SUSTAINABLE RESORT DEVELOPMENT IN SENSITIVE ENVIRONMENTS

HOW CAN TOURIST DEVELOPMENTS IN POPULAR TOURIST DESTINATIONS, SUCH AS THE MALDIVES, ALSO BE SUSTAINABLE DEVELOPMENTS?

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ABSTRACT

Sustainability is at the forefront of discussion regarding the development of our natural environments. With the tourism industry continuing to expand, particularly in developing nations and small island economies, it has become apparent that the sustainability and longevity of developments must be considered.

The Maldives is an example of a nation experiencing accelerating growth within the tourism development sector, with resort development increasing at unprecedented annual rates.

The review of literature and precedent studies establishes an understanding of the current opinions and concepts regarding sustainable development. Alongside this, three resorts, each of different character and concept, have been compared and contrasted to establish the positive and negative effects they are having on the natural environment. Coupled with the three case studies, the theoretical and informative research, as well as smaller examples, forms the basis of a suggested best-practice method of uniting man and nature, and creating equilibrium between development and the fragile environment.

The suggested methods and research show that sustainable development can assist with the protection of the environment in the Maldives. However, its success is dependent on the implementation of practices by both the government and developers themselves. The evidence of sustainability in practice in resort development in the Maldives shows that, through design and planning, the fragile environment can be protected and conserved at the same time as contributing to the Maldivian society and economy.

1. INTRODUCTION

Sustainable development is one of the most well-known concepts of the latter half of the twentieth century. "The term 'sustainable development' first came into prominence in the World Conservation Strategy (WCS) published by the World Conservation Union (IUCN) in 1980".[1]

With traditional tourist destinations becoming less popular places of outstanding natural beauty, particularly in developing countries, have to respond to the pressures of providing good quality yet competitive resorts. Development for tourism is often required quickly and, due to the poor economy of many of these destinations, the costs need to remain low. This often compromises the sustainability of the development, and protecting and preserving the environment is often overlooked as an expensive and time-consuming task.

[1] Reid, D. (1995). *Sustainable Development: An Introductory Guide* (Earthscan, London, 1995), p. xiii

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Tourism in the Maldives, a coral archipelago situated south-west of Sri Lanka in the Indian Ocean, is the main industry and provides a significant percentage of the country's GDP. The Maldives' equatorial climate and coralline geology provides a majority of the coastline with white sandy beaches and some of the most ecologically important coral reefs in the world. As a result of its natural beauty the Maldives attracts an increasing number of international tourists each year, and to accommodate the increasing numbers resorts are being constructed at an increasing speed. As the environment is fragile due to its isolated and exposed position, ecosystems have had to adapt to the extreme conditions and disturbance to them may cause irreversible damage. With tourism development in the Maldives only occurring within the last thirty years, practices are still fairly experimental and only a few of the existing resorts are successfully sensitive and sustainable environmentally.

Aiming to explore the concepts of sustainability and answer the question – how can tourist developments also be sustainable tourist developments in popular tourist destinations, such as the Maldives? – this paper uses comparative analysis of selected resorts in the Maldives and examines their impact on the local environment, which may determine whether tourist developments can be sustainable.

2. THE CONCEPTS OF SUSTAINABLE DEVELOPMENT

2.1 Introducing Sustainable Development

There are many variations on the definition of sustainable development. Adams stated in 1990 that sustainability "represent[s] a response to changing scientific understanding, changing knowledge about the world and its society"[2]. It can be difficult to define 'sustainability' as the term's definition has had to adapt to a changing society with the introduction of new technologies and shifting circumstances. The Brundtland Report, written by the Brundtland Commission, formerly the World Commission on Environment and Development (WCED), convened by the United Nations in 1983, deals with sustainable development and the change of politics needed for achieving it. Its definition has become one of the most commonly cited and states that "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[3].

The United Nations (U.N.) has also become a key player in the field of sustainability and through its sub-organisations, such as WCED and the United Nations Environment Programme (UNEP), has developed and is adapting valid concepts and theories of sustainability on a global level. National sustainability is also a consideration of the U.N.; however, it is commonly left to national and local governments and organisations to coin and implement the overall concepts of sustainability.

Sustainability can therefore be summarised as the maintenance of equilibrium between how current generations wish to live and the resources they require to live comfortably, and what future generations will require to continue to live as successfully and as comfortably as the current generation.

Sustainable development refers to all aspects of development globally and can be divided into three categories:

1. Economic Sustainability
2. Social Sustainability
3. Environmental Sustainability

[2] Adams, W.M. (1991) *Green Development: Environment and Sustainability in the Third World* (Routledge, London, 1991), p. 14.
[3] World Commission on Environment and Development (1987) *Our Common Future* (Oxford University Press, London, 1987), p. 43.

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2.1.1 Economic Sustainability

Economic sustainability is concerned with the maintenance of income and capital over a period of time. It can be achieved by the development of industry and infrastructure in a sensitive and stable manner.

