in 2000). The "moratorium" was proposed as an opportunity to stop and reconsider the future development of the island, and more specifically to raise the debate regarding which should be the maximum limit of accommodation places in Lanzarote after the mentioned decennial period.

The *Cabildo of Lanzarote*, within the new LIFE program "Lanzarote on the Biosphere 2001-2004", developed a series of studies proposing new lines of

action, funding and fiscal measures for the Biosphere Reserve. This paper summarises some of the main findings of the report "Taxes, environment and tourism in the island of Lanzarote" that was developed in this context (Roca, Puig, Hercowitz, Hernández, 2003) which is oriented by the idea that it is necessary to continue the process of limiting the land devoted to new urban developments. Nevertheless, as many urbanising processes are already under way, the only effective means to limit these processes is by reacquiring the construction licences. According to most legal experts, unlike what happened in past stages, the reacquirement of the remaining licenses is only possible by means of important indemnification to their owners. Given the impossibility for the *Cabildo* to afford this extraordinary expense with its ordinary budget, it is necessary to think in other sorts of instruments.

Inspired by the "Impuesto sobre Estancias en Establecimientos Turísticos de Alojamiento" (tax on nights spent in tourist accommodation establishments), in force in the Balearic Islands (Spain) from May 2002 to October 2003, the idea of applying a tax on tourism to raise the funds needed for the indemnification payments gained acceptance in Lanzarote. The Balearic tourist tax charged tourists staying in hotels, apartments, farmhouses, etc., an average of one euro per night (the amount depending on the kind of establishment).

Either the Balearic tax or the Lanzarote proposal have been locally known as the "ecotax". In fact, the use of the term "ecotax" to define a tax designed to collect money rather than fostering changes of behaviour leading to environmental improvements is very arguable, even though when the money collected is to be expended in environmental policy measures.

Given the fact that environmental damage is not only due to the total number of tourists but also due to the behaviour of each individual, environmental policy needs to deal with both factors. The first factor, the number of tourists, could be adequately addressed by several policies, and a tax on tourism could be among them. The second factor could be tackled by introducing environmental criteria into the tax system of the island, i.e. "greening" the island's fiscal system.

The "greening" of the tax system could take place in a double way. On the one hand by reducing through tax incentives or subsidies the tributary load of activities that the Administration wants to stimulate, and on the other hand by increasing the tributary load of activities the Administration wants to discourage, because of their intensive use of natural resources or because they cause pollution (urban waste generation, water discharges...)<sup>1</sup>

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1. In Roca, Puig, Hercowitz, Hernández, 2003 are discussed several proposals in this field.

On the other hand, the extent of the actions necessary to reduce the current environmental pressure in Lanzarote would undoubtedly require additional public expenses and it is convenient to create a specific fund to be used only for expenditures in environmental policies. A fund of this type could channel money from different sources in order to spread risks and avoid depending on only one single instrument of income generation (Spergel 2001). Some of the possible financing sources could be: voluntary donations of individuals and foundations, surplus generated by changes on the existing tax system, taxes on the provision of tourist services or services that affect the environment, perhaps a part of the entrance fees (maybe increased) for the centres of Art, Culture and Tourism run by the *Cabildo*, contributions from the Regional Government of the Canary Islands and other public bodies... and the income generated by a tourist tax.

This fund should be permanent and not only with the purpose of reacquiring construction licences, nevertheless, given the amount of the expenditure probably needed to this end, this could take priority during the first years of its existence.

The fund should be managed by a Council representative of the whole of society and independently of the budget of any other government department. The current *Consejo de Reserva de la Biosfera* (Biosphere Reserve Council) could well play this role.

Among the different sources of income of the fund, the tourist tax stands out for its quantitative importance. This option, the most discussed in Lanzarote, has the capability to generate an important amount of resources for the reacquirement of construction licences, but furthermore the levy charges the tourist activity, what is in general seen favourably by locals.

