



Short Communication

Environmental Impacts of Tourism and Management in Maldives

Suresh Kumar Kundur^{1*} and Dr. Krishna Murthy²

1-Research Scholar, Department of Studies in Geography, University of Mysore, Mysore

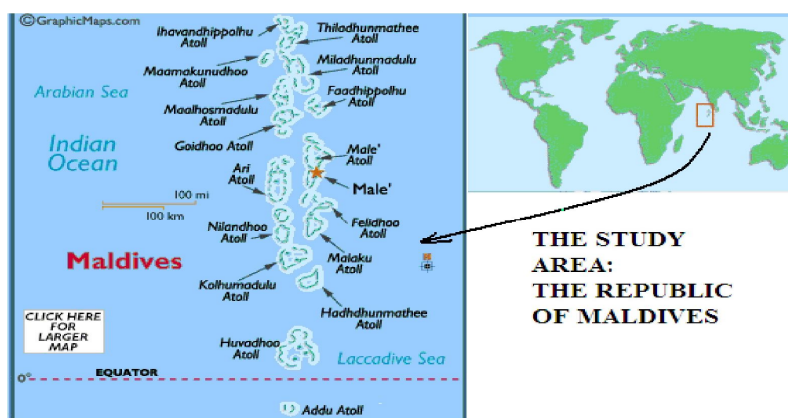
2- Professor, Department of Studies in Geography, University of Mysore, Mysore

**Corresponding Author: Suresh Kumar Kundur*

Introduction

The Maldivian archipelago located 500 km from southern tips of both India and Sri Lanka. Is a beautiful string of 1,190 low-laying coral islands scattered across the equator in the vast expanse of the Indian Ocean, giving us a rare glimpse of what is aptly described as tropical paradise. Just consider this sparkling white sun-kissed beached, crystal-clear lagoons studded with profusely colored corals; azure warm seas with an undisturbed exotic marine life palm-fringed island the providing serenity all of it summarized by the famous Moroccan traveler Ibn Battuta on describing Maldives as “one of wonders of the world”

The sun, the sand and the sea, these are just three simple realities beckoning tourist from far and wide to these little islets, giving as a result, a glorious sense of happiness and proving to be a heavenly getaway from the word and its worries. The Maldives teaches the visitors the pleasurable art of doing nothing, simply lazing around and enjoying some the most spectacular and colorful vistas offered by nature.



No wonder than that tourists flock in large numbers to the 80-odd self-contained island resorts provided with all the comforts and warmth exuded by traditional Maldivian hospitality. This is why Maldives is considered to be the ultimate destination, the future world for holiday-makers.

Tourism indicator

Tourists first started coming to the Maldives in significant numbers in 1972 when the first resort, with a 280-bed capacity, was established. In the years since, five phases can be identified in the development of the Maldivian tourism industry (MTCA, 2008a). During the year of inception of tourism in the Maldives, 1972, only 1097 tourists visited the Maldives. The number of annual tourist arrivals (reaching over 800,000 in 2010) now exceeds the total indigenous population of about 310,000. Europe is the leading generating market followed by the Asian market. Germany and Italy are the two main suppliers of tourists and in 2010, shared 80% of the total tourist arrivals to the Maldives.

In the late 1970s, international tourism became an important source of income for people of Maldives. The readiness of the Maldives to develop its tourist sector can only be understood in terms of its very limited economic possibilities, especially the absence of local raw materials to diversify into exports of manufactures. At 9 % of gross domestic product, which provides over 23 percent of the

government revenue and contributes around 68 percent of the country's foreign exchange earnings, tourism is the largest contributor to the economy and it is increasing in importance yearly.

Tourism and the Environment

Tourism depends on environmental quality more than any other activity and a central precept that has been preached in tourism is not to kill the goose that lays the golden eggs. Yet, in general, it is characterized by rapid, short-term development which more often than not damages the very environment. Without careful attention, the balance between the volume and type of tourist activity, and the sensitivity and carrying capacities of the resources being developed, tourism projects can be not only environmentally harmful but also economically self-defeating.