Tourism has directly improved the economies of many of the world's developing countries, such as Thailand and Indonesia; however, the industry is dependent on the economies of developed countries. When long standing industries, such as fishing and agriculture, are replaced by industries such as tourism, which provide an immediate economic gain, there is a danger that traditional skills and infrastructure may be permanently lost. Tourism is a fragile industry – local political or social instability, or natural disasters can wipe out a nation's GDP in a season. The relocation of native people from traditional industries and homes to service tourism can result in loss of homes and income if tourism collapses. Developing a sustainable economy will enable the people of a nation to support themselves indefinitely.

2.1.2 Social Sustainability

Achieving social sustainability and justice can be important for the success of a nation's economy. The elimination of poverty, creation of a stable and secure infrastructure and the protection of cultures can help to achieve social sustainability. Encouraging local enterprises, particularly within the tourism industry, can also contribute to achieving a positive social balance.

Encouraging local ownership can help achieve social sustainability. Ownership may not only be fiscal – engaging local people in the development and maintenance of the resorts will confer a sense of ownership. External organisations developing resorts should be encouraged to support local traditions and industries.

Social sustainability also concerns human equity and health. The Brundtland Report states that "sustainability requires views of human needs and wellbeing that incorporates such non-economic variables as education and health enjoyed for their own sake"[4]. Equal access to infrastructure, health services and education can contribute to achieving social sustainability at local and national levels.

2.1.3 Environmental Sustainability

Environmental sustainability refers to the sustainable use of natural resources, such as fresh water, and applies methods in which the world can continue to develop economically and socially without damaging the planet. The protection of the world's natural environment is important to ensure the existence and success of the human race. Achieving environmental sustainability involves the careful consideration of development locations. Careful planning and long-term considerations are needed when developing industries to ensure natural resources are maintained and not exploited so that industries and communities can continue to survive.

In addition to protecting natural resources through environmental sustainability, the protection of the environment can also be achieved through the consideration of ecosystems and their carrying capacities. The term 'carrying capacity' has been defined as "the population of a given species that can be supported indefinitely in a defined habitat without irreversibly altering the habitat"[5]. An ecological system can withstand a certain degree of use and exploitation. Beyond this degree the system is unable to regenerate and begins to deplete and disappear. It is important to consider the effects on the entire surrounding environment, rather than just the local environment when developing an area to ensure sustainable development.

In addition to this, many environments have evolved in isolation, such as in the Galapagos Islands, and the introduction of tourism can often jeopardise the success of an ecosystem. Proprietors of resorts often introduce alien plant species to their resort landscapes which can instigate competition between the introduced species and the native species, damaging the natural environment and, in many cases, introduce pests and diseases to which native species are unaccustomed. This can consequently accelerate the damage of natural environments and ecosystems.

The success of each category is dependent on the success and the characteristics of the others. Sustainable economic development can only be achieved when social development is sustainable and secure, and sustainable social development can only be achieved when environmental resources and conditions are satisfactory.

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[4] World Commission on Environment and Development (1987) *Our Common Future* (Oxford University Press, London, 1987), p. 53

[5] Brown, K. et.al. *Tourism and Sustainability in Environmentally Fragile Areas: Case Studies from the Maldives and Nepal* (The Centre for Social and Economic Research on the Global Environment, East Anglia, 2007), p. 2

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In practice there is no simple answer to achieving sustainability. In many cases its success may be subject to specific regional or local conditions, which should be considered during the developmental process.

3. SUSTAINABLE TOURISM

Tourism has greatly affected the sustainability of local environments, economies and communities. It has become one of the world's largest and fastest growing industries, with almost all of the world's nations encouraging its growth.

3.1 The Economy and Development of Tourism

The introduction of tourism can have enormous benefits to a country's economy, such as the alleviation of poverty through job creation for locals and subsequent improvements to infrastructure and services. However, the importance of economic growth must remain hand-in-hand with social and environmental development as without such balance, tourism can be destructive with the effects only seen in the long-term. Ensuring a balance through the concepts of sustainable development will enable the economy to continue to thrive alongside the development of culture and the protection of the environment and natural resources.

The economic gains from tourism often seem to outweigh the importance of sustainable development. The need to build quickly and to collect immediate economic revenue from the industry have meant that the values of sustainability have become secondary to the development.

However, Selman states "sustainable development does not necessarily mean having less economic development"[6]. Environmental sustainability can be both cost effective in the long- and short-term. In the long-term, it can help to prevent the depletion of natural resources and, in turn, reduce import costs. In the short-term developments can be designed around existing natural features keeping replanting costs low.

3.2 Island Development

Many island nations have embraced development for tourism in order to benefit their economies; however, many islands seem to have difficulty in achieving a balance between economic development and environmental protection in practice. Islands generally have limited development space and, in most cases, have approached development for tourism in the form of resorts to control and contain the industry.

Resort tourism in small island economies can limit opportunities for local economic development as communities cannot always benefit from introduced infrastructure or create small enterprises which directly tap into the industry. Islands also have limited natural resources which can easily be exploited and diminished if development is not environmentally sustainable. The exploitation of the natural environment and resources can, in the long-term, result in increasing economic loss. In the case of the Maldives, desalination and bottled water imports have had to substitute the depleted fresh water supplies, which can become extremely expensive.

