

WATER RESOURCES MANAGEMENT IN ISLAND ENVIRONMENTS: THE CHALLENGE OF TOURISM DEVELOPMENT

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INTRODUCTION

The availability of water of the right quantity and quality is a fundamental factor in tourism development. An environment rich in water holds great appeal for tourism, yet, tourism can place great demands on water and without great care can contribute to the degradation of this essential resource.

In water-deficient areas of the globe, water availability is a very real constraint on all forms of resource use. Yet, despite its intrinsic importance, water often appears to be viewed as a non-critical factor in the location and scale of tourism developments. This can lead to conflict when new demands are made on scarce water resources for uses, such as tourism, which are seen as non-essential. Nowhere is this more obvious than when proposals are put forward for tourism development in island environments.

In islands of the developed and developing world, resistance is encountered to tourism initiatives seen to threaten established claims on the water resource base. In small island developing states, water has cultural, economic and even religious significance, as well as its role in life support. However, even island countries of the developed world can experience conflicts over limited water supplies. The negative reaction in the Hawaiian Islands to proposals to develop or expand golf courses and tourist resorts, for example, may be partly a reflection of negative Japanese sentiment. It is also based on the perceived consequences for agriculture from increased pressure on water reserves on some of the islands.

The question of how to deal with emerging claims on water resources for tourism is an important focus of concern in the management of small islands. Demands for water to support tourism can become particularly contentious in island environments in developing regions where competition for water is already strong and the need to use the resource sustainably is great.

SMALL ISLANDS AND WATER STRESS

In April 1999, the Commission on Sustainable Development focused its meeting on "Oceans and Seas, Tourism, consumption and Production Patterns and Small Island Developing States" (Upton, 1999). This was only the most recent in a series of international meetings dating from the 1970s, concerned with the problems of island countries. In 1977, for example, the United National General Assembly adopted Resolution 32/185 endorsing an Action Program in Favour of Developing Island Countries (United Nations, 1990). This was in response to their special economic problems, including transportation, communication, distance from markets and limited natural resources. Since then, strenuous efforts have been made on a regional and interregional level to address these shortcomings.

The development potential of small island developing states is restricted in various ways - isolation, exposure to natural hazards, lack of organisational expertise, cultural and traditional barriers, often deficient human and financial infrastructure, and an inadequate biophysical resource base. Not least among these inadequacies is the limited availability of fresh water. Small islands in the developmental stage, in particular, experience pervasive problems with water supply.

Typically, water resource development in island environments must contend with a number of constraints related to:

- Diverse and erratic patterns of precipitation, with sharp demarcation between coast and inland, between coasts exposed to and sheltered from onshore winds, and between different elevations. Islands, especially in the tropics

and sub-tropics, are often affected by severe weather in the form of hurricanes and tidal surges which can lead to damage or destruction of water systems and infrastructure.

- Poor prospects for water harvesting and storage as the island terrain typically does not offer many suitable sites for water storages, catchment areas are restricted and affected by deforestation, which contributes to erosion and sedimentation from rapid runoff. High evaporation rates are a further constraint on water supply in low latitude islands.
- Lack of, or deficiencies in water infrastructure, leading to water wastage particularly in urban centres because of leakage, and little regard for conservation in the absence of effective pricing and cost recovery systems. Provision of infrastructure and refurbishment of systems are frequently hampered by isolation and lags in delivery of materials, shortage of qualified personnel, and a restricted database on surface water and groundwater resources.
- Limited scope for capacity building for human resources in water management, and for education in water conservation. These shortcomings are most obvious in the lack of, or inadequate assessment and analysis of, potential environmental impacts of water development projects.

A particular challenge for small islands developing countries in planning and managing their limited water resources is the provision of water for the development of tourist facilities.

TOURISM DEVELOPMENT IN ISLAND ENVIRONMENTS

A global conference on the Sustainable Development of Small Island Developing States held in Barbados in 1994 highlighted the characteristics and valuable resources of many small island nations (Fagence, 1997). The conference identified a number of priority areas for the small island states, one of the most important of which was tourism development; indeed, for some, tourism was the only development option. At the same time, the Barbados conference recognised that, without proper planning and management, tourism could lead to degradation of island environments. The Commission on Sustainable Development shares this concern and is seeking practical answers to the challenge of finding sustainable forms of tourism for small island developing states.

Without them, the very assets on which much tourism thrives - sun, sand, surf, clean and green unspoilt environments - may become irreparably damaged or disfigured.

(Upton, 1999,32)

The Barbados conference recommended a range of actions directed towards sustainability of tourism in small island developing states. The emphasis was on compatible resource use planning and management within existing cultural and environmental constraints.

Recommendations included:

- Pursuit of mutually supportive strategies for tourism development and environmental management
- Adoption of integrated planning policies
- Mandatory environmental assessments for tourism projects
- Monitoring of the environmental impact of tourism activities
- Development of guidelines and standards for construction, protection of tourism resources, and attention to carrying capacity of tourism destinations

(adapted from Fagence, 1997, 30-31)

Fagence considers that such an agenda represents a considerable challenge to small island developing countries charged with the efficient management of often fragile and vulnerable environmental resources. Certainly, evidence from some South Pacific island resorts (King, 1997) suggests that meeting the challenge may be beyond the capacity of small island nations in that developing region.

