

ENVIRONMENTAL SECURITY OF MALDIVES

*Dissertation submitted to Jawaharlal Nehru University
in partial fulfilment of the requirement for the
award of the degree of*

MASTER OF PHILOSOPHY

T.C.KARTHIKHEYAN



South Asian Studies Division
Centre for South, Central, South-East Asian
And South-West Pacific Studies
School of International Studies
JAWAHARLAL NEHRU UNIVERSITY

New Delhi - 110067

July 2007



30 July 2007

DECLARATION

I declare that the dissertation entitled "**ENVIRONMENTAL SECURITY OF MALDIVES**" submitted by me for the award of the degree of **Master of Philosophy** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this University or any other University.

T.C.KARTHIKHEYAN

CERTIFICATE

We recommend that this dissertation be placed before the examiners for evaluation.

Prof. P.Sahadevan

Chairperson, CSCSEASWPS

CHAIRPERSON
Centre for South, Central, South East
Asian and South West Pacific Studies
School of International Studies
Jawaharlal Nehru University
New Delhi-110 067

Prof. P.Sahadevan

Supervisor

SUPERVISOR
Centre for South, Central, South East
Asian and South West Pacific Studies
School of International Studies
Jawaharlal Nehru University
New Delhi-110067

Dedicated to

My Parents

Acknowledgements

I owe my sincere gratitude to my supervisor and Chairperson Prof.P.Sahadevan for his stupendous supervision to finish this dissertation within the stipulated time. During the course of time, his intellectual insights and succinct criticism had not only shaped the direction of my work indeed I learnt some valuable lessons. I also pay my sincere respect to all other faculty members. I am very much thankful to our centre staff and others. I am also thankful to the library staff of JNU central library, IDSA and South Asia Foundation for having provided me material and documents.

I am thankful to the High Commission of Maldives in New Delhi and I am extremely grateful to Mr.Ahmed Latheef, Deputy High Commissioner, who helped me in getting some materials and also for arranging a meeting with the representatives of the Government of Maldives. I also thank Mr.Mohamed Shareef, Executive Director and Mohamed Imad, Director (Spatial Planning) from the Ministry of Planning and National Development, Government of Maldives, for providing me deeper understanding of the national policies and programmes undertaken by the Government of Maldives.

I am grateful to my father, mother and sisters for their love, affection and prayers for me, and inspiring me to finish my dissertation in time. My heartfelt thanks go to my friends who kept me going whenever I needed support and encouragement. I submit my sincere thanks for my seniors for their invaluable help and guidance. Finally I bow to the almighty for giving me all the energy I needed to complete this work and bringing my efforts to fruition.



(T.C.KARTHİKHEYAN)

July 2007

TABLE OF CONTENTS

Certificate	
Acknowledgements	
List of Abbreviations	
	Page Nos.
PREFACE	iv-vii
Chapter-I	
NON-TRADITIONAL SECURITY: AN ANALYTICAL FRAMEWORK	1-21
Introduction	2
Change in the Perception of Security as a Concept	2
Environment as a Non-Traditional Security	4
Environmental Dimension of Security: A Global Approach	5
The Linkage between Environment and Security	8
Theoretical Perspectives on Environmental Security	11
The Regime Theory Approach	12
The Problem of Global Warming	14
Impact on the Small Island States	17
Ensuring Cooperation among Nations	19
Chapter-II	
THE ENVIRONMENTAL INSECURITY OF MALDIVES	22-44
Introduction	23
Geographic Features	23
Population and Demographics	25
Education	26
Economic Development	27
The Inherent Vulnerability of Maldives	28

Sources of Environmental Insecurity	30
Tourism in Maldives	31
Impact on the Environment	31
Future of Tourist Industry in Maldives	34
Global Warming and Climate Change	34
IPCC Report of 2007	36
Global Warming and Sea Level Rise	37
Problem for the Small Island States and Maldives	37
The Tsunami Disaster	40
Impact on the Environment	41
Damage to the Ecosystems	42
Conclusion	44

Chapter-III

THE ROLE OF MALDIVIAN GOVERNMENT IN ENVIRONMENTAL SECURITY

45-76

Introduction	46
Institutional Structure of Maldives	46
The Legal Provisions	48
The Fisheries Law	48
The Environmental Protection and Preservation Act	49
Conservation and Protection in Practice	50
Marine Protected Areas	51
Environmental Impact Assessment	51
National Environment Action Plan (NEAP)	52
National Initiatives	54
Awareness Programmes and Community Participation	54

List of Abbreviations

ADB	-	Asian Development Bank
AEC	-	Atoll Education Centres
AOSIS	-	Alliance Of Small Island States
APS	-	Atoll Primary Schools
AusAID	-	Australia AID
BPOA	-	Barbados Programme Of Action
BSAP	-	Biodiversity Strategy and Action Plan
CARICOM	-	Caribbean Community
CDM	-	Clean Development Mechanism
CROP	-	Council of Regional Organisations in the Pacific
CSD	-	Commission on Sustainable Development
CSP	-	Country Strategy Paper
CSP	-	Country Support Programme
EIA	-	Environmental Impact Assessment System
EIB	-	European Investment Bank
EPZ	-	Environmental Protection Zone
GDP	-	Gross Domestic Product
GEF	-	Global Environment Facility
GEO	-	Global Environmental Outlook
GHG	-	Greenhouse Gas
GNP	-	Gross National Product
GoM	-	Government of Maldives
GSP	-	Generalised System of Preferences
IFRC	-	International Federation of Red Cross and Red Crescent
IPCC	-	Intergovernmental Panel on Climate Change

IUCN	-	The World Conservation Union or International Union for the Conservation of Nature and Natural Resources
LDC	-	Least Developed Countries
LDCF	-	Least Developed Countries Fund
LECZ	-	Low Elevation Coastal Zone
MPAs	-	Marine Protected Areas
MPHRE	-	Ministry of Planning, Human Resource and Environment
NAPA	-	National Adaptation Plan of Action
NCPE	-	National Commission for the Protection of the Environment
NDP	-	National Development Plan
NEAP	-	National Environment Action Plan
NGO	-	Non Governmental Organisation
SAARC	-	South Asian Association for Regional Cooperation
SACEP	-	South Asia Co-operative Environment Programme
SCCF	-	Special Climate Change Fund
SIDS	-	Small Island Developing States
SPOCC	-	South Pacific Organisations Coordinating Committee
TRRF	-	Tsunami Relief and Reconstruction Fund
UN	-	United Nations
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environmental Programme
UNFCCC	-	United Nations Framework Convention on Climate Change
UNICEF	-	United Nations Children's Fund
UNCED	-	United Nations conference on Trade And Development
WB	-	World Bank
WCED	-	World Commission on Environment and Development
WHO	-	World Health Organisation

PREFACE

The international political system has been faced with uncertainties and a doubt about the human safety in the future looms large. In this period of overt globalization and inter-state relations, the traditional concept of national security as understood exclusively in military terms and associated with the narrow state structure can no longer be considered adequate. The conventional understanding of securing is no longer found to be a politically relevant setting.

For small island states to meet their obligation to provide national security to their respective citizens, they must first of all recognise that the national security encompasses much more than the military security from external threats. In fact, the national security they must seek to be seen as having two major components – environmental security and social security (of which military security is an element). Neither can be fully attained unless both are attained, because there are numerous linkages between these two major components.

As regards many of the states in South Asia are simply too small to include within their boundaries all of the resources necessary for survival and well-being and, at the same time, generally too poor to obtain them through international trade. This hurdle is often not a small size, but rather derives from the fact that the ecological boundaries of the world rarely coincide with the political boundaries of the world. That is to say, most sovereign states, even the larger ones, share both natural-resource opportunities and natural-resource problems with their immediate and near neighbours. Thus, for any state to become an ecologically viable entity, it must in virtually all instances enter into a host of cooperative agreements with the other members of its eco-geographical region. In short, for any sovereign state to think nationally, our global political system certainly demands that it must act regionally and internationally.

Although most environmental opportunities and problems in South Asia and elsewhere in the world are confined to an eco-geographical region, there are, of course, some environmental issues with greater functional dimensions and which therefore call for global cooperation. This stems from one or more primary factors like: (a) some natural-resource or other environmental issues are, in fact, truly global in nature – for example, global warming, stratospheric ozone depletion; (b) some of

these issues, despite their national or regional dimensions, have global ramifications, perhaps at the same time being beyond local institutional or financial means, for example, biodiversity protection, sea level rise etc.