In the case of island development for tourism, it is imperative to the country's economic success to encourage and initiate sustainable development. Environmental sustainability is particularly important in island development to maintain and build upon existing resources, thus keeping the location a desirable resort capable of supporting the local economy.

3.3 The Importance of Sustainability in Resort Design

Areas which are of ecological interest and have natural beauty will attract tourists and, therefore, have an economic value. Achieving sustainable resorts can be a difficult task as the requirements for infrastructure and comfort can often compromise the protection of resources, societies and the natural environment.

The availability of resources to a resort is perhaps the most important consideration when developing an area for tourism. With careful planning at the design stage a resort can function without exploiting resources, such as water supply, and be cost-efficient in the long-term. The design of a resort should take into consideration the existing natural environment within the development area in order to ensure the success of existing ecosystems, as well as visitor appeal. Natural succession is likely to continue on site whether or not it is interrupted by development and assets, such as beaches, should be maintained in an environmentally

[6] Selman, P. (1996) *Local Sustainability: Managing and Planning Ecologically Sound Places* (Paul Chapman Publishing Ltd., London, 1996), p. 13

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sustainable manner. This will help to ensure that the development is not at risk from natural disasters, as well as proving facilities for its potential users. The conservation and maintenance of coastal and marine vegetation, such as coral and peripheral planting, can often become critical to the security and protection of island resorts. Firaag points out that the "change of coastal vegetation adversely affects erosion and accretion patterns"[7]. Coastal erosion can be accelerated by the removal or disturbance of coastal and marine vegetation during island development, and can potentially increase a resort's vulnerability to devastation by natural disasters.

When providing open or 'natural' areas within a resort the replanting of native species can often ensure the success of the landscape design, and are considered environmentally sustainable as they are adapted to the specific climatic and ground condition, unlike introduced species which have a higher risk of failing. In addition to the increased risk of non-native plants failing, there are other dangers associated with introducing non-native species into resort landscapes. These include greater demands on irrigation, potential use of fertilizers and introduced pests and diseases, which could potentially have damaging effects on the local hydrology and indigenous biome.

Sustainable resort development is important in order to secure its success in the tourism industry. When resorts are unsustainable they are unstable and risk losing visitors, damaging their natural assets and depleting their resources. The problem in reality is precisely that lack of sustainability is rarely apparent in the short-term, and it is only in the long-term or in a wider perspective that instability becomes apparent, by which time often much damage has been done.

3.4 Integrating Resorts into the Nation

Resorts are often more successful when planned within the framework of the region. Strategies and frameworks might help to implement overall sustainable development, particularly when introducing and developing the tourism industry. Integration within the region's economy, social structure and environment can ensure the success of a resort's development and its long-term profitability. Enforced governmental legislation can be fundamental to the successful integration of the resort into the national development framework. If visitor numbers increase dramatically to a region due to the opening of a new resort, the international airport and existing transport system must be able to carry the increased volume. Similarly, existing service and infrastructure, such as electricity and waste disposal, must be able to cope with the increased demand. If such aspects are not considered and integrated into the region, the entire system can breakdown and the region may be affected as a whole.

In addition to its integration into regional development plans, the resort should also be integrated into society. This can be achieved through the use of local tradesmen, as well as using locally sourced and sustainable construction materials and traditional architectural styles. This will reduce the impact, both visually and physically, on the environment.

3.5 Recognised Sustainable Resort Developments

The following three examples were identified by the World Tourism Organisation (WTO)[8] in 1992 as examples of well integrated and successfully sustainable resort developments.

3.5.1 Nusa Dua Resort, Bali, Indonesia

In the 1960s the Indonesian Government identified Bali as a logical location to focus their efforts to introduce the tourism industry to Indonesia, and by doing so, initiated a tourism development policy for the country. The development of Nusa Dua Resort was chosen with the aim of creating a working example of successful tourism in Bali, and to become "an integrated high quality beach complex with self-contained recreation and commercial facilities"[9].

The Indonesian Government set out the tourism development policy in which certain restrictions and regulations were applied to the design and construction of the resort, including building height restrictions and open space provisions, which were adhered to during the development. However, there have been a number of problems related to the development which have compromised the resort's sustainability. For

[7] Firaag, I. (1996) *Tourism and the Environment: Current Issues for Management* (Ministry of Tourism, Male', 1996), p. 3

[8] Inskeep, E.; Kallenberger, M. *An Integrated Approach to Resort Development: Six Case Studies* (World Tourism Organisation, Spain, 1992)

[9] Inskeep, E.; Kallenberger, M. *An Integrated Approach to Resort Development: Six Case Studies* (World Tourism Organisation, Spain, 1992), p. 9

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example, beach erosion, thought to be occurring as a result of off-shore reef extraction, is beginning to compromise the resort's sustainability and security.

