

MITIGATION OF GREENHOUSE GAS EMISSIONS

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The National GHG Inventory of the Maldives shows that the contribution of Maldives to global emission of GHGs is insignificant. As the Republic of Maldives is a non-annex I party to the UNFCCC, Maldives is not obliged to implement GHG mitigation measures. But implementation of such mitigation measures would not only reduce the Maldives emission of GHGs but would be a significant step towards achieving sustainable development.

The Maldives depends entirely on imported fossil fuels to meet its energy demand. According to the national GHG inventory, the generation of electricity and transportation sector contributes to the major GHG emissions from the Maldives. Hence the mitigation of GHG emissions could be based on lowering the demand on the imported fossil fuel by increasing the efficiency in generating and utilising energy and improving the efficiency of the transportation mechanisms.

Reducing CH₄, the main source of emission of GHGs from landfills and sewage discharges is another possibility. This can be achieved through improving of the solid waste disposal methods, management practices and by providing treatment of sewage discharges.

The enhancement of the Maldives natural GHG sinks by increasing the vegetation cover and improving the health of the coral reef has been considered as possible mitigation options. As sufficient data was not available on land use, land use changes and forestry and the existence of natural and managed GHG sinks, these were not accounted for in the GHG inventory.

3.1 Energy

Opportunities for immediate mitigation are small given the imbalance in energy use between the urban and rural islands of the Maldives and the importance of access to energy for social development. However, the following mitigation options would have a long-term goal of reducing the emission of GHGs and improving the standard of living for Maldivians.

The use of high efficiency generators

A significant number of inhabited islands of the Maldives do not have access to 24 hours electricity. As electricity is important for social development, the communities of the islands would develop programmes to electrify such islands. Development of such programmes with the use of energy efficient generators and good distribution networks would improve the efficiency of the national utilisation of the energy. The new generators, which have been installed in the powerhouse of Malé, have 13% higher fuel efficiency than the older generators, which have a fuel efficiency of 0.29 L/kwh. This is an important option for mitigating GHG emission from the energy sector.

Increase awareness on the use of high energy efficient appliances

All electrical appliances in the Maldives are imported. In 1994, more than 2,828 television sets were imported (Customs, 1994). Few importers are aware of the energy labelling in electrical appliances. It is common to find such appliances in the country and generally the people are not aware such energy labelling exists. The use of energy efficient appliances improves the use of electricity and this could lower the electricity consumption. Increasing the awareness of energy labelling and appliance efficiency to importers and the general public would help to improve the energy consumption pattern of the Maldives.

Increase the use of renewable energy sources

Diesel generators provide the majority of electricity in the Maldives. Diesel generators have been seen as a reliable source of electricity generation but exploring the possibility of renewable energy is important as a mitigation option for GHG emissions from electricity generation. Studies carried out in the Maldives showed that solar energy is a feasible option for the Maldives (Hurry, 1984). Since 1989, DHIRAAGU, the national telecommunication provider has successfully used the photovoltaic technology as a source of electricity to the repeater stations of the national digital microwave antenna systems. Similarly successful so-

lar water heating has been widely used in the resort islands to meet most of the hot water needs in the resort islands.

Use of solar energy for desalination

Desalination with reverse osmosis is widely used in the Maldives as a portable water resource. 28% of the population of the Maldives and all the resorts depend on desalinated water to meet their water demands (MWSA, 2001). Reverse osmosis desalination technology, is an energy intensive process that depends on diesel. Introduction and utilisation of solar distillation or desalination with solar energy would reduce the dependence on diesel for water production and hence has the potential to reduce GHG emissions from the Maldives. Changing to such technology could increase the security of water resources and make it less vulnerable to the fluctuation of the oil price on the international market.

