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When tourist flows cause flooding
- the economics of overcrowding

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Acknowledgements

Summary

Today, people are travelling more than ever, and an increased amount of this travelling occurs in natural environments. There exists a fundamental relationship between the environment and tourism, as the environment is a fundamental ingredient for tourism development. However, the increased numbers of tourist at these places have the potential to destroy the very natural components that the travelling is based on in the first place. These increased numbers can lead to serious overcrowding and congestion issues at prime natural attraction, which again has negative effects on both the environment, the tourist experience and the host community.

The aim of this study is to contribute to a better understanding of the adverse effects stemming from increased tourism, and how the public good and open access nature of these natural resource cause problems of overexploitation and degradation of the environment. Through concepts of negative externalities and carrying capacity, the thesis will discuss the negative impacts occur and try to identify a threshold limit for when they occur. Furthermore, the study attempts to analyze different policy instruments than can be used to regulate tourism. Exclusion mechanisms such as tourist quotas, taxes and charges are analyzed according to neoclassical economic theory, to understand the effects the instruments has on quantity and price. Moreover, these instruments were assessed through criteria of effectiveness, equity and distribution and transactions costs to highlight the different aspects of the respective instruments and to understand the trade-off between them.

Through our discussion, we found that there is no perfect instrument that can solve all the problems of negative externalities related to overcrowding, and that sometimes a mix of instruments should be considered. It became clear that the different instruments have different attributes, and that while some would be effective in limiting visitor numbers and group sizes, and by that reducing the problems of overcrowding, others were more suitable to change tourist behavior and to deal with pressures on the infrastructure and facilities. This shows that choice of instruments is related to the objective of the policy makers. It further shows that areas that are sensitive to tourism and need to limit the amount might prefer tourism quotas, whilst others areas might be able to accompany increased amount of visitors, given that conservation, maintenance and supporting facilities are provided, where economic instruments might be preferred, as they have the ability to generate funds. There is a trade-off between the different instruments that must

be made, with regards to the different criteria, and the choice of instruments will depend on the relative weight attached to the different criteria. Furthermore, it becomes clear that the political structure of countries, the characteristics of the environmental area, the willingness to pay and accept the regulation by the community and the equity and distributional concerns plays vitals roles in deciding on how to regulate the environment. Nevertheless, the thesis shows that there is a need for natural areas subject to tourism to be regulated, in order to avoid overexploitation and for the nature to be able to regenerate itself, and that the choice of policy instruments is highly subjective and depends on what negative impacts the policy maker aims to reduce.

Sammendrag

I dag reiser folk mer enn noen gang før, og de siste tiår har vi sett en økende tendens til at folk velger naturopplevelser som sitt reisemål. Det eksisterer et fundamentalt forhold mellom natur og turisme, ettersom naturen selv er en del av turisme opplevelsen. Det økende antallet turister ved naturlige steder har et potensiale til å ødelegge selve naturen som turisme er grunnet i. Denne økende turismen kan føre til alvorlige problemer ved å overbefolke turiststeder, som blant annet fører til opphopning/kødannelser. Dette har negative effekter både på naturen, turistenes egen opplevelse og forvetninger, samt på vertssamfunnet.

Målet med denne oppgaven er å bidra til en bedre forståelse av de virkninger og bivirkninger som følger av økt turisme, og hvordan offentlige goder og den frie tilgangen til disse naturressursene forårsaker problemer med tanke på overutnyttelse og nedbrytning av miljøet. Gjennom begreper som eksternaliteter og miljøets bæreevne, diskuterer oppgaven de negative effektene som oppstår, og forsøker å diskutere en grensenivå for når de tiltrer. Videre forsøker studien å analysere ulike politiske virkemidler som kan brukes til å regulere turismen. Utelukkingsmekanismer som turistkvoter, skatter og avgifter, analyseres i henhold til neoklassisk økonomisk teori, for å forstå virkningene instrumentene har på mengde og pris. Videre blir disse instrumentene vurdert ved hjelp av kriterier for effektivitet, rettferdighet og distribusjon og transaksjonskostnader, for å markere de ulike aspektene ved de respektive instrumentene, samt å forstå avviket mellom dem.

Gjennom diskusjonen fant vi ut at det ikke finnes et perfekt instrument som kan løse alle problemene/utfordringene med negative eksternaliteter knyttet til overbefolkning, og at noen ganger må en kombinasjon av instrumenter vurderes. Det ble klart at de ulike instrumentene har forskjellige egenskaper. Mens noen vil være effektive for å begrense antall besøkende og gruppestørrelser, og dermed redusere problemer vedrørende overbefolkning, er andre mer egnet til å endre turistadferd og for å takle presset på infrastruktur og fasiliteter. Dette viser at valg av instrumenter er knyttet til målet for de politiske beslutningstakerne. Det viser videre at områder som er følsomme for turisme, og trenger å begrense omfanget, kan foretrekke turismekvoter. Andre områder kan være i stand til å holde tritt med økt antall besøkende, gitt at bevarings-, vedlikeholds-, og fasiliteter er gitt. Her kan økonomiske instrumenter være foretrukket, da de har evnen til å generere midler. Det må gjøres en avveining mellom de forskjellige instrumentene med

hensyn til kriteriene, og valg av instrumenter vil avhenge av den relative vekt som er knyttet til de ulike kriterier. Videre blir det klart at landets politiske struktur, egenskapene til miljøområdet, viljen til å betale og akseptere samfunnsreguleringen, og egenkapital-, og distribusjonshensyn spiller viktige roller når det gjelder å regulere turisme. Ikke desto mindre viser avhandlingen at det er behov for at naturområder som er knyttet til turisme blir regulert, for å unngå overutnyttelse og for at naturen skal kunne regenerere seg selv. Valgene av politiske virkemidler er svært subjektive og avhenger av hvilke negative virkninger man har som mål for å redusere.

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1 Introduction

1.1 Background

The process of managing overcrowding at natural tourist sites can be understood by comparing it to a flow of water running down a river. The steady stream of tourists to a tourist destination is comparable to the steady stream of water through a river. The majority of tourists move through a destination and its associated natural and cultural sites in a relatively consistent manner and along well-defined routes. Congestion occurs when physical obstructions block the natural flow causing the flow to slow down. Flooding occurs when the flow finds new undesired outlets, for example, when provided trails are filled up and tourists start using non-assigned areas for walking. A sustainable approach to tourism depends on an effective management of these tourism flows at and through natural sites, giving the visitors time and opportunity to appreciate and enjoy the local culture, values and the natural environment attributed to the chosen natural site. The dynamic nature of tourist flows is thus a key factor in the management of overcrowding at natural or cultural sites (Brooks 2005).

Natural areas have attracted people throughout lifetimes, and with the arrival of the cheap air travel, humans are now visiting places all over the world (Newsome et al. 2001). While the reasons for why individuals travel are varied and usually alter with their life cycle, one important reason for the choice of travel destination is natural wonders and experience, or to utilize different features of nature for enjoyment (Tisdell & Wilson 2012). Over the last decades, tourism has experienced continued growth and increased diversification, becoming one of the largest economic sectors in the world. It is predicted that these growth trends in the world tourism will continue to grow, with estimated total arrivals reaching 1.8 billion by 2030 (WTO 2005). These trends are further shown in tourism to natural area been undergoing an explosive growth, and as such it has the capability to change both natural sites as well as tourism itself (Newsome et al. 2001).

There is a fundamental relationship between the environment and tourism, the environment being the most fundamental ingredient for tourism development (Vehbi 2012). With the increasing number of people travelling, it is important that we take care of these areas, both from the perspective of the environment itself, the local population, and to maintain the qualities of the sites for future tourism (WTO 2004b). We observe an increased need to regulate tourism, in order to

protect the countries and the natural sites and attraction subject to the increased pressure of tourism. But, exactly how does overcrowding at certain natural areas effect the nature and people surrounding it? And, what are the strategies and possible measures to limit and deal with this potentially harmful overcrowding?

In this thesis, we will explore the effects of the high growth in tourism and overcrowding on both the environment and the host communities at tourist destinations. Many tourist destinations are already overcrowded and are suffering serious congestions and overflows in peak periods (Vehbi 2012; WTO 2004b). With this overcrowding comes a range of negative impacts, and careful management of these natural areas is necessary in order to protect and conserve them, aiming for sustainable tourism (Vehbi 2012).

1.2   Structure of the Thesis

The thesis is divided into four chapters. The second chapter starts by defining the problem of overcrowded nature-based tourism destinations, before moving on to explain the economics behind the problem of open access in natural areas and the costs of the negative impacts of overcrowding. In the third chapter, policy instruments for regulating overcrowding will be analyzed, in order understand the different aspects to different choices of policies dealing with the challenges of overcrowding. To highlight the relevant considerations of the policy instruments and their attributes, the instruments will be assessed through different criteria. The use of any instrument is likely to involve conflicts or trade-offs between different criteria and the weight of the instruments will vary different with the different objectives of reducing negative impacts of tourism. The assessment through criteria will aim to underline these differences, to get a better understanding of the complexities in managing sustainable tourism. The thesis does not aim to solve the problem of overcrowded destinations, nor will it point out the "best" solution. Rather, it aims at getting a better overall understanding of the problem and why it calls for regulations, and how different policies that can be used in order to achieve a more sustainable tourism approach.

2   The Overcrowding Problem

This chapter starts by explaining the concept of overcrowding at natural sites and the shorty introduce the impacts it has on environmental, social and cultural elements. We will then go on to define the different concepts that will be discussed through the chapter. First off, we will explain the problem of overcrowding related to the tourism industry being dependent on natural resources which are public goods. We will then go on to discuss the problem of open access stemming from these public goods, and the effects it has on the tourist destination. In relation to this, lastly, the concepts of negative externalities and carrying capacity will be discussed in relation to the negative impacts of overcrowding.

2.1   Overcrowding at Natural Sites

One of the consequences of the growth in tourism is the impact is has on the natural wonders of the world, which are attracting increasing numbers of visitors. The visitors arrive whenever they wish, causing time delays and crowding at destinations and site, that can spoil both their experience and the environment of where it takes place. Congestion arising from high levels of visitation can impact the conservation of a site, it can lead to disruption to the local community, excessive pressures on the infrastructure, it can negative alter the biodiversity and can cause operational inefficiencies. Overcrowding is not only related to the amount of visitors in a space at any one time, but also their behavior while in this space. It is clear that a crowd that is patient, quiet, respectful of the environment and the community, and interested in minimizing their impact, will have less of an impact on the surrounding environment than those who are disturbed or threatened by excessive pushing and unruly behavior. Furthermore, their behavior can also be linked to the type of tourism activity they take park off. A group on snowmobiles can have more of an impact than a group hiking (WTO 2004b).

Tourism is characterized by spatiality and temporality. There is a spatial fixity, as tourists consume tourism experiences at particular sites, giving rise to a number of implications: the potential for spatial polarization, direct environmental impacts of visitation, necessity for relationship between the host community and tourists, and the travel to the tourism site. Tourism is further characterized by perishability, as tourism experiences have to be consumed at particular times and cannot be stored. A consequence of this is that temporal polarization tend to reinforce

the spatial polarization (Shaw & Williams 2004). All the economic effects stemming from seasonality derive from one consideration: tourism is a service, and one cannot store a service. It is not possible to produce and stock services in periods of low demand to sell them when the demand is higher. The tourism infrastructure may be facing an excess of demand during the high peaks of the season. Creating serious problems of overcrowding, overbooking, higher operational costs and by that, a lower degree of tourist satisfaction, with a corresponding loss in reputation. There is a negative environmental effect due to the strong presence of tourists during high seasons peaks, where the carrying capacity may be overstepped. Seasonality can also display positive effects, by backing up the nature's tendency to automatically regenerate some of the resource used by tourism, the shutting down of tourism structure off-season may be the only alternative that allows the natural environment to recover its sustainable status. There are also sociocultural effects of seasonality, affecting both host community and visitors. Negative aspects of crowding onto local communities are issues such as traffic jams, parking congestion and all additional costs in order to maintain street cleaning and waste collection, security and other services (Candela & Figini 2012).

We see that there are multiple consequences of overcrowding at nature-based destinations. These negative impacts can lead to deterioration of the natural environment, to problems of waste and littering, be a burden on infrastructure, create congestion and annoyance and have adverse effects on the tourist experience. Furthermore, these impacts can have effects on the nature itself, on other tourists, on local residents or on future tourists. These negative impacts will be discussed further in Section 2.4, with regards to negative externalities and the concept of carrying capacity. As we will come to understand, negative externalities are the negative impacts that appear when a threshold level, i.e., the carrying capacity is reached.

2.2   Public Goods

The natural environment, which nature-based tourism relies upon, is often considered as a public good. The concept of public goods is important when assessing the negative impacts of tourism, as the situation signals negative externalities which can be a major source of market failure (Robinson & Ryan 2002). There are two main characterizations clarifying what a public good is; rivalry and excludability. Rivalry refers to whether more than one individual can

simultaneously benefit from the good without reducing the utility from consumption. If the simultaneous use of many agents leads to a partial reduction in everyone's utility, then the public good is subject to congestion. Because of this rivalry in consumption, the good ceases to be a pure public good. Excludability refers to a case where if the good is made available for someone, then it is not possible, or economically advantageous, to exclude other consumers from the benefits stemming from the good (Candela & Figini 2012). Within the theory of public and private goods we characterize four different features based on rivalry and excludability.

	Excludable	Non-excludable
Rivalrous	Pure private good	Common pool good
Non-rivalrous	Club good	Pure public good

Table 2.1: Characteristics of private and public goods based on discussion by Candela and Figini (2012) and (Perman et al. 2011)

On one pole, we find pure public goods that exhibits both non-rivalry and non-excludability. That means that the consumption by one individual does not reduce the amount available to other consumers and that no one is excluded from its provision (Candela & Figini 2012). On the other pole, we have pure private goods. Private goods are both excludable and rivalrous. That means that an increase in consumption by one individual will be at the expense of consumption of others, and that any individual can be excluded from the consumption (Perman et al. 2011). A club good is an impure public good that allow for a certain degree of excludability. For these goods, it is possible to find a mechanism that allows for providing services only to well-defined groups, excluding non-participants from the group. This excludability could be technical, by access only given to a certain group of people, or economic in the sense of charging a fee to grant access. Common pool goods are mixed goods, that has a certain degree of rivalry, but that are non-excludable. Consumption by an individual can partially reduce the consumption of others, but cannot completely eliminate it (Candela & Figini 2012).

In relation to tourism, we introduce a fifth type of good, congestible goods. This type of good can be placed in the middle of the table above. Congestible goods are non-rivalry up to the point where congestion kicks in. There is a non-rivalry between the consumption of the different individuals, provided that the overall usage does not exceed a threshold level at which congestion

occur, in a sense that one individual's enjoyments reduces the enjoyment's of other consumers, and the resource becomes rival (Perman et al. 2011). The resource moves from being a public good below the threshold level, towards becoming a common pool good when the threshold level is reached. Furthermore, exclusion of congestion goods is possible, but it is costly (Perman et al. 2011).

Most natural attractions are congestible goods. Up to a point, one visitor's enjoyment of the attraction does not impinge the other visitor's enjoyment. However, heavy use of a popular site, means that the threshold level is exceeded, causing negative externalities, such as environmental damage, congestion and cultural disruption. The environment can be impacted directly from litter and the disruption of flora and fauna, as well indirectly through waste generated at lodges. This indirect consequence can occur when there is a rapid growth of tourism infrastructure, without the adequate pollution-control measures, leading to serious water pollution and shortage of fresh water. Congestion also occur as the number of tourists mounts and the nature of their activities changes. As a result of this, eventually the enjoyment of the attraction will fade. These impacts are all negative externalities linked to overcrowding which will be discussed in Section 2.4. A deterioration in the quantity and/or the quality of the resource could be the result if the good is not preserved and protected. As preservation, quality and protection are all non-rival, non-excludable goods, meaning that free-riding can occur even if individuals realize the significance of the free resources to their business activities. This creates a collective action problem which makes it difficult to provide non-rival or non-excludable goods. To deal with this problem there needs to be awareness of the threshold limit at which congestion sets in, and exclusion mechanisms, such as regulations, taxes or charges, can be introduced to prevent the good from becoming rival (O'Fallon 1993). We will look closer on how to manage this problem, and the exclusion mechanisms, in Chapter 3.

2.3   Open Access Resources

When there is an open access character of the resource, such as for public goods, tourists and the tourism industry are allowed to use the resource without any significant restrictions through exclusion mechanisms. This structure leads to use of popular nature attractions beyond the threshold of renewal, where negative externalities such as environmental damage, congestion

and cultural disruptions surfaces (Butler 2006; Rydén et al. 2003). The individuals seek to maximize their own utility, harvesting as much as they can of the nature before someone else does it. This leads to overexploitation. This is what Hardin (1968) called "The Tragedy of the Commons". In a market where prices prevail, price is an important factor in rationing the demand for scarce resources. Consumers economize on use so as to conserve their limited income. When the prices are zero, there is no incentive to economize. This can lead to overuse and degradation at natural sites, as they are free to the user (Tribe 2015).