Although the WTO recognises Nusa Dua Resort as an example of successful sustainable development, stating that "the plan for the Nusa Dua resort has proved to be realistic and successful overall"[10], over time a number of issues have arisen which contradict this statement, as previously discussed. Within the last decade, the Indonesian Government has reviewed its policies on resort and tourism development and is actively encouraging ecotourism in the country. The new policies are providing more opportunities for local people to participate in tourism development, contributing to the overall social sustainability of Bali. In addition to this, the government has created a "tourism builds prosperity and peace" theme to which tourism development should be adhered to, ultimately aiming to implement community based tourism.

3.5.2 Cancún Resort, Cancún, Mexico

In the 1960s international tourism began to develop in Cancún, located in south-west Mexico, and as a result the Government of Mexico developed the National Tourism Plan to control development and ensure its sustainability and that it was well-planned. In order to implement the National Tourism Plan, the government chose to develop a resort in Cancún, hoping to create a functional model for future development.

The Cancún resort development commenced in the early 1970s; however, problems began to emerge early in the development of the resort, such as sewage effluent causing the bordering lagoon to bloom with unsightly and foul smelling algae. Conservation and environmental controls were enforced as a result, and this included the designation of 53 percent of the site as a conservation area, creating greenbelts around the development site, and protecting the underground water system from pollutants.

The WTO recognises that there has been environmental degradation as a result of the development, but recognises the resort as being successfully implanted and sustainable. The government has acknowledged the problems presented by the development of Cancún resort and from other resorts in the region. As a result, they have reviewed their policies and programme accordingly, engaging public and private consultations and meetings in order to identify solutions which will assist in the continued development of the industry. They have identified that they must work will all parties in order to achieve successful tourism growth across the board and stress that a successful tourism industry requires a balance between customer satisfaction, economic growth and sustainability. They suggest in the National Tourism Programme 2001-2006 that they will attempt to fully embrace the concepts of sustainable tourism by identifying the environmental and social problems in development areas and work with them to integrate tourism sensitively in to the country.

3.5.3 South Antalya Tourism Development Project, South Antalya, Turkey

The South Antalya region, located along the Mediterranean coast in south-west Turkey, was chosen as a location for the expansion of the tourism industry by the Turkish Government. During the 1970s the government implemented a number of tourism policies and principles in order to encourage growth to become sustainable, and therefore be beneficial to the country's economy without compromising the diverse environment of the country.

The project, which had a government appointed managerial group – South Antalya Tourism Development and Infrastructure Operations Union (GATAB), began in 1974. Water supply was sourced from the mountains in the area in order to ensure that the project's continuing development would be environmentally and economically sustainable. The project is environmentally sustainable as a result of the careful infrastructure planning, which has also contributed to the ongoing economic stability of the industry. As the government did not substitute traditional industries for tourism the regional economy is not at significant risk of faltering with the fluctuations in the tourism market. Socially, the development has responded sensitively by integrating development into the local architecture and landscape, and its position enables locals to benefit economically from tourism.

As a result of the implementation of the project, the government has seen that careful planning, sustainability and sensitivity to the environment and character can benefit a development more economically than one that has not been sensitive or carefully planned. Since the establishment of the project, the government has adopted an environmental protection law and an Environmental Impact Assessment procedure to ensure that future resort and tourism development in Turkey is as successful as the South Antalya Tourism Development project.

[10] Inskeep, E.; Kallenberger, M. *An Integrated Approach to Resort Development: Six Case Studies* (World Tourism Organisation, Spain, 1992), p. 23

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3.6 Criteria for Achieving Sustainable Resort Development

Expressed in the form of a series of questions, the following criteria focus on achieving sustainability through the planning and design of resorts with consideration for the surrounding environment in which they sit.

- *1. Is the resort unobtrusive within the landscape?*

  a. Does the resort visually blend into the natural environment?

  b. Has the resort used local materials and construction techniques sensitive to the local vernacular?

- *2. Is the development respectful of traditional, sustainable industries?*

  a. Has the introduction of the resort had significant impacts on the existing industries of the local area?

- *3. Has adequate infrastructure been developed for the resort?*

  a. Was existing national/regional infrastructure developed adequately alongside the development of the resort?

  b. Has the resort's infrastructure been sensitive to the carrying capacity of the development area (with respect to natural resources, waste disposal and water supply)?

- *4. Is the vegetation adequately conserved?*

  a. Has the resort introduced any non-native species to the design of the landscape?

  b. Was existing vegetation utilised and conserved?

  c. Has coastal vegetation and ecosystems been adequately conserved? If not, have there been issues with erosion and other natural disasters?

- *5. Has the resort provided any social integration?*

  a. Does the resort provide opportunities for local enterprises, which directly contribute to the local economy?

  b. Does the resort contribute directly to the local society (with respect to economic aid and environmental protection)?

4. CASE STUDY – THE MALDIVES

4.1 Resort Development in the Maldives

The Maldives is a coral archipelago located in the Indian Ocean. Straddling the equator, it is comprised of 26 atolls in which are 1,192 islets, approximately 200 of which are inhabited. The islands vary in size with the largest being no more than five kilometres long and all sit approximately two metres above sea level.