Tourism in the Maldives exists solely due to the physical and geographic features of the coral islands. The beauty of the underwater world at the reefs, clean water in the lagoons, white and pristine sandy beaches, a rich island vegetation and ideal tropical climate which form a virtual paradise that attracts tourists from Europe and Asia.

Environmental Impacts of Tourism

The first proper evaluation of tourism in the Maldives was carried out in 1983 after 10 years of tourism development. It was revealed that the pollution of the sea with garbage, piles of waste found in the resorts often close to the tourist cottages, the picking of corals, the use of pear guns were features present that did not fit into the tourists, Image of the Maldives. In 1991, after almost two decades of tourism development in the Maldives, the perception of impacts has changed. According to the present perceptions, the islands offer uncommon visual beauty unspoiled by human settlement, virtually unsurpassed marine environment and the strongest of all, unspoiled, under populated tiny tropical islands replete with natural beauty and abundant sea life.

The Environmental Protocol prepared in 1992 by the Ministry of Planning and Environment to determine the carrying capacity constraints in the tourism sector concluded that the natural resources of the Maldives are in a sufficiently pristine state, and of such high aesthetic quality, that a period exists in which environmental deterioration can occur without an adverse effect on tourism. However, concern was expressed that the duration of this period cannot be predicted and with increasing environmental pressures, rising environmental sensitivity, and without compensatory environmental management, adverse effects may be felt sooner than later. According to a survey carried-out in August (Ministry of Planning, Human Resources and Environment) 1995 involving the management of 47 resorts, beach erosion was identified to be the major existing environmental problem facing the resorts. The highly dynamic Maldivian beaches erode and build in response to wave action associated with storms, the tidal cycle, and the monsoons. The results of a survey carried out in 1992 showed that 12.8 percent of the total shoreline of 32 resorts surveyed consists of seawalls and groins and is not sandy. The same survey also showed that 12 of the 32 resorts surveyed (38 percent) had offshore breakwaters to protect the beach. The maintenance of natural beach is of paramount importance to attract clients to the resorts and the construction of artificial structures designed to control and limit beach erosion are not only unsightly but also expensive.

Rubbish on beach is the next environmental problem identified by the resort management. Rubbish on beach mainly results from waste dumped at sea irresponsibly by neighboring resorts and inhabited islands that get washed ashore onto islands with the current and to some extent from the messy habits of certain tourists. The resort management is quite emotive on this issue as this is one issue that will reflect very badly on the image of the resort environment.

Sewage Disposal

In 1980 only two resorts were reported as discharging saltwater flushed toilets to the open sea. In a survey of methods of sewage disposal reported from 34 resorts in 1992, 23 resorts disposed sewage into the ground while 11 discharged sewage to the sea. A survey in 1993 (Ministry of Planning, Human Resources and Environment) revealed that at 67 percent of tourist resorts sewage effluent is piped into septic tanks, and the untreated sludge is dealt with by natural processes and soil absorption. At 33 percent of the resorts analyzed, septic tanks and sea outfalls were the reported practices. Measures to protect the environment in cases of direct sewage discharge include the location of outfall pipes which is around 100 meters from the island and 30 meters below the mean sea level.

Sewage disposal has both health implications and environmental consequences. Aquifer contamination by *faecal coliform* bacteria or the contamination of bathing waters which could give rise to health problems. Since a very small percentage of resorts pump sewage into the sea and even so, these resorts have a very small population, it might be concluded that the current levels of sewage emission into the coastal waters of the resorts do not pose any serious problems to human health. The capacity constraints survey carried out in 1992 showed that the sewage discharges from resorts are relatively small and the observed effects were limited. Even though the volume of waste matter disposed is quite small, nutrients from sewage could build up over time, especially if the process of discharge is not managed well. However, volumes of water and rates of water exchange are large and in view of the productive fisheries, the atolls are probably subject to relatively high nutrient input from upwelling as oceanic currents hit them.