2.3.1   Maximum Sustainable Yield

The concept of maximum sustainable yield (MSY) is concerned with renewable resources, which are capable of renewal, either naturally or through appropriate management. This is applicable to tourism, as the natural environment where the tourism takes place has the ability to renew itself. Flora and fauna are renewable resources, but they can potentially be exhaustible if improperly managed. The key issue is how to achieve maximum yield, whilst still maintaining sustainability from the economic use of open access resources.
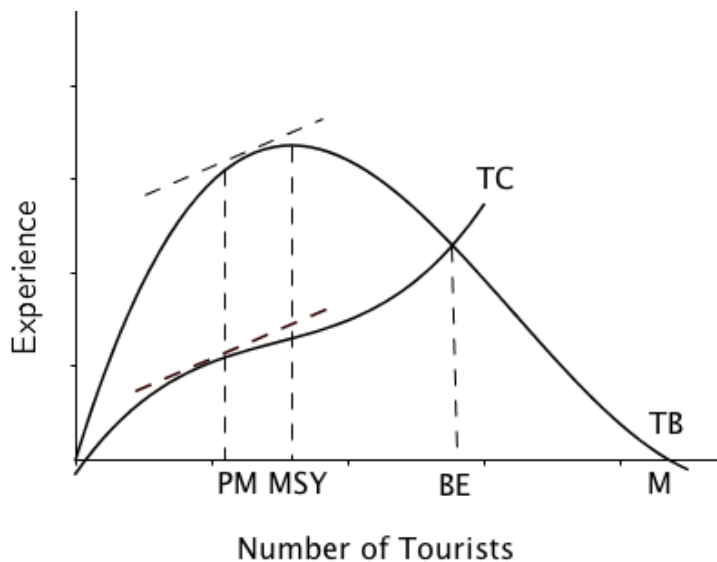

Figure 2.1: The Bioeconomic Model of Maximum Sustainable Yield

The figure shows the bioeconomic model of maximum sustainable yield, as adapted to tourism. This model is usually considered with respect to open access fishery, but can be used for other renewable resources as well, such as for natural tourist attractions (Perman et al. 2011). We suppose that tourists make use of a natural resource, such as a wilderness area, which can be degraded by overuse (Sinclair & Stabler 1997). The figure shows that as visitors proliferate, the added marginal benefit of visitation decreases and the total benefit curve, TB, levels off. Meanwhile, the marginal costs of visitation increases, leading to a rise in the total cost curve, TC (Lindberg 1991). The total benefit curve can be looked upon as the tourists' willingness to pay for the natural experience. The figure assumes that benefits are maximized at PM, which is where the vertical distance between the total costs curve, TC and the total benefit curve, TB is the greatest. The resource is capable of sustaining a larger number of visitors and a greater total benefit, but at a declining rate of experiences to the right of PM (Lindberg 1991; Sinclair & Stabler 1997). The benefits of each additional visit are less that the added costs of the visits, as a result of ecological congestion and cultural impact. Continued use still generates profits for individual users as the average returns exceed the average costs (Lindberg 1991). The maximum sustainable yield, MSY, indicates the maximum benefit possible which declines to zero at M, because of a reduction in the resource's capabilities to support large numbers of visits. This could occur as a result of a visitor's perception of a decline in the quality, or it can be a result of deterioration in the physical properties of the resource. If there is increased tourism in a wilderness area, this can disturb the animals and their breeding patterns to such an extent that the fauna reproduction rate declines. BE shows the break-even point for providers meeting the demand of the tourists. This presupposes that there is free access, so that tourists will continue to overuse the resource, even though abnormal benefits are compared away. The nearer the use of the resource is to M, the more is its renewability threatened.

This situation calls for the resource to be managed in order to avoid overexploitation. The visitation could be limited to PM if the attraction is managed to maximize social welfare. Exclusions mechanisms, such as quotas, taxes and charges, could be used to regulate the number and impact of tourists at the natural area, allowing for constant regeneration. These mechanisms could further be used to generate revenue for funding the management and conservation of the natural area (Lindberg 1991). By limiting the number of tourists and generating funds to improve

the capacity of the natural site, the negative impacts of consumption can be reduced, allowing the nature its renewable characteristics.

2.3.2   Butler's Life Cycle Model

Butler takes the concept of open access further, applying it to the life cycle of tourism, illustrating the different stages of tourism at a destination: from discovering the destination until the overexploitation that follows from too many visitors. Tourist areas are dynamic; they evolve and change over time. This evolution is brought about by a variety of factors including changes in the needs and preferences of visitors, the change of the original natural and cultural attraction which is responsible for the initial popularity of the area, and the possible replacement of physical plants and facilities (Butler 2006).
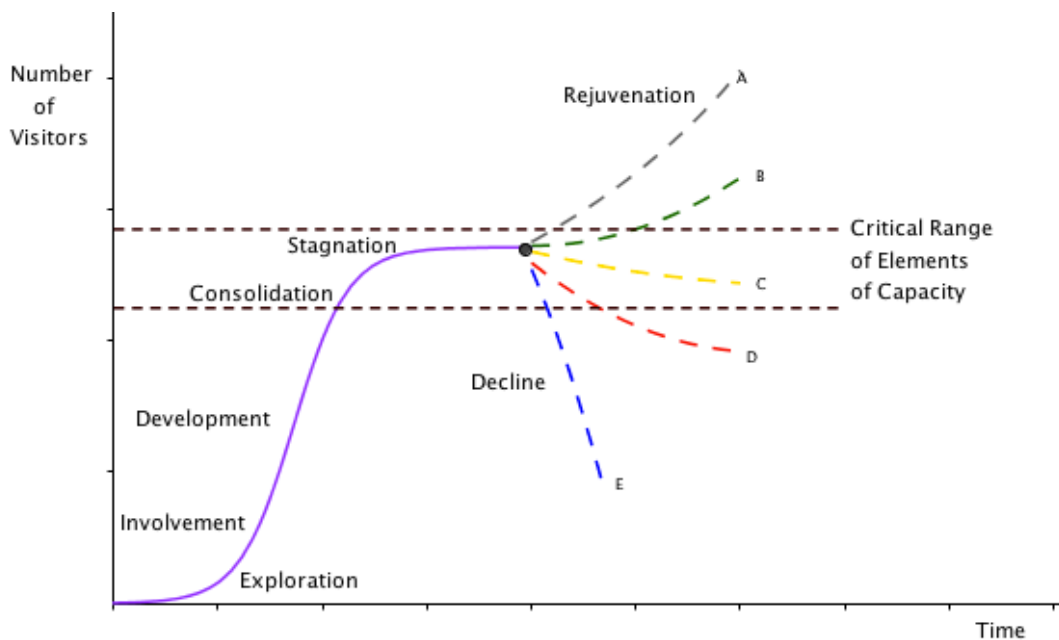

Figure 2.2: Butler's Tourism Life Cycle showing the different stages of tourism (Butler 1980)

The figure displays the tourism cycle that shows the potential for overexploitation and decline of the environment due to tourism.

At the first stage, we find exploration. This illustrates where there is a small number of visitors travelling to the destination, being restricted by the lack of access, local knowledge and facilities. Tourism is based on primary tourist attractions, natural or cultural, and there will be no economic or social significance to the host communities.

As facilities are provided and awareness grown, the number of visitors increase, and local residents enter the involvement stage and begin to tailor facilities specifically for tourists. As this stage progresses, advertising to attract tourists and the word about the destinations appeal will spread and create increased visitation. A tourist season may be expected to emerge and the first pressure put on improvements of transport, hotels and other facilities will be expected.

In the development stage, there are high numbers of tourists, which might equal or exceed local residents at peak periods. There is a well-defined tourist market, which is in part shaped by heavy marketing. Larger, more elaborate facilities will be provided by external organizations, often foreign finances, leaving visitors disenchanted (Butler 1980; Lindberg 1991). Both natural and cultural attractions will be developed and marketed. Changes in the physical appearance of the area will be noticeable, and it should be expected that not all of these are welcomed by the local residents. As this stage unfolds, the type of tourists will have changed, as there is a wider market that is drawn upon.

When entering the consolidation stage, the rate of tourism growth will slow down, although the total number still increases, and the number of total tourists will exceed that of local residents. A major part of the destinations economy will be tied to the tourist industry. Large numbers of tourists and the facilities provided for them can be expected to arouse some opposition and discontent among local residents, particularly those not involved in the tourism industry in any way, and to result in some deprivation and restriction upon their activities. The marketing will at this stage be wide-reaching and resort areas will have a well-defined recreation business districts.

As the area enter the stagnation stage, the peak number of tourists will have been reached, i.e., the threshold we have been talking about earlier. The threshold levels for many variables will have been reached or exceeded, with attendant environmental, social and economic problems. This threshold point may be reached in terms of land scarcity, water quality or air quality, or it might be reached in physical terms, such as transportation and accommodation, or of social factors such as crowding and resentment by the local residents. The type of visitors can be expected to change

towards the organized mass tourist. The artificial tourism attraction will, in this stage, supersede the original primary attractions and the destination will have a well-established image, that will no longer be fashionable.

In the final stage of the model, there are different scenarios between complete rejuvenation and total decline. The directions of the curve in the period of stabilization is open to several interpretations, shown in the graph by the different paths. Path A shows successful redevelopment leading to renewed growth. Minor modifications to capacity levels leading to modest growth in tourism could result in path B. Path C shows that tourism is stabilized by cutting capacity levels. Continued overuse of resources and lack of investment leading to decline, is shown in path D. Path E shows complete decline, where war, disease or other catastrophe cause an immediate collapse in tourism. In the decline stage, the destination will no longer appeal to tourists, but will be used increasingly for vacationers on weekend or day trips, if it is accessible to large numbers of people. In this stage, the destination is unable to compete with newer tourism attractions. On the other side, rejuvenation might occur, but there is need for a change in the attractions on which the tourism is based. There are two ways of accomplishing this goal. One is additions of man-made attractions, another approach is to take advantage of previously untapped natural resources. The latter can be accomplished by reorienting the market, thus allowing the areas to experience a year-round tourist industry (Butler 1980). Because of this potential for "overshooting" it is important that tourism managers are constantly aware that, although the industry is resilient and growing, tourism at each destination should be treated as renewable resources that need to be carefully cultivated, to ensure future returns. Stagnation is unlikely to happen if the number of visitors remains low, however, because of the open access nature of tourism attraction, the structure leads to overuse at popular attractions (Lindberg 1991).

This problem illustrates an overall trend at tourist destinations, from the stage of discovery to a final tourist destination. The different stages give us an understanding on the development process, and what can be expected as the destination develops with increasing amounts of visitors. As with the maximum sustainable yield model, also this model illustrates that there is a threshold level for which the increased use of the tourist destination can lead to overexploitation and degradation of the environment. However, the model does not give a clear answer to exactly when this degradation will occur, but rather states that it will occur if no measures are taken. In this way,

it is a framework, showing the different paths the natural attraction can take, with regards to how the destination is managed.

2.4 Negative Externalities and Carrying Capacity

As we have seen, the key issue of the relationship between environment and tourism, is that most of their complex interaction do not pass through the market, and with that, the market's price mechanism. The concept of externalities can be used to introduce the link between tourism and the environment and to define carrying capacity and sustainability. There can be both positive and negative externalities, however, we will focus on negative externalities as these are a threat to the natural resources of which tourism relies upon. Negative externalities arise when the threshold level of congestible goods is reached. When the resource goes from being a public good towards becoming a common pool good. That means that when this threshold level is reached, negative externalities appear, disrupting cultural, environment and social local systems (Schubert 2009). This threshold level is linked to the concept of carrying capacity. This concept is usually used in the context of how many tourists can be accommodated in a certain place or area without damaging the place or reducing tourists' satisfaction (Candela & Figini 2012). As negative externalities are a major source of market failure, when they are not accounted for or internalized as a part of the costs and benefits of economic agent, they can lead to agent behavior that optimize economic gain at the expense of environment sustainability (Robinson & Ryan 2002). This calls for proper management dealing with these negative impacts of tourism, where regulations such as quotas, taxes or charges can be used to internalize the externalities. We will first describe the economic problem of negative externalities, before discussing the different negative externalities stemming from overcrowding.

2.4.1 The Economics of Negative Externalities

Negative externalities occurs when the consumption decision of one visitor have an impact on the utility of other consumers in an unintended way, and when there is no compensation made by the generator of the impact to the affected party (Perman et al. 2011). Because of this, externalities are not account for in the marginal private costs. The graph below shows the effects of a negative externality when it is not accounted for.
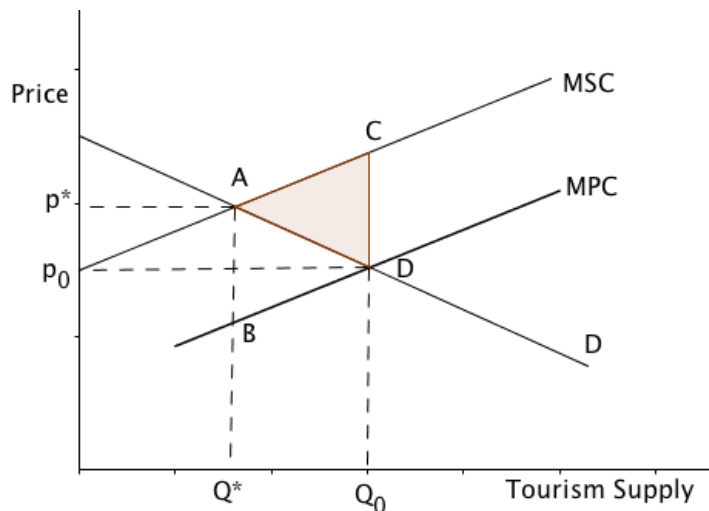
Figure 2.3: The effects of a negative externality, based on Dwyer's model of negative externalities (Dwyer et al. 2011).

The demand curve, D shows the marginal private benefits, MPB of consuming the good and, assuming no external benefits, it also represents the marginal social benefits, MSB. This shows how much a consumer is willing to pay for extra units of the tourism experience. The supply curve equals the marginal private costs of production, MPC, i.e., costs per extra unit of the tourism experience. Producers want to expand their output to Q_0, as the price they receive from extra units of the tourist experience will exceed the costs of extra units of the experience, up to that point. Beyond this point, the extra costs of providing each tourism good will exceed the price received from it. Thus, Q_0 represents the optimal market level of production. The marginal social cost curve, MSC, is generated by adding marginal external costs to the marginal private costs, MPC. Now, that external costs are included, i.e. previously unpriced environmental resources, the level of output Q_0 is no longer optimal, as MSC > MSB by the amount AB. From the society's viewpoint, the market equilibrium quantity combination, (p_0, Q_0) does not reflect the true costs of the tourists visiting the area. The host community incur the external costs, and too much tourism is occurring and it is experienced too cheaply (Dwyer et al. 2011). A reduction in output to Q_1 where MSC = MSB would need to take place to provide the optimal social level of production (Tribe 2015). The

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figure indicates that the socially efficient outcome would be the output and price $\left(Q^*, p^*\right)$, where the MSC curve intersects the demand curve. For each unit that is provided above Q^*, the MSC exceeds the private costs of providing it. The loss to society from overuse due to Q_0 is the shaded area ACD. This area also represents the gain to society if the providing of tourism experience were to be cut back from Q_0 to Q^* (Dwyer et al. 2011).

As we have discussed, negative externalities are the negative impacts of tourism which takes place when the threshold line of carrying capacity is reached. Carrying capacity is usually in the context of how many tourists can be accommodated in a certain place or area without damaging the place or reducing tourists' satisfaction (Candela & Figini 2012). The concept measures what level of use that is sustainable. However, when applying it to tourism, the concept become much more complex, given that there is a wide range of socio-economic and environmental factors that interact at tourism destination, and that many of them depend on perception of host communities and tourists (WTO 2004a). Carrying capacity and negative externalities does not only deal with the possible degeneration of the physical environment, but also the fact that too many tourists may spoil the visitor experience (Tribe 2015).

It is important that carrying capacity is considered as a means to an end, instead of an absolute definite limit that is unalterable for the type of environment assessed. The aim is not necessarily to get the number of tourists down to a level where there are no externalities, but rather to find a balance where the benefits outweigh the costs of the tourism experience. At the point of threshold, the benefits of the last tourist should equal negative externalities which are caused. One definition of tourist carrying capacity, is the number of users that a tourist area can provide each year, without any permanent biological or physical deterioration of the area's ability to support recreation, and without appreciable impairment of the recreational experience. If we look at the carrying capacity from an ecological point of view, the definition will be the maximum level of recreation use, in terms of visitor number and activities that can be accommodated before there is a decline in the ecological value. In these terms, the capacity of a tourist area could be defined as the point where the minimum infrastructure requirements and the natural resource assets which creates demand, become insufficient to meet the needs of both the local population and the tourists, whereupon the threat of environmental hazard appears. Thus, the problem refers to the quantitative

levels of change of the environment which can be permitted on the natural area under consideration. However, the above definitions do not consider the ways in which recreational activities interact with natural ecosystems, such as the length of stay, the level and time of use, the way it is distributed over time and space and the desires of management. These should all be considered in any comprehensive definition in ecological terms (Briassoulis & van der Straaten 2000).

2.4.2 The Dimensions of Carrying Capacity

Overcrowding and congestion are negative externalities themselves, but with them comes a range of other externalities. The externalities generated by the tourism sector can unfold around two dimensions: the time, affecting subjects who use the environment, either at the same time or in the future; the space, affecting other subjects in the destination, either other tourists or the host community (Candela & Figini 2012). Our discussion of negative externalities will be linked to a modification of the four dimensions of carrying capacity introduced by Candela and Figini (2012). These dimensions explain the threshold levels at which different negative externalities sets in, and the impacts of tourists leading to these externalities. There is an ecological dimension, a physical-structural dimension and a psycho-social dimension. Included in Candela and Figini (2012) discussion of the dimension, an economic dimension was considered as well, explaining how tourism leads to increased prices at the destination. However, this negative impact is not an negative externality, as these prices are reflected in the market, i.e., there is no market failure. We have further modified the dimensions to include a dimension of pollution to cover the negative impacts of littering, noise pollution and pollution from vehicles. It is important to note that there are also positive externalities linked to the different dimensions which will not be considered.