TOURISM, SMALL ISLANDS AND WATER STRESS

When island states seek to exploit opportunities for economic development through tourism, increased pressure on water resources is inevitable. Thus, water supply becomes a crucial environmental issue if sustainable tourism development is to be achieved (King, 1997). The inherent constraints referred to earlier are made worse by:

- Increased diverse and more sophisticated requirements for water to service tourist facilities for a more affluent and demanding clientele. Large airconditioned hotels and resorts with a full array of bathroom appliances, along with spas, swimming pools and landscaped irrigated grounds, call for substantial allocations of water to satisfy their needs.
- Higher standards for drinking water quality for tourists. A clean, safe water supply is essential to maintain patronage and requires either upgraded treatment facilities or access to a source of naturally good quality (packaged) water. Either response may lead to conflict over limited water supplies and adversely affect the quantity and quality of water remaining for local use.
- Limited options for sanitation and disposal of water containing wastes. Fragile island ecosystems offer limited potential for disposal of often excessive generation of waste waters from tourism activities. Further difficulties can be encountered in the siting of latrines, septic tanks and other storage or disposal facilities, eg. groundwater contamination, and pollution of shallow sandy soils. Discharge of waste waters to the sea is a frequent response with obvious deleterious consequences for the marine environment.
- Inappropriate institutional arrangements. Whereas full cost recovery in developing island countries is impractical, modest water charges, stepped tariff, structures and metering systems would go some way towards conservation of scarce water supplies. Significant contributions towards costs of provision of water to tourist facilities should be a component of business investment and development plans.

By contrast, in the industrialised world, problems with water supply and disposal of wastes related to development and operation of tourist facilities in small island environments can usually be offset through higher levels of investment and access to advanced technology.

GREEN ISLAND RESORT

Green Island near Cairns, off the coast of far north Queensland, is a good example from the developed world of a tourist resort developed in keeping with best practice environmental management, with attention to siting, design, use of appropriate materials, sources of supplies especially water, and disposal of wastes (Pigram, 1996). Said to be Australia's first 5-star eco-tourist resort, Green Island is built on a coral cay and offers luxurious accommodation under a rainforest canopy. Resort facilities and structures are suspended to protect the delicate ecology of the forest floor, and special design features seek to maximise recharge of groundwater from heavy tropical precipitation.

Implementation of efficient procedures for water management is obvious also in the day-to-day running of the resort. The high cost of importing water 20 kilometres by barge from the mainland calls for optimum harvesting of rainfall. The architecture of resort buildings, for example, is designed to allow direct infiltration of runoff on to the land surface and deep percolation to the underlying aquifer. Grey water from the island's sewerage treatment plant is recycled and reused for toilet flushing, landscape irrigation, and as a reserve for fire fighting.

The tertiary treatment sewerage plant has been designed to handle both the resort's effluent and grey water. Sludge residue from the treatment plant is pumped on to a barge each month and transported to the mainland for processing. Disposal of the sludge on the island could lead to infiltration of phosphorus and other nutrients into the groundwater aquifer and the surrounding marine environment.

Liquid effluent from the treatment plant is discharged to the sea through an outfall pipeline. This involved plotting a course through areas where no coral life existed so that disturbance during construction was minimised. Because of the sensitivity of the coral environment surrounding Green Island, the Great Barrier Reef Marine Park Authority has

set stringent sewage quality standards for nutrient levels. Nitrogen and salinity levels for this outfall are monitored to ensure that there is no effect on nearby coral growth.

TOURISM IN SMALL ISLAND DEVELOPING STATES

The Green Island example demonstrates that given appropriate technology and investment, limitations of water availability and quality in the developed world can be offset, at least in part. Major constraints remain in less developed island states where tourism development must compete for scarce water supplies with other more basic uses. Developing economies, also, often lack the organisational and institutional expertise and commitment to apply financial incentives or sanctions to encourage water conservation.

A particular challenge in the establishment of tourist facilities in small island environments is to ensure that the claims of tourist operations on the island's limited water resources, and the use of water and disposal of waste, do not adversely affect the quantity and quality of water available to traditional land uses and island communities.

In responding to this challenge, a range of opportunities needs to be considered by small island developing states considering the tourism option. These include:

- Improved knowledge and understanding of local communal demands and needs for water in a range of uses, through a survey prior to tourism development
- Identification of additional sources of surface water (including desalination) and groundwater (including induced recharge) and options for water harvesting and storage
- Planning of water supply infrastructure (storage and reticulation) adequate to cope with base demands and peak tourism demands, integrated to service/upgrade community water needs also
- Provision of water treatment facilities with adequate capacity and levels of treatment to service both tourism and island community water needs at a high standard
- Provision of facilities for treatment, recycling and reuse/disposal of wastes and waters containing wastes, according to agreed guidelines for avoidance of pollution to catchments, waterbodies, aquifers, or the marine environment
- Monitoring of performance of water supply infrastructure and treatment facilities to detect and correct deficiencies
- Monitoring of water quality over space and time, following tourism development, including testing of groundwater aquifers for contamination
- Control of deforestation and encouragement of reforestation and integrated catchment management to correct adverse effects on watersheds and water supplies
- Organisational and institutional strengthening and capacity building to enhance water resources management, operations, maintenance and service delivery, and optimum deployment of human resources.