Groundwater

There is an increasing move away from using groundwater as a resource in tourist resorts. Drinking water in tourist resort comes from rainwater which is collected on roofs and stored in large tanks and is now supplemented by desalinated water and imported bottled mineral water. There has also been a move away from the system in which groundwater was used for showering and flushing toilets to one in which saltwater is used for flushing with the wastewater pumped out to sea and desalinated water used for showering. Groundwater quality deterioration could be caused through increasing abstraction of groundwater which depletes the already thin freshwater lends; salt water intrusion into the freshwater aquifer; and contamination of groundwater from sewage discharges. In addition to sewage, groundwater can also be contaminated through the use of contaminated soils; the excessive use of fertilizers; the use of pesticides; and inappropriate solid and liquid waste disposal.

An analysis of groundwater(MWSA) quality and pollution in tourist resorts, based on the results of Maldives Water and Sanitation Authority Surveys and consultants showed that groundwater quality in the resorts is deteriorating. However, the capacity constraints study in 1992 concluded that whilst there is some evidence that groundwater quality has deteriorated on some resorts through tourism, the deterioration is not significant and is unlikely to be irreversible. The study also suggested (MWSA) a number of factors mitigating any possible deterioration and they are:

- I. The contaminant adsorption properties of coralline soils are generally extremely limited.
- II. High rainfall backed up by evidence that salinity vary widely on many of the islands between the wet and dry season indicates that flushing rates, and oxidation, of contaminants are likely to be rapid.
- III. The sources of pollution are relatively benign though more and more pesticides are being used and rubbish buried on islands.
- IV. Before upgrading, resorts traditionally used groundwater flushing for toilets and for showering, this minimizes the historic loss of groundwater.

One advantage of this is that any contaminants should be flushed out eventually. This is good for the state of the groundwater but not so good for adjacent lagoon waters.

Solid Waste

Solid waste disposal is one of the most obvious impacts of tourist resort operation and one of the easiest environmental management problems to deal with and thus has been addressed in a number of reports on tourism development in the Maldives. The pollution of the sea with garbage and piles of waste found in the resorts often close to the tourist cottages were identified in 1983 among features that was not aesthetically pleasing. In 1985 the Department of Tourism reported that the disposal of non-biodegradable waste was then



a serious problem and that there was need for education to increase environmental awareness, and for the use of re-cycling technology. In the new Tourism Master Plan solid waste is identified as a major issue for resort islands and it is stated that at current tourism levels, problems are probably more aesthetic than environmental.

The plan also points out that while solid waste itself may not currently pose a serious environmental threat, its impact in conjunction with the effects of other human activities should be considered.

Solid waste management in Maldives

National Vision

- Reducing the impact of waste management disposal activities
- Establishing economically viable environmentally sustainable waste management system.

Environmental challenge

- Waste generated coupled with limited land area,
- Environment being placed under increasing pressure
- Solid waste disposal is one of the most critical environment issue throughout the country

Waste produce

- In Male average of 2.8 kg per capita per day
- In the atolls around 0.66 kg per capita per day
- Tourism Industry stands at 7.2 kg per guest per day.

Present Scenario

- Solid waste management is identified as a key environmental issue in the 2nd NEAP
-

1- Waste Management in the Central Region

Municipal landfill site created on the island of Thilafushi

2- Waste Management in the Atolls

Current arrangements are inadequate

Plastics dumped near the beach

Unconsolidated wastes are entering the lagoon systems

Burning combustible wastes

3- Regional Waste Management Facilities

-Waste management facility at North

* No proper operation

- Waste management facility at South

* Privately operated and offers a voluntary fee for service

* Some separation occurs at household level,

* Mixed not recyclable wastes are stockpiled

4- Current Activities

Following the Tsunami, various bilateral donors are actively participated to supporting the Tsunami Debris and Waste Management ProgrammeARC/CRC to construct 74 IWMCs - UNDP to construct 8 IWMCs and Government of Maldives committed to another 8 IWMCs 50% of the islands will have an IWMC by the end of 2007.