Carrying Capacity Dimension	Negative externalities of Overcrowding
The Ecological Dimension (Impact on flora and fauna)	- Land and coastal erosion - Trampling damaging vegetation of soil - Deforesting - Disturbances on wildlife - Water-based creation affecting marine ecosystems
The Physical-Structure Dimension (Impact of infrastructure and services)	- Pressures on public transportation and services - Increased amount of cars creating congested roads and pollution. - Need for tourist accommodation and rooms - Need for rescue service - Pressures on water-, sewage-, and waste systems
The Psycho-Social Dimension (Impact on local residents and other tourists)	- Tourist experience depending on amount and types of tourists - Impact on native culture and relationship to local residents - Ratio of tourists to residents - Having to stand in queues
The Pollution Dimension (Impact on pollution levels)	- Noise pollution from helicopters, snowmobiles, tourist groups and development of facilities - Littering - Visual pollution from development of tourist facilities and accommodation - Pollution from cruise-ships, cars and boats

Table 2.2: The different dimensions of carrying capacity with their related negative externalities from the impacts of tourism

The Ecological Dimension

This dimension refers to the physical environment of the destination. Natural sites are often prime tourist attractions, which receive varying levels of tourists depending on the conditions of the broad tourist region where they are located. These very environments which attract visitors in the first place, can be the most vulnerable to the increased number of visitors. The unique features of special ecosystems are the environmental condition and flora and fauna that is found there. With increased numbers of tourists and the need for tourism development, these ecosystems are in

danger (WTO 2004a). Some ecosystems such as alpine regions, wetlands, rain forests and coral reefs, are particularly fragile and sensitive to development and change of use. Specific impacts from recreational activities include damage by trampling on vegetation, the impact of water-based creation on marine ecosystems such as coral reefs, and animal distress and displacement from safaris (Tribe 2015). Land and coastal erosion are particular areas of concern for physical degradation, which may be caused by changes in vegetation cover or marine infrastructure affecting longshore currents. Land degradation can also lead to the loss of biodiversity (WTO 2005).

The negative externalities discussed takes place when the ecological threshold is reached. It identifies this threshold as the resiliency of the ecosystem, in connection with the tourism activity and with the coexistence in the same destination of more types of tourism (Briassoulis & van der Straaten 2000). This can be the capacity of the negative externalities, such as of species to withstand disturbance or the sensitivity of flora to trampling or harvesting by visitors (WTO 2004a). This carrying capacity cannot easily be measured in qualitative, nor quantitative terms, although individual natural resource parameters can be quantified and measured (Candela & Figini 2012).

One aspect of overcrowding on the degradation of nature is trampling. Trampling is a universal problem and damage both to the vegetation and soil that take place as a result of tourists leaving established trails to traverse an area, or where users create informal trails to suit their own purposes. Trampling can also occur at sites or trails of concentrated use or where the visitor activity is not confined to trails. Consequently, common tourism activities are sources of trampling such as cross-country activities, camping and firewood collection, use of bush toilets, off-road vehicles, hiking, wildlife viewing, mountain biking, and to get access to riverbanks and viewing points. The type of distribution of visitor activity, the type of tourism and use of the nature, and the density and relative fragility of vegetation all influence the degree of the impact of trampling (Newsome et al. 2001). To deal with the issue of trampling, it is important to manage trails properly. Trails can serve to focus visitor attention, and thereby helping to prevent more dispersed and randomized soil erosion and trampling of vegetation. Trails range from boardwalks and rubber or steel mesh, to gravel pathways through natural rock and soil. There might be steps, staircases and viewing platforms (WTO 2004a). It is important to note that even if man-made trails can be vital in order to deal with trampling, some individuals might also see them as visual pollution in the area. They

are man-made and should not be in nature. It could be important to make individuals aware of the reason behind these, and to make them fit into nature in the best possible way.

Another important aspect is the effect tourism has on wildlife. Increased tourism development, and the trails and roads provided, can affect the natural habitat of wildlife. Roads can impact the density, distribution and diversity of animals. They can cause displacement of species, act as barriers and sinks for wildlife. By acting as barriers to the wildlife habitat, they can further cause low genetic differences, leading to a decrease in populations. Wildlife viewing can bring about stress for the animals and can alter their behavior when tourists come too close.

The Physical-structural Dimension

The physical-structural dimension refers to the destination's system of structures and infrastructure, including transport networks, waste collection and water services, which are used by both residents and tourists. The dimension refers to the man-made environment like cities, monuments and public goods (Candela & Figini 2012). Increased number of visitors put a greater pressure on the public transportation in the area, as well as on the physical capacity of local road systems, including parking areas. In some cases, there can be a competition for local infrastructure and services between local people and tourists at peak times, creating annoyances.

Increased tourism also puts pressures on water consumption and the sewage and waste collection systems. If the capacity is built to serve large visitor levels, it might be unused during off-season. If the capacity is insufficient built, it will be overstressed at peak-season. Solid waste is a major source of pollution, as nearly all human activities generate waste. The main solution has been to throw it away, which most frequently leads to it ending up at a landfill. Waste or user materials sent to landfill, represent a loss of resources, and their replacement increase the greenhouse gases during their production and transport. There are also destinations where such a system does not exist, and waste material become abandoned where created, or someone is paid to make it "disappear".

Tourists further put pressures on accommodation. Increased numbers of visitors calls for increased tourism development, as additional accommodations need to be built to account for the larger number of tourists. To minimize the negative impacts of tourists, facilities need to be

provided at the natural attractions, such as toilets, roads and waste collection (WTO 2004a). Possible negative impacts of infrastructure and support facilities development are as listed under the ecological dimension, with disturbances to wildlife, soil erosion and vegetation.

Increased development of new building and infrastructure to deal with bigger tourist numbers, can cause visual pollution. Pollution can come by using cheap and standardized buildings, that might be out of character with local vernacular architecture, or grossly out of proportion or which fails to harmonize with the natural features in and around a destination. Some individuals might react on there being any construction at all in a natural area. Visual pollution also comes to play with the building of parking lots, toilet facilities, transportation at natural sites and boardwalks (WTO 2004a; WTO 2005)

The Psycho-social Dimension

This dimensions refers to the impacts an increased amount of tourist has on the experience of residents and other tourists, and which level of crowding is perceived as intolerable by both residents and tourists (Candela & Figini 2012). It evolves around the relationship between the host community and the tourists visiting it. For some places, visitors have a clear vision of what they expect of their trip. If the site is of great natural beauty, or when watching wildlife in their natural habitat, they expect it to be more or less empty. If the place is inside a place of worship, they want to contemplate the place in a quiet manner. Overcrowding decreases this quality of visitors' experience and can become a source of visual pollution. It is important to notice that simple crowding at a destination is not necessarily undesirable. If people expect there to be other people present, often in large numbers, it can be acceptable and contribute to enjoyment. This often occurs when there are expectations for market days, local festivals, in parks or at religious ceremonies (WTO 2004b). Visitors tends to enjoy seeing the local people going on with their everyday life, creating a vibrant social setting, into which the visitor can mingle and appreciate the contemporary lifestyle. However, a remarkable presence of tourists can be regarded as undesirable both by other tourists themselves and by local residents when they outnumber the local population (WTO 2004b).

Another externality that can become negative in tourism, is the impacts tourists brings upon the host community. The extent to which the local culture is incorporated into tourists' experience,

can be a continuous issue. Some traditional communities might want to not share their culture with tourists at all, whilst other may not even recognize the interest tourists might have in their way of life. Yet it is virtually impossible for communities to isolate themselves from tourists and impacts from other cultures in this increasingly globalized world. Accepting economic development often means accepting the cultural changes that comes with tourism development. This might happen without the communities having the opportunity to decide whether they actually want this change. If community-based tourism is to be sustainable, there need to be common goals that has community support. The small communities may be at risk of being taken over and turned into a tourism town, in which the original residents are marginalized and cannot longer afford accommodation. Growth in tourism can lead to significant change in the composition of local residents, with long-time residents leaving their community when it has changed too much, and with new residents arriving to take up jobs and opportunities due to tourism (WTO 2004a).

Development of tourism can come at the expense of real or perceived access to key valued assets by the local residents. Local communities which has traditionally used trails, beaches, roads or other natural resources, might find its access changed. In some cases, public shorelines or forests can become private, or restrictions can be placed on the permissible uses. Local users may be displaced by tourists or even priced out. Where protection of cultural or ecological resources is involved, limits may be placed on those allowed access (WTO 2004a). Real or perceived problems with access can lead to reduced use of the site by locals. If a site access becomes subject to entry fees, the fees themselves can become a significant barrier. Fees are often set to accommodate the purses of the visitors, rather than the locals. While sometimes there are employed dual fees where the locals purchase at a lower price.

The Pollution Dimension

The pollution dimension refers to the impacts on increased pollution levels of the destination, including noise, visual and waste pollution. It is well known that tourism leads to different kinds of pollution of the environment, as all human activity does. Important pollution externalities include noise pollution, littler, property destruction, CO_2 emissions and visual pollution. In the case of overcrowding we will focus on pollutions stemming from the increased number of tourism such as noise, visual, transport and waste pollution. As the thesis is about

overcrowding, which is happening at the tourism destination, pollution from travel by air will not be considered (WTO 2004a).

Noise pollution can stem from recreational vehicles such as snowmobiles, boats or jet skis, as well as from the infrastructure through air travel, road and rail transport. Linked to noise pollution is also the increased amount of noise generated through the overcrowding at destinations itself. This type of pollution can have both bad effects on the life quality of the host community, disturb the wildlife and their habitats and ruin the experience of together visitors (WTO 2005).

Pollution can also take form as a visual pollution. As discussed, this is often related to building of tourism facilities and infrastructure, the main issue if such buildings do not "fit in" with the nature. It can also be related to tourism activities, such as helicopter or snowmobiles, which not only creates noise pollution, but also visual pollution.

Other that contributing to both noise and visual pollution, there can be negative externalities linked to the choice of transportation. Transport is one of the most significant sources of environmental pollution resulting from tourists (WTO 2005). With an increased use of cars comes both the need to develop roads, parking lots and increased potential for congestion. The more congested the road, the slower the traffic, and the more pollution comes from the burn of fuel. Congested roads are also an important source of noise pollution. Cruise ships are another major contributor to pollution and congestion effects. More and larger ships are visiting an increasing number of destinations, and the impacts of the ships can be significant, bringing both risks and benefits. Problems with the operation of cruise ships are related to air emissions, ballast water, solid waste, effect on coral reefs and oily bilge water. There are also effects on the destinations as provisions of dockside facilities, water supply, waste disposal and treatment, impacts of destination services and infrastructure, crowd management, scheduling and the capture of benefits for the host community, such as revenues and jobs and control of social and environmental impacts on target tour sites, and protection and contribution to conservation of coral reefs. This is linked to the physical-structure dimension. Most cruise tourists only stay at the destination for a short time, leading to crowding at the site when they come ashore. It is also evident that they have all the facilities they need at the ships, such as food, so they do not contribute in an economic way at the destination (WTO 2004a).

There has been an increased problem with tourists littering and not picking up their own waste. These problems of contamination and negative impacts on both the environment and often the image of the destination, it is increasingly necessary for destinations to manage waste created. Waste that is not managed can accumulate, creating environmental and health issues, and also disturb the experience of the tourists and by that affect the image of the destination (WTO 2004a). Trails in Nepal and Peru has been nicknamed after the amount of trash that is left behind after trekkers, something which make the destinations less appealing, and gives and understanding of why there is need for proper waste management (WTO 2005).

As we see there are multiple issues of negative externalities linked to tourism and overcrowding at destinations, and different carrying capacities related to different types of negative impacts of tourism. Of the above dimension, the ecological might be the one with most importance, as it involved the damage to the nature which tourism, and other sources of human activities, lies upon. If there is not set a threshold level of sustainability, the overuse could cause problems on a global scale. In order to better understand how to find the threshold level, we will look at the carrying capacity which can be both fixed and flexible with regards to the characteristics of the destinations, the tourists and the problems stemming from overcrowding.

2.4.3   The Economics of Carrying Capacity

As we have discussed, carrying capacity is the amount of tourism activity that can be accommodated without incurring serious harm to the tourist destination (Newsome et al. 2001). We introduce two different types of carrying capacity, fixed and flexible. The idea of fixed carrying capacity is related to setting a cap on tourism, where the threshold level for which negative externalities occurs is fixed. On the other side, the idea of flexible carrying capacity allows the government to influence and modify this limit of threshold, in order to allow for increased flows of tourism without necessarily leading to greater negative impacts.

Fixed carrying capacity

The fixed carrying capacity is the level and mode of tourism activity that are maintained below the critical carrying capacity threshold range of the destination, regardless of the actual level

of demand. This is a supply-side approach, as the decision to accept this assumption of fixed carrying-capacities is based on what the destination (i.e. the supply) is believed to be capable of supporting under these circumstances. This assumption may be warranted when anything more than minimal tourism-related change in this area is undesirable. This can be the case in several circumstances, including when the area considered is known to be occupied by a fragile, relatively undisturbed natural environment or culture, when its carrying capacity is unknown (in which case the precautionary principle is invoked), when resources are not available to accommodate the intensification or expansion of tourism, and/or when the residents are opposed to intensification. The decision is underpinned by the assumption that a strong sustainability approach is appropriate (Weaver 2006).
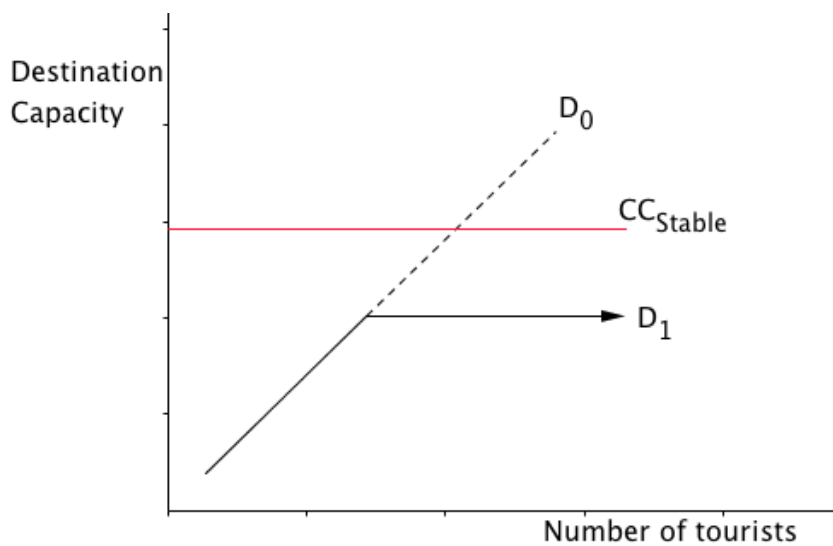
Figure 2.4: A fixed carrying capacity, based on the illustration by Weaver (2006).
The figure shows how the demand is affected by this threshold limit, where the fixed capacity is illustrated by CC_{Stable}, and the new demand is equal to D_1

Flexible carrying capacity

Because of the benefits of tourism, and that destinations often are intended primarily to accommodate tourism-related activity and land uses, an increased level of tourism is often considered desirable. Accordingly, strategies are implemented in order to allow for a gradual increase in the critical carrying capacity, so that higher levels of tourism activity can follow. This

approach is basically demand driven, but it is important to stress that the visitation curve should ideally follow the threshold curve, so that conditions are in place to cope with increased demand at the time as more visitors arrive. A risk with this approach is to raise the threshold range in response to increased visitations, in which case the coping mechanisms might not be in place. However, this reactive approach might be adopted on the gowns of understandable unwillingness of managers to invest in coping mechanisms, intended to address visitation levels that may not actually be realized. Flexible carrying capacity is appropriate when the area is already heavily modified and a weak sustainability approach is taken, when there is confidence in the projected carrying capacity thresholds associated with a given level of intensification, when resources are available to invest in appropriate coping mechanisms, and/or when local residents and other stakeholders support the intensification that leads towards sustainable mass tourism (Weaver 2006).
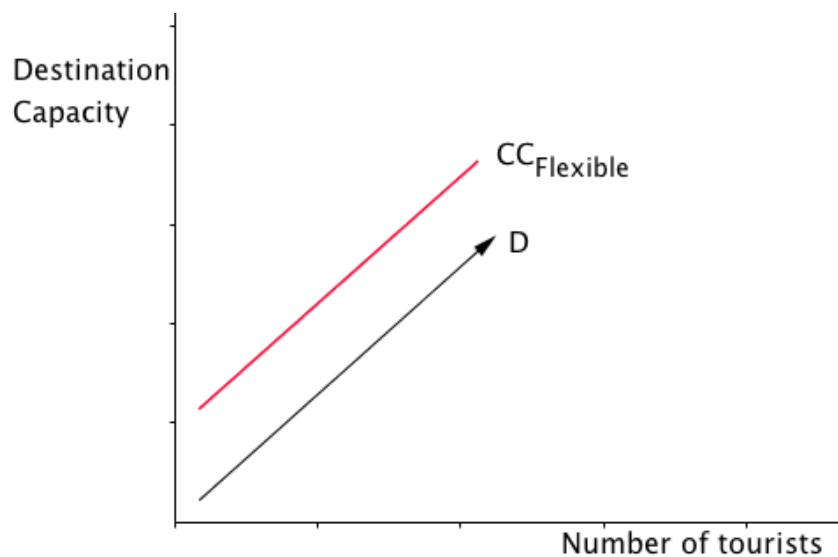
Figure 2.5: A flexible carrying capacity, based on the illustration by Weaver (2006).
The flexible capacity is illustrated as Flexible, showing a higher level of capacity parallel to the demand function, D.