Tourism, which was introduced to the Maldives in the 1970s, has become one of the country's largest industries, contributing to around twenty percent of the country's GDP. The tourism industry markets towards beach tourism, using its geographical position and character as its main asset. The natural beauty of the Maldives has ensured its success in the international tourism sector and is continuing to grow at unprecedented rates. The tourism industry has evolved in the form of resort tourism due to the country's geology and geography, where entire islands are developed for the purpose of a single resort. Islands are usually uninhabited prior to development and the result is that tourists come into very little contact with local communities or culture.

Competition between resorts is immense and new developments compete to increase the standards of accommodation and services. However, this has led to an 'any resort, any place' phenomenon, where the character of a majority of the resorts is the same, rather than taking advantage of the uniqueness of each island and its natural landscape. This means there is little distinction between different resorts and their design seems not to have taken innovative approaches in order to become more desirable or 'better' than

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other resorts. Resorts are often built quickly, in some cases taking less than two years from purchase to full operation and, as a result, costs are kept low and the immediate economic gain seen as the priority.

The Government of the Maldives has developed legislation in order to control the development of resorts. When establishing a resort, an Environmental Impact Assessment must be carried out in order to assess the environmental impacts the development may have on the natural environment. However, this is often conducted by the developers themselves rather than a government official, resulting in many potentially insensitive resort designs being approved without inspection. Legislation limits "the maximum built up area to twenty percent of the total land area" and "all rooms should face the beach, five linear metres of beach line has to be allocated to each tourist in front of their rooms" where only "68 percent of the beach length can be allocated to guest rooms as 20 percent has to be allocated to public use and twelve percent left as open space"[11]. Legislation also restricts building heights to a maximum of two-storeys in order to keep buildings below the natural tree line. All resorts are instructed to install plastic compressors and incinerators to deal with waste within the resort periphery.

The following resort case studies have been selected as they each aim to provide the idealised Maldivian holiday. Each resort, named as Resort A, Resort B and Resort C, was visited for a period of two to three days, examined through field analysis and a representative from each of the resorts was informally interviewed.

4.1.1 Resort A (25 kilometres north-west of Malé), North Malé Atoll

1a. Does the resort visually blend into the natural environment?

The resort buildings are restricted to a single storey and are integrated into the natural vegetation on the island. Densities are controlled within the governmental legislation and results in the built elements of the resort having little significant visual impact on the landscape. Development on beaches has been restricted; however beach front rooms extend onto the shoreline, which may have a negative impact on natural coastal systems.

1b. Has the resort used local materials and construction techniques sensitive to the local vernacular?

The resort's architectural style is typical of Maldivian resort development and echoes traditional architecture found on more remote inhabited islands in the country, using cylindrical building with palm-thatched roofs. Palm thatch is an environmentally sustainable material as palm trees are grown successfully and in abundance throughout the Maldives. Coral is not used in any of the construction or decoration of the resort, which is beneficial to the marine ecosystems as removal of coral can be environmentally devastating.

2a. Has the introduction of the resort had significant impacts on the existing industries of the local area?

The traditional industries of the Maldives include tuna fishing and the exports of coconuts. As tourism has taken over as the main industry in the country, traditional industries have been substituted and are now significantly less funded. This has had both positive and negative implications. The traditional fishing industry, which is sustainable and environmentally sensitive, now receives less funding, resulting in a loss of skilled labour and a greater reliance on tourism to sustain the country's economy. However, coral harvesting – another of the country's traditional industries – is now illegal due to the realisation of its significant negative impact on marine ecosystems. Resort A was an uninhabited island prior to its development for tourism and, along with other resorts in the region, its development has contributed to the loss of the traditional industries in the atoll.

3a. Was the existing national/regional infrastructure developed adequately alongside the development of the resort?

The development of Resort A has not directly influenced the national transportation system. Links to and from the airport are operated by the resort itself using high-speed boats. This can have negative impacts on the marine ecosystem, such as the disruption of sediment causing the suffocation of corals and reduction of fish stocks. The close proximity of the resort to Malé has meant it benefits from a sophisticated communications network with a high carrying capacity which continues to develop with advances in technology.

3b. Has the resort's infrastructure been sensitive to the carrying capacity of the development area (with respect to natural resources, waste disposal and supply)?

[11] Firaag, I. (1994) *Tourism and the Environment: Current Issues for Management* (Ministry of Tourism Maldives, Malé, 1994) p. 4

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The internal infrastructure of the resort has generally achieved environmental and economic sustainability. Desalination plants provide the resort with a water supply, rather than exploiting the limited underground fresh water. Power is generated through solar energy, providing adequate energy for the entire resort. Sewage is treated on the island with the effluent discharged into a regularly monitored area of deep sea outside of the resort's reef. Compressors and incinerators deal with a majority of the island's remaining waste; however a significant percentage is still sent to the nation's 'rubbish island' which receives waste from the entire atoll. The resort could recycle more of the exported waste on-site to help reduce the environmental impacts of the landfill site.

4a. Has the resort introduced any non-native species to the design of the landscape?

The resort has not introduced non-native plant species to the landscape. Areas of natural vegetation which were cleared or damaged during construction were replaced with plant species native to the Maldives.

4b. Was existing vegetation utilised and conserved?