3.2 Transport

A detailed examination of the transport sector of the Maldives was not undertaken due to constraints on the availability of necessary data. This initial assessment represents an attempt to identify options in the sector but has not undergone a cost benefit analysis. The Maldives has taken policy measures that have a bearing to reduce the emission of GHGs from business as usual scenario. These policy measures include:

Banning the import of reconditioned vehicles

A large number of old reconditioned vehicles were imported to the country because these were available cheaply within the region. From 1990, the import of motorcycles has increased to an average of 51%. In 1994, 4,443 motorcycles were registered (MPHRE, 1995). The rapid increase of vehicles has induced the traffic problem in Malé. As a means of reducing the traffic problem and improving the air quality in Malé, the government banned the importing of reconditioned motorcycles which have engine capacity of less than 150 cm³ into the country, from December 2000 (MTCA Directive no. 9-B4/2000/94).

The increased use of cars in Malé is causing a similar problem and under the above mentioned regulation there is a ban on importing of cars which are more than 5 years old into the country (MTCA Directive no. 9-B4/2000/94). Importing new vehicles would have the potential to reduce the emission of GHGs from the transport sector, as the efficiency of the imported vehicle would be better than the old reconditioned vehicles.

High import duty on vehicles

As a measure to reduce the increased use of vehicles, a high import tax was levied on importing reconditioned vehicles. This measure has the potential to reduce the demand for vehicles and hence reduce the growth of GHG emission from the transport sector.

Mitigation for land and sea transport sectors

The islands of the Maldives are scattered, so sea and air transport are essential modes of transport between islands. Developing an effective integrated transport system is important to the further development of the country. Land transport demand is felt mainly in Malé and other regional growth centres in the atolls. The number of vehicles used in Malé has reached to the carrying capacity of the island, but there is potential for the number of vehicles to expand in other regional growth centres of the country.

Developing of an appropriate integrated transport system combining the land, sea and air transport system is important as the transport sector consumes a significant proportion of the imported fossil fuels to the country. On average, 18 boats travelled to atoll capitals at least three times in a month and 29 boats travelled once or twice to Malé from the atolls (MPND & UNDP, 1998).

Development of a public ferry transport system

Currently, regular ferries operate between Malé, the urban centre and Villingili, the satellite island of Malé and between Malé and Hulhulé, the

International Airport. Establishment of a regular scheduled ferry service between these islands have reduced the need for *ad hoc* hiring of ferries and have improved the efficiency of the transportation between these islands.

Developing similar ferry services in other atolls, between the growth centres in the atoll and islands, as well as between atolls, would reduce the *ad hoc* movement of boats. A detailed proposal for a study of transport practices and opportunities to reduce GHG emissions is included in Chapter 7.

3.3 Solid waste and sewage management

The reduction of solid waste generation and recovery of CH₄ from landfills through an integrated waste management system are options to mitigate the GHG emissions from the solid waste. Development of an integrated solid waste management system taking into consideration the unique environmental condition of the small islands would be a huge step for the sustainable development for all the small island countries.

Similarly, though the GHG inventory developed for the Maldives has not accounted for the GHG emissions from the sewage treatment, developing of sewage treatment facilities to remove GHG would be an important step for improving health of the marine environment of the Maldives. A detailed project proposal is included in Chapter 7.

3.4 Enhancing sinks in the Maldives

Increasing vegetation cover

Though the islands of Maldives are small, and fertile land for agriculture is scarce, efforts have been carried out to increase the vegetation cover of the Maldives. A three year plantation of one million trees was initiated in 1996 to increase the vegetation cover of the Maldives. Due to the huge success of the programme in the first year, the programme was extended to two million trees. The huge success of this programme was due to high community participation. The success of the programme can be seen by the transformation of virtually non-existent greenery to the present greenery of Malé.

The success of the million-tree programme has resulted in a similar programme for fruit tree planting. In an effort to increase the fruit trees, a three year fruit tree planting programme was launched on World Environment Day, 2000. The success of such programmes throughout the country would increase the vegetation cover of the Maldives.

Improving the health of the coral reefs

Coral reefs of the Maldives are the most important natural resources of the Maldives. It is a source of food, beach sand, building material and protection for the islands. The coral reefs are threatened by human induced and climatic related stresses. Healthy reefs not only act as a natural breakwater, but also as natural sink for CO₂. Implementing measures such as banning of coral mining and pre-treatment of sewage discharged on to the reefs would minimize the human impact on the reef and thus improve the health of the reefs.