As we see from the negative externalities discussed above, it is recognized that a single and absolute measure of the carrying capacity of an area is difficult to estimate, as the factors involved are not all quantifiable or measurable, although a variety of techniques and methods occasionally have been employed (Briassoulis & van der Straaten 2000). Through carrying

capacity, the tourism destination can calculate the hospitality load, defined as the maximum number of tourist that the destination can host, naturally identified with subject to the most binding constraint among those expressed by the different carrying capacities. Hence, the problem becomes a complicated one, as the more dimensions a destination's carrying capacity has. We will therefore first consider a destination specialized in a single type of tourism, showing carrying capacity in only one dimension, before moving on to a problem with more dimensions (Candela & Figini 2012). Although the carrying capacity is complex and hard to measure, we have simplified the concept into a one-dimensional carrying capacity, and a two (or more) dimensional carrying capacity.

One-dimensional carrying capacity

For destinations that are specialized, having only one resource and hosting only one type of tourism, the carrying capacity is represented by one index, the threshold value of the overnight stays N^*. To maintain the quality of tourism, we assume that the destination management aims at reaching that size of tourism flows that does not exceed the carrying capacity of the resource, so that $N \leq N^*$. In a case like this, it is sufficient to monitor the flow of overnight stays. If $N > N^*$, the destination would face a deterioration in the quality of its tourism that can lead to serious economic problems. This happens as tourists can choose to plan their vacation elsewhere, and can show their disapproval by a reduction in their spending at the tourist destination.

In order to avoid this outcome, the tourism policy can intervene with instruments of direct or indirect control. Direct controls are those that limit the access and impose prohibitions and regulations in using the natural resource. Indirect controls are those that are able to modify the individual decision in terms of arrival and the length of the stay, without imposing an explicit restriction, mainly by using the price system. An example of this is the use of taxes in tourism that will be discussed later.

Two (or more) dimensional carrying capacity

The monitoring becomes more complex when the destination must deal with a carrying capacity composed of more than one dimension, regarding to resources and types of tourism. We consider a ski resort with a carrying capacity of two physical dimensions that are easy to measure.

We assume that we have an index of carrying capacity for the skiing hill, which support up to N_D^* people, and an index of carrying capacity for the backcountry tracks, with a maximum value of N_B^*. If the destination receives only one type of tourism, it becomes clear that the overall carrying capacity of the destination is bounded by the minimum of the two values. The activity of monitoring and controlling verifies whether the condition $N \leq \min\left[N_D^*; N_B^*\right]$ is satisfied, which is more general than the condition indicated in the one-dimensional problems. The destination's carrying capacity is defined with respect to a single dimension, the one with the strictest carrying capacity.

The problem becomes more complex if there exist two types of tourism, $N = N_1 + N_2$, which utilize the two resources differently. Selection of the strictest carrying capacity could depend on the consumption habits of the different types of tourism. Consumption habits of the host population should also be added, if they compete with tourists in the use of the same resources. Let us assume that there are two types of tourism. Type 1 tourism are tourists that prefer backcountry skiing b_1, and will substitute more days of backcountry with days in the ski lifts and slopes, d_1. Type 2 tourism are tourists that prefer downhill skiing d_2, and will spend more time in the ski lifts and slopes, relative to the backcountry b_2. Given these hypotheses, the following property is verified between the coefficients: $\dfrac{b_1}{d_1} > \dfrac{b_2}{d_2}$. Therefore $\dfrac{b_2}{b_1} < \dfrac{d_2}{d_1}$.

The threshold for the carrying capacity are as follows:

$$N_B^* \geq b_1 N_1 + b_2 N_2 \text{ therefore } N_1 \leq \frac{N_B^*}{b_1} - \left(\frac{b_2}{b_1}\right) N_2$$

$$N_D^* \geq d_1 N_1 + d_2 N_2 \text{ therefore } N_1 \leq \frac{N_D^*}{d_1} - \left(\frac{d_2}{d_1}\right) N_2$$

The figure represents the two thresholds for the carrying capacity, developing two hypotheses that differ according to the assumption on the value of the abscissa at the origin $\dfrac{N_B^*}{b_2}$ with respect to $\dfrac{N_D^*}{d_2}$.

In figure 2.6a the constraint stemming from the downhill resource DD' is dominated from the bottom by the one stemming from the backcountry resource BB'. Because of this, the carrying capacity of the destination is determined solely by this last factor and the problem is similar to the one-dimensional problem. Even though there are more dimensions in the carrying capacity, the destination management only needs to control the overnight stays $N = N_1 + N_2$, independently on the composition of the types of tourism. Figure 2.6b assumes that the two constraints intersect at point E. The overall carrying capacity of the destination is now determined by the area defined by the minimum envelope between the two constraints, the area OBED'. The mix of tourism hosted by the resort determines which constraint of the carrying capacity is binding. Along the expansion path of tourism K, which sees a relatively larger presence of tourists of type 1, the backcountry constraint intersect before the downhill constraint, while along the expansion path of tourism H, which sees a relatively larger presence of tourism of type 2, the downhill constraint intersects before the backcountry constraint. Consequently, as the mix of tourism hosted by the destination changes overtime, the constraint defining its overall carrying capacity changes as well.
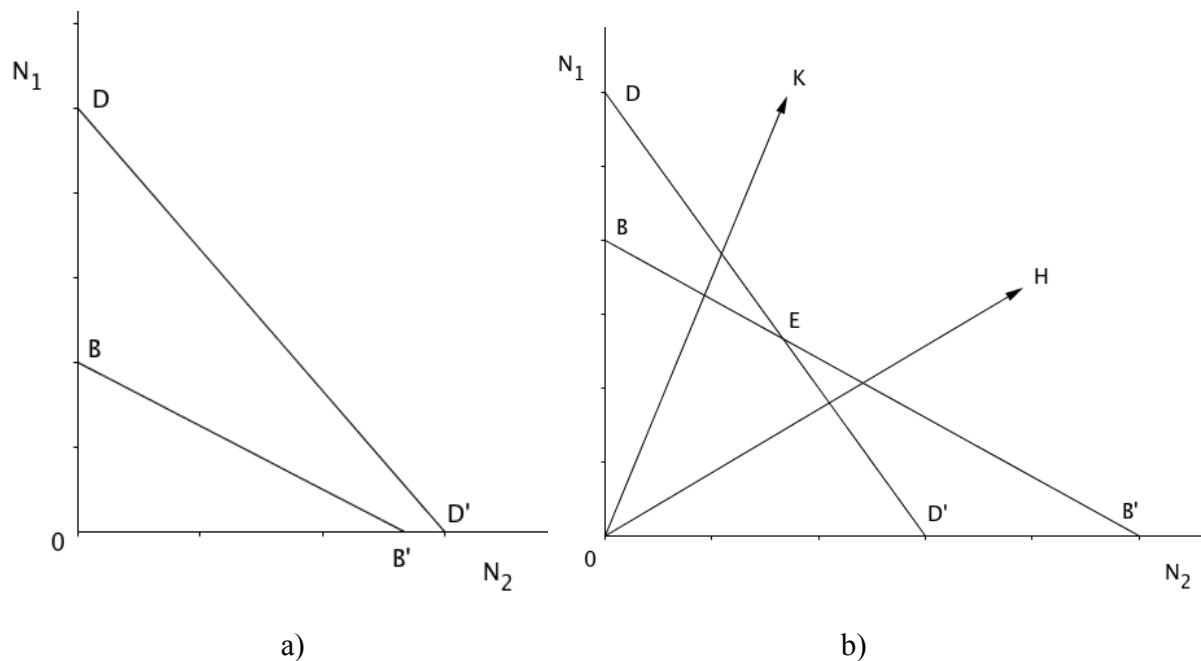
Figure 2.6: The carrying capacity in a two-dimensional problem based on (Candela & Figini 2012)

In the case of 2.6b, the activity of monitoring becomes difficult, as the carrying capacity does not only depend on the overall number of overnight stays, but also on its distribution among different types of tourism. The destination that plans its tourism policy based on the carrying of the backcountry, BB', does fine until the expansion path of tourism follows the vector OK, but it would commit a serious mistake should the structure of tourism change following the vector OH, thus leading to deterioration of the mountain. This shows how the carrying capacity is a dynamic concept that can change also in the short run follow the dynamic role of the tourism mix in the destination. The importance of the carrying capacity when planning tourism policy is clear. Through monitoring of the carrying capacity both the preservation of the quality of existing resources and the optimal level of investment in these resource scan be addressed (Candela & Figini 2012).

3 Regulating Overcrowding

The future of sustainable tourism lies in the planning and management of both the flow of tourists and the infrastructure and facilities of the tourist destinations. Such planning should be flexible and iterative so as to allow objectives and strategies to be achieved while still providing a means for consistent management (Newsome et al. 2001). To control and reduce the adverse effects of tourism on the environment and to achieve a more sustainable development of tourism, especially when it comes to nature-based destinations, increased attention has been given to discussions about the appropriate instruments for environmental governance (Song 2012).

Policy instruments are the measures that public authorities can use to remedy the environmental externalities. Two categories are currently distinguished, economic instruments and command and control instruments. Economic instruments (EIs) include measures such as taxes, subsidies, and tradable permits which are used to internalize the negative externalities (Sterner 2003; Vatn 2005). They use market-based incentives to channel economic activity in environmentally desirable directions. Leaving actors free to respond to certain stimuli in a way actors themselves think is most beneficial. Command and Control (CAC) instruments include measures such as different types of quotas and zoning (Sterner 2003), and a regulatory instruments formulated by the state (Vatn 2005). In this paper, we will focus on policy instruments dealing with how to limit overcrowding and with the externalities stemming from it. There exist a number of instruments than could be applied, but our main focus will be on those of quotas, redistributing strategies, environmental taxes and different user charges. It is important to notice that there does not exist a single best instrument that is best for dealing with all negative externalities, and a trade-off between instruments and goals must be considered (Perman et al. 2011).

In this chapter we first introduce different criteria for assessing the characteristics of the different policy instruments, looking at their effectiveness, equity and transaction costs. These criteria will be used in order to discuss the different policy instruments throughout the chapter, in order to highlight their attributes and to assess different trade-offs between the instruments. In our discussion of the different policy instruments, neoclassical economics of supply and demand will be used, where the curves are assumed linear for reasons of simplicity. We first start discussing the implications of using different quotas to deal with problems of overcrowding, and more specifically a quota to limit the amount of visitors to a national attraction. We will then go over to

discussing different distributional methods of limiting overcrowding, which is where we introduce the concept of zoning. Next, we will discuss environmental taxes and will further introduce the concept of user charges. In relation to user charges we will first discuss the concept of an entrance fee, before we move on to multi-tiered pricing, which includes third-degree price discrimination, two-tariff pricing and peak-load pricing. We will end our discussion by summarizing the different attributes of the instruments, and apply them to the previously discussed four dimensions of carrying capacity.

3.1   Criteria for Policy Assessment

Criteria are related to how to measure the objectives of the policy instruments, and give managers information and clues in order to understand the situation. They can be used to discuss why certain policy instruments should be chosen over others and the trade-offs between them. Welfare economics postulates that the overriding criterion for society is welfare maximization, and that this welfare is measured as a function of individual utilities. However, these utility and welfare functions might be unknown or too complicated to be operational, and it is common to have several separate subgoals. The most prominent subgoals are cost-effectiveness, efficiency, incentive compatibility, distributional and equity concerns, and administrative feasibility and flexibility. Many of these, like efficiency, can be seen as requirements to achieve welfare maximization, while others, such as equity and distribution, are important for political acceptability. These goals are neither perfectly clear, nor are they completely separable, and the political process is often a struggle in which groups place different emphasis on the different goals and have different interpretations of them (Sterner 2003). Nonetheless, the different criteria can highlight what attributes of the instrument are considered. Because of the trade-offs between the criteria, instruments will often depend on the weights attached to them by the policy makers and will vary according to the negative externality they are target to deal with (Perman et al. 2011).

We will focus on the criterion of effectiveness, equity and distribution, and transaction costs. Effectiveness is important as it is concerned with how effective the policy instrument is in dealing with the negative externalities of overcrowding. Furthermore, equity and distribution is important for fairness and political acceptability, and is strongly related to the concept of sustainable tourism. We will also discuss the different transaction costs linked to the policies as

these administrative costs are important for the implementation of policies, as well as for the effectiveness and political acceptability. As we see, the two last criteria of equity and distribution and transactions costs can be linked to the overall effectiveness of the instruments. An instrument is not effective if it is perceived as unfair and does not gain political acceptance, and it can neither be effective if the costs of enforcing and monitoring it are too high. In this way, the criteria are interrelated and should be seen together in order to understand the different consequences of the chosen policy instrument(s).

3.1.1 Effectiveness

Effectiveness is concerned with how effective the instrument would be in mitigating the negative externalities of tourism, or more generally, in achieving the stated objective of the policy maker. An instrument should be capable of attaining its objective in a reliable and consistent fashion, while being adaptable to changing circumstances over time and sensitive to differences in local conditions (Hall 2008). In our case, effectiveness becomes related to the ability of the instrument to deal with an overcrowded natural attraction, mainly through limiting numbers of visitors at one place, in one time. Effectiveness is further concerned with the ability of the instrument to respond to flexible circumstances and the speed of implementation, which can be important when dealing with complex problems (Theobald 1998). In our case, we will primarily consider the instruments' effectiveness in reducing overcrowding and congestion, but the other negative externalities stemming from overcrowding will also be of concern.

3.1.2 Equity and Distribution

Equity and distribution is concerned with what implications the instrument might have for the distribution of wealth and income with regards to the targeted group (Perman et al. 2011). Is the distribution of costs and benefits perceived as "fair"? When regulating tourism in natural areas, an important issue becomes the right of indigenous people in the respective area and the rights of the local residents (Sterner 2003). In many countries indigenous people do not have the same financial and technical capacities to engage in policy debate and lobbying their interest, it is therefore important that the policy takes the indigenous people thoughts into concern (Hall 2008). Equity is also related to who has the right to use the land, which can be based on historical and

traditional rights. Some policy instrument, such as economic instruments, have the ability to generate revenue. For political acceptability, it is crucial to consider the distributions of these revenues and the distribution of the costs of the negative externalities. How this revenue is obtained and how it is allocated become great concerns (Sterner 2003; Theobald 1998).

3.1.3   Transaction costs

Transaction costs are the costs associated with administering the instruments. The question becomes if such administration can be undertaken through existing structures, such as fiscal authorities for collection of charges, taxes, and special environmental bodies quotas. Or does it have to be set up specific organizations and/or structures in order to deal with the regulation or collection of fees (Sinclair & Stabler 1997; Stabler et al. 2009)? Concerns of ability to collect taxes and charges from multiple point of collection and the ability to create barriers in order to collect these at certain entry points because key concerns (Theobald 1998). Furthermore, there may be requirements for monitoring activities and enforcing compliance (Sinclair & Stabler 1997).

3.2   Command and Control (CAC) Instruments

Command and Control Instruments are regulatory instruments which have a direct influence on the behavior of actors by imposing rules that limits the actions of targeted groups. These instruments can be used to control the number and frequency of certain activities, which through their concentration in space and time have high impacts on communities and the environment. These can include restricted access to a certain area, frequency or length of use and qualification of operators. CAC instruments have a legal basis, and monitoring and enforcement are key elements for the success of the instruments (WTO 2005). Our focus will be on setting tourism quotas and redistribution strategies in order to limit visitation, and thereby coping with the negative externalities due to overcrowding.

3.2.1   Tourist Quotas

Quotas are formal restrictions on the permitted rates of visitation increase in the number of visitors allowed in one certain area, over a specific period of time, be it daily, monthly, or seasonal.

In that way, quotas can be used to ensure quality in the visitor experience and to avoid overcrowding. Strategies that set a quota on visitation numbers are consistent with the fixed carrying capacity approach in managing the destination; assuming that additional numbers of tourists will result in unsustainable tourism within a given area, over a given period of time. If the quota involves a restriction on the annual growth of visitors, for example a 2% increase annually, then it is indicative of a flexible carrying capacity. This allows for increased visitor numbers in concert with the implementation of measures that accommodate the increased growth (Newsome et al. 2001). Quotas can be introduced to limit entry to a country or an environmental site, to close seasons, to limit infrastructure and services, or to limit group sizes (Sinclair & Stabler 1997). A quota set to limit group size can be beneficial as larger groups tend to have greater social and biophysical impacts (Eagles et al. 2002). Quotas set to limit infrastructure and service limits the demand by constraining supply, rather than by raising prices. They can be set to limit parking lots or to limit amount of visitors allowed at a campsite (Sinclair & Stabler 1997). Ideally, the quota should attempt to eliminate the externality up to the point where the marginal cost of further reductions is equal to the marginal benefit it derives. However, in practice there are insufficient data to bring this about. If the quota is too lenient, then the pollution levels will exceed the optimal level. If it is too restrictive, pollution discharges will be below optimal level. In both of these cases, there is a resource misallocation resulting in less benefits to society overall (Newsome et al. 2001).