The concept “environmental security” arose at a time when there was already an intellectual debate, in the field of international security in the western world. The need for reconceptualising the traditional understanding of security due to the latter’s utter inadequacy was felt. The need was to secure the people living within the state. Environmental degradation has been perceived as an equal, if not greater, threat to humanity than a military threat. When environmental degradation or environmental scarcity of resources becomes a threat to a neighbouring country in terms of pollution and environmental refugees, environmental security becomes a national security issue. This has been exactly seen in the case of Maldives in the context of global warming and its consequence of rising sea level.

This study deals with the problem of environmental security of Maldives in general and about global warming and sea level rise in particular. The policies of the Maldivian government and its efforts to mobilise international support for protection of its environmental security are analysed. The commitment and support of the international community in ensuring the environmental security of Maldives is also examined.

The main objectives of the study are:

- To examine the fragility of Maldives’ environmental security.
- To analyse the importance of the protection of environmental security of Maldives.
- To assess the government’s policies towards protection of the country’s environmental security.
- To examine the international cooperation in ensuring the environmental security of Maldives.
- To identify the challenges facing the country in ensuring environmental security.

The first chapter would evolve an analytical framework. This would be reflecting upon the need for a non-traditional security, especially environmental security. The focus would be on the issues of global warming and its repercussions for the humankind. The second chapter would analyze the major environmental issues facing in Maldives. This would deal with the geographical structure and the environmental problems faced by Maldives. It also deals with the environmental damage due to the development of resorts and tourism. The focus would be on the rising sea level due to global warming and its effect on Maldives. This chapter will also give the picture of natural resources in the country like coral reefs, flora and fauna, and the problems for their survival.

The third chapter examines the role of the Maldivian government in delivering positive policy measures for the environmental security of its people. The focus would be on the steps taken to reduce the impact of sea level rise and the post Tsunami rebuilding operations. It will also focus on the integrated community level participation on environmental security. The fourth chapter analyzes the regional and the international cooperation of the Maldivian government on the issues of environmental security. The focus would be on the role of regional organizations like SAARC, EU, SACEP and AOSIS etc, which also extends to bilateral donors, international institutions like the World Bank, ADB, FAO, GEF, UNDP, and UNEP etc for that cause. It also looks into the international conventions, agreements, and summits like the Rio Earth Summit, Kyoto protocol etc on environment, and the problems and possibilities of implementing the accepted goals. The concluding chapter will identify the problems and prospects confronted by the Maldivian government in implementing its policies into action with the help of the international community.

The study has employed both descriptive and analytical method. The empirical data for this study is based on both primary and secondary sources. The primary data includes the reports published by the Maldivian government and non-governmental and international organizations and agencies. The secondary sources are drawn from books, news reports, articles; some academic papers etc. internet sources are effective and useful for this research.

CHAPTER ONE

**Non-Traditional Security: An
Analytical Framework**

Introduction

From the beginning of the 21st century, one of the most dominating aspects of all development and livelihood issues revolves around the environmental problems. International fora are full of debates on the environment and environment related issues. This has been strengthened by a number of UN conventions and multilateral agreements on environmental issues like the International Trans-boundary Hazardous Waste Management, Montreal Protocol on Ozone Depletion, Rio Earth Summit; The UN Framework Convention on Climate Change, Kyoto Protocol, etc. These agreements and conventions have also generated a lot of political debates among nations in the context of security. Prominent among those are the problems of Global Warming and its repercussions on the humankind. Intense debates are taking place among the scientists that global warming is due to natural cycle of the temperature patterns, which is not accepted by some scientists who contend that global warming is the result of man made activities like burning fossil fuels, overt industrialisation, deforestation, etc.

Change in the perception of Security as a concept

In the recent years the perception of both national and international security has undergone change. Security is no longer conceived solely as defense of national territory against 'external'. The traditional concept of national security is concerned only with military threats. The military approach to national security is based on the assumption that the principle threat to security comes from other nations (Gaan, 2000: 11). The Realist paradigm of security got precedence in the post second world war period and dominated the cold war era. Realist perspective gave importance to the security of the territory and people as a whole, and thus "geopolitics" was predominant in relations with nation states. Realism is engaged with power politics where it is guided by the national interests with the dominant use of the military might. During this period, a number of bilateral, trilateral agreements and regional associations emerged in the form alliance for collective security and collective response with the sole aim of protecting the state from

external threat and aggression. Strategic locations and military cooperation shaped the relations among nations during this period. Each state is forced to help itself and give priority to its own national interest in terms of the state's survival and territorial defence (Heywood, 2006: 128).

A major shift came with the end of the cold war and new trends got shaped in the field of international relations. The third world countries are far more concerned with internal security issues such as: threats to state security arising from various combinations of ecological, economic, military, ethnic and secessionist difficulties, aggravated by poverty and inequality. National security can only be achieved by ensuring ecological, economic and societal security, apart from military security (Dyer, 2001: 442). Here arise the need for a common security approach with a broader perspective and thus the Neo-Realist perspectives of international relations emerged as an alternative to the realist perspectives. It gives importance to the structure of the international system and cooperation, rather than the goals and ambitions of the individual states, thus reducing the reliance on military actions and power politics.

The new world approach to security intends to enhance the long-term health and welfare of the human race, by reducing the human sufferings to the minimum. The new threats facing the humanity in the form of disease, poverty, global warming, etc cannot be combated by the state alone and thereby complicate the realist assumption of self-help. This brings a massive shift from the national security perspective to the global security. With the advent of globalization and "geo-economics", the lifestyle of the individuals and trade preferences has gained importance equally with the military security. This has also been strengthened by the fact that individuals and not the state alone are the referent point of security. Thus a democratic form of human security (Booth, 1991: 321) comes into being.

According to Robert McNamara, "security means development. security is not military hardware, though it may include it; security is not military force, though it may involve it, security is not traditional military activity, though it may encompass it.

Security is development and without development, there can be no security” (McNamara, quoted in Thakur, 2004: 4). This gives rise to non-traditional security perspectives – an approach that goes beyond military threats and state centric analysis, to a range of human challenges across the globe. For most of the people in the world, the greatest threats to security come from disease, hunger, environmental contamination and degradation, crime and unorganised violence, terrorism and human security as a whole (Raghavagan, 2002: 349). The response to these kinds of non-traditional security challenges had taken many shapes in the form of vibrant social movements and International cooperation.

Environment as a Non-Traditional Security

The non-traditional security approach is not necessarily in opposition to state sovereignty and national security; the state remains the central provider of security in ideal circumstances. Security analysts today grapple simultaneously with the problems of external threats, internal social cohesion, failed states, economic development, structural adjustment, gender relations, ethnic identity, terrorism, environmental degradation, etc. Non-traditional security must clearly demonstrate its distinctiveness from issues of welfare and governance. Some of the above mentioned issues are not actually security threat, but these issues becomes security concern when they reach a crisis point, when they undermine and diminish the survival chances of significant proportions of the citizens of the society and when they threaten the stability and integrity of society (Thakur et al. (eds), 2004: 3).

Non-traditional security compliments the human security. Adherents and analysts of non-traditional and human security are familiar with the difficulties of defining security and developing a sound methodology. Since the field of international relations is full of contested concepts, defining human security is conceptually and practically troublesome. And the very exercise of constructing boundaries of exclusion and inclusion can itself be problematic: Norman Mayers in his book ‘Ultimate Security’ argues that security applies most at the level of the individual citizen. It amounts to human well-being: not only protection from harm and injury but access to water, food, shelter, health, employment, and other basic necessities that are the due of every person on Earth. It is

the collectivity of these citizen needs that should figure prominently in the nation's view of security (Mayers, 2002: 601). This definition almost shows what human security is concerned with. The definition used by the United Nations University is: Human Security is concerned with the protection of people from critical and life-threatening dangers, regardless of whether the threats are rooted in anthropogenic activities or natural events, whether they lie within or outside states, and whether they are direct or structural. It is 'human-centered' in the sense that its principal focus is on people both as individuals and as communal groups. It is 'security oriented' in the sense that the focus is on freedom from fear, danger and threat (UNDP, 2001). The human security approach specifically holds the non-traditional objects, such as individual or the natural environment as the referent point of security concerns and policies and not the state alone.