Island Vegetation



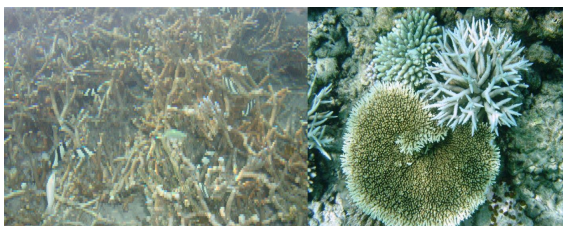
The image of a palm fringed sandy beach and lush tropical vegetation is integral to the perception of, and satisfaction, with Maldives as a tourist designation. At present there is no requirement to survey and consider the vegetation of an island as part of the planning approval process prior to resort development. In the construction process trees and shrubs are cut down and coastal vegetation is removed. Exotic ornamental and fast growing species are imported to replace the vegetation removed and for new resort gardens. The introduction of exotic species not only reduces the ability of the island to recover to its natural state but also the exotic species may overcome local ones directly or through the introduction of pests.

There is also the matter of maintaining the natural perception of the island for marketing purposes. Whilst the palm is the most important vegetation feature on an island, there are local plants that have historic and cultural importance and so have marketing value which imported exotics do not have. Soil and fertilizer have largely been imported to improve the growth prospects of exotic imports. These imports are very much on trial and error basis and there is little doubt that many soils and a variety of fertilizers have been tried. This process detracts from efforts to use local vegetation which is already adapted to local conditions, and so should not have to be sustained artificially. Imports may also introduce soil associated pests and diseases for which local plants have limited resistance.

Coral Reefs

On tourist resort islands reef damage has been caused by scuba divers, and by snorkelers and bathers walking out across the reef flat. The greatest threat at present almost certainly arises from snorkelers and bathers, from both inadvertent breakage and deliberate removal of coral and coral fauna for souvenirs. A study at Kurumba Village has assessed the effects of snorkelers on the reef flat/crest at depths up to about 1.5 m. Results indicate breakage of 18 percent of all *Arcopora* corals/month. Hence most or all coral colonies of this genus stand to get broken each year, suggesting a significant effect from snorkelers.

The present evidence on reef degradation from sewage in the Maldives is inconclusive. The Environment Protocol reported that none of the 32 resorts surveyed in 1992, and none of the 70 dive base operators on 41 resorts, identified sewage as a problem causing reef deterioration. Direct and indirect damage to reefs is also caused by divers and tourists demands. However, the greatest impact to reefs in the Maldives has originated from coral mining for construction purposes.



Environmental Management in Maldives

Policy and Planning

During the first decade of tourism development, there was no specifically planned development; rather, tourism took place according to individual private sector initiatives in locations that offered market advantages principally related to the access opportunities offered by Hulhule Airport. This essentially informal development managed to generate almost 3,500 bed spaces of international quality and the industry was achieving enviable occupancy rates of up to 80 percent in the high season.

The first formal initiative to plan, in an integrated way, the future development of the tourism industry in the Maldives, came when the Department of Tourism and Foreign Investment commissioned Dan group International in November 1980 to carry out a Maldives Tourism Development Plan. This long-range (10 years), tourism development plan was prepared for the Maldives in May 1983 and some, but not all, of its recommendations were considered feasible for implementation.

The tourism plan provided some ideas for development. However, to date, most of the tourism planning and management has resulted from government initiatives, based on its evaluation of the best forms and standards of development. Many of the government's present approaches and standards have evolved through the monitoring of the earlier phases of development to determine what is most suitable. Approaches and standards have been refined and some abandoned based on the experience gained from previous types of development. By government policy, the resorts are located on uninhabited islands, in order to reduce any possible socio-cultural impacts.

Also most islands are too small to contain both resorts and traditional villages. These islands are owned by the government and it can allocate them for resort use as needed.