To better understand the economics behind setting a quota, we will look at the case of setting a fixed quota on the entrance to a national park.
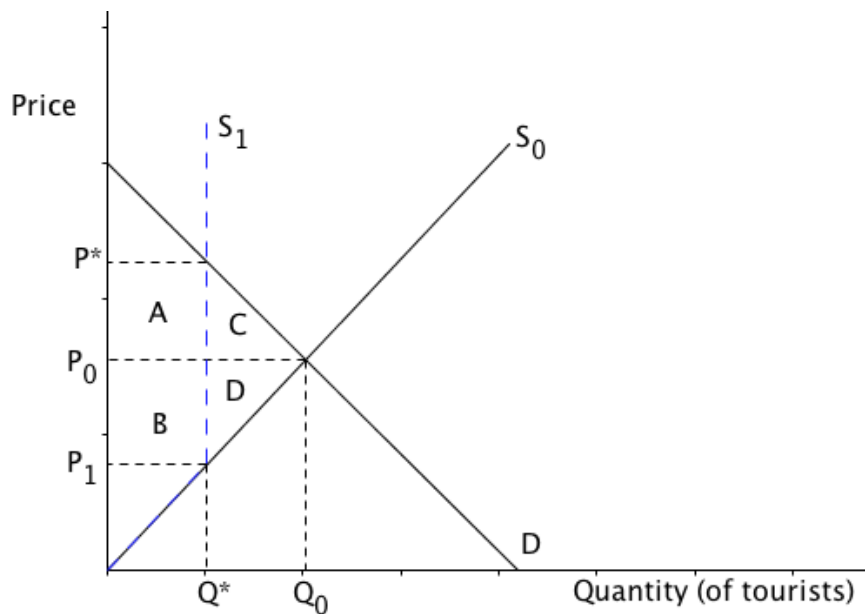
Figure 3.1: The effect on price and quantity, by setting a fixed quota.

The figure shows how a quota on tourism can be applied. Q^* illustrates the quota, showing the maximum number of tourists allowed at the destination, i.e., the carrying capacity. This is a reduction in the number of tourists from the market equilibrium level Q_0 to Q^*. If the number of tourists are fixed, as in this case, the new supply curve becomes the blue stapled line, S_1, which first follows the old supply curve, before continuing vertically from where the quota becomes binding. The demand curve, D, is downward sloping.

A park owner or operator managing the park, seeking to maximize revenue from the entry fee, would set the fee at P*. This leads to is a change in consumer surplus of $-(A+C)$, while the producer surplus changes by $(-D+A)$. Whether the producer surplus is reduced or increased is dependent on the elasticities of demand and supply. There are also what we call "quota rents", which are equal to $(A+B)$. This rent occurs as managers would be willing to supply the national park at P_1, but the price is now P^*.

If we assume that this price is reflected in a numerical price, such as the costs of going on a safari, then the producers are now getting a higher price, than they originally would be asking

for, for the same quantity of tourists. Moreover, we can say that this rent is a "nature rent", at which the price illustrates the gained benefits from controlling the numbers of visitors, reducing the impacts of overcrowding. $(C+D)$ illustrates the deadweight loss of the quota. However, the environmental benefits of the quota could outweigh the private deadweight loss. As the quota is set to reduce the negative externality, there is an overall improvement in social welfare.

The park owner or manager could also set a price between P_0 and P^*. If the price is set below that actual demand for the given quota, we may get hidden costs in the form of the extra costs of having to stand in lines, to book in advance without full certainty if one would visit, or in the form of a black market, where permits are traded at a price P^* and middlemen will keep some of the rent that the quota has created.

Tourism quotas are currently being used for multiple purposes around the world. At national levels, countries with border controls are in position to levy quotas on foreign visitors. Bhutan is noted for its policy of rigorously restricting international tourist flows, despite a high demand, to a few thousand individuals per year in the interest of increasing its gross national happiness. Quotas on visitation has also become increasingly prevalent in high demand linear recreation resources, such as the West Coast Trail in British Columbia, Canada where no more than 60 hikers are permitted to begin the hike each day, combined with an annual quota of 8 000 users. Furthermore, the West Coast Trail also operates with limiting group sizes, allowing no bigger groups than ten individuals, except in certain circumstances (Weaver 2006). Another example of the use of quotas is the wilderness trails of Yosemite National Park in California where numbers are regulated through a free permit system. Antarctica is also known for limiting visitor numbers and group sizes. There are strict bylaws providing for a maximum of 400 ship passengers, where no more than 100 of these are allowed ashore at any given time with one expert guide provided for every 15-20 tourists. There are also examples like the Galapagos National Park, where managers have have employed a strategy wherein a quota on visitation is established and periodically raised, thus indicating a fluctuation between flexible and fixed carrying capacity approached. In 1973 there was set a ceiling of 12 000 annual visitors. This was raised to 25 000 in 1981, and further to 50 000 in the early 1990s. The quota set in Bermuda is an example of a quota set to limit service. The limit is set on the number of beds available, limited to 10 000. When new spaces come available due to closures or downsizing, there is a reallocation of priority given to

hotels that maintain the highest operational standards (Newsome et al. 2001; Sinclair & Stabler 1997).

Effectiveness

If the quota works as it is supposed to do, there is no doubt that it is effective in limiting the number of tourists at the natural site, reducing the threat of overcrowding. However, as we have discussed, there are uncertainties in setting the optimal number of visitors, especially as it is hard to estimate quantitative limits, such as the carrying capacity. As quotas are a regulatory instrument, the implementation of it often requires a sophisticated regulatory compliance staff and in some cases, a better functioning political institution. Many countries have gaps in both the authority and the function of their legal systems (UNEP 2004). The effectiveness of the quota can further depend on if it is set on a national or site specific base. A quota which is set on amount of visitors allowed in the country could be easier to sustain, then a quota set on a natural site, where monitoring of the actual number could be hard and costly. The effectiveness can further be tied to how the quota is allocated, whether through an entrance or as a backcountry permit. This is again connected to the ability to monitor and enforce the quota.

Equity and distribution

An equity problem of great concern when setting the quota, is the rights of the people who have had historical rights to the area, such as ingenious people and local communities. It is important to protect the traditional lifestyles of these people, and multiple national parks have given ingenious people special rights in the use of the area, and the rights of entering the area should be included in this (Stevens 2014). On the other side, one argument is that as the local communities live at the site all year around, they will still have the opportunity to access the site in a case where the quota is only binding during the high-seasons. In this way, local communities have limiting access during high-peaks, but opportunities for the use of the site at low-peaks. However, should the local community not be able to use the site freely at all seasons?

Further, the quota can generate some surplus, a quota rent, equal to $(A+B)$ in the figure, which has to be allocated to someone. An equity and distributional concern is who should get this rent? The question become, how should these revenues be distributed? Should they go towards

general public funds, or should they be used for conservation and maintenance of the park? The quota system given a rent that can be distributed according to the priorities of the policy makers.

Transaction Costs

The transaction costs of setting a quota are linked to the costs of implementing and monitoring the regulation. Costs vary with weather the quota is set on a national, local or site specific levels. There can be costs related to the ability of setting boundaries at a site, which makes it possible to register amounts of visitors, or if permits are used, the costs of issuing and checking these permits. Limits on use tend to generate controversy, particular in how they are being implemented. Because of this, the process used to determine the limit is critical. Restriction of access to natural site has financial costs and the cost of enforcement and education can be high, especially in the early stages of implementation (Eagles et al. 2002). Overall, compared to other policy measures, the transaction costs of setting quota should be relatively low.

3.2.2   Redistribution

An alternative to limit the number of visitors to a destination, during specific time periods, is to redistribute, i.e., divert visitor flows so that the problems of congestion and overcrowding are avoided. This concept is strongly related to zoning, which is the principal method used to deploy visitors (Eagles et al. 2002).

Dispersal Strategies

Dispersal strategies builds on the principle of dilution being the solution to pollution. One way of redistributing visitors is through dispersal strategies. Dispersal strategies builds on the principle of dilution being the solution to pollution (Terefe et al. 2015). These strategies "dilute" tourism related activities and in theory distribute its employment and revenue benefits more equitably and can be used at national, reginal, local or site-specific levels. Nepal illustrate such strategies at a nationwide scale through policies of opening new regions and locations to tourism in order to disperse benefits while preventing overcrowding at existing locations (Weaver 2006). Dispersal strategies are often chosen to deal with the negative impacts in a small area or several areas, and works effectively in biophysical settings that are relatively resilient to use. But the

strategy is less effective in sensitive setting, where damaging impacts may just be spread more widely through this approach (Eagles et al. 2002).

Concentration Strategies

As an opposite to dispersal, concentration strategies may be another way of dealing with the distribution of tourism. These strategies focus on recreational use on small areas with high levels of management, thereby confining the impacts (Eagles et al. 2002). Unregulated tourism development, as we have seen in Butler's life cycle model, tend toward spatial and temporal concentration, which in turn is commonly regarded as both a cause and a symptom of unsustainability. Spatial concentration can serve as an effective strategy contribution to the attainment of sustainable tourism with the destination as a whole, as long as there are appropriate regulation and management. Concentrated tourism serves to confine negative impacts such as congestion to a small portion of the destination. Thereby, it leaves most of the environment as a backstage relatively unscathed by these direct negative impacts, while still receiving benefits from employment and revenue disbursements (Weaver 2006). Since this strategy places development in small areas, it can effectively discourage visitors from gaining access to other parts of the protected area (Eagles et al. 2002).

The Australian Gold Coast illustrates this, where the vast majority of tourism takes place along the narrow coastal strip occupying less than 2 % of the city council area. Another example of congestion strategies is found in the South Rim area of the Grand Canyon Park. The development carried out at this place is only feasible because of the expectation of four million or more visitors per year. Central to the development is the introduction of shuttle busses eliminating the need for private cars and parking lots. The construction of the information place serves as a hub and creates a center for focused visitor orientation, education and retail activity (Weaver 2006).

Dispersal/Concentration Hybrids

Managers can also choose a combination of the two strategies discussed above, and highly visited high order protected areas often pursue this combination of dispersal and concentration strategies. In this case, an example is where 5 % of visitor-related activity is deliberately channeled to 5 per cent of the park area. This concept is related to zoning. Zoning can be crucial in achieving the appropriate combination of concentration and dispersal. It allocates geographical areas for

specific levels and intensities of human activities and of conservation. It often involves spatial zones with varying levels of intensity of human activity. At one end, there are developed areas, such as information centers, cities or villages, with a strong emphasis on tourists provision; on the other end, there are remote and wilderness areas with effectively no development at all (Eagles et al. 2002).

Another option is to consider the dispersal or concentration of visitors throughout time. Periodic closure of camping sites and section of beaches to facilitate natural recovery is an example of a temporal component to a redistribution strategy. Many tourist destinations offer direct and indirect incentives such as reducing prices to encourage visitation during off-season, which we will discuss when looking at peak-load pricing. This is often due to financial reasons, rather than environment, but still covers the sustainability criteria. This is similarly applied to options of raising user fees or instituting quotas only during periods of high demand

An example of such hybrid strategies is Canada's zoning system. The system assigns a small part of a park for recreation, which are designed to accommodate for large numbers of generally daily visitors, engaging in a wide variety of nature based activities. The remaining area of the park is zoned wilderness or natural environment, attracting a relatively small number of visitors engaged in physically challenging activities, requiring few, if any, services and facilities. These strategies can be further implemented at a national scale (Weaver 2006).

Strategies of redistribution of tourism flows can be linked to both command and control instruments and economic instrument, and often describes a mix of the two. Some redistribution strategies may need regulations such as zoning and land planning, whilst other strategies can be effective through incentive-based instruments. Nonetheless, we will assess redistribution strategies according to our criteria, to get a better understanding of the different attributes.

Effectiveness

Dispersal strategies can be effective in redistributing the tourists to new locations, avoiding overcrowding. In this way it can distribute the benefits of tourism, whilst also reducing the risks of overcrowding. This can be effective in reducing the negative externalities, as long as the negative impacts on nature can be reduced with redistributing the tourism flow to other area that

are more resilient to use. However, this strategy might be less effective in a sensitive setting, where the negative impacts will only be further spread out. If the latter is the case, a concentration strategy might be more effective, in that it confines tourism within one space, which also limits some of the negative impacts. These strategies allows for flexibility in targeting different types of tourists. The example of Canada's zoning system shows how some tourists can be confined to an area that can meet a high demand, whilst other tourists with special interest still have the ability to use the whole nature without restrictions. However, creating a tourist hub will not eliminate all the externalities of overcrowding, as there will still be crowding. However, it will reduce the area of impact.

Equity and distribution

An equity concern of concentration strategies is, that in confining the impacts in one place, the negative impacts on local residents will increase, and the ratio of tourists to locals might increase. This can further have implications for the reputation of the area, which might lead to a spread in tourism again. Redistributing tourists to new locations might also redistribute the benefits of tourism, but it can also contribute to increased conflict of interest with local residents. Introducing tourism to new natural area, can cause further problems that need to be dealt with.

Transaction Costs

There can be significant costs linked to the marketing required for these strategies to work, and furthermore to allocation of zones. If redistribution strategies are implemented through zoning and land planning, the same transactions costs as for other regulatory instruments might apply. However, if the strategies are realized through economic instruments, the costs will be more linked to the ability of setting prices to regulate tourism.

3.3 Economic Instruments (EIs)

Economic instruments (EIs) seek to address the market failure of environmental externalities, by working through factors such as cost, price and income, which have proved to be major influences on the choices and decisions of consumers and producers (WTO 2005). The use of EIs are closely linked to the polluter pays principle, which states that the costs of pollution should be borne by those who cause it (Vatn 2005). In this way, the negative externalities are

internalized in the price paid by consumers. We should note that the use of EIs are linked to the "Pigou Tax". A Pigovian tax is where taxes are levied on the tourist who generates the negative externalities, which amount is equal to the externality (Candela & Figini 2012; Varian 1992). EIs can have both an incentive effect and a revenue-raising effect. The first effect is concerned with the ability of the instrument to regulate behavior. The second effect is concerned with raising revenue which can be used to cover the costs that guests impose on the residents and support actions, such as conservation that lead to greater sustainability. It can further be used to improve infrastructure and facilities so that the carrying capacity can be increased (Candela & Figini 2012; WTO 2005). An important side of this, is that revenue raised should be earmarked and distributed fairly, i.e., the revenue raised should be restricted to specific types of use rather than simply going into the general public purse (WTO 2005). While this may not be the primary purpose of the economic instrument, earmarking can help to increase the popular acceptance of taxes and charges. The principle underpinning these instruments is that the costs or benefits of consumption should be estimated, in order for the appropriate level of charge, tax or grant to be ascertained to achieve a socially optimal position. This is where the marginal social benefits and costs are equal, i.e., the full costs or benefits are reflected through the market prices (Sinclair & Stabler 1997).

3.3.1 Environmental Tourist Taxes

As we have discussed, taxes on tourism aim to decrease the quantity demanded by altering the tourists' behavior through increasing the effective price of the natural area, while generating extra revenue for the destination. (Candela & Figini 2012).

To better understand the different taxes on tourism, we classify them as follows:

- A fixed (lump-sum) tax paid by each tourist, which can be defined as a tax on arrivals. This type of tax is charged to travelers in airport or at ports.
- A tax proportional to the length of stay, which can be defined as an "overnight tax". These taxes are sometimes charged in hotels or other hospitality firms.
- An indirect tax, which is a sum proportional to the price paid, computed as a percentage of the price paid by the tourists. A typical case is the Value Added Tax - VAT paid on tourism services.

The introduction of a fixed tax may be difficult if it is seen by businesses as adding to their existing tax burden. A more successful approach may be to direct such a charge on visitors. Theory shows that it does not matter whether the tax is levied on the producers or the consumers, the outcome of the tax is still the same.

Multiple countries have introduced taxes on tourism in a form of tax paid per visitors, which is often raised per overnight stay. Usually, these taxes are collected from tourism enterprises, and may or may not be passed on by them tourists. Normally, it is not seen as a way of influencing number of visitors, but rather as a process for raising revenue. Great sums can be raised this way, but it can also have effects on demand and on enterprise profitability (Candela & Figini 2012). Our focus will be on this overnight taxation, which is illustrated in the figure below.