Environmental dimension of Security: An Global Approach

The conception of ecological security adds a security dimension to the ecological problems, thereby putting global ecology in the purview of security. Security can be defined as any trend or event that threatens the very survival of the nation and, where the nation is having the resources to defend or mitigate it. This shows that environmental crisis could also be considered as a security threat. A number of research findings in recent times have established clear indications that such interconnections do exist. The World Commission on Environment and Development (Brundland Commission Report) entitled 'Our Common Future' has highlighted the importance of environmental security, which could not be solved militarily. It also noted its concern for the impact of ecological stress upon our economic prospects (UNICEF, 2003). All these things clearly suggest that threats to a state and its citizens are not only military and political but also economic and environmental.

If a nation's environmental stability is destructed and causes livelihood problems for the people who depend on it, like the tribal and the fishing communities, there may arise a tension between those communities and of the state, which could eventually disturb the political structure and stability of the nation. The outcome may be the conflict in the form of disorder and insurrection within nation or tensions and hostilities with

other nations. Thus national security also relates to watershed, croplands, forests, climate, etc, which deserve to be viewed equally as crucial to a nation's security as economic and military approaches are now. It is true that, if the environmental issues are strategic to a society, one would expect them to become a prominent dimension of national policies (Raghavagan, 2002: 355).

Some foreign policy experts propose that environmental change may shift the balance of power between states either regionally or globally, producing instabilities that could lead to war. As global environmental damage increases the disparity between the North and the South, poor nations may militarily confront the rich for a greater share of the world's wealth. Warmer temperatures could lead to contention over new ice-free sea-lanes in the Arctic or more accessible resources in the Antarctic (*ibid*, 2002: 356). Increasing population and land stress may produce large numbers of environmental refugees that cross across the borders with destabilizing effects on the receiving country's internal security and also on its international stability. Countries could also fight over dwindling supplies of water and the effects of pollution, which is apparent in the case of Israel fencing its borders with the Palestinian territory to protect its natural resources from the "others".

It is clear by now that, Environmental security is an important part of non-traditional security. Environment is generally perceived as a progressive issue which has been explicitly linked with peace. Clause 25 of the Rio Declaration (agreed after the 1992 UNCED Conferences) categorically states that "peace, development and environmental protection are interdependent and indivisible (Peter, 1998: 447). Environmental security can be identified as "the process of peacefully reducing human vulnerability to the effects (and risks) of human induced environmental degradation by addressing the root causes of environmental degradation (Barnett and Dovers, 2001: 158). Environmental security as a part of policy structure seeks a fundamental recognition that environmental issues can no longer be ancillary matters. Rather they form integral components of industrial, social and economic issue. This is now substantiated by Nicholas Stern (former chief economist of the World Bank) Report, which says that environmental problems pose a big threat to

the world economy next only to the great depression and the two World Wars scenario and thus threatens the lives of many in the world. From the policy perspective, the language of environment and security has begun to seep not only into the documents of international organizations but also into military establishments (The United States is said to have an under secretary for environment in its defense ministry). As early as in the 1980, Report on Comprehensive National Security was submitted to the Prime Minister of Japan to reformulate security in order to encompass economic vulnerabilities, natural disasters and ecological imbalances. In the mid 1980s, Mikhail Gorbachave's proposal for a comprehensive system of international security talked about disarmament as well as economic and ecological security (Gaan, 2001: 302). Thus, the integration of environmental considerations into national security apparatus of any nation can be seen as an example of a broader transition of environmental issues from "overhead" to "strategic" for the society.

Since the end of the cold war, considerable attention has been given to the role of environmental factors in shaping global security and international relations. More attention is thus focused on reality of global economic and ecological inter-dependence. A debate has emerged over the redefinition of national security response to new global challenges. The arguments for the broadening of national security to include non-military threats were to constitute the nucleus of a 'post-realist' thrust linking the global environment with security. In this context some theorists hold the view that, competition and control over critical natural resources will be guiding the principles behind the use of military force in the 21st century. They put forward three hypotheses to link conflict with environmental change, they are,

- decreasing supplies of physically-controllable resources would provoke 'simple scarcity' conflicts;
- 'group identity' conflicts would result from large population movements caused by environmental stress;
- severe environmental scarcity would simultaneously increase economic deprivation and disrupt key social institutions and cause 'deprivation' conflicts (Bestill et al. (eds), 2006: 211).

The Linkage between Environment and Security

Almost as soon as 'the environment' appeared on the policy map of state security policies there were some dissenting voices who opposed the linking of environmental issues to national security practices. The most compelling argument against this link comes from Deudney, who says that, the structures developed to ensure national security are of little help as far as environmental problems are concerned. National security depends on secrecy and technological expertise, whereas solutions to environmental problems require transnational cooperation, openness and creativity. Secondly, the very multitude of interdependency in this contemporary world, particularly among the industrialized countries, makes it unlikely that intense cleavages of environmental harm will match interstate borders (Dudney, quoted in Thakur et al. (eds), 2004: 152).

Realist scholars, who oppose the linkage between environment and security, point out some persistent problems. They include tendencies toward a) confusing resource scarcity with environmental degradation, b) exaggerating the security aspect, c) overlooking important political, social and cultural variables, d) devising complex and untestable models, using a biased selection of cases, f) inordinately focusing on environmental stress as a cause of conflict, g) using the future, rather than the past, as evidence, h) muddling up different levels of analysis. In essence, such criticism constitutes a conceptual as well as a methodological challenge (Bestill et al. (eds), 2006: 216). But these kinds of dissidents are very few compared to the vast group of scientists who support the linkages between the environment and security. Even the recent conference on climate change has confirmed these linkages and has urged nations to take appropriate policy measures.

The study of the link between environmental degradation and national security threats has become important in view of the civil strife occurring in countries such as Bangladesh, Peru, Somalia and Rwanda. The rise in sea level may result in the migration of a large number of people of the state on the coastline to neighbouring countries creating international instability (Gaan, 2001: 304). Migration of people may also take

place on account of natural disasters such as floods, cyclones, droughts and earthquakes. But massive migration into another state may create tension and even interstate conflict as has been the case between India and Bangladesh over the issue of Bangladeshi migration to the Indian state of Assam (Myers, 2002: 610). Looking at environment and security links from a different perspective, highlights the deep relationship between the deterioration of environmental quality- whether it is in the form of urban pollution, water contamination, soil degradation, deforestation, or biodiversity loss- and human well being. Ultimately, a threat to human well-being can be seen as a threat to human security.

The connection between environment and security is considered overwhelming and obvious from the following observations;

- The World Commission on Environment and Development: “Nations have often fought to assert or resist control over war materials, energy supplies, land, river basins, sea passages and other key environmental resources” (WCED, 1987: 43).
- UN Security Council: “The absence of war and military conflicts amongst states does not itself ensure international peace and security. The non-military sources of instability in the economic, social, humanitarian and ecological fields have become threats to peace and security” (UNDP, 2003).
- Norman Myers: “National security is no longer about fighting forces and weaponry alone. It relates increasingly to watersheds, croplands, forests, genetic resources, climate, and other factors... that taken together deserve to be viewed as equally crucial to a nation’s security as military prowess. The situation is epitomized by the leader who proclaims he will not permit one square meter of national territory to be ceded to a foreign invader, while allowing hundreds of square miles of topsoil to be eroded each year” (Thakur, et al. (eds) 2004: 149).

Adil Najam identifies four arguments that are commonly put forth by those who envision a strong link between environment and security:

- The conceptual argument that “security implies freedom or protection from serious threats to human well-being... (therefore) whatever poses such a threat, be

it military, economic, resource, food, or environmental realms, becomes a security problem”.

- The theoretical argument focuses principally on “empirical cause-and-effect relationships, in particular the potential of major environmental changes to generate and intensify (violent) conflict between and within states”.
- The political argument seeks to “advance the environmental cause by taking advantage of the potency of the term security... (and) bestow the (environmental) problematique with a greater sense of urgency that elevates it to the realm of “high politics”.
- Finally, the normative case “presumes the primacy of environmental values and the threat that modern civilization poses to them” and seeks to place “societal values in a more appropriate hierarchy” (Najam, in Thakur et al. (eds), 2004: 150).

An environmental perspective on security might better reflect human concern about environmental change, the insecurity that it endangers, and the prospects for coping with (Dyer, 2001: 446). A more pragmatic effort is needed to integrate environmental issues and national security structure, a policy evolution which reflects the increased complexity. It thus proposes a more rigorous definition of the components of the enhanced national security mission – resource security, energy security, environmental security and biological security. A conceptual mechanism for identifying environmental security issues for a state is needed to facilitate more conducive implementation of environmental security programs and policies.

