



A market-based proposal for encouraging water use efficiency in a tourism-based economy

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ABSTRACT

Barbados is almost wholly reliant on groundwater as its source of water largely due to replenishment during the wettest 1–3 months of the year. Annual renewable freshwater resources place it in the top 15 of the world's most water scarce countries. Acknowledging the scope of the problem, government officials have noted that the amount of water available for economic activity has become very limited and might therefore affect future development. Most of the proposed measures to date have focused on mains replacement and increased energy efficiency but little thought has been given to demand-side management. This study therefore attempts to provide a framework for managing the water resources in the island's single largest industry: tourism. It is conceptualised that a system of tradable permits would not only enhance the management of water resources, but should also reduce the cost of water resources to hotels.

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1. Introduction

1.1. Promoting water use efficiency

Barbados's climate tends to be one of the main attractions as a tourist destination (Moore et al., 2009). The island's main tourist season occurs between December to April, when climatic factors are most favourable: warm temperatures and little rainfall. While these characteristics may be appealing to tourists, they have also resulted in significant stress on the island's scarce water resources. BWA (1997) estimates that hotels account for 12–15 percent of total water consumption (not including use for golf courses, which are usually supplied via hotels' private wells and is largely unaccounted for). As more tourism-related development takes place in the future, it is likely that the domestic water system could come under significant stress. At present, there is no system in place to encourage water use efficiencies, as extractions via private wells are loosely monitored and access charges to the local water distribution system do not reflect the economic cost of water provision.

Common approaches to encouraging efficiency of resource use include the provision of fiscal incentives, awareness campaigns or certification schemes. Each approach has its merits and at their core

they share a common element that at a particular stage there will be some level of pay-off.

Awareness campaigns in the hotel industry have taken the form of encouraging guests to minimise their in-room water use as well as programmes such as not changing towels unless guests specifically ask. The effectiveness of such programmes, however, is sensitive to factors such as how the message is conveyed to hotel guests (Shang et al., 2010). While these measures can potentially be effective, they are passive approaches and limited in scope. An alternative is to try to increase awareness of the importance of minimising water use among hotel employees. Here, research has shown that the effectiveness is positively correlated with the attitude of top management (Park, 2009), as it requires a high level of involvement of management and leadership to ensure that it succeeds.

An increasingly popular measure is for hotels to adopt some form of environmental certification (Priego and Palacios, 2008), whether Ecomanagement and Audit Scheme (EMAS), ISO 14001 Environmental Management, Green Globe certification or other similar schemes. The effectiveness of these programmes appears to be mixed. On the one hand, Font (2006) suggested that "there is no systematic set of data that can demonstrate just how effective, and cost-effective, certification is for improving environmental, social, and economic performance," while Chan (2011) concluded from his study that small- and medium-sized hotels face obstacles in implementing such systems. Evidence from Barbados of the impact of environmental certification on resource use has suggested that there was no difference to overall resource use between

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certified and non-certified hotels (Charara et al., 2011). In contrast, there does appear to be growing interest among hotel chains to adopt forms of certification as a means of improving performance and image (Ibis, 2008; Font, 2006). Ayuso (2007), in a study of the Spanish hotel industry, concluded that environmental management systems appeared to be the most promising voluntary policy instrument but that there was a need for assistance and support to overcome the practical difficulties and high costs associated with adoption.

Incentive programmes often take the form of tax credits or subsidies on water-saving technologies. Implementation costs are the main hurdle in relation to the adoption of such policies, particularly for small states such as Barbados. Small states often face constraints in relation to socio-economic conditions, external debt ceilings as well as limited economic diversification. These characteristics often make revenue-raising measures a key part of fiscal management (Codrington, 1989). The evidence in relation to the effectiveness of such fiscal incentives has also been mixed. Walsh (1989) as well as Dubin and Henson (1988), for example, both highlight the ineffectiveness of tax credits as a tool to induce conservation investment while Hassett and Metcalf (1995) found some benefit associated with tax credit programmes.

In terms of costs and benefits of the various measures described there is minimal published material. The costs associated with increasing awareness among guests are relatively low and depending on communications design, the returns can more than justify the initial expenditure. The costs of increasing awareness among staff on an on-going basis would be more and no studies of this appear to have been undertaken. The costs and difficulty of implementation are the main barriers to the adoption of environmental certification schemes (Ayuso, 2007; Chan, 2011; Charara et al., 2010). Programmes that encourage the installation of water savings devices have been shown to have relatively short payback periods and do result in tangible costs savings. The problem with the adoption of any of the above measures lies in providing the motivation and creating the right conditions to encourage their uptake by hotel managers.