This has been the case in Belize, which is essentially a hypothecated exit tax. Any tax like this kind needs to be fairly and evenly applied, easy to collect and fully discussed and supported by everyone involved, including the travel trade. The utilization of the tax need to be completely transparent and made broadly known to those who are paying it. In Belize, funds were given to the Protected Areas Conservation Trust (PACT), raised by a compulsory conservation fee charged to visitors on their departure of the country. The conservation trust also received 20% of the cruise ship passenger head tax and the recreational license and concession fees in protected areas. Corporations and individuals can also donate voluntarily to PACT (WTO 2005).
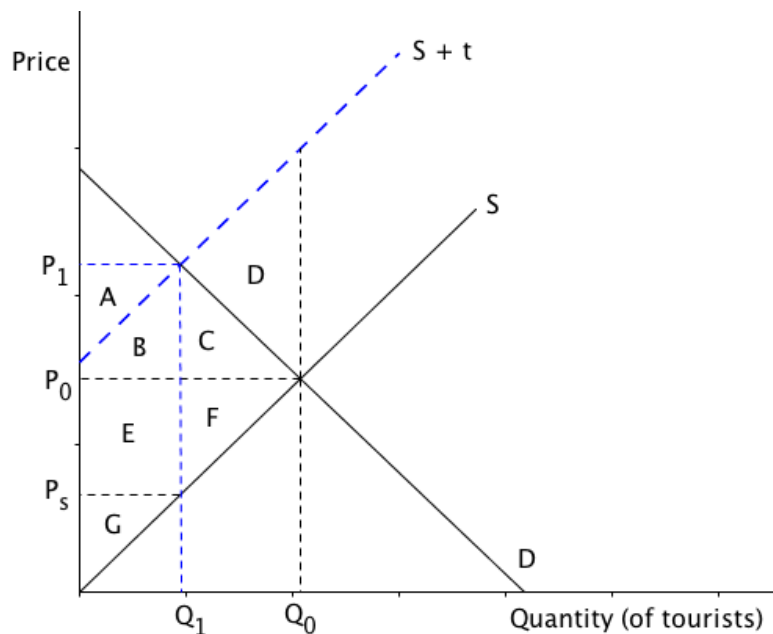
Figure 3.2: The effects of taxation of overnight stays

The figure shows the imposing of a tourist tax, reflecting the negative externalities caused by tourism. It extends the previous figure on tourists quotas (Figure 3.1), by explicitly including the externality in the discussion of the welfare effects. It illustrates the case where a tax is put on overnight stays, where the tax – reflecting the externality – raises the supply curve above the marginal private cost. Shifting the supply curve from S to $S+t$, which reflects the overall social costs. The initial market situation is shown by the supply, S, and the tourist demand, D. The original market equilibrium is at (Q_0, P_0). The external effects associated with Q_0 are the area $(B+C+D+E+F+G)$. We assume that this tax is set equal to the marginal social costs, as regulations are designed to internalize the externality by considering the external cost of production. The new equilibrium becomes (Q_1, P_1). The total quantity of tourists is reduced from Q_0 to Q_1, as this is the socially desirable outcome, and the price increases from P_0 to P_1. The tax is equal to $(P_1 - P_s)$. The tax leads to a change in consumer plus (CS) of $-(A+B+C)$, and a change in producer surplus (PS) of $-(F+E)$. However, in our case the ones who are supplying the good are also the ones gaining revenue from it, equal to $(P_1 - P_s) \cdot Q_1$, which is equal to

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$\left(A+B+E \right)$. Furthermore, there triangle often referred to as the deadweight loss, $\left(C+F \right)$, is the deadweight loss to the private consumers or producers, but not one to the society overall. The benefit of the decreased number of tourists are seen as improving welfare as it resolves some of the overcrowding externality. The avoided external costs associated with taxing are $\left(D+C+F \right)$-Therefore, the net benefit of regulating is $\left(D+C+F \right)-\left(C+F \right)=D>0$. The welfare of the current tourists is reduced due to the taxation, but not to the society overall. Moreover, the total welfare can be improved if the tax revenue is used for conserving the environment and to cover the costs of public goods provided.

Elasticity of demand

When asserting how tourists are affect by a tax (or a charge) it is important to take the tourists elasticities of demand into consideration. To assume that the tourist is the subject who is effectively affected by the tax, the price of the stay in the destination, P, should increase by the exact value of the tax, t. In such a case, we can easily demonstrate that the revenue from the tax on tourists depends on the elasticity of demand. Figure 3.3 shows what happens if a tax t is introduced when two different demand functions D_1 and D_2 are compared. We assume that, before the introduction of the tourist tax, in equilibrium the two functions have the same number of overnight stays, N^*, and the same price of tourism, P^*. In this case, we can affirm that the demand curve D_1 is more elastic then D_2 (Dwyer et al. 2011).
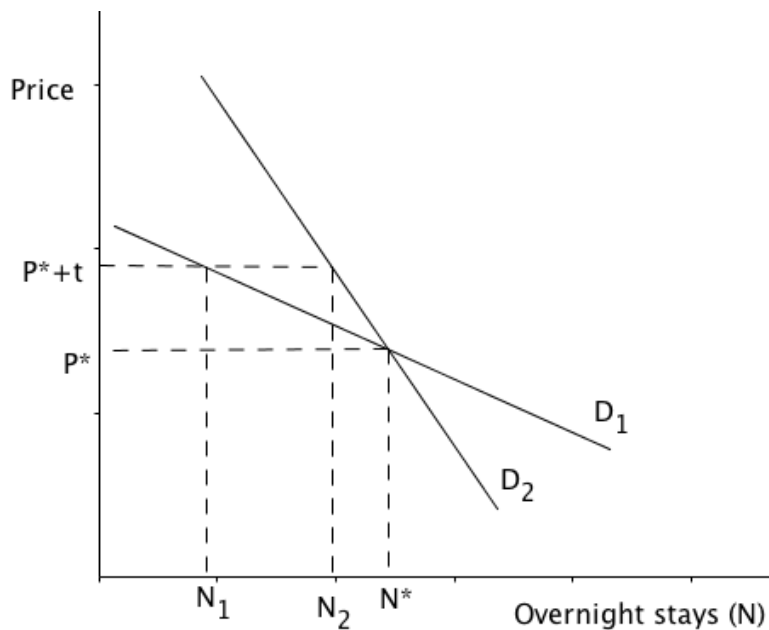
Figure 3.3: The different elasticities of demand with the effect of a tax on overnight stays.

An introduction of a tax proportional to the length of stay raises the price of the tourism product to $\left(P^{*}+t\right)$, which leads to a reduction in the number of overnight stays. This effect is larger the more elastic the demand is. In the case of demand D_{1}, overnights stays equals N_{1}, and in the case of demand D_{2}, overnight stays equals N_{2}. Since the tax revenue is equal to the value of the tax, t, times the number of overnight stays after its introduction, we can verify that the tax revenue is larger for the least elastic demand, so that: $tN_{2} > tN_{1}$ (Candela & Figini 2012). However, with regards to controlling visitor numbers, high elasticity of demand can indicate that there are other good alternatives for the tourists, such as switching to another destination without too much loss of welfare. High elasticity can by this make it easier to regulate the total amount of tourists, as the more inelastic the demand is the less the tourists are prone to changing their behavior. These are considerations that need to be taken into account when analyzing the effectiveness and equity concerns of the instrument of taxation.

Effectiveness

When discussing the effectiveness of taxes we first look at the taxes ability to limit visitation, affecting the overcrowding problem. As we have discussed earlier, it is difficult to determine the optimal level of tourists, and the externality costs are difficult to estimate, which complicates the determination of an appropriate tax base. The solution also assumes that no changes occur in the demand curve, which will affect the level of the social optimum. Tourism demand can depend on the season or the weather. If the demand is greater than expected, the tax may not reduce output sufficiently and environmental costs may be high. If demand is lower than expected, the tax may result in inefficiently, high discouragement of visitation, or use (Dwyer et al. 2011).

Further, a tax might not affect tourism demand as overnight taxes do not take into consideration the relatively low elasticity of demand, as an overnight stay is a relatively necessary product. In the case of higher accommodation prices, a tourist will first cut other expenditures. As we saw when discussing the elasticities of demand, the tax is more likely to regulate amount of tourists if the demand is elastic. However, the demand of tourists are often less elastic, depending on how big of a proportion the tax is of the total expenditure, and on the uniqueness of the area.

A strength of taxes is that they are difficult to avoid. Individuals avoiding payments can become of great concern when, for example, charging entrance fees. Overnight taxes are often included during the booking process, added on to the total costs of booking, and are usually set around one dollar or one euro. Because of this small "extra costs", individuals tend to pay it without too much consideration. However, there is the possibility of tourists self-catering or staying at unregistered accommodation, and by this avoids paying the tax. This can be a threat to both the effectiveness and the equity concerns of the tax if it is considered unfairly applied (WTO 2005).

One disadvantage of taxation is the fact that the tax base is not very precise in targeting the externality itself. Overnight stays themselves do not cause major negative external effects, such as overcrowded tourism places and overloaded infrastructure. A much greater burden on the environment stems from activities more harmful to the environment than walking, such as skiing, diving or mountain biking. One-day visitors cause greater environmental damage and congestion, such as traffic chaos, than overnight guests. Instead, the tax could be set on the basis of various tourism activities (Fennell & Dowling 2003).

Equity and distribution

Taxes can be favored on the base of being justified in terms of equity, as they mainly charge the tourists with a share of costs for the public services provided to them. The local residents are already indirectly paying for these services and the conservation of the environment through taxes, and it can seem only fair that the tourists, being the main users of this environment, should pay their share for use. However, tourists can perceive taxes as unfair, as some believe that they are already contributing to the destinations local economy through the price paid on the vacation, and through taxes raised on profits and incomes. However, the negative psychological effect of the tourist tax is minimized if the tax is indirectly passes the extra cost on to the tourists, such as an increased price in overnight stays (Candela & Figini 2012).

As we saw in the graphical analysis, taxes have the ability to generate revenue, equal to $(P_1 - P_S) \cdot Q_1$ in Figure 3.2. a tax that is earmarked to environmental causes at the destination, will lead to less objection towards paying it (WTO 2005).

Taxes can also work in creating a psychological contract, where the tax creates awareness of the tourists' impact on the environment and their need to fund some of the public goods they are subject to. In this way, the tax can contribute to limit some of the negative externalities related to the behavior of the tourists.

Transaction Cost

Taxes can have low administrative costs in the case where they are easily collected through existing collecting system. However, the implementation can become expensive if there is a need to establish separate systems to collect these taxes. Furthermore, the collection of taxes has little need for monitoring and enforcement as the taxes are hard to avoid, which again saves costs linked to this enforcement.

3.3.2 User Charges

Manipulation of user fees to regulate demand is a popular tool in protected areas and other nature attractions. Managers can increase prices until the desired level of visitation reduction is achieved, without incurring any concomitant decrease in the revenue. If 1000 visitors are paying $10 each, it will equal 20 000 visitors paying $5, but incur lower management costs. In addition to an entry cost, user fees can be used to include recreation service fees, accommodation,

equipment rental, food sales, parking, permits and licenses (Weaver 2006). To illustrate the concept of user fees, will focus on charges on entry to natural sites, which is the charge most relevant to controlling numbers of visitors. However, it is important to note that charges (and taxes) are sometimes levied on complementary goods and services, such as parking meters near national parks or an a tax on accommodation within national parks (Weaver 2006).

National Park Fee

In the last few decades, there has been much discussion about the introduction of charges to enter national parks, with strong arguments being put forward for, and against, the introduction of such charges. In this section, we will examine the effects on demand of setting such charges. The debate considers how national parks should start charging, or increase their existing entry fees to supplement funding from government, so that more conservation can be undertaken, wildlife habitat improved, visitation limited, visitor facilities enhances and more land brought under the umbrella of "protected area".

As with other regulations, there are different sides to introducing a national park fee. One the one side, it is a belief among the public that entry to national parks should be free, because they already pay taxes and because nature should be freely accessible to all. On the other side, some form of fee can raise money to undertake conservation and improve visitor facilities, which leads to increased satisfaction by visitors. Funding to most national parks have always been limited, and hence they remain under-resourced and understaffed, especially at a time when nature-based tourism is growing rapidly in many countries. The question of entry fees is especially important when park agencies are moving in the direction of greater commercialization of national parks. The use of entrance fees can be justified on the ground of providing better visitor facilities, reducing visitor numbers. Hence, reducing environmental effects, removing subsidized competition with privately owned protected areas, achieving efficiency in revenue collection, creating positive attitudes towards protected areas and helping to recover some of the park's maintenance costs, which reduces the dependency on government funds (Tisdell & Wilson 2012).

The distinction between taxes and charges are not always clear and they are occasionally considered together, suggestion that they have similar characteristics (Sinclair & Stabler 1997). The economics behind charging an entrance fee, are the same as with taxing overnight stays.

However, the terms are different, as there is only a one-time charge for entrance fees, whilst the tax on overnight stays depends on the time spent at the location. In order to show this difference, we will illustrate the entrance fee on a graph with overnight stays, instead of total number of visitors. While the user charge would be illustrated similar to the overnight tax in Figure 2.1, it will here be shown as a horizontal supply curve.
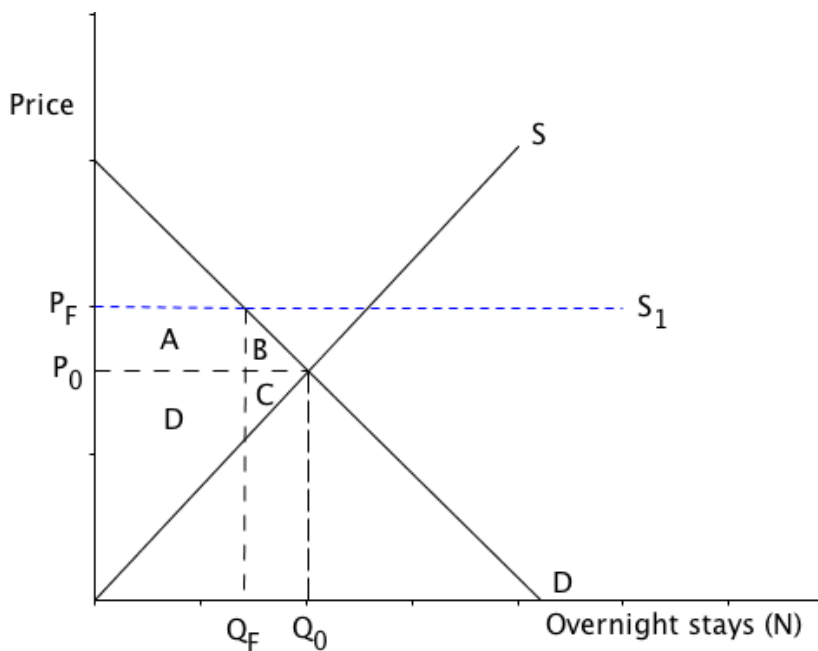

Figure 3.4: The effects of an entrance fee with regards to the number of overnight stays

The figure illustrates the application of a fixed entrance fee, P_F. where the initial market conditions are (Q_0, P_0). The introduction of an entrance fee reduces the total number of overnight stays from Q_0 to Q_F, whilst the price increases from P_0 to P_F. The consumer surplus is changed by $-(A+B)$, and the producer surplus is changed by $(-C+A)$. This shows a reduction in consumer surplus, while the effects on producer surplus are uncertain, depending on the elasticities. In this case, there is no tax going to the government, but a price going to the producers. However, as we have already stated, in our case the government and the producers can be seen as the same, i.e., the revenue is equal to area A. The deadweight loss is equal to $(B+C)$. For same

reasons as discussed when applying the tax, this loss does not reduce the total social welfare, as the benefits outweigh the loss.

As several national parks are short of funding, and therefore are unable to undertake most of these above-mentioned activities, it is likely that many countries will examine the option of entry fees. In the United States, Mount Rainier National Park became the first park to impose visitor fees as early as in 1908, with multiple national parks now charging for entrance, such as Yellowstone and Yosemite Source (United States Government Accountability Office 2015; Weaver 2015). Also in Canada and Australia have user fees been an aspect of park use for decades (Sickle & Eagles 1998; Tisdell & Wilson 2012). Furthermore, there are examples of a charge for sleeping in the backcountry, as is the case in parts of Canada. There are also examples of park using an entrance fee together with a quota on visitation. In Rwanda Gorilla Park, the limit of visitors was set to 17 000 annually, with a price of $750 per non-resident person (Biwindi National Park 2017).

As we see, there are many different types of user charges and aspects when deciding on how to implement a user charge. Where some might be effective in some locations, it might be better we another type at other locations. In our discussion of the instrument according to the different criteria we focus on the national park fee and the overall characteristics of this fee.

Effectiveness

In order for user fees to reduce the problems of overcrowding, it needs to be large enough to discourage visitors, i.e., affect their demand. High user fees can contribute to both lower visitor numbers in total, as well as redistributing visitors to other areas free of charge or with a lower fee. In this way, user fees are effective in reducing the congestion and overexploitation of the natural site. However, as we discussed in the issue of taxes, it is believed that the introduction of such a fee, unless large, will not significantly reduce visitor numbers, especially in the long run, as demand for visits are relatively inelastic, especially for unique attractions (Tisdell & Wilson 2012). Just as for taxes, there is evidence that people will put off or go elsewhere if the entrance fee for the protected area is a large proportion of the total trip costs. However, as the costs of visiting a natural site is usually a small proportion of the total trip costs, a tourists fee might have little influence (Eagles et al. 2002).

The effectiveness of setting a fee is strongly related to the possibility of setting boundaries. Barriers, such as fences and gates, can make it possible to determine who enters and who does not. In this case, it is feasible to charge for entry or to impose conditions on entry. However, where these barriers cannot be erected, exclusion can be difficult and costly. If the boundary problem is one of not being able to exclude visitors, it is possible that both price and quantitative controls will result in a less efficient solution overall, than would be the case of no control where imposed. Charging for entry can induce some visitors to take alternative routes resulting in the control methods being less effective, perhaps even counter-productive if visitors use more environmentally damaging routes into the area than the official routes. In extreme cases, the optimal charge for use of the area might be zero (Dwyer et al. 2011).

Equity and distribution

User charges are seen as ensuring fairness by equitably distributing the burden of paying for public services and national park conservation among those who benefit from them. National Parks are not cost-free to provide, and there should therefore be costs linked to using the services. As we discussed when assessing taxes, local residents are often already paying indirectly for these services through taxes, and it seems only fair that visitors should pay their share as well. By charging a national park fee, those who contributes to the negative externalities generated and puts costs on the environment, are those who should to pay for them, i.e., the polluter pays principle.

The imposition of entrance fees could have major impactions for political support from the public when it comes to the subject of equity. Entry fees could create adverse distributional consequences, calling for that public resources should be equally available to all socio-economic groups, that conservation of natural resources is a community service obligation, and that such entrance fees amount to a double tax. If entrances fees are increased sustainably, there is a probability that foreigners and high-income groups will become the main visitors as a result of their elasticities being less elastic. This can create a danger of national parks becoming luxury goods (Tisdell & Wilson 2012).

Another argument that arises with charging user fees, is the principle that the nature should be free for everyone. Again, as with the introduction of quotas, a question that enters the discussion, is if people with historical rights should get free access or other special rights to the

area. Furthermore, the psychological contract discussed with taxes can work in the same way for entrance fees, reducing negative externalities linked to behavior.