Certain criteria can be used to argue that particular environmental issues warrant consideration on matters of security. There are three obvious parameters that help to frame identification of important environmental security problems; these are time, space and impacts. Stephan Dovers of Australian National University provide a broad three-tiered framework that serves as a filter for prioritising policy problems. They are micro-, meso-, and macro-problems. Micro-problems are generally local or sectoral, they are not particularly complex and their resolution is not necessarily expensive and can generally

be achieved through existing policy mechanisms. Meso-problems are often contained within a country, and can be largely addressed by that country within a time period in the order of years to decades. Finally, Macro-problems are “multifaceted, complex, fraught with uncertainties, spatially and temporarily diffuse, highly connected to other issues, and threaten major disruption of human and natural systems (Barnett, and Dovers, 2001: 160). Bio diversity loss and climate change are the components of macro-problems and are environmental security issues. A study prepared for the World Economic Forum titled ‘Global Risks 2007’, includes global warming as one the major environmental risks apart from loss of fresh water supplies, tropical storms, and inland flooding (“Global risks”, *The Hindu*, 1 Jan 2007: 11).

Theoretical Perspectives on Environmental Security

Environmentalism as an ideology is linked with the ecological movement, which has its roots with the nineteenth-century revolt against industrialization. Its radical edge is the fact that it offers an alternative to the anthropocentric stance adopted by all other ideology. Some of the major theories are ecosocialism, ecoconservatism, ecofeminism, etc. Marxist theorists of environment point out that the natural resources have been exploited by the rich nations at the cost of third world countries, and it results in environmental degradation and thereby insecurity for the whole world. Environmental degradation is likely to exacerbate tensions between “haves” and “have-nots”, the growing gap between rich and poor nations, characterised by enormous per-capita differences in resource consumption; and growing global environmental degradation caused by industrial nations but felt more severely by poorer countries (Raghavan, 2002: 379). Developing countries are not only less responsible for global environmental problems (as per available data, developed countries accounts more than 65 percent of the global greenhouse gas emissions), but they are more vulnerable to them and less capable of preventing their impact. They further argue that the industrialized countries are increasingly polluting the environment with wastes of the production of polymers, created to enrich their modern way of life, and polluting the environment from the sea bed to the top layers of the atmosphere.

Systems management theory of environment gives the perspective that, the problem of global warming and the environmental security can be handled by efficient management of the resources and also by adopting a sustainable development (Dyer, 2001: 442). Shallow ecologists believe in small change and adaptation of ecologically sound policies and lifestyles. Whereas deep ecologists insist on nothing short of a fundamental reordering of political priorities and placing the ecosystem before individual interest, ultimately the aim is to secure the environment. There is a view that, the mainstream International Relations literature ignores the complexity of environment-society relationships by concentrating on institution building and aspects of international cooperation. The traditional concern of study in international relations has been the behaviour and/or relationships between states and other international actors. However, the case has been made that this concern is not far-reaching enough. It is not just the actions and the behaviour of international actors trying to cooperate on an issue that needs to be studied but even more so how they do it.

The Regime theory approach

Regime theory gives importance to the institutional arrangements established under the terms of treaties and conventions at the international level and the work done under them. Here, the concept of regime has been used to describe the institutional arrangements established under the terms of treaties and conventions and the established practices that have evolved more informally in international society (Jeong, 2001: 17) . As institutional responses to a collective situation, like the disaster management, global warming and the environmental crisis, regimes are supposed to regulate the behavior of the participants for overall good of the society. The policy co-ordination at a collective level can be facilitated by common recognition of the issues and agreements on the means to achieve the goals. The effectiveness international environmental regimes can be measured by the ways in which treaties, conventions and declarations regulate behavior of both state and non-state actors (*ibid*: 18).

To analyse the emerging trend in the ambit of environmental security, regime theory offers some scope for the betterment of the humanity. Though, there has been

some efforts even during the cold war scenario, the Regime theory approach for the global problems of environmental security became prominent in the post cold war period only. The Stockholm Conference in 1972 was the first international conference on environment, which outlined some broader perspectives for environmental security. The next year saw the first international treaty on environment with the signing of the Convention on International Trade in Endangered species of Wild Flora and Fauna (CITES). The next major thrust for environmental security came in the form of Brundtland commission or The World Commission on Environment and Development in 1987. This report put forth the need for sustainable development and protection of the environment, where the application of Systems management theory of efficient management of resources was highlighted.

During the post cold war time in 1992, the first United Nations conference on Environment and Development was organized in Rio de Janeiro, Brazil. The outcome of this conference was the Rio declaration on environment and Development, and Agenda 21. The Rio Declaration is a set of twenty-seven principles on the rights and responsibilities of states for environment and development. Agenda 21 is a 300-page action programme to promote sustainable development (Dauvergne, in Ravenhill, 2005: 378). This conference and the declaration formed the nucleus for the development of different environmental regimes like the Kyoto Protocol, which addresses the issue of global warming and sea level rise. The importance of this kind of institutional approach to environmental security could be realized with the definition of the term “tragedy of the commons”, put forth by Garrett Hardin in 1968. He points out that, the individuals pursuing their self interest in the society that believes in the freedom of the commons, brings ruin to all by exploiting the maximum from the environment. Therefore, he suggests “mutual coercion, mutually agreed upon by the majority of the affected people” (ibid, 2005: 388), where it holds importance and relevance to the regime theory approach of mutual cooperation on mutual rules and guidelines agreed upon.

The best example that illustrates the effectiveness of this Regime theory approach on global environmental security is the Ozone depletion regime, where the international stake holders acted in tandem for achieving the set goals and guidelines in protecting the

Ozone layer from its depletion due to the increased production and consumption of the chlorofluorocarbons (CFCs). This regime was the first of its kind which created the Montreal Protocol Fund for assisting and financing the developing countries for effective implementation of the policies and goals set under the Montreal Protocol of 1987 (Dauvergne, in Ravenhill, 2005: 389). This approach proved to be more effective for these kind of large scale environmental problems, which needs compliance and cooperation at the global level. This approach would also be useful to the most urgent environmental security threat of global warming and sea level rise.

Since, this study looks into the national policies and international response where institutional set-ups are important, emphasis has been given more on the institutional mechanisms and cooperation. For a small island country like Maldives, it is important to have a functional institutional set up for negotiating with the international community and also at the same time it is also important for the efficient management of resources and a sustainable form of development. Though, Maldives follows stringent guidelines for the efficient management of resources and sustainable development, it is of no use for it without the aid and assistance of the international community, where it lacks financial resources and technical capacity to meet its environmental security. So the institutional structure and the strategy for negotiations with the international community get predominance, and for this purpose this study will follow the regime theory approach.

The Problem of Global Warming

Global environmental problems involve far greater complexities and uncertainties, and will require far greater sacrifices to solve. Climate change is perhaps the most complex of all. Human activities are altering the relative volumes of greenhouse gases – such as carbon dioxide, methane, and nitrogen oxides- in the earth's atmosphere (Dauvergne, in Ravenhill, 2005: 392). Warming of the climate is “unequivocal” and “very likely” resulted from the observed rise in greenhouse gas concentrations, said the Intergovernmental Panel on Climate Change (IPCC), the United Nations body tasked with determining the state of the planet, in its latest assessment

report released on 2 February 2007, pointing to increased global air and ocean temperatures, widespread melting of snow and ice, and rising sea levels. The report holds grim warning for humanity. Even if the world becomes responsible, convergent, cooperative, and energy-efficient place with exemplary performance in reducing GHG emissions, existing gas levels in the atmosphere can continue the warming process for centuries.

Climate change, induced by global warming is global in scope; its impact on states are by most estimates likely to be very severe; it is a long-term, potentially runaway issue that is not reversible except in the very long term; and the degree of connectivity with other problems (like economy, livelihood, development, etc) is probably higher than any contemporary issue, making it complex and difficult for political and economic systems to deal with. Based on scale, magnitude, and irreversibility, global climate change constitutes a critical security issue.