The resort was designed around the natural distribution of the existing vegetation. Large areas on the island have been left to develop into dense natural jungle. The resort does not use any chemical pesticides and, instead, rears chickens to control the native insect population. Natural vegetation in accommodation areas is maintained in order to allow unrestricted use of the developed area, and groundcover vegetation is kept low in order to reduce the mosquito population.

4c. Has coastal vegetation and ecosystems been adequately conserved?

A majority of the island's existing coastal vegetation has been conserved and maintained in order to reduce beach erosion. The island suffers from seasonal sand shifting and attempts to control this have been implemented using temporary sand groynes, which may have a negative impact on the natural accumulation of material. The resort is currently harvesting and replanting corals in areas of reef damaged by El Niño[12] which may help to reduce beach erosion and gradually eliminate the need for man-made coastal protection.

5a. Does the resort provide opportunities for local enterprises which directly contribute to the local economy?

Due to the nature of resort tourism, the resort does not provide opportunities for local enterprises. The resort does employ staff from the local communities; however, this can have a negative social impact as resort workers are separated from their families for long periods of time. There is evidence which suggests that this separation contributes to the increasing numbers of marriage breakdowns.

5b. Does the resort directly contribute to local society (with respect to economic aid and environmental protection)?

Resort A is involved with community development programmes which include the regeneration of isolated island communities. They provide a labour force which helps locals to build homes and schools in remote communities and were particularly active in the post-tsunami reconstruction of a number of island communities.

Resort A presents an example of overall sustainable resort development. There is still room for improvement however, particularly within waste management processes and coastal protection, but it illustrates a working example of sustainability in the Maldives.

4.1.2 Resort B (seven kilometres north of Malé), North Malé Atoll

1a. Does the resort visually blend into the natural environment?

A majority of the resort buildings are two-storey and are, visually, fairly dominant. Although they sit below the existing tree canopy, the clustered layout conflicts with the natural environment. Densities are controlled within government legislation, but on the ground the built environment seems imposing and less integrated into the island character. Development on beaches has been restricted and building are set back allowing a visually uninterrupted coastline.

1b. Has the resort used local materials and construction techniques sensitive to the local vernacular?

The resort's architecture is fairly reminiscent of the remote islands; however the style is fairly unique to the resort. A majority of the public-use buildings have tiled roofs rather than the traditional thatch or more

[12] The term El Niño refers to the extensive warming of the world's oceans and has contributed to the damage and death of many areas of coral reef in the Maldives.

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modern corrugated iron, which is not common in the Maldives. The resort does not use any coral in its construction; however, some landscaped areas are decorated with coral, the extraction of which is extremely damaging to marine ecosystems.

2a. Has the introduction of the resort had significant impacts on the existing industries of the local area?

As with Resort A, Resort B has contributed to the overall loss of transitional industries in North Malé Atoll through the introduction and prioritisation of the tourism industry.

3a. Was the existing national/regional infrastructure developed adequately alongside the development of the resort?

The development of Resort B has not directly influenced the national infrastructure, with transport links to and from the resort operated in the form of high-speed boats by the resort itself, which may have environmental impacts as stated previously. The resort's close proximity to Malé means it benefits from the existing communications network in the area.

3b. Has the resort's infrastructure been sensitive to the carrying capacity of the development area (with respect to natural resources, waste disposal and supply)?

As per government legislation, compressors and incinerators handle some of the waste produced by the resort; however, a significant percentage of waste is still sent to the landfill island. The resort imports its water supply from the capital's desalination plant. Although this is a reasonably environmentally sustainable practice, as the resort is not extracting limited underground fresh water, it could be more economically sustainable for the resort to install an on-site system, rather than paying service and transport charges. Due to the resort's proximity to Malé it uses the national electricity supply to power the island. Malé, however, does not generate energy from solar power; therefore the resort could improve its environmental and economic sustainability by installing solar panels. Sewage is treated on-site with the effluent discharged into deep sea outside the resort's reef. The area is not monitored and the effluent could potentially have adverse effects on the marine environment if it is not treated sufficiently.

4a. Has the resort introduced any non-native species to the design of the landscape? If so, has this been successful?

The resort has used a mixture of native and non-native plant species in areas which were cleared or damaged during construction, and in areas of landscaping. The non-native species have established fairly well and are maintained in order to create an aesthetically pleasing appearance. They do not however successfully match the character of the island and their introduction has also contributed to the decrease in biodiversity on the island. As many non-native plants will require higher maintenance and intensive irrigation, there is a risk of damage to the natural biome and existing ecosystems.

4b. Was existing vegetation utilised and conserved?

Large existing trees and some well-developed, mature existing vegetation were retained during and after the development of the island. A significant percentage of the island has been developed however, with a minimal amount of the island's natural jungle character remaining.

4c. Has coastal vegetation and ecosystems been adequately conserved?

A large percentage of the natural coastal vegetation has been cleared in order to enable visitors' easy access to all parts of the island. This has accelerated erosion and many of the resort's beaches are quite narrow, reducing the island's protection against destructive waves. This may increase the island's vulnerability to devastation by natural disasters.

5a. Does the resort provide opportunities for local enterprises which directly contribute to the local economy?