There are many experiences around the world on the use of economic instruments to manage tourism. While in some cases these instruments are used as tools to promote tourism –sometimes arguing the idea suggested by some experts that tourism can contribute to the conservation of protected natural areas (Myers 1988; Terborgh 1992; Pearce and Brown 1994; Lindberg *et. al.* 1997; Gössling 1999)–, for example through subsidies for the construction of tourist accommodation, in other cases they are used as a way to raise public funds. In most cases, tourist taxes are used only as a means of creating revenue for general expenses, but there are also experiences of tourist taxes focused on the generation of resources specifically for environmental conservation as (partially) the aforementioned “Impuesto sobre Estancias en Establecimientos Turísticos de Alojamiento” in the Balearic Islands (Valdivielso, 2001), the “Conservation Trust Fund” in Belize (Spergel, 1996) and the “Taxa

de Preservação Ambiental’ in the archipelago of Fernando de Noronha – Brazil (Puig, Hercowitz, 2003; Teixeira, 2001).

The *Cabildo* cannot legally create and apply the tourist tax, because the competence to do so belongs to the *Comunidad Autónoma* (regional government). The government of the Canary Islands could pass a law allowing Lanzarote and other islands that so wish to apply local taxes, or could implement a regional tax only applied in those islands that so decide. Since the *Cabildos* have legislative initiative in the Canary Parliament, those interested could present a proposal in this way.

## 2. THE PROPOSAL FOR IMPLEMENTING A TAX ON TOURISM

Any discussion on how to set up a tax on tourism in Lanzarote should begin analysing its different possible characteristics (object of taxation, tax base, individuals subject to taxation, amounts...).

### *Object of taxation*

If the object of taxation of the new “ecotax” was defined as the permanence in tourist establishments of accommodation, the legality of the tax would be almost assured due to the Balearic Islands precedent.<sup>2</sup>

If the arrivals or departures from the island are to be taxed, the object of taxation could not be stays in tourist accommodation establishments, because it would then be illegal to charge people arriving to or leaving from the island and not staying in these establishments. In this case the object of taxation should simply be the stay made on the island or its “use”, what certainly would raise more debate about the legality of the tax.

### *Tax base: charging for days or charging for entrance*

It could be argued that the definition of the tax base as the number of days spent, charges visitors in proportion to the strain they exert on the local environment, which is indirectly indicated by the length of stay. However, two considerations must be done here. The first is that although it is true that, generally, more days on the island means a higher use of resources and greater pressure on the environment, it is also true that some forms of environmental damage –especially those at global scale– are especially associated with the trip to and from the islands.

The second consideration, even more important, is that the estimation of environmental pressure according to the days of permanence is not accurate at all, since people have different behaviours and hence exert different pressures on the insular territory. Nevertheless, a tax depending on the number of days spent and charging tourists in their places of accommodation has potentially the advantage that could be “greened” in its design (e.g. conceding advantages to rural establishments or establishments supplied by renewable energy sources). Furthermore the fact that the tax varies depending on the number of days spent on the island provides an additional tool for tourist planning, since it could affect people’s average time of permanence (for example by using different levels of taxation per day according to the number of days spent, as done in the Fernando de Noronha archipelago, in Brazil (Puig, Hercowitz, 2003; Teixeira, 2001).

On the other hand, the category of the hotel in which the tourist is staying is an indicator of his affluence. Consequently, a tax that varies in amount according to the category of the hotel allows taking into account the economic capacity of the individual liable to be taxed, a desirable feature from the point of view of the vertical equity.

#### *When to collect the tax*

There are several possibilities regarding when to collect the tax. The two alternatives most commonly discussed are payment in the establishments providing tourist accommodation and payment at the airport (possibly also in the ports). Another alternative is for tourists to pay the tax when they buy their tickets at the travel agencies or airline companies.

Payment in hotels and other kinds of tourist accommodation allows putting in practice a tax proportional to the number days of permanence. This type of charge also allows modulating the tax value according to the hotel category or its environmental performance. However, a flat-rate tax (very similar to an entrance tax) could also be levied in tourist accommodation establishments, independently of the length of stay or any other criteria.