One of the consequences of global warming is its impact on food security, particularly in the Asian region. Scientists at the second International Rice Conference in New Delhi, organized by the Indian Council of Agriculture Research and the Manila based International Rice Institute said that Asian rice production could decline by an average of four per cent due to climate change in the present system. Altered timing and magnitude of rainfall could induce drought or flood injury to the rice crop. Increased temperatures and/or changes in precipitation could have dramatic impact on disease and insects. Increasing temperature and carbon dioxide may alter competition between rice and major weeds and the contribution of other organisms to nitrogen fixation in rice fields ("Climate change, challenge to rice cultivation", *The Hindu* 11 October 2006). Another report supported by the United Nations Environment Programme suggests that air pollution remains a threat to health and quality of life in most Asian cities (Regional Surveys of the World- South Asia, 2005: 39). The World Health Organisation estimates, about 600,000 Asians die prematurely each year due to air pollution. Rapid urbanisation, increased motorisation and energy consumption are listed some of the reasons for this

(WHO, 2005). These are some of the major problems that the South Asian region is facing due to climate change.

Global warming has its profound impact on the collapse of the ecosystems by creating ocean famines. According to a research using nearly a decade of satellite data, in some ocean regions microscopic plants in the plankton, respond to rising temperatures by scaling down their productivity by 30 per cent or more. Since, almost the whole food chain of the ocean depends on these plants; this could be followed by the disappearance of some fish resources due to less production at the bottom of food chain. A warmer world will be extremely harsh on biodiversity and agriculture – 1700 species of plants, animals, and insects have already moved towards the poles at a measurable rate each year in the second half of the 20th century (“Collapse of ecosystems likely”, *The Hindu* 12 Dec. 2006: 11).

One of the far reaching consequences of global warming is its impact on sea level rise, due to the melting of glaciers and extreme weather conditions with the changes in precipitation levels, causing heavy rainfall and floods which also contributes to sea level rise. Scientists at the National Snow and Ice Data Centre in Boulder found that the normal expansion of sea ice as the Arctic chilled in fall had been extraordinarily sluggish last year. The widespread melting of mountain glaciers and polar ice caps had already contributed to rising sea levels.

According to the IPCC report of 2007, there has been an acceleration in sea level rise since 1993. Between 1961 and 2003, the sea level had increased an average rate of 1.8 mm a year. But between 1993 and 2003, the rate of rise had nearly doubled to 3.1 mm a year. This fourth assessment report predicted sea levels increasing by up to 0.59 meters by the end of the 21st century. But the report also points out that 125,000 years ago, which was the last time the polar regions were significantly warmer than at present for an extended period, sea levels rose by four to six meters as the ice melted. Some experts fear the IPCC prediction is too conservative. Recently, Stefan Rahmstorf of the Potsdam Institute of Climate Impact Research in Germany argued in the journal *Science* that “a

rise in sea level of over 1 meter by 2100 for strong warming scenarios cannot be ruled out” (“Growing threat of rising sea levels”, *The Hindu* 5 Feb 2007: p.10). In this context small island states are the most vulnerable ones which face the threat of extinction due to inundation in the next 50 to 100 years. There is little doubt that climate change and associated sea-level rise pose the most serious security problem small island states have ever faced, indeed in a worst-case scenario nothing less than the erasure of their sovereignty is at risk (Barnett and Dovers, 2001: 162).

Impact on the Small Island States

The Small Island States chapter of the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) implicitly concludes that climate change-induced sea-level rise, sea-surface warming, and increased frequency and intensity of extreme weather events puts at risk the long-term ability of humans to inhabit low-lying atolls (IPCC Report, 2001). An assessment of the vulnerability to sea level rise and climate change was performed for island countries in the South Pacific under the collaboration of Japanese experts and the South Pacific Regional Environment Programme. A combination of experience-based and scientific methods were developed to reveal the overall vulnerability of and possible impacts on the coastal zone sectors. The studies identified the common impacts on and vulnerability of these countries. Inundation and flooding are the common threats of these islands because of their low-lying setting; the problem is exacerbated by the social trends of population growth and immigration to main islands, in particular to the capital cities. Other threats include beach erosion, saltwater intrusion, and impacts on the infrastructure and coastal society. For the island countries, the response to sea level rise and climate change focuses on adaptation rather than on reduction of greenhouse gas emissions, that is mitigation (Mimura, 1999: 137).

The case of Atoll nations is much more complicated with regard to the global warming and the rising sea levels. Atolls are rings of coral reefs that enclose a lagoon. Around the rim of the reef there are islets with a mean height above sea-level of approximately two meters. Worldwide there are five countries comprised entirely of low-lying atolls: the Maldives (population 298,968), Kiribati (population 78,000), the

Marshall Islands (population 58,000), Tokelau (population 2000), and Tuvalu (population 9000) (Secretariat of the Pacific Community, 2000). With the exception of Tokelau (a dependent territory of New Zealand), these are all sovereign states. The Maldives, Kiribati, and Tuvalu are official 'Least Developed Countries' (LDCs are the countries that exhibit the lowest indicators of socioeconomic development, with the lowest Human Development Index ratings of all countries of the world) in the United Nations system. Atolls have common environmental problems that render them particularly vulnerable to climate change. They generally have very high population densities (909 people/km² in the Maldives), meaning that large numbers of people are potentially exposed to single events (UNCTAD, 2002). Water reserves on atolls are restricted to a narrow freshwater lens easily contaminated by salt water and human and industrial wastes. These freshwater lenses become depleted in times of low rainfall. Atoll islands typically face coastal erosion as a result of exploitation of beaches for building materials, while construction of sea walls and infrastructure and waste dumping on reefs and mangroves undermines the ecological functions on which these island systems depend. Coastal developments and pollution also lead to depletion of artisanal fisheries (UNEP, 1999).

Overall, their small size, isolation, generally low levels of income, and relatively low levels of physical infrastructure make atoll countries apparently vulnerable to global economic forces as well as to climatic changes. The atoll countries are relatively more vulnerable in terms of economic structure and, on average, more food insecure than other small island developing states. When combined with sensitivity to climatic changes, this underlying economic vulnerability creates the necessity for large-scale adaptation for the atoll countries (Commonwealth Secretariat, 1999). The 'commitment' to climate change caused by greenhouse gases already present in the atmosphere means that the small island states in the Pacific, Indian Ocean and Caribbean regions are projected to experience a certain degree of environmental change.

Ensuring Cooperation among Nations

Environment related problems and their implications are regional issues as the countries of the region share them. Most of the environmental problems extend beyond national boundaries and are shared by more than one country. There are some environmental issues that are beyond the jurisdiction of any one country of the region. These regional interlinkages of environmental issues and problems have given rise to bilateral and multilateral conflicts, which has to be solved through bilateral and multilateral agreements. Individual countries should have environment-friendly policies. Not all the countries are conscious about environmental protection on the same scale. Therefore, a common approach to securing the environment at the regional level should have some integrating factors. These new threats cannot be combated by the state alone and thereby the shift from national security to global security would be the core of the world order perspective (Upreeti, 2000: 37).

The science of climate change has accumulated over many decades to become compelling. Thus the two recent reports by Nicholas Stern and the IPCC were catalysts for the dramatic swing in world public opinion. There is a need for action by all and a need for action now. The central question facing leaders, parliamentarians, and policy makers is who is going to pay for the costs of addressing global climate change and how the costs will be shared. There is a special responsibility on the part of advanced industrial countries, which accounts for the largest share of the current levels of carbon emissions in the atmosphere. Yet they insist on meaningful binding commitments from developing countries who query why they should not aspire to raising their own standards of living, and why any sacrifices should not be borne by developed countries. Both industrial and emerging market economies need to acknowledge their common but differential responsibilities, to accept an equivalence of burden-sharing, to see that all countries take national action on climate change, and to negotiate an effective regime aimed at stabilising global levels of carbon emissions within agreed acceptable targets. This was the basis on which India and China were given differential treatment for their compliance with the Kyoto Protocol (“Climate change and global leadership”, *The Hindu* 27 Feb.2007: p.11).

Problems like the United States' refusal to join the Kyoto Protocol, the international agreement on greenhouse gas emissions; on the ground of economic slow down doesn't fit with the ground realities. Environmental issues that too global warming in specific, needs a strong international cooperation. Some political analysts are of the view that the biggest challenge our global political system has ever faced with are the issues related to global warming. We have never been faced with a challenge of collective decision making by all major countries. The timescale too is unprecedented. Among the global environmental threats, climate changes are most likely to affect international politics especially between the industrialised North and the developing South. Developing countries are hampered not only by the limited resources they have available for development, but they also labour under the burden of deep international debt that exacerbates their general state of poverty. The UN has estimated that the developed would have to contribute US\$125 billion annually to protect environmental resources and clean up pollution in the developing world (Raghavan, 2002: 380).