The resort developer receives a long-term lease and pays an annual rent that is calculated individually for each island. The resorts must supply their own infrastructure of electric power, water supply, sewage and solid waste disposal, boat dock and recreation facilities. They must also provide housing and related facilities for the resort employees. The families of the resort employees remain on their home islands, often some distance away. The government policy has been to expand tourism for its economic benefits, but in a systematic manner of staged development. In the late 1980s, Kaafu Atoll was considered saturated with resort development. This decision was made within the framework of maintaining high environmental standards for the existing resorts, and retaining sufficient land for village and urban expansion and recreation parks.

All new resort development was then programmed to take place in Alif atoll, which is accessible by sea and air from the international airport. In parallel the government policy turned to encourage expansion and upgrading of existing resorts to higher standards, including meeting present environmental quality standards. This upgrading was considered necessary to maintain the viability and competitiveness of these resorts and to maintain all tourism development at a reasonably high level, catering to quality tourist markets. As an inducement to achieve these objectives, resort leases were extended from 10 to 21 years and much of this upgrading has been accomplished.

The Third National Development Plan (1991-1993)(Ministry of Planning, Human Resources and Environment) recommended the development of a ten-year zoning plan (1991-2000). Under strategies and policies to achieve the main objectives of tourism development, the NDP (1991-1993) included a proposal to assess environmental impacts of resort developments and operations, and further strengthen measures taken to protect and conserve the environment and natural setting for tourism, and to adopt remedial measures on environmental degradation.

The issues that are examined in the new Tourism Master Plan draft include new markets, priority markets, air travel and other transportation issues, tourism infrastructure development, legal aspects, human resource development, gender situation, socio-cultural aspects and environmental impacts.

National Legislation

The Department of Tourism and Foreign Investment was organized in 1978 and made responsible for supervision, co-ordination and maintaining standards of tourist services in the country. To develop and regulate tourism, and simultaneously to strengthen the institutional framework for administering and monitoring the industry, this department was renamed the Department of Tourism in November 1982 and made solely responsible for tourism management. In 1984, the Tourism Advisory Board was established as a consultative body affiliated to the tourism authority.

The tourism sector was given elevated status in 1988 with the establishment of the Ministry of Tourism, according to the designating law 3/68 J under 1/69 J as at 1993, to provide ways to develop the tourism industry in the Maldives, to plan methods of income generation through tourism, to provide guidelines, and to administer the industry.

The Ministry of Planning and Environment was established in 1988. This Ministry is responsible for the formulation of policies on environment, environmental guidance to other development sectors, the implementation of environmental impact assessment and the designation of protected areas.

Environmental Impact Assessment

The Environmental Protection and Preservation Act of Maldives (4/93) provided the basic framework for the Environmental Impact Assessment (EIA) process in the Maldives and under Article 5 (1) of the Act, an impact assessment study shall be submitted to the Ministry of Planning, Human Resources and Environment (MPHRE) before implementing any activity that may have an impact on the environment. According to the EIA guidelines issued by MPHRE all new resort developments require an EIA study before approval for development can be made.

Architectural and Design Controls

The design of resort buildings is controlled so that they are well integrated into the island environment, take advantage of the tropical climate and use local building materials to the extent possible, such as thatch roofs. Previously many buildings were constructed from coral mined from the reefs. However, the use of coral is now restricted and use of imported materials is now encouraged, although these are expensive by local standards. Coral and sand mining from resorts and their house reefs is strictly prohibited. Hard engineering solutions for dynamic coastlines are discouraged and construction of solid jetties and groins are controlled. Design of boat piers and jetties should be in such a way that they do not obstruct the original flow of currents or disrupt the wave climate within the lagoon.

Waste Disposal

According to the regulations issued by the Ministry of Tourism, garbage from tourist resorts should be disposed of in a manner that would not cause any damage to the environment. All garbage disposed into the sea should be done as far away into the sea as necessary in order to ensure that it does not get washed onto any islands with the current. Tourist resorts are required to have incinerators and compactors adequate in size to burn all flammable materials and crush all the cans respectively. Those who lack these facilities are not allowed to operate. Plastic or polythene bags should not be thrown into the sea and such material should be burnt. Those who contravene these regulations are subject to fines and penalties. Two airlines have joined in the effort to keep Maldives clean by arranging for waste to be carried back to Europe. Under this program all tourists who fly in to the Maldives in these airlines are given a bag and asked to bring to the airport, all the waste they produce during their stay in the Maldives when they depart. The airlines carry the waste to the original destination for recycling free of charge.