Nevertheless, collecting the tax in tourist accommodation establishments has one important disadvantage. Only tourists staying in legal establishments pay the tax. All tourists staying at unregistered lodgings –including undeclared hotel beds and illegal establishments– would evade the tax. This would increase the advantages of the unregistered establishments. So would skip the tax those

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2. Although the legality of the tax (no longer into force) is still pending of the resolution of the

staying in rented accommodation and second homes, which is the sort of tourism expanding faster in Lanzarote at the moment, and the kind of tourism that has the greatest environmental impact.

Precisely, the great advantage of collecting the Lanzarote's tourist tax at the airport (and ports) would be that the chances to avoid the levy are almost inexistent. It would be collected either on arrival or departure, and all tourists would be taxed without exception.

Payment as part of the cost of the ticket –collected at travel agencies or airline companies– allows all formalities related to the payment of the tax to occur at the moment of buying the flight ticket or package deal. This makes things much more straightforward for the tourist, who has already fulfilled this obligation before arriving to the island. However, it would entail paying these companies for the administration costs involved in including the tax in the fare and transferring the money to the Public Administration. This would be a fairly simple way for the *Cabildo* to collect the tax and keep an effective record of the amounts collected.

The place where the tax is collected does not affect significantly its distribution, i.e. who is in the end paying for the tax (hotel owners or tourists, for example), as the main factors in determining this are market forces: supply and demand, and the degree of competition. Although this is generally true in the medium and long term, in the short term the formal fact of where the tax is collected may have some kind of incidence. Prices charged by hotels and apartments are to a great extent the result of a negotiation between them and touroperators, in which, at least in the short term, the latter are in advantage.

### *Level of taxation*

The value of the tourist tax can determine the role this fiscal instrument will have. A fairly low level should have practically no effect on the number of tourists arriving (especially when this amount is already restricted by a Moratium, as is the case in Lanzarote) and thus would only have the effect of generating public funds. A higher level of taxation could, in addition, be used to limit tourist demand.

In the following discussion we assume “moderate” levels of taxation, meaning those that are unlikely to cause the number of visitors to fall below the (already ambitious) objective of stabilizing the tourist population which is part of the “Lanzarote on the Biosphere Strategy”.

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appeal of the Spanish government appealed to the Constitutional Court.

### 3. THE ECONOMIC EFFECTS OF A TOURIST TAX

#### *Tourist tax and total tourist expenditure*

To situate the debate on the potential economic effects of a tourist tax, the first point of reference is to calculate its magnitude in relation to the total amount spent by tourists. A tax of 1€ a day –the average rate of the Balearic Islands tax (no longer into force)– would come to little more than 1.08% of the total average expenditure of a tourist in Lanzarote in 2000, according to the official surveys on tourist expenses (ISTAC, 2001). Even much more ambitious proposals, which are not in the political debate, would represent relatively small proportions of the total tourist expenditure.

#### *The tourist market: a simplified model of reference*

Even at the risk of simplifying too much, we may think of a reference model to discuss the possible future scenarios and the potential effect on the market of a tax implementation. A model of this kind is useful to focus the discussion, clarify some concepts and establish some conclusions, although, of course, it cannot cover all the complexities of the real market of tourist services in Lanzarote.

Let us take as a first variable the amount of tourism, measured by the overall number of nights spent in the island. Let us also consider as a second variable the price, defined as the average daily expenditure of a tourist, which includes the whole set of goods and services purchased (trip to the island, hotel, restaurants, visits to tourist attractions...).

For the whole range of services tourists face prices that cannot control (airplanes or boat fares, hotel prices, the exchange rate if they come from outside the “euro zone”...). Given these prices they can choose to come to the island or not -or, to a lesser extent, to spend more or less days in the island- and, all other circumstances the same, the lower the price the higher the number of people visiting the island. In this context, an important reference concept is the demand elasticity to price, which is calculated (for small variations) as the percentage variation of the amount demanded divided by the percentage variation of the prices.

Regarding supply, it is clear that one of the main factors determining the investment in tourist infrastructure is the price tourists pay for accommodation (or, to be precise, the percentage of the price that receive the providers of such



accommodation) and, even more important, the expectations on the future evolution of prices.