As with the other economic instruments discussed, also entrance charges raise revenues which has to be distributed. Again, the political acceptance of such charges are linked to earmarking and the importance of demonstrating the benefits of the fees in terms of conservation work undertaken and improvement in public facilities in the park where the charges occurs. Fees should also at the same time serve to maintain and improve the infrastructure, services and protection of parks (Tisdell & Wilson 2012).

Transaction Costs

The transaction costs linked to user fees are mostly related to the process of collecting these fees and the ability to provide barriers for entering. In order to collect fees, there is often a need new jobs for collection and maintenance, as well as the creation of barriers and entrance points. Entrance could be controlled through one road leading to the national park or through entrances around the information hub. Either way, proper infrastructure is needed to make charges effective. If user fees are linked to permits, and paid online, the issue becomes how to control who has the permit needed to enter. As we see, there are costs linked to the ability to monitor and enforce the user fees, depending on how and where they are collected. As with other instruments, costs are also tied to the ability of gathering information about demand and to decide on prices.

3.3.3   Multi-tiered Pricing

Multi-tiered pricing involves charging different prices to different tourist groups. In the discussion, we will focus on price discrimination and peak-load pricing. Multi-tiered pricing allows from combining elements of social justice (through charging different prices for less privileged groups), market response (by raising prices when there is a rise in demand and management tactics) and by helping redirecting visitor pressures. It can redistribute use levels, achieve a social purpose and maximize income in periods of peak demand (Eagles et al. 2002).

Third-Degree Price Discrimination

In order to deal with the problem of equity when setting tourism charges, the concept of price discrimination enters the discussion. Third-degree price discrimination involves charging consumers different prices, but each consumers still faces a constant price (Varian 1992). As discussed with other user fees, there is an equity concern when it comes to charging a price for people natural heritage, which are often seen as "free" goods. Furthermore, there are concerns with regards to the different elasticities of demand seen with tourists and residents and with resident paying a "double-tax". To deal with this problem, price discrimination between international tourists and local visitors could be employed, or there could be further difference in prices for other different groups of people (WTO 2005).

In this way the policy maker (or the national park) could act as a monopolist. This is a viable solution when the natural area is unique, as that calls for a more inelastic demand. Many natural areas are unique; thus, the owners have the opportunity to make profits by exploiting the "scarcity rent" of their resources. Because of this monopoly power, managers can limit use and raise significant revenue at the same time. The extent of this power relies on how differentiated their nature attraction is, compared to competitors. The uniqueness of the nature attraction is only on factor contributing to differentiation. Attractions and destinations can also be differentiated by complementary offers such as higher quality experiences, "add-on" tours, facilitation of sports and activities in nature, and other services (WTO 2005). In order to price discriminate, the managers must be able to distinguish between the different target groups by different elasticities of demand. Further, they must be able to prevent resale between them (Pasour & Rucker 2005; Varian 1992). These requirements are fulfilled in our case, as we operate with different elasticities of demand. Resale can be prevented as we operate with international and national visitors, where an ID card would meet this requirement.
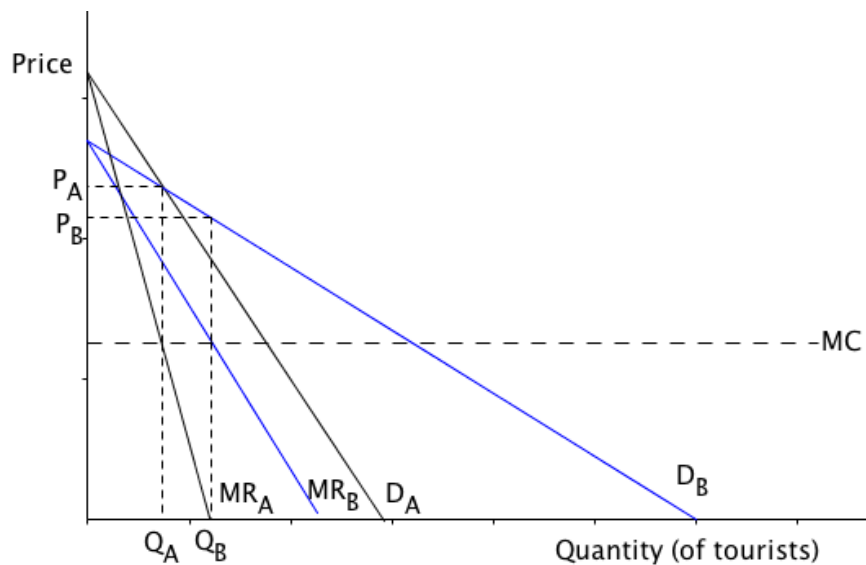
Figure 3.5: The effects of price discriminating on the different elasticities of demand.

The figure shows how a monopoly can price discriminate between two groups of tourists, A and B. A represents the demand of international tourists, while B represent the demand of national tourists. Based on our prior discussion, we assume that the elasticity of international tourists is less elastic, than that of national tourists. The figure shows how the policy makers can charge a higher price, (Q_A, P_A), to international tourists and a lower price (Q_B, P_B) to national tourists. In order to maximize profit, the firm allocates supply between the two markets so that the marginal revenue, MR in each market is identical. The outcome depends of efficiency depends on whether there is a drop in the consumer surplus relative to the one-price policy is outweighed by the gain in producer surplus. If this hold, price discrimination will have improved efficiency (Dwyer et al. 2011).

The pricing policy in Costa Rica shows an example of introducing price discrimination. Long set at $.125 per entry, the fee was raised to $15 in 1994, but lowered to about $6 in 1996 in response to opposition from inbound tour operators who felt they would be absorbing the extra costs and other who claimed that this would foster elitist form of tourism. To address the latter problem, it was introduced a differential fee where nationals continued to pay the original $1.25. As foreign demand is more inelastic, an increase of 400% contributed little to raise the total price of a vacation in the country, thus the foreign demand was not likely to be much affected. There is

suggested that an increase of even more as to $40, would still not lead to suffers in demand compared to money obtained for conservation. In Indonesia's Bunaken National Park, a survey suggested that backpacker visitors were willing to pay an entry fee of at least $12.50. For most respondents, this was conditional upon having assurance that the fee would be put forwards towards conservations programs within the park. A differential fee structure was implemented whereby Indonesian citizens pay a nominal fee while international visitors pay $8. The decision to opt for a lower fee was based on the desire to minimize oppositions from tour operations, prevent the government from appropriating a more attractive pool of funds and demonstrate that the fund would actually be used for conservation purposes, before asking for a larger fee (Weaver 2006).

Effectiveness

With regards to effectiveness, many of the same arguments used for other user chargers holds for price discrimination as well. Furthermore, price discriminating between residents and tourists can be a way to gain acceptance of the fee from the local community. The effectiveness of the fee is also related to the ability to act as a monopolist and distinguish between different groups in order to charge different fees. As natural attractions are often unique, the elasticities of demand for foreign tourists and local residents are shown to be different, this is a viable option.

Equity and distribution

Third-degree price discrimination has the same concerns of equity as we have discussed earlier. Further, the discrimination calls for foreign tourists paying more, which can be seen as fair, as they do not pay taxes for the public services provided. With this, price discrimination can solve the problem of equity related to the user charges discussed earlier. In this way price discrimination is justified as the same grounds as a tourist tax, but are also justified on the ground discussed under user charges, as all groups still have to pay to use the natural area.

Transaction costs

Transaction costs involves the same arguments for barriers and collections as discussed earlier. Furthermore, there could be costs linked to discriminate between different groups, but in our case of international and national, this should not be a problem. Other costs are linked to multi-tiered pricing tending to be more complicated to administer, and how it might cause confusion

among guests and employees and resentment for resources when the reasons for use are not clearly communicated (Eagles et al. 2002).

Two-Part Tariff

Another way of price discriminating, is to charge both at the entrance (a tax on arrivals), with a lump-sum, and then charge for overnight stays (an excise tax). The policy maker has two policy instruments with which the destination's optimal policy, in terms of length of stay, can be implemented. Therefore, the fee can be composed out of two parts, a fixed amount tariff paid to access the destination, and a variable part depending on the number of services that are effectively bought (Candela & Figini 2012).

We consider this concept by looking at a national park, where the tourists, in order to enjoy the park, must pay an entrance fee. Additionally, the tourists have to pay an extra sum for each night spent in the park, which can be understood as a tax proportional to the length of the stay. The fixed part of the tariff, F, is paid upon the entrance of the national park, with the tax, t, paid for each night spent camping in the park, N. The two-part tariff paid by the tourists is then:

$$T = F + tN$$

The unit cost, UC, of a day spent in the park decreases as the length of stay increases:

$$UC = \frac{T}{N} + t$$

One way of looking at this form of price discrimination is illustrated in the figure below
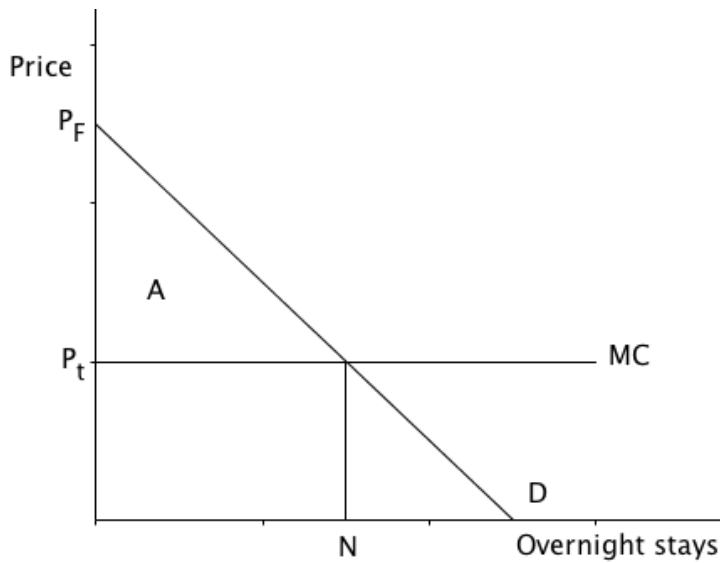
Figure 3.6: Two-Part Tariff based on Friedman (1986)

The figure shows a simple version of the introduction of a two-part tariff. The entrance fee is equal to the consumer surplus of A, whilst the costs per overnight tax is P_t. This gives us a number of overnight stays of N. By charging a fee equal to the consumer surplus, which assumes all consumers have the same willingness to pay, the managers are converting this extra surplus into revenue, based on a first-degree price discrimination where the managers charges each person the maximum willingness to pay. In practice, the willingness to pay will be different across tourists and there will be imperfect information known by the managers. In this case, tourists with a low willingness to pay, will choose to not enter the area at all.

In order to get a better understanding of the reduction in overnight stays and the different prices charges we look at the following figure:
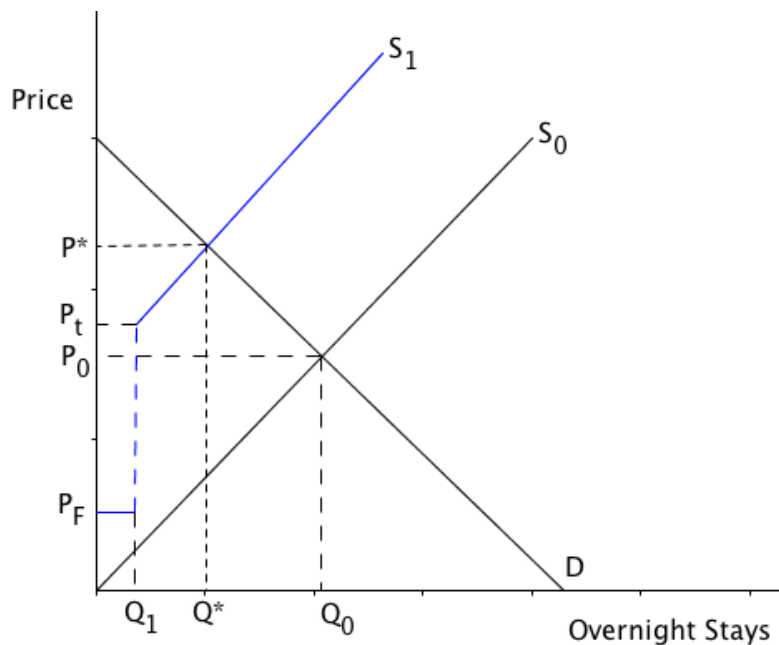
Figure 3.7: The implications of a two-part tariff on overnight stays

The figure illustrates the implementation of an entrance fee, P_F, together with an additional tax on overnight stays, t. This shifts the supply curve to S_1. This curve starts horizontally at P_F, showing the entrance fee for one day, Q_1, before increasing to P_T, where the tax is proportional with the length of the stay. This limits the overnight stays to Q^*, with a price of P^*, reducing the amount of overnight stays and increasing the price. Individual who are only interested in staying one day will only pay the price of P_F, whilst the tax is levied on those staying longer.

Effectiveness

The effectiveness of this instrument lies in the ability to influence nights spent at the location. A consequence of the two-part tariff, is that it is no longer indifferent to the tourists whether they spend 6 days in the park during one single trip, or if they travel twice and spend 3 days each. This second alternative, for the same price on the tourism product, become more expensive due to the two-part tariff. Hence, by means of fine-tuning the two part of this tariff, the destination could control, at least partially, the average length of stay of tourists, and thus choosing the favor certain types of tourism rather than others. In this way, the two-part tariff can be adjusted

flexibly in order to meet the aims of the managers. The externalities produced by tourists can be divided into two classes: a) those that are mainly associated with the movement of tourists, measured by arrivals, congestion in transport terminals, and traffic jams; b) those that are mainly associated with the presence of tourists, like cost of trash collection and use of water. If the externalities are mostly type a), the national park can impose a relatively high fixed part F, with respect to t, in order to discourage "hit and run" tourism, or in the extreme case, that of same-day visitors. If the externalities are mainly of type b), the national park can weigh more the variable component t with respect to F, in order to diminish the average length of stay of the tourists that tend to stay much in one place (Candela & Figini 2012). This can affect both congestion at places and the waste accumulation.

A two-part tariff can be important as it allows for targeting different aspects of the overcrowding problem, with the flexibility to alter the pricing according to the problem. The ability to set boundaries in order to collect the fees can again become of great concern with regards to the effectiveness. The possibility to control separately the number of arrivals and the amount of days, depends on the different impact of these variables on the visitor's utility. If the tourist can easily rearrange their holiday, by decreasing the number of arrivals and correspondingly increasing the length of stay, there can be an increase in the entry fee (Figini & Scorcu 2009).

Equity and distribution

With regards to equity and the distribution of the revenue generated, the concerns are the same for two-part tariffs as with taxes and charges. Nevertheless, arguments could be made that residents would favor a low entrance fee, with higher overnight taxes, as they might not need to stay overnight. Overnight taxes could also be collected at campsites or hotels, leaving the local residents to only pay the entrance fee. With regards to the polluter pays principle, the instrument can be adjusted to target the type of tourist that causes the greatest externalities, be that one-day tourists or overnight tourists. Furthermore, the externalities of tourism are associated with different parts of the tourism experience. Overnight stays might lead to increased water consumption and more waste, while other costs might be linked to arrival, including parking, traffic and pollution. With two-part pricing the destination can control, with the use of the fixed and variable components of two-part tariffs, the average length of the stay (Figini & Scorcu 2009).

Transaction Costs

Transactions costs with this pricing-mechanism are related to the costs of monitoring the length of the stay and the collection of revenue. How will the revenue per night be gathered? Do the visitors need to know prior to the time of the stay, or is this considered at exit? The revenue per night could be collected as an overnight tax at hotels. However, where backcountry camping is allowed, the matter becomes more complicated. As with other user fees, there are extra costs of setting barriers where needed in order for the instrument to be effective.