Under sewage and excreta disposal the tourism book of regulation specifies that the sewage system should be prepared such that pollution of water supplies, beaches and other areas are prevented; nuisance, ugly sights, and unpleasant odors do not occur, human wastes do not come into contact with people, animal and food; and breeding of flies and mosquitoes will be prevented.

Biodiversity Conservation

To protect and preserve marine biodiversity a number of measures have been prescribed. Spear, poison and dynamite fishing are strictly prohibited. Net and trap fishing are controlled and confined to certain areas. Removal of shells, juvenile lobsters and lobsters ready to lay eggs are strictly prohibited. The catching of turtles is strictly prohibited and trade in all turtle products is banned. The commercial exploitation and export of a number of other species is also banned. Resort operators also voluntarily prohibit the catching

of reef fish from the house reef or tourist resorts. Fifteen important dive sites have been declared as protected areas in 1994, where fishing, anchoring, removal of coral and other destructive activities are prohibited.

The Ministry of Tourism recognizes the importance of vegetation in maintaining the natural beauty of the islands and there are a number of regulations which aim to secure this resource. These include a limit of 20 percent of the islands for building, the requirement that no buildings be put up that disrupt the natural facade of the island, that there be a minimum setback limit of 5 meters from the vegetation line of the island, and that no buildings should appear above the tree tops.

Conclusion

Tourism in the Maldives began in 1972 and it then evokes the image of a lost paradise. The tourism industry of the Maldives is dependent entirely on environmental quality and since it established itself in the tourism market and it has maintained its strong position in a rapidly growing market. A few critics in the 1980s proclaimed that environmental pollution had begun to rear its ugly head in the Maldives. However, the natural resources of the Maldives are still in a sufficiently pristine state and of very high aesthetic quality and environmental concerns are few.

Environmentally unsound practices in solid waste and sewage disposal pose the most serious threat from tourism to the delicately balanced coral reef ecosystem of the Maldives. Though solid waste is a cause of environmental concern, at current level it is more of an aesthetic problem. In the past the portion of waste and garbage which could not be burned was dumped into the sea. This practice is now prohibited by law and waste incinerators and crushers have to be used in all resorts. Sewage effluent is discharged into the sea by the resorts. However, their discharges from resorts are very small and the evidence on reef degradation from sewage discharges is inconclusive. Some of the resorts are turning to the latest technology in sewage treatment using UV radiation to produce virtually pure water.

The Maldives has developed a very suitable form of tourism, appropriate for the small island environment. The present form of tourism development has not generated any serious environmental impacts. This has been accomplished through careful management. The government has developed appropriate policies, legislation and plans and instituted mechanisms to apply strict standards and regulations.

References

- Conrady, R., & Bakan, S. (2008). Climate change and its impact on the tourism industry
In R. Conrad & M. Buck (Eds.), Trends and Issues in Global Tourism. Berlin, Germany: Springer.
- MTCA. (2008a). Fathuruverikamugetharahgye 35 aharu (1 ed.). Male': Ministry of Tourism and Civil Aviation.
- Madhuratap, M. and A.H. Parulekar. 1993. .Estuarine Biology and Management.. Environmental Impact on Aquatic and Terrestrial Habitats, pp. 215-226. Environment research Centre (JICA 1998) republic of Maldives
- Tourism and environment simadsaeed 1998
- MPHRE: the Ministry of Planning, and Human Resources and Environment
- MWSA: Maldives Water and Sanitation Authority
- NDP: national development plan
- EIA: Environmental Impact Assessment
- Ministry of environment, energy and water republic of Maldives
- Ministry of tourism, Republic of Maldives
- Male municipality, Republic of Maldives