Anyhow, supply at the medium and long term and supply at the short term are very different things. In the short term, the elasticity of supply is very inelastic. In other words, even if prices are high supply cannot be increased and even if prices go down, owners of tourist accommodation prefer to fill it at the best possible price –whatever it may be within some limits– rather than take it off the market.

*“Risk scenario” and scenario of total restriction of supply: main foreseeable economic effects*

The tendency over the next decades, defined as “risk scenario” by the “Lanzarote on the Biosphere Strategy” report, would probably be characterised by an increasing supply and demand, resulting in a higher number of tourists and unpredictable prices. It would not be rare for prices to go down, especially as the tourists who valued the special qualities offered by the island could become more disillusioned with environmental deterioration and the increasing overcrowding, more notorious because more tourism also leads to increasing resident population (Calero, Márquez, 2002).

This scenario is considered undesirable by the majority of the population and that is the reason why measures were taken to limit supply, and the “Lanzarote on the Biosphere Strategy” proposed to stop the growth of tourism that has led to the present debate about the reacquirement of construction licences.

Figure 1 shows qualitatively the effects on price of variation in supply and demand of tourist services. The average price in the case of an increase in demand and not in supply ( $p_2$ ) would be higher than the price that would occur if there was no supply restriction ( $p_1$ ). Depending on the increase in supply and the future evolution of demand,  $p_1$  could be greater or smaller than the present price ( $p_0$ ) (Figure 1 shows the latter). The reason why  $p_2$  is greater than  $p_1$  is that the market is in this case characterised by a lower supply and in addition (although this is not shown in Figure 1) the future demand for any price will probably be higher in the case of supply limitation than in a growth situation due to higher quality of the environment and less overcrowding.

If we compare the price  $p_2$  with the current  $p_0$  it is well possible that the price will be higher (unless we think in future scenarios with decreasing tourist demand) because at the current price an unsatisfied demand would exist. Therefore, limiting the supply may also be seen as a way to maintain and even increase prices in the tourist market.

(Figure 1)

A situation of restricted supply, which limits tourist accommodation, does not necessarily lead to a loss in overall tourist expenses in comparison to a situation without restrictions. Only in the case of elastic demand is the rise in prices caused by these restrictions relatively small and therefore unable to compensate for the fewer number of tourists. As we see it, and this is coherent with the results of most of the studies made on the Balearic Islands, the overall tourist demand in Lanzarote does not seem to be very elastic. Although the need for environmental conservation is not based on economic criteria, it is worth mentioning that there is a possibility that uncontrolled expansion of the tourist industry brings about a “double loss”, both economic and environmental, and not just in the long term but also within a relatively short period of time.

The debate on the consequences of levying a tax on tourism usually focuses on its effect on prices and on the number of tourists, in comparison to a context of unrestricted supply. However, in the case of Lanzarote this way of focusing the debate lacks relevance. The tax is considered as part of a strategy for limiting supply, in a context where increasing demand is deemed excessive and makes it difficult such contention. In other words, we are talking about a situation in which two measures are taken at the same time; restriction of supply by means of the Tourist Moratorium and taxation.

The main difference between applying taxation or not would be a difference in the distribution of income between people providing tourist accommodation and those who benefit from the public spending from Public Administrations made possible by the tax. Providers of tourist services would receive an amount per tourist reduced by the amount of the tax, compared with what they would get if there was no tax, that is to say they would earn  $p_2 - t$  instead of  $p_2$  (being  $t$  the amount of tax per day).

Considering that the tax is proposed in a context where prices will probably go up due to the limitation of tourism, what is really at stake with the “ecotax” (if is not substantially different from the small amounts in debate at present) is who will benefit from this rise in prices. It comes down to whether the providers of tourist accommodation will have extra income per bed or if at least a part of this income will be collected by the authorities. Seen in this light, and given that the (initial) main use of the revenue would probably be to buy back building rights, a tax on tourism could be seen as a way of transferring money from those who benefit from the limits on supply to those who are harmed by it because will not be allowed to build.

However, there are a number of points that need to be clarified. The previous argument is based on the assumption that prices will go up and the increase will be higher than the proposed tax. If this was not the case,  $p_{2-t}$  would be less than  $p_0$  and, instead, it would be a situation in which providers of tourist accommodation would suffer a reduction in their income in comparison with the initial situation.

Whether or not a drop in income is to happen depends above all on the amount of the tax and on the future evolution of tourist demand. Demand is the result of many factors, among which are considerations as varied as the international situation or the political stability of competing destinations. In the case of a drop in tourist demand, a tax on tourism could certainly make things a little worse, but it would certainly have a very moderate effect compared to the factors responsible for the crisis in the tourist industry.

On the whole, in spite of these considerations, we think that –as long as adequate environmental policies are carried out– the natural beauty of Lanzarote is a guarantee of future demand at prices that are high enough to allow the payment of a moderate tax without a decrease in profits. The problem is rather the opposite: the demand for tourist accommodation is –and will very likely continue to be– too high.

#### *Different kinds of tourism*

Rather too simplistically, a “high quality” tourist is frequently equated with a tourist with higher economic capacity whereas from the environmental point of view affluent people tend to consume more natural resources and tourists who spend very little money may well be concerned with conservation of the environment. It is even likely, that those tourists that pay more attention to the cultural and environmental values of the island be prepared to spend more than tourists who choose their destination on the basis of price alone. This last category is the most sensitive to prices since for them many other destinations with sunshine and beaches could substitute perfectly well a stay in Lanzarote and, if any, is the category in which a tax would have a higher impact.

#### 4. THE TAX ON TOURISM AS A WAY OF FINANCING COMPENSATION FOR BUILDING RIGHTS

As many people in Lanzarote gives priority to obtaining additional funds for compensating the loss of building rights conceded in the past, it is important to analyse whether a tax on tourism is capable of doing this and in what way.

### *The financial potential of different kinds of tax on tourism*

The final result of levying a tax on tourism depends on many factors, including the basic tax rate, how it is calculated (by days spent on the island or by visits), when it is collected and the market situation. Thus, we can only outline several hypothetical scenarios with the aim of estimating the financial potential of the tax under different conditions and comparing this potential with the need for funds to buy back building rights.

We will consider two basic models of tourist tax. On the one hand, a daily tax proportional to the number of nights spent on the island, to be collected in establishments of tourist accommodation as a fixed daily amount. We analyse three possible amounts: 1, 1.5 and 2€ per day. In the case of a daily tax with a value defined according to the category of the establishment these three figures have to be understood as the average amount. On the other hand, we consider an entrance tax consisting on collecting to all non-residents a fixed amount on arrival. Again we consider three different amounts: 10, 15 and 20€. In both models it is assumed that the tax is imposed in its entirety from the beginning, not gradually, and that the nominal amount is maintained over the whole period in consideration (which clearly means a reduction in its real value due to inflation).

Apart from the type of tax and its amount, the other main variable to be defined is the total number of tourists subject to taxation. We assume that the tourist population will be limited to a number that is fairly close to the present one, due to the implementation of policies with this end (primarily the tourist moratorium).

A distinction should be made between tourists staying in officially registered accommodation and those staying in other places, such as second homes, with friends or family, or non-legal accommodation. A tax on arrival would affect all non-residents (of course some exceptions could be made to this rule, for example, people born on the island who are non-residents, people who have close relations on the island, or even all residents of the Canary Islands or visitors to the island for work reasons who only stay one day, etc.). On the other hand, a tax collected on a daily basis would only affect those staying in officially registered accommodation. To estimate the financial potential of the daily tax we will use an approximate figure based on the official number of beds and the average occupation provided by the *Cabildo of Lanzarote* (2001), obtaining an average daily figure of 49,005 tourists in official establishments for the year 2000. For the purpose of calculating the financial potential of the daily tax we work with the figure of 50,000 tourists per day.

For calculating the financial potential of the entrance tax we also use an approximate number of non-residents visiting the island, based on official statistics (Cabildo de Lanzarote, 2001; ISTAC, 2001). The figure we work with is 2,000,000 tourists per year.

#### *Amount needed to compensate for the reacquirement of building rights*

If we are to compare the effectiveness of different kinds of taxation, it is requirement to know the amount needed to buy back the building rights.

This amount has been calculated as 300 million euros (Larrea *et al.*, 2002), although there is a lot of uncertainty and the real amount could vary considerably. There is also a great deal of uncertainty about when this compensation would have to be paid. This is important because any lapse of time between making the payments and receiving the funds would cause the amount to increase considerably because of interest paid for loans that allow the payments, or interests paid on payments that have been delayed.

For the calculations the most pessimistic hypothesis is assumed, that is to consider that the holders of building rights are entitled to receive the entire compensation during the first year of the projected tax and that the advance and/or delayed payments incur financial costs at a nominal rate of interest of 5%. This would be the case if the compensations were paid in the first year financed by a loan or public debt at an annual rate of 5%; another equivalent way is to establish a debt to the holders of building rights that generates annual interests of 5%, and is paid back over a number of years.

Table 2 shows the yearly amount necessary to buy back the building rights, considering different time paces. For example, in order to acquire back the building rights in ten years a compensation payment of 38.8 million euros per annum would be needed.

#### *Buying back building rights using revenue from a tax on tourism: different scenarios*

Table 3, which also considers a compensation payment of 300 million euros to be made at the beginning of the implementation of the tax and an annual interest rate of 5%, shows the tax collected each year and the number of years necessary to buy back the building rights for the six types of tax under consideration. This assumes that the whole of the revenue from the tax is used for compensation payments and that no other funds are used for this end.

## 5. CONCLUSIONS

The reacquirement of building rights needed to stop further urban development in Lanzarote requires extra sources of funding. Unless regional or national Administrations provide these economic resources, the easiest way to gather enough funds in the island is through the implementation of a tourist tax. This paper has shown that the tax has capability enough to generate the needed amount of money in a reasonable period of time. Although in some contexts one could worry about the potential negative effect of a tax on tourism, in the context of Lanzarote this tax could help ensuring the observance of the Tourist Moratorium, which is precisely the best way to guarantee the sustainable exploitation of tourism in the long run.

As said, insular Cabildos do not have the competence to create and apply the tourist tax. Moreover, tourism pressure on the archipelago is very unevenly distributed among islands. Therefore, if the regional government allowed insular Cabildos to implement the tax, only those islands where tourism has exceeded the desired limits would implement it, leading to a possible rebalance among the islands.

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Table 1. Financial potential of different taxes on tourism in Lanzarote

| Type of tax                          | Entrance tax |        |        | Daily tax |        |        |
|--------------------------------------|--------------|--------|--------|-----------|--------|--------|
| Tax value                            | 10€          | 15€    | 20€    | 1€        | 1.5€   | 2€     |
| Annual revenue in thousands of euros | 20,000       | 30,000 | 40,000 | 18,250    | 27,375 | 36,500 |



Table 2. Annual and total amount needed to buy back buildings rights valued in 300 million euros considering a rate of interest of 5%

| Number of years | Annual payment<br>(thousands of euros) | Total payment<br>(thousands of euros) |
|-----------------|--|---------------------------------------|
| 10              | 38,851                                 | 388,514                               |
| 15              | 28,903                                 | 433,540                               |
| 20              | 24,073                                 | 481,456                               |
| 25              | 21,286                                 | 532,143                               |
| 30              | 19,515                                 | 585,463                               |
| 50              | 16,433                                 | 821,651                               |

Table 3. Revenue obtained by the six taxes on tourism considered

| Type of tax  | Entrance tax |        |        | Daily tax |        |        |
|--|--------------|--------|--------|-----------|--------|--------|
| Tax value  | 10€          | 15€    | 20€    | 1€        | 1.5€   | 2€     |
| Annual revenue in thousands of euros   | 20,000       | 30,000 | 40,000 | 18,250    | 27,375 | 36,500 |
| Number of years needed to buy back building rights at an interest rate of 5% | 29           | 15     | 10     | 36        | 17     | 11     |

Figure 1. Supply and demand in the tourist market with and without limits on growth.