Given that the effectiveness of the approaches outlined above is uncertain, this paper conceptualises a market-based approach to encouraging water-use efficiency in the hotel industry. It does so not as a substitute but rather as a way of supporting the adoption and implementation of other water-saving measures by managers. It also provides an additional instrument available to authorities as they seek to encourage sustainable resource use in a dynamic and cost-effective manner, as advocated by Gunningham and Grabosky (1998) in their discussion of 'smart regulation'.

1.2. Rationale

Much economic analysis is based on marginal analysis: economic decisions are made to ensure that marginal benefits are equal to marginal costs. Applying this concept to environmental issues (e.g. biodiversity), Simpson (1998) suggests that one could compare the marginal benefit of saving a species relative to the marginal cost (i.e. development opportunities foregone). Without any type of government regulation, however, the marginal benefit a firm obtains from saving a particular species may be relatively small, while the benefits from development could be expected to be quite large. As a result, the firm might engage in "too much" development from an environmental perspective, since it is not accounting for the externalities of its decisions. Even if the firm does attach some estimated economic value to the marginal species, the loss of one species could potentially damage the entire ecosystem. Externalities are non-monetary effects not taken into account in the decision-making process. These non-monetary effects have non-zero costs, but are not priced. Therefore, the market fails to

undertake trades in these areas. Because firms fail to consider these externalities, one can argue that it is in the public interest to regulate any activity that could potentially have detrimental environmental effects.

Government regulation of the use of environmental resources can be in terms of profits, prices or quality of service (Parker, 2002). Therefore, one approach to environmental regulation is to tax those entities that are using environmental services at a rate that would compensate the rest of society for the damage to the ecosystem. Alternatively, one could charge the entity a fee that accounts for the estimated damage to the environment. The main problem with government regulation is that it assumes that government can effectively price the damage caused to the environment. To impose the right tax rate or fee requires government to identify and measure those entities affected as well as measure how much they would have been willing to pay in order to avoid the externality effects or the damages incurred. These costs can be measured using hedonic pricing, the travel cost method or contingent valuation techniques (see Barbier, 1993 for a discussion and application of these techniques). Despite the tremendous benefits of environmental regulation, the empirical approaches to measuring environmental damage are still subject to error and abuse.

An alternative approach to measuring environmental externalities is instead to assign property rights to environmental assets (Simpson, 1998). Taking a broad view of property, it can include both physical and intangible objects (e.g. clean beach, beautiful view, clean air, etc.). If an individual holds a right to a particular property, the economic agent has the right to consume or sell the property. Therefore, if a firm dumps harmful toxins into the atmosphere, this impinges on your property right to clean air, and you as the owner of the property have the right to sue for compensation for use of your property (see *Defenders of Wildlife* (1995) for a practical implementation of this approach). The assignment of property rights is known as a market-based approach, since it shifts the burden of measuring the costs of environmental degradation away from the government towards those individuals affected.

This paper proposes the assignment of property rights to water resources in the hotel industry through a system of tradable permits. The permits provide the rights to the use of amounts of water could be exchanged between willing buyers and sellers within the industry. Efficiency of use is encouraged as surplus units can earn a return on unused water rights while deficit units are encouraged to enhance their efficiencies to reduce amounts spent on purchasing water rights. In addition, caps on use can also be used to encourage increases in efficiency for the industry as a whole over time.

The paper addresses the possible application of a permit system to a single industrial sector – hotels. By its nature it fulfils one of the requirements for a tradeable permit system to work, a large number of diverse actors receiving a uniform product. Apart from domestic demand, hotels constitute the most significant users of potable water from the public supply in Barbados, more than commercial and industrial users combined. That said, there is the possibility the hotels may feel unfairly targeted, though this needs to be contrasted with the favourable fiscal support received from the government. It is likely that the new tourism policy will provide further incentives that support the 'greening' of the sector. Thus not only would the overall burden be minimised but the intention is to promote opportunities for revenue gains through greater efficiency. Many of the efficiency measures would not entail large capital outlays, which might otherwise privilege larger players over smaller operators and it fits with the government's intention of promoting a 'Green Economy'. This study therefore reviews the research on market-based instruments for managing natural resources with an aim of identifying whether or not such an approach can be applied to hotel water use in a small tourism-based economy. The paper outlines how such a system could possibly work as well as simulating potential mar-

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