Therefore, actions being asked of the political system today are only going to play through into mid-century and beyond. So for the first time we are asking a global political system to make decisions around risks to their populations that are well outside the time period of any election process. Some of the options for protecting this planet should be an ecosystem-based management approach toward restoring marine biodiversity, including integrated fisheries management, pollution control and creation of marine reserves, which are essential to avoid serious threats to the global ecosystem. Forest preservation and management of methane-generating waste should also be covered (Harris, 2004: 275). But the challenge lies in turning policies into practice with appropriate public investments and liberal fiscal incentives to encourage energy efficient products and process with international cooperation.

Failure to protect forests, spend adequately on modern public transport, and levy a realistic carbon price for personal transport will also escalate emissions. The Stern Review commends China for setting domestic goals to reduce energy use by 20 per cent relative to each unit of GDP between 2006 and 2010 and India for creating an Integrated

Energy Policy. With more and more reports emerging with inter-connections between environment and economy, geopolitics is being replaced with “geo-economics” and this new development can evoke suitable response to the environmental problems from the developed countries (which was reluctant to take appropriate measure) to protect its economic interests (“The heat is on”, *Frontline*, 9 March 2007). So the more appropriate way to combat the problem of global warming is through international cooperation with strong policies at the national level. There should be the integration of national and international policies for this global cause. Here it would be appropriate to draw parallels between the scientific advice on global warming and advice from seismologists ahead of the December 26, Tsunami of 2004. A month before the disaster a delegation visited governments around the Indian Ocean to warn about the extreme danger posed by tectonic activity under the sea. No government chose to act on the advice. \$30 million as the cost to install some kind of early warning system presumably looked like a lot of money. But such a system could have saved 150,000 lives (“Detecting and dealing with tsunamis”, *The Hindu* 26 December 2006)

TH-14036

For the international policy process, centred on the UN Framework Convention on Climate Change (UNFCCC), a possible future in which atoll countries become effectively uninhabited because of sea level rise, radically challenges international norms of justice, sovereignty, and human and national security. The non-resolution of climate change is less a function of the failure of knowledge about the policies and methods necessary for reform, and more a function of the lack of political will to implement reforms (Ravenhill, 2005: 394). In this respect securitizing climate change to motivate action may well be justifiable, particularly for small island states. The following chapters deals with the problem faced by Maldives with regard to global warming and its national response in mitigation and adaptation strategies with the help of regional and international cooperation.



CHAPTER TWO

**The Environmental Insecurity of
Maldives**

several square kilometres. The islands are low-lying, with an average elevation of 1.6 meters above mean sea-level. Maximum height above sea level within the Maldives is around 3 meters and in excess of 80 percent of the land area is less than 1 meter above the mean high tide level. Few of the islands have a land area in excess of 1 sq km and only 199 are inhabited. Only 33 inhabited islands have a land area more than 1 sq km and no fewer than 67 islands - one third of the total - have less than 500 inhabitants, while 144 islands - 70 per cent of the total - have less than 1000 inhabitants (Ministry of Planning and National Development, 2006).

Maldives has neither hills nor rivers and is also without land based building materials. Although some larger atolls are approximately fifty kilometres long from north to south, and thirty kilometres wide from east to west, no individual island is longer than eight kilometres. Each atoll has approximately five to ten inhabited islands; the uninhabited islands of each atoll number approximately twenty to sixty. Several atolls, however, consist of one large, isolated island surrounded by a steep coral beach. The most notable example of this type of atoll is the largest island of Fua-Mulaka situated in the middle of the equatorial channel. The atolls of Maldives vary in shape from circular, oval and elliptical to pear-shaped, and lagoon waters vary in depth from 40 to 60 m. Lagoons contain micro-atolls, faros, patch reefs and knolls. Most are open to the Indian Ocean although a few are almost closed, and channels through the atoll margin are in some cases as deep as the lagoon itself. The main channel separating the eastern and western chain of islands is generally between 250 and 300 m deep. The islands are built of sediments and the islands vary in shape and size from small sand banks to elongated strip islands. Many have storm ridges at the seaward edges with swampy depressions in the center (Godfrey, 1996: 5).

The entire country receives adequate rainfall and there is very slight variation in the amount of rainfall in different parts of the country. The average annual rainfall of approximately 1980 mm is evenly distributed throughout the year. However, monthly variation in rainfall are significant ranging from 12.3mm in February to 250 mm in May. The Maldives has a tropical climate, which is warm and humid. The weather is dominated by two monsoon periods: the South-West monsoon from April to November and the North -East monsoon from December to March when winds blow predominantly from either of these two directions. In Maldives, the wet

southwest monsoon lasts from the end of April to the end of October and brings the worst weather with strong winds and storms. In May 1991, long before the 2004 Tsunami, violent monsoon winds created tidal waves that damaged thousands of houses and piers, flooded arable land with seawater, and uprooted thousands of fruit trees. Daily temperatures vary little throughout the year. The annual mean temperature is 28°C, with a maximum average of 32°C and a minimum of 25°C. Relative humidity ranges from 73 per cent to 85 per cent.

Land is scarce in the Maldives and only around ten per cent of land is suitable for agriculture. Soils are generally young and thin, being no more than 20 cm deep, and containing substantial quantities of parent material, coral rock and sand. The soil is highly alkaline, fertility is generally poor, and deficiency in nitrogen, potash, and iron severely limits agricultural potential. In wetter depressions a thick clay layer is present at around 10 to 15 cm depth. The tropical vegetation of Maldives comprises groves of breadfruit trees and coconut palms towering above dense scrub, shrubs and flowers. Ten per cent of the land, or about 2,600 hectares, is cultivated with taro, anabas, coconuts and other fruit. Only the lush island of Fua Mulaka produces fruits such as oranges and pineapples, partly because the terrain of Fua Mulaka is higher than most other islands, leaving the groundwater less subject to sea water intrusion. Freshwater floats in a layer, or “lens”, above the seawater that permeates the limestone and coral sands of the islands. These lenses are shrinking rapidly on Male and on many islands where there are resorts catering to foreign tourists. Mango trees already have been reported dying on Male because of saltwater intrusion. Most of the atolls depend on groundwater or rainwater for drinking purposes. Maldives has unique geography, and is a relatively homogeneous country with respect to religion (Islam) and language (Dhivehi) (Shaljan, 2004: 3). Concerns over global warming and a possible long term rise in sea level as a result of the melting of polar ice are important issues to the fragile balance between people and environment of Maldives.

Population and Demographics

The total population of Maldives at present (according to 2006 census) is 298,968, a considerable increase (2.78 per cent) over the number reported in the last census of 2000. The population of Maldives is large in relation to the land area and the population growth rate is among the highest in the world. The geographical

distribution of the population is unequal, with only 200 of the total 1,190 being inhabited. Of the 200 inhabited islands 90 have fewer than 500 people, 72 have between 500 and 1,000 inhabitants, 38 have between 1,000 and 5,000 and only 3 have more than 5,000 inhabitants. More than 28.5 per cent of people live on the island capital of Male, with an area of 1.77 sq km (Ministry of Planning and National Development, 2006).

The rapid growth in Male's population is associated with the bulk of development activities that has centred on North and South Male' atoll as a consequence of the locations of the capital, the international airport, the port of Male' and the tourist resort islands. The rate of population increase in Male was boosted by the closure of the Gan air base in 1976, and the birth of the Maldives tourist industry centred around the Male International Airport at Hulhule. About 71.5 per cent of population is dispersed widely over 200 inhabited islands, with an increasing proposition of people living in larger atolls over the years. Maldives has few towns besides the capital of Male. Villages comprise most of the settlements on the inhabited islands. The population growth is a serious problem in Maldives, given its lack of resources and space for accommodation. Higher population also poses problems for the country's food supply. Rice is a staple food, which is not grown in the islands. It is believed that the high rate of growth of population is due to a reduction in the crude death rate that has resulted from improvements in primary health care.

Education

The Maldives has a high functional literacy rate of 97.2 per cent (2006). The literacy rate is marginally higher for females than for males and presents no rural urban disparities. There are 272 educational institutions in the country, out of which 63 are government institutions. The current educational environment presents a merging of traditional and modern education. In 1975 the Government, with international assistance, started vocational training at the Vocational Training Center in Male. The Rural Youth Vocational Training Programme was designed to meet the local needs like engine repair and maintenance, carpentry, tailoring and boat building. These trainings had immensely helped the youth for their employment and livelihood.