The resort has a well-established conference centre which is used by local and international businesses. This practice has enabled the resort to achieve a degree of social integration.

5b. Does the resort directly contribute to local society (with respect to economic aid and environmental protection)?

Although Resort B does not contribute through aid programmes as demonstrated by Resort A, its social integration and conference facilities contribute significantly to the local economy by providing a location for business and education on both a national and international level.

Resort B provides an example of successful social integration and sustainability; however, its response to the natural ecosystems and surrounding environment appears to be fairly insensitive and potentially damaging, not only to the resort's economy, but also to its security. Regenerating the coasts, reintroducing native

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species and the designation of vegetation rehabilitation and conservation areas may assist in integrating the resort into the natural environment and improve its security against future natural disasters.

4.1.3 Resort C (19 kilometres north-east of Malé), North Malé Atoll

1a. Does the resort visually blend into the natural environment?

Although the architecture of resort adheres to the two-storey maximum building height, the buildings are large and visually dominant in the landscape. The resort includes 26 water bungalows which, although are fairly popular among international tourists, can disrupt coastal systems. The development occurs in dense clusters spread throughout the resort island, which feel rather imposing.

1b. Has the resort used local materials and construction techniques sensitive to the local vernacular?

Resort C uses a mixture of architectural styles in its development, with a majority of the buildings having tiled roofs which do not particularly match the traditional architecture of the Maldives. The buildings use a mixture of masonry and coral. Although coral was used in the construction of traditional buildings in the past, it is not environmentally sustainable and its continued use has severe implications on the quality and existence of reef systems in the country.

2a. Has the introduction of the resort had significant impacts on the existing industries of the local area?

Similarly with Resorts A and B, Resort C has contributed to the overall loss of traditional industries in the region through the introduction and prioritisation of the tourism industry.

3a. Was the existing national/regional infrastructure developed adequately alongside the development of the resort?

The development of the resort has not directly influenced the national infrastructure of the country. The transport links to and from the airport are operated by the resort using high-speed boats, which may have the same environmental implications referred to previously. Due to the resorts close proximity to Malé the development benefits from the existing communications network in the area.

3b. Has the resort's infrastructure been sensitive to the carrying capacity of the development area (with respect to natural resources, waste disposal and supply)?

The resort follows the government legislation with respect to the use of compressors and incinerators; however a majority of the remaining waste is sent to the atoll's landfill island. The resort imports desalinated water from the capital's plant; however, it could achieve a higher degree of environmental and economic sustainability if it installed an on-site system as previously discussed. The resort has been able to tap into the capital's electricity and communications system. It could be beneficial economically for the resort to install solar panels on-site. Sewage is treated on-site and the effluent discharged into the surrounding ocean. There is no monitoring of the effects of discharging the effluent, which could cause environmental problems as discussed previously.

4a. Has the resort introduced any non-native species to the design of the landscape? If so, has this been successful?

The resort has introduced many non-native species to its landscape, some of which have not established successfully. The failure of the introduced species is likely due to the unsuitability of the ground and climatic conditions of the Maldives. This has resulted in unsightly areas of planting, particularly where large areas of lawn grass have failed and become patchy.

4b. Was existing vegetation utilised and conserved?

Although some mature trees were retained during the development of the resort, a majority of the vegetation has been replanted. As a result, the buildings are more dominant than the natural environment. Areas of mature, retained vegetation have had their shrub and groundcover understorey vegetation cleared, which could have a negative impact on the local ecosystems, disrupt habitats and disturb natural succession. There are no areas designated within the resort for conservation or natural development and succession, which has also contributed to the loss of habitat and degradation of the island's ecosystems.

4c. Has coastal vegetation and ecosystems been adequately conserved?

A large percentage of the natural coastal vegetation has been cleared in order to allow visitors easy access to all parts of the island. This has accelerated erosion and many of the resort's beaches have been lost. Where beaches have been severely eroded, concrete groynes and large boulders have been placed to accelerate

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sediment accumulation to create recreational beaches. As discussed with Resort A, groynes and boulders can have damaging effects on coastal systems, obstructing the natural movement of material along the coast.

5a. Does the resort provide opportunities for local enterprise, which directly contribute to the local economy?

Resort C is a popular surfing location and hosts international surfing competitions. These subsequently contribute to the national economy through increasing visitor numbers during particular seasons and local sponsorships.

5b. Does the resort directly contribute to local society (with respect to economic aid and environmental protection)?

The resort does not contribute to the protection of the local environment or aid to isolated or struggling island communities.

Resort C illustrates an example of a development which has prioritised economic gain whilst inadvertently compromised its own security, as well as its long-term economic and environmental sustainability. The resort is attracting international revenue through sports development and marketing as a surfing resort. This ensures some economic sustainability as the resort is not only relying on tourism for income. The resort's lack of developed natural coastal protection and areas of dense, natural vegetation could potentially prove detrimental to the resort in terms of returning visitors and ecological succession.

4.2 Best Practice Methods

Following analysis of the Maldivian case studies, resort examples and review of literature, the following guidelines are suggested. These guidelines could enable future resort development to achieve environment, economic and social sustainability.