Local action at this level would not only place island communities in a better position to provide for the water demands of tourism, but would also enhance the health and welfare of island populations. Practical questions remain however. Do small island developing states and their policy makers and water managers know where to obtain the technical help and financial support they need; if so, will the support contribute to harmonious accommodation of competing claims on limited water supplies?

A simple, but unimaginative response by small island communities might be to refuse approval for tourism development at the outset because the adequacy of water was in question. However, any decision to exclude tourism

on the basis of some apparent or perceived limitations on the island's water endowment should always be qualified. Improved information and technology coupled with enlightened planning and management of water resources, may permit innovative measures to be implemented and make the initial cautionary reaction irrelevant.

Desalination is a case in point. Largely waterless arid zones have long been considered hostile to tourism development. Even along coastal areas the costs of desalination usually rule out extensive human settlement because of the absence or shortage of fresh water. However, the availability of solar, wind and tidal sources of energy and the promise of new technology are changing the economics of the desalination process. The fast developing resorts along the Gulf of Aqaba and the arid Sinai Peninsula in Egypt are good examples of the expansion of tourism. In some arid coastal areas, experiments are now being made with floating, mobile desalination plants (Technical Editor, 1998). Conversion of oil tankers for this purpose could be advantageous in supplementing water sources for small islands with limited land area and inadequate water resources. A mobile, self-contained processing plant could provide flexibility of supply to isolated areas with fluctuating water demand eg. island resorts, or groups of islands, with a large seasonal influx of tourists.

Aside from technological advances, a range of measures is possible in response to concern over the adequacy of water supplies to support tourism development. Perhaps the most constructive approach is to work towards better use and management of what water is available (Pigram, 1993). More efficient use of water in irrigated agriculture - "doing better with less" - may free up some water for alternative uses such as tourism. Adjustments to the price of water may also stimulate efforts to economise in use, and to recycle and reuse water. A system of tradeable water rights is another mechanism which would permit island tourist developers to enter a water market and bid for a share of available water (Pigram et al, 1992). Again, in some island situations, new opportunities for tourism development can be created by encouraging multiple use of waterbodies.

All of these measures are an indication of the endorsement of the principles of "best practice" in tourism water use and management. To some, the term "best practice," is seen merely as jargon, popular with management consultants. To others, it represents the essential direction which sectors of the economy need to take to become and remain sustainable. In the context of allocating a share of the scarce water resources of small islands to tourism, a commitment to best management practice by tourism developers would help justify their claims on those resources and demonstrate the capacity for their sustainable management.

Small island developing states with finite water resources offer a suitable vehicle for the development of an action plan to facilitate the adoption of best practice in tourism water use and management (Pigram, 1999). The process involves a number of steps, ideally undertaken prior to the introduction of tourism to the island environment.

- Survey of prospective tourism developers to establish their awareness of the need for efficient management of the limited water resources available, and appreciation of the relevance of best practice in their use
- Consultation with leading edge tourism industry operatives and agency professionals to identify and document best practices in water use and management in the tourist sector
- Identification and testing of actions and procedures most likely to be effective in promoting awareness and acceptance of best practice in water management - including incentives and sanctions for non-compliance
- Identification of barriers, impediments and constraints to adoption of best practice - whether personal, economic, social, cultural, or political - and the change agents needed to offset these obstacles
- Introduction of mechanisms for benchmarking to link leading tourism developers to small establishments to encourage adoption and widespread diffusion of successful examples of best practice and innovative techniques in water management
- Establishment of achievement targets, in space and time, and priorities for implementation of best practice (or elimination of worst practice) in the use of water in tourism developments

- Development and application of performance indicators to monitor progress in the achievement of best practice and water use efficiency following the introduction of tourism to the island environment.

Such an action plan is intended to complement environmental impact analysis and, with the endorsement of island communities and tourism developers, should help ensure the establishment and operation of forms of tourism compatible with the limited water resources typical of small island environments.

CONCLUSION

In seeking to introduce tourism to small island developing states, the task confronting developers is to work within the capacity of an island's limited resource base. A key constraint in the establishment, expansion and operation of tourist facilities on small islands is the availability of water. The challenge for the tourism industry is to demonstrate its willingness and capacity to adopt best practice in the sustainable management of the limited water resources at its disposal, relevant to the needs of alternative uses and the island community. In adopting this response, tourism not only justifies its claims on the resource, but becomes a model for other water using sectors to pursue more sustainable water management practices in island environments.

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