A modern formal English medium schools system has now been established in Male' operated both by the public and private sectors. This system provides primary, secondary and upper secondary education culminating in GCE Ordinary and Advanced Level Examinations of the University of London. This system was introduced in Male' in the early 1960's. Progressively, the government is creating similar educational facilities in the islands by establishing Atoll Education Centres (AECs) and Atoll Primary Schools (APSS) in each atoll, and regional secondary schools (Ministry of Education, 2006).

Economic Development

Economic life in the Maldives was dominated in the past by subsistence agriculture and fishing with some exchange of marine and other products for rice and other necessities. Rapid social and economic development is of recent origin with living standards having increased very substantially since the late 1970's. The impressive annual growth in the economy since the later part of the 70's has been due largely to the increased receipts from tourism and fishing as well as government investment in infrastructure. The Maldives has a typical small island economy limited by natural and human resources, an acute shortage of raw materials, heavy imports of most requirements and an ever increasing demand on government revenue to cater to the basic needs of an expanding population. Despite all these problems, its economic performance has been impressive in recent years. The economic progress recorded in Maldives has been considered the highest (16.2 per cent in 2004 before Tsunami) among the countries of the South Asian Association for Regional Cooperation (SAARC). But, ever since the Tsunami of 2004, it has witnessed some setbacks to its economy, from which it is recovering gradually.

Fishing has always been a central activity in Maldivian society and the fisheries sector is extremely important for the economy providing around 80% of export income. Fishing has been expanded through mechanisation of the traditional fishing fleet, fuel distribution systems and fish collection facilities. The tuna fishery is based on trolling and pole and line fishing from mechanised *dhoni*, thus producing a "dolphin-friendly" product. Fishing is widespread throughout the atolls and boats operate primarily within about 75 miles of the atolls. Collector boats and mother vessels purchase fish from fishermen, consolidate and freeze the supplies and deliver

them to the plants for further processing (Ministry of Fisheries and Marine Resources, 2006).

Tourism is the second largest contributor to the economy of the Maldives. The number of annual tourist arrivals now exceeds the total local population. At present there are 75 resorts, mostly on small islands. Resorts are established on uninhabited islands leased to resort developers for a 25 year period. Resort development relies heavily on imported equipment, facilities, food stuffs and skilled labour, although about 3,000 Maldivians are employed. Over 61 per cent of the tourists come from Europe, mainly Germany and Italy.

The Inherent Vulnerability

The modern era has increasingly demonstrated the problems of distance that have restricted contemporary development in small island states. Since atolls are tiny, resource-poor, often distant from each other and remote from substantial land masses, it has to face a lot more problems in its day-to-day activities. Maldives consequently face a host of development problems, often in a more accentuated form than in other island micro-states. Problems include limited skills, a small domestic market size, the high cost of imports and exports, the restricted diversity of exports and substantial administrative costs. These disadvantages have usually led to large trade deficits, balance of payments problems, and considerable dependence on foreign aid and technical assistance. Only in the field of tourism has there been some development.

Since, the linkage between the population and the economic development is directly proportionate to the environmental stress/damage caused, it is important to see how the population of Maldives and its internal migration pattern affect its environmental security. The internal migration has been creating severe imbalances in the distribution of population in Maldives. The movement of population between Male and the other islands had always dominated internal migration in Maldives. Among the 'pull' factors which have attracted internal migration to Male are mainly the jobs generated by the development of tourism, apart from education, health, business and modern amenities. The attraction in other atolls can be attributed only to the existence of the tourist resorts, which offers lucrative employment opportunities

(Shaljan, 2004: 1836). This kind of migration pattern creates a lot of stress for the tiny atoll both on land and its marine resources. In addition, lack of enough land to accommodate the people and to build necessary infrastructure is another problem in the islands. The overcrowding in Male has been the root cause of many of the pressing environmental problems in the capital. More than a quarter of the country's population lives on an area of less than two square kilometres. This has also put severe burden on infrastructure and resources of the island (Khan, 1997: 472). Many problems arise from congested conditions in Male, from a combination of increased pollution, urbanisation, infrastructure development, changes in technology and increased consumption. Poorly planned land use, sewage and waste disposal have had serious environmental, economic and social consequences for Male.

To the problem of small size, insularity and extreme dispersal of population must be added. There is also extreme paucity of land-based natural resources. This paucity extends far beyond mineral resources with a commercial value, to include such basic resources as water and agricultural land (but Maldives has one of the best marine resources in the world to its credit). All these translate into severe diseconomies of scale in production, transport and the provision of essential infrastructure and services (Shaljan, 2004: 1853).

Another aspect of vulnerability to which much attention has to be given in Maldives is its ecological fragility. Maldives possesses one of the best corals of the world, which is now endangered. Small islands act as habitats for species which are distinct from alternative populations of the same species, and there is a high degree of species endemism. The introduction of other species threatens indigenous species which often lack the ability to compete with them and which therefore puts them at risk of extinction (Commonwealth Advisory Group, 1997: 76). The openness of economies means that this endemism is always at risk, and, indeed, islands have tended to be the focus of many of the recent species losses. There can be an economic consequences for Maldives, since it is developing ecotourism ventures exploiting the uniqueness of their species and habitats.

The present ecology of the islands and the reefs is extremely delicate. Therefore, the general ability of the environment to withstand stress or the environmental threshold is relatively low. With the development of the resort and

tourism economy, major environmental problems arise. The constructions of coastal structures severely affect the reef system. The ecological formation of Maldives makes resource management extremely difficult and the lack of trained personnel adds to its problems.

Maldives is in the situation of extreme dependence on the outside world, primarily for aid and concessional trade. The absence of international migration opportunities comparable to those in many other island micro-states, in turn, has necessitated domestic responses to the problems of achieving economic development. With few human or natural resources though, the problems have been increasingly difficult to address. Moreover, generally a greater self-reliance and increased privatization are being thrust upon the least-developed states by reluctant donors and international organizations. It is also true to some extent in Maldives' case. Maldives is also disadvantaged in its geographical location and physical characteristics and also have little trade and strategic location to provide bargaining status (Connell, 2006: 3). Though there are few prospects for significant economic growth in Maldives, they are not likely to be possible without some degree of external support.

Sources of Environmental Insecurity

Environmental insecurity for Maldives arises mainly from three factors; a.) in the form of tourism and its impact on its environment, b.) in the form of global warming and the associated problem of sea-level rise, and c.) the possibility of tsunami, as witnessed in 2004. The internal risks arise from the higher flow of tourists, the waste generated and the pollution caused by them, scarce natural resource of the nation state, the demand made on those resources, the availability of human resources, and the size of the market. Smallness seems likely to give rise to disproportionate risks since the availability of substantial resources is less. For every nation, resource endowments are the result of a combination of features including land area, the chance of fortunate location, and climate (Commonwealth Advisory Group, 1997: 71). Here, Maldives suffers from the very limited land area accompanied with limited resources. But its major strength is its location that helps tourism, which is the back bone of its economy.

Tourism in Maldives

Smaller states tend to have higher dependency on tourism, and there is an inverse statistical relationship between tourism receipts as a percentage of GNP and the population size of the country. The high dependency on a single source of revenue brings its own macroeconomic problems, but it also has a critical environmental dimension, which is very true of Maldives. Tourism contributes 10 percent of anthropogenic induced climate change (7-8 per cent transports, 2-3 per cent accommodation and activities) (Simpson 2006). If the number of tourists exceeds the carrying capacity of a country, then the quality of the resources that sustains the tourist industry will itself decline (Commonwealth Advisory Group, 1997: 75), which is very true in case of Maldives. This will also tend to deter repeat visitors and even potential first time visitors if they get to hear of the change in environmental quality.

Much of Maldives' economic boom was due to its resorts and tourism development. Maldives has one of the best corals and diving site in the world. It attracts lot of tourists from Europe (Germany and Italy) and East Asia (Japan and Indonesia). Coral reefs are created by a tiny animal, called a polyp, which secretes a hard limestone skeleton and provides the reef framework (Godfrey, 1996: 2). Knowing its limitations and vulnerability, Maldives was championing the cause of environmental security, long before it was affected by the Tsunami and the global warming. The protection of its fragile environment was considered important because of its flourishing tourism and the money it brings. But much of its problems arise because of the development of the tourism itself, like the problem of waste management and disposal, generated by the tourists and the resorts.

Impact of Tourism on the Environment

While tourism provides considerable economic benefits for Maldives, its rapid expansion can also be responsible for adverse environmental and socio-cultural impacts, like dumping of more and more waste in the sea and conflict of interest in resource sharing between the resident population and the tourists. Natural resource depletion and environmental degradation associated with tourism activities are sometimes serious problems in tourism rich countries and regions. The management

of natural resources to reverse this trend is thus one of the most difficult challenges for governments at different levels (Webb, 1998: 70). The fact that most tourists chose to maintain their relatively high patterns of consumption (and waste generation) when they reach their destinations is particularly a serious problem for Maldives, combined with the lack of appropriate means for protecting their natural resources and local ecosystems from pressures of tourism.

Maldives's sea areas have long been used as a 'sink' for waste disposal which can be either land-based (affecting the coastlines through run-off and out-falls) or sea-based (through dumping or passage of tourist boats). While the former is the main source of contamination and pollution, marine transportation and dumping of waste at sea account for the major part of pollutants entering the marine environment (UNEP, 2006). These can take a number of forms ranging from extremely hazardous items to unsightly garbage and sewage disposal. Oil pollution is also a significant problem from the increased tourist activities on sea. Throughout the world, intensified use of oceans and seas as a source for food, mining, energy generation, water, transportation, recreation and tourism have increased the importance of the marine environment and highlighted the need to control marine pollution .

The main environmental impacts of tourism which are typical to Maldives are:

- a) pressure on very limited natural resources,
- b) pollution and waste generation, and
- c) damage to marine ecosystems.

Furthermore, it is widely recognised that not only uncontrolled tourism expansion is likely to lead to environmental degradation, but also that environmental degradation, in turn, poses a serious threat to tourism. In Maldives the main natural resources at risk from tourism development are land, freshwater, and marine resources. Intensive tourism development can also threaten natural landscapes and loss of wetlands and soil erosion.

Tourism development in coastal areas - including hotel, airport and road construction – is a matter of increasing concern in Maldives as it can lead to sand mining, beach erosion, and land degradation. Land conversion/expansion, i.e. dumping the garbage/waste in the uninhabited islands to stretch the land cover, to

provide space for resorts is a major problem in Maldives, in the absence of suitable location and space. Rapid expansion of the tourism industry, which tends to be extremely water-intensive, can exacerbate this problem by placing considerable pressure on scarce water supply in many destinations. Water scarcity can pose a serious limitation to future tourism development in many low-lying coastal areas and small islands that have limited possibility for surface water use and storage, and whose groundwater may be contaminated by saltwater intrusion (Pandey, 2004: 164). This is a grave concern for Maldives, where its tourist facilities are extracting more and more ground water and also exacerbate local shortages. Rapid expansion of coastal and ocean tourism activities, such as snorkelling, sport fishing and scuba diving (Godfrey, 1996: 127), can threaten coral reefs and other marine resources. The loss of marine diversity will also increase the chances of coastal flooding, harmful algal blooms, oxygen depletion and fish kills ("The disappearing fish resources", *The Hindu* 26 October 2006: 11). Disturbance to aquatic life can also be caused by the intensive use of thrill craft, such as jet skis, frequent boat tours and boat anchors which are very common in Maldivian life style. Anchor damage is now regarded as one of the most serious treats to coral reefs in the Maldives. Severe damage to coral reefs could also damage local fisheries, and it is an important concern for Maldives where fisheries form the major part of its GDP.

Besides the consumption of large amounts of natural and other local resources, the tourism industry in Maldives also generates considerable waste and pollution. This also results in the contamination of freshwater by untreated sewage. In addition, relatively high level of energy consumption in hotels and fuel used for transportation can also contribute significantly to local air pollution and marine pollution because of the disposal from cruise ships and tourist boats in Maldives. The delicate ecosystems of most small islands like Maldives, together with their increasing reliance on tourism as a main tool of socio-economic development, means that these environmental impacts can be particularly damaging since the success of the sector in these islands often depends on the quality of their natural environment. The loss of Biodiversity is also high due to huge tourism industry. The UNEP's Global Environmental Outlook (GEO) says on the state of the global environment highlights that, on a global scale, biodiversity is being lost at a rate many times higher than that of natural extinction. This loss is due to land conversion for tourism purpose, climate change, pollution,

unsustainable harvesting of natural resources, and the introduction of invasive species (Simpson, 2006: 35).

The future of Tourist Industry in Maldives

Maldives should also be aware of the 'life cycle' of a tourist destination, that is "its evolution from discovery, to development, to eventual decline... attributed to a site's over use and the subsequent deterioration of key attractions and facilities" (Pandey, 2004: 177). In other words, the negative impacts of intensive tourism activities on the environmental quality of the beaches, forests and other ecosystems also compromise the viability of the tourism industry in these places. In addition, tourism in Maldives could be particularly threatened by global environmental problems, notably the potential threat of 'global warming'. There is increasing scientific evidence that human activity has begun to change the average temperature on the earth's surface. This has also been validated by the recent assessment report of the United Nations Intergovernmental Panel on Climate Change (IPCC).

The inherent problems associated with the environmental degradation in Maldives could also result in its loss of attractiveness of the country as a tourist destination, which in turn brings livelihood problems for the workforce engaged in the service sector through the loss of employment in the tourism industry. To negate these kinds of problems and to protect its healthy environment, at least to some extent, the Maldivian government has to take appropriate steps to protect both its tourism industry, thereby keeping its economy intact and also to conserve its environment.

Global Warming and Climate Change

Few scientific issues in recent years have attracted as much public interest and political attention as the looming threat of climate change that now faces us; and the study of climate change has become an area of intense activity both in scientific and political terms. Climate change has important economic, environmental and social effects (Maslin, 2004: 29). The most dramatic declines are seen in India and South-East Asia, where economic development is proceeding fast.

The external factors which affect the environment of Maldives are mainly related to the global warming. There is growing scientific evidence that human activity has begun to change the average temperature of the earth's surface. These temperature changes have been brought about by the emissions of various 'greenhouse gases', most notably carbon dioxide from the burning of fossil fuels and from the burning of tropical forests, and methane, also from fossil fuel use and certain agricultural activities. Prof. Godwin O.B. Obasi, former Secretary General of The World Meteorological Organisation, has said way back in 1996 that, "the climate variations of the past have been essentially natural, without any human influence. However, a major concern now is that for the first time in history, human activities have reached the stage where they are having a discernible effect on climate on regional and global scales" (Obasi, 1996: 7). The second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) itself declared that 'the balance of evidence suggests that there is now a discernible human influence on climate' and 'the signal is just beginning to emerge from the noise of natural variability', but 'there are still uncertainties in key factors' (IPCC, 2002). This assessment gained influence in the context of the heat waves across Europe in 2004, which got the world's attention towards global warming.

Another document to add to the mounting evidence that things are going very wrong in the world was the report by a former Chief Economist of the World Bank, Sir Nicholas Stern, to the British government. The Stern Review stated that the global temperatures have risen by half a degree Celsius as a result of carbon emissions and that if nothing is done, there is a 75 per cent chance that temperatures will rise by two to three degrees Celsius over the next 50 years. This will have devastating effect on weather patterns resulting in floods, droughts, melting ice caps, and rising sea levels. The countries that will bear the brunt of this are the poorest ones. The important finding of the Stern report is that, there would be an estimated loss of one percent of the global gross domestic product caused by extreme weather ('Threats to world economy', *The New Indian Express* 26 November 2006: 12). Thus, the emphasis on the performance of the world economy, made many developed nations to give a serious thought over the issue of global warming, who, otherwise were reluctant to listen what the scientists had been telling for quite some time.

Global warming aggravates rapidly because, the carbon dioxide is accumulating in the atmosphere much faster than scientists expected (CO₂ concentration in the atmosphere is measured in parts per million (ppm)), raising fears that humankind may have less time to tackle climate change than previously thought (“The heat is on”, *Frontline* 9 March 2007: 60). New figures from dozens of measuring stations across the globe reveal that concentrations of CO₂, the main greenhouse gas, rose at record levels during 2006 – the fourth year in the last five to show a sharp increase. At its most far-reaching, the finding could indicate that global temperatures are making forests, soils, and oceans less able to absorb CO₂ - a shift that would make it harder to tackle global warming (IPCC, 2007).

IPCC Report of 2007

The Fourth Assessment Report of the IPCC (the report