- Development should be preceded by careful strategic planning of the entire region, examining existing tourism locations.
- Infrastructure planning should be sophisticated and should not overexploit non-replaceable natural resources.
- Waste produce from the resort should be treated to a high degree and the effluent disposed of in a controlled and secure manner.
- Water supply should come from a sustainable source, without compromising existing ground water levels or the water table.
- The introduction of a resort should positively influence the existing ecosystems, rather than adversely affect them.
- Architecture should respect the traditional values of the area/country.
- Buildings should be constructed from sustainable materials, local if possible, and from a sustainable source.
- Existing mature vegetation should be protected and any development should be planned around and incorporate the existing natural environment.
- Any proposed planting and landscape design should be sensitive to the natural environment and not pose a risk or competition to existing vegetation.
- Densities of buildings should be controlled, with a certain percentage allocated for conservation and open space.
- The resort should provide benefits for local communities and should not compromise local values, economies or the local people's sense of ownership.

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6. CONCLUSIONS

The current approach towards the tourist industry in the Maldives is evidently both positive and negative. Tourism has benefited and improved the country's economy significantly and will continue to do so, provided that the industry adapts to changing global attitudes towards the protection of the environment and natural resources. However, the prioritisation of tourism over traditional industries, such as tuna fishing, may have negative long-term impacts on both the economy and society. International tourism is highly dependent on the global economy and, as a majority of tourists to the Maldives are from Europe, the volatility and stability of the European market is crucial to the industry. Fully replacing traditional industries with tourism could potentially be detrimental to the Maldives and the tourism industry could have been developed more sensitively, hand-in-hand with traditional industries.

The Maldives could benefit more economically, socially and environmentally from the introduction and enforcement of sustainability practices and longevity in resort design and planning. However, the pressure from competitor resorts seems to overshadow the importance of environmental protection and cultural integration. This may be partly due to the uncontrolled nature of tourism development in the Maldives which, although it is creating more opportunities for local and international investors, can subsequently result in increasing competition.

It is clear that many resorts are responding to competition by developing at high speeds in order to become fully operational and to create immediate economic gain as quickly as possible. Although this does benefit resorts in the short-term, it potentially increases the risks of long-term problems and complications. For example, resorts which have not been designed and planned around the existing vegetation of the site can have environmental problems, such as accelerated erosion and damaged ecosystems. Both can potentially jeopardise the island's security and result in higher costs and reductions in visitor numbers, ultimately damaging the economic growth of both the resort and potentially the region.

Developing and designing resorts quickly can also result in designs which lack innovation and do not take advantage of the unique character and landscape of the Maldives. This can create the 'any place anywhere' scenario, where resorts lack individual character and distinction, and can become generic in design and layout. The creation of a defined character and sense of place through innovative design may help more resorts achieve environmental sustainability and successfully retain island character. In addition, resorts can potentially secure their economy by marketing themselves for their uniqueness and differentiation from all other Maldivian resorts.

Design principals, such as the use of local materials, orientation, landscape design and conservation, can help to ensure long-term environmental sustainability in the Maldives. Utilising existing vegetation can benefit the overall design and draw of the resort to tourists. The humidity of the equatorial marine climate can be lessened by using the existing mature vegetation to provide shade. Mature vegetation also stabilises the ground, in particular coasts and beaches, which provide increased security from tidal surges and natural disasters. Case studies B and C both presented cases of depleted coastal vegetation, and both were subjected to damage from the 2004 tsunami. It is speculative whether the absence of coastal vegetation was a major contributing factor to the level of damage caused in both resorts during the tsunami; however, it is evident that the impact could have been significantly reduced if beaches and coastal vegetation had been present to dissipate wave energy. The use of sustainable local materials in resort design and construction not only helps to protect the Maldives' natural environment, but also assists the long-term maintenance of resorts, keeping costs down, and providing resorts with cheap and readily available materials.

The concepts of sustainability change and adapt continuously as new research and issues are discovered and presented, hence these can alter our perceptions of good and bad design. However, there are basic conditions which are proven to help achieve sustainability in practice. Case study A illustrates how environmental sustainability can be achieved in practice through sensitive design and continued monitoring of the environment port-development.; There are a number of issues within case study A which could be improved through updating practices and technologies; however, these improvements may be fairly recent considerations of sustainability, and the encouragement and involvement of the Maldivian Government can help to continually update and improve legislation and guidelines enabling existing resorts to achieve levels of sustainability. Similarly, case study B, which may not have been successfully sensitive to the environment, has managed to integrate the development and function of the resort into society. Both examples represent the ability of the Maldives to achieve sustainable resort development in practice, and their successes, as well as their problems, should be considered in ordered to develop suitable and up-to-date regulation for future resort design and development in the Maldives.

In summary, sustainable development can assist with the protection of the environment in the Maldives. However, its success is dependent on the implementation of practices by both the government and developers

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themselves. The evidence of sustainability in practice in resort development in the Maldives shows that, through design and planning the fragile environment can be protected and conserved at the same time as contributing to the Maldivian society and economy.

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