Peak-load pricing

Similar to price discrimination between different consumers, managers can also choose to charge different prices during different seasons, i.e. peak-load pricing. This involves charging tourists different prices, at different seasons, that better reflect the marginal costs of production. High seasons lead to higher marginal costs of production or leads to scare capacity and therefore higher prices. Airlines and ski lifts are already reflecting this in their prices, but the concept can easily be used when deciding on price for entrance to environmental sites or camp sites. Peak-load pricing has been used in Tasmania in the case of park entry fees. The parks charged a higher fee in holidays, AU$12 versus AU$ 5, and AU$30 versus AU$9 per vehicle. Similarly, the White Rivers National Park in the United States has charged a US$5 fee per person on weekend for cross-country skiing and snowmobiling, but only a US$2 fee during the week (Eagles et al. 2002; Lindberg 1991).
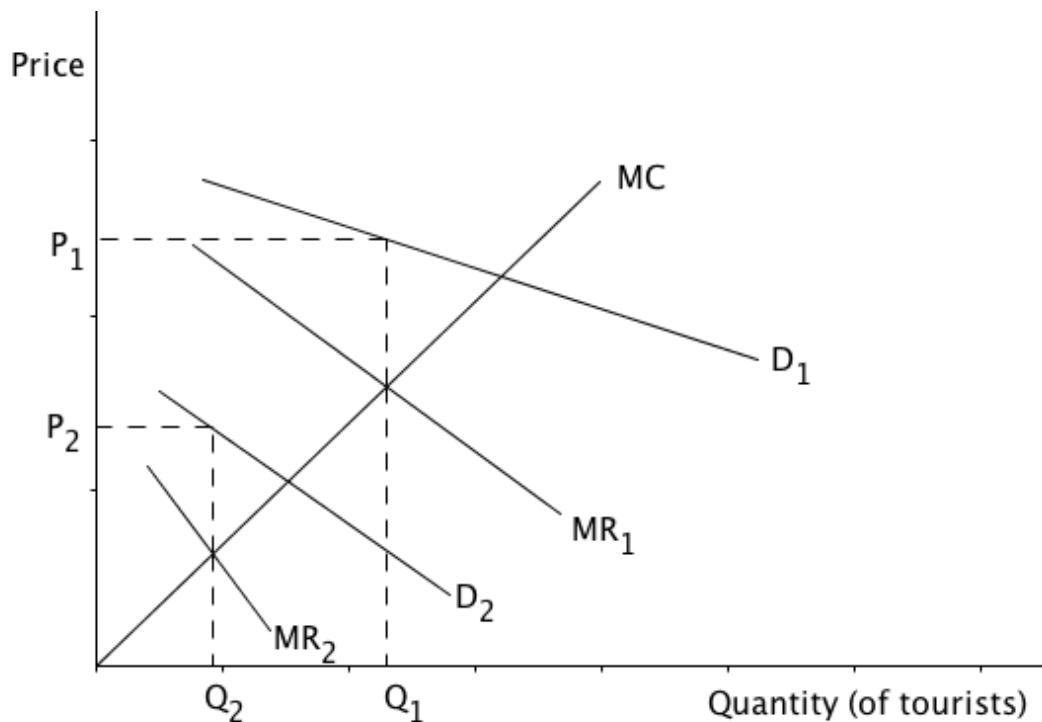
Figure 3.8: Peak-load pricing as illustrated by (Dwyer et al. 2011)

The figure shows how a destination could charge different prices at different seasons, with regards to the different demands. A profit-maximizing destination would charge P_1 during the peak season when the demand is high, but only P_2 at off-season because of the low demand. This would result in a number of tourists equal to Q_1 during peak-seasons, and Q_2 during low-seasons. In this way, there is a higher price when the demand is high, and there is experiences greater negative impacts on the environment.

Effectiveness

The effectiveness of peak-load pricing is related to the ability to distinguish the different demands for different seasons. Peak-load pricing allows for charging high fees, when the demand is higher, and lower fees when there is a lower demand. In this way, the pricing can be used to redistribute some of the tourists to low-seasons or other attractions, smoothing the overnight stays across the different seasons. In this way, the instrument reaches the goal of reducing overcrowding

and limits the visitation during periods of high demand. Together with this, the destination could introduce suitable infrastructure and accommodations for tourists throughout the year, as well as investing in marketing activities aimed at informing tourists about new opportunities and low prices (Candela & Figini 2012).

Equity and distribution

This pricing has same concerns of equity as other charges towards visitors. In addition, local residents live close to the destination all year around, and have the ability to use the natural area during low-seasons of lower prices. In this way, peak-load pricing can be perceived as more "fair", then other types of user charges. However, fairness problems are still linked to the ability to use the resource all year around.

Transactions Costs

Transactions costs are the same as for other types of multi-tiered pricing.

3.4   Application of Policy Instruments

Type of Policy Instrument	Criteria
	Effectiveness
Tourist Quota	• Effective in limiting number of tourists and crowding • Uncertainties of carrying capacity can limit effectiveness • Depends on how the quota is allocated and where it is set • Dependent on political system of the country
Redistribution	• Concentration strategies can be effective in limiting damaged area • Can be effective in smoothing the overcrowding
Taxes	• Will internalize externality, but will not affect visitor number unless large • Difficulties linked to estimating costs of externality • Depends on the elasticity of demand • Question of where the tax is allocated • Hard to avoid
Entrance Fee	• High fees can contribute to lower visitor numbers and can redistribute visitors to other cheaper areas

	• Depends on ability of setting barriers to collect fee and costs linked to it • Ability to collect charges and monitor entrance
Multi-tiered Pricing	• Effective in limiting total tourist numbers and overnight stays • Based on ability to act as a monopolist • Flexibility in type of tourists and externalities to target • Higher price where the demand is higher, allowing for redistribution across time and space
	Equity and Distribution
Tourist Quota	• Question of historical rights to the area • Distribution of nature rent of quota • Nature should be free for all
Redistribution	• Concern of local people in congested area • Concern of moving tourists to new, more delicate cultural and environmental area • Does not restrict anyone from access
Taxes	• Polluter Pays Principle • Makes tourists pay for public services • Distribution of revenue – importance of earmarking for conservation • Psychological contract of taxes
Entrance Fee	• Polluter Pays Principle • Concern of "double-tax" for residents • Discriminating low-income groups • Historical rights to the area
Multi-tiered Pricing	• Polluter Pays Principle • Tourists pay higher fees than residents, as resident already pay for public services – depending on where the price is allocated
	Transaction Costs
Tourist Quota	• Costs of implementation, monitoring and enforcement • Costs linked to the ability to set barriers and boundaries
Redistribution	• Marketing costs • Costs linked to allocating zones
Taxes	• Costs depends on whether there is an existing collection system, or whether there is a need to establish new systems • Low costs of monitoring and enforcement
Entrance Fee	• Setting barriers and establish systems for collection of fees • Costs linked to monitor and enforce fees
Multi-tiered Pricing	• More complicated to administer that regular user fees

| | • Ability to distinguish different elasticities |
| | • Monitoring and enforcement (length of stay) |

Table 3.1: A summarize of the different policy instruments with respect to the three criteria used to evaluate the characteristics of the instruments.

In discussing how the different instruments relates to effectiveness, it is important that the objectives of the policy makers are clear, as the effectiveness is based upon the instruments ability to reach these objectives. . The main objective of this thesis has been how to reduce and limit the problems of overcrowding, i.e., the different externalities because of too many tourists compared with the carrying capacity. As the consequences of overcrowding are multiple, the policy maker needs to decide upon which of the negative externalities causes the biggest problems for natural area. Different problems, calls for different instruments. If the main problem is to limit tourism flows, command and control instruments such as tourist quotas might be the most effective, while if the aim is to improve the natural area to account for bigger groups of tourists, economics instruments such as taxes and charges might be better as they have the ability to generate revenue needed for maintenance and development.

Further, we see that there are great concerns of the different instruments when considered equity and distribution. Historical rights to the area is an important issue, especially regarding tourist quotas and user charges. These instruments are dependent on forms of barriers to the natural area, and therefore has the ability to exclude people. A question which arises is if whether indigenous communities and other local people who have historically used the area should get special rights. These rights can, among others, take the forms of property rights, compensation through subsidies and exclusions from the regulations.

Another major equity concern is the exclusion effects on lower-income people. This holds especially for economics instruments, as they intend to exclude groups with low willingness to pay through high prices. However, as we have seen through multi-tiered pricing, price discrimination can address some of the equity concerns, targeting groups with less elastic demands. Pricing can also be set in a way where the local residents pay the same for a year for entrance, as tourists would do for a couple of days. Economic instruments are also favored on equity concerns as they are linked to the polluter pays principle. Moreover, the revenue generated could be further used to improve the overall welfare of society.

With regards to transaction costs, most of the costs are linked to implementing the policy and regulation of it. A major concern for tourism quotas and user charges is the ability to create barriers, in order to be able to regulate entrance. If entrance is regulated through prepaid permits, then the costs are related to the ability to enforce, monitor and control these permits. In a case where user fees and quotas cannot be enforced, taxes might work better as they are harder to avoid. However, the costs of all instruments are linked the existing infrastructure for collection, and whether new bodies or collection point have to be introduced in order to regulate. Information gathering can also become a cost, but this holds the same for both quantity and price based instruments.

In order to achieve high effectiveness, it is important to target the negative externality as directly as possible. Carrying capacity is linked to exceeding various thresholds, generating negative externalities. As we will see in the table below, different dimensions might call for different instruments. In this table, we have applied the policy instrument to the four dimensions of carrying capacity which we introduced in Chapter 2.

Dimension	Policy Instrument
The Ecological Dimension	- Tourist quotas – Limiting visitation and group sizes - Distribution - Limit visitor concentration to one area to protect the other area - User charges and taxes – Increase carrying capacity and improve facilities
The Physical-Structural Dimension	- Taxes - User pays for public services - User charges – Prices on parking, rentals, facilities to change behavior ➔ Revenues generated used to improve infrastructure and facilities
The Psycho-Social Dimension	- Tourist quotas – Deal with queueing, group sizes, ratio of tourists to locals. - User charges – change behavior, smoothing seasonality - Taxes – acceptance of locals

	• Distribution – congestion concentrated to one area
The Polluting Dimension	• User charges • Taxes ➔ Pricing to change behavior and psychological contract • Education and codes of conduct – awareness of littering and other polluting behavior

Table 3.2: Application of policy instruments to the four dimensions of carrying capacity

In the ecological dimension, we find some of the negative externalities which might be of the greatest concern for tourism development. Implications of the physical degradation taking place and the adverse effects stemming from trampling and recreation, might destroy the ecosystem, and the flora and fauna found there. Under some circumstances, the ultimate objective might be to limit the number of tourists allowed within the area, in order to reduce the impacts of these tourists. The introduction of tourist quotas might be the best option when it is critical for numbers to be limited. Likewise, this might be popular in order to avoid visual pollution from tourism facilities and infrastructure. However, the severity of the problem needs to be considered, and in some cases it can be possible to support increasing numbers of tourists, as long as the rights measures are taken in approving facilities, infrastructure and education. If this is the case, economic instruments might be a better approach, as they can generate the revenue needed to order to cope with larger numbers of tourists. Redistribution strategies can also be used in order to confine the environmental impacts within a small area, and by that reducing the impacts on other natural area. In this way, commercialized area can be created, that can sustain great numbers of visitors, while leaving the greater part of nature "wild".

When it comes to the physical-structural dimension, the negative externalities are tied to the pressure on infrastructure, services and facilities. These can easily be improved or expanded to cater for larger visitor flows. However, concerns must be taken to how much improvement is economical, as tourism is often seasonal. With regards to this dimension, taxation might be the best fit. By taxing tourists, the tourists are now also paying for the services provided to them, and not just the local communities through indirect taxes. User charges can also be effective in that it

can raise revenues to better cater for tourists. There are also positive externalities linked to this dimension, in that improved services can be seen as a benefit to the local residents.

In the psycho-social dimension the overcrowding and congestion itself, is seen as intolerable by both residents and tourists. The case could be that the local residents or other tourist experiences are negatively affected by crowding and having to wait in lines. Other concerns are also the effects tourists has on the local culture and how they behave when visiting. To deal with this dimension, quotas on total numbers, limitation on group sizes or limitation on time spent, might be the best instruments in dealing with the overcrowding. In this way the pressures of tourism flows can be more evenly distributed. Peak-load pricing to redistribute tourists across seasons can be a good option, reducing the pressures in high-peaks. However, also taxes and charges can improve the negative impacts in this dimension, as local residents might tolerate tourism better if they know they benefit from them and that they are paying for the costs they bring with them. Educational instruments and codes of conduct might also make the tourist experience more pleasant, and can reduce the impacts on culture. Redistribution strategies like concentration strategies can also be used to confine the adverse impacts of tourism to a smaller area, in order to reduce the pressures on local communities.

In the dimension of pollution, different measures can be taken to deal with the different negative externalities of pollution. Pollution such as waste and littering can be fairly easy taken care of through proper infrastructural systems and facilities and through the education of tourists. Economic instruments can be used to generate revenue to improve such systems or to build appropriate facilities, such as toilets, and they can further be seen as a psychological contract with the tourists. Now that they have to pay, and might understand that there are environmental consequences, they might be more considerate. When it comes to pollution stemming from private vehicle use, extra charges or taxes on vehicles might influence the behavior of the tourists to choose public transportation. Revenue generated can further be used to improve the public transportation infrastructure, so that there is less need for private vehicles. Marketing and educational instruments could also be used to create awareness of the problem with pollution and to guide towards more sustainable approaches.

4 Conclusion

The steadily increasing tourism flows have become of great concerns to countries experiencing high pressures of nature-based tourism. Overcrowding and congestion have become major concerns, influencing the tourists experience and the environment, bringing with them numbers of negative externalities. Nature-based tourism takes place in areas where it might destroy the very natural components that it is based on in the first place. Through our thesis we have seen that overexploitation and degradation will occur in the case of free access to the natural resources of tourism, and it becomes crucial to estimate a threshold level for which tourism can be sustainable in the long-run. The overcrowding are market failures, with the externalities not internalized in the market price. Furthermore, we have introduced different policy instruments which can be used to regulate the market, and to internalize the negative externalities. As tourism is a complex phenomenon, with possible impacts on the destination in multiple ways, our discussion has shown that the different instruments used should be aimed at targeting the externality considered. As overcrowding is related to multiple externalities, trade-offs need to be made and objectives need to be stated clearly. As we have seen, the relative benefits and costs need to be asserted, with the aim of the benefits of the regulations surpassing the deadweight loss of regulating. We have seen that taxes and user charges might reduce the private welfare, but that it increases the aggregate welfare of the society, which is the justification of the policy intervention. This again can be further improved if revenues generated are used for conservation.

Governments and tourism firms often fail to consider the full picture of the product they are offering and the impact of tourism on the natural resources, prioritizing the short-term benefits stemming from tourism. Accordingly, conservation of the environment is compromised. A crucial issue of the effectiveness of the instruments discussed, is that there is an implicit assumption of an identifiable limit of carrying capacity, which the instruments will prevent from being exceeded. There is a practical difficulty of ascertaining the allowable environmental damage, which is the foundation of the concept of carrying capacity and an environmental target. The economic optimum at which the instruments is meant to guide towards, does not necessarily accord with optimal position propounded by other disciplines, such as ecology (Auerbach & Smetters 2017).

In choosing between command and control instruments versus economic instruments, it is neither easier nor harder to set the right prices than the right quantity, and there is no basic rationale

towards selecting one of them. However, as Weitzman (1974) pointed out in his article "Prices vs. Quantities", there tends to be a preference of quantitative measures when the marginal benefit curve is steep, relative to a flat marginal cost curve, and a preference for economic instruments when the marginal benefit curve is flat, relative to a steep marginal costs curve. This means that when there is uncertainty about the costs of abatement, a tax could fix the problem and leave the quantity uncertain, which could be a problem when we have a threshold quality, this is linked with a steep benefit. In contrast, quotas could be a problem when the costs are steep (Auerbach & Smetters 2017; Weitzman 1974). However, this is an oversimplification of the price instruments versus direct instruments, but it teaches us that sometimes one instrument might be better, whilst sometime a mix of different instruments are for the best (Auerbach & Smetters 2017).

Our study shows that different instruments can be applied to different externalities. Whilst tourist quotas might be more effective in limiting the negative impacts of increased tourism, taxes and charges might generate more revenue allowing for greater political acceptance, and with the ability to increase the carrying capacity of the area, making it equipped to support larger flows of tourists. There is not one ideal instrument that can deal with all the negative externalities of tourism, and the question becomes what mix of instruments are the best to deal with the different problems. This further shows that the choice of what policy to apply needs to be considered related to the objectives. There is a trade-off between the different instruments that must be made, with regards to the different criteria, and the choice of instruments will depend on the relative weight attached to the different criteria.

A potential of regulating tourism is that policy makers might aim to reduce the deadweight loss and the costs of regulation, and thereby will aim for profit-maximization with targeting tourists that are willing to pay more for the service. This is the case especially when the owner or manager of a natural attraction can act as a monopolist. However, as we have seen, this aim need to be regarded against principles of equity. In order to decide upon how to regulate the natural area, the concerned natural area and the circumstances the instruments will be provided in, needs thorough considerations. Considerations need to be done about the ability and the rate of the nature to regenerate itself. Other consideration are linked to the characteristics of the political system, the ethics and value of the society, the costs of monitoring and enforcing, costs and benefits to the economy and the different property rights need to be taken into consideration in the choice (Theobald 1998). One way to look at the problem would be to follow the Tinbergen rule, which

states that for each and every policy target there must be at least one policy tool. If there are fewer instruments than targets, the same policy goals will not be achieved. In our case, some instruments might meet more than one target, whilst in some cases the instrument meeting one target, might make it more difficult to achieve another target. Managers need to realize that there is not a single policy than can solve all the issues stemming from overcrowding, but that a series of instruments need to be employed (Knudson 2009; Tinbergen 1954).

This thesis has been limited in only considering the negative externalities of tourism, but it must be recognized that there are great positive impacts and externalities as well. However, in order to get a closer look at the problem of overcrowding, we have only considered the negative impacts and how to regulate these. Furthermore, there are also negative impacts of tourism, that are linked to other problems than overcrowding, such as air emissions from flying, which need to be considered, and other instruments might be more prober to deal with these, such as tradable permits or taxes on emissions.

Further research need to be done with regards to the possibilities of determining a threshold level at tourism destination and to assess the different negative externalities of tourism. There needs to be a thorough research on different cases tied to the different instruments, assessing the implications of the policy of choice and the results with regards to different criteria in the long-term. It is important that the different objectives and aims of the policy are debated, as different instruments are better suited to serve different objectives. As many countries have already implemented a large variety of the policies, studies of empirical data with regards to willingness to pay, fairness and effectiveness, need to be discussed further, in order to understand how the policy can work the best, and what policy to choose.

We started off comparing the flow of tourists to a flow of water running down a river. We see throughout the thesis the importance of guiding the river, in order to avoid flooding. As with water, tourism comes with great benefits and has been an important industry, especially for developing countries. On its own, tourism is neither bad nor good. However, the tourism industry can have good or bad impacts, and the governments are central in determining the outcome (Becker 2013). There are multiple of policy instruments and alternative ways to deal with overcrowded tourist destinations, and what is rights for one destination, might not be the case for another. Nevertheless, doing nothing might be the worst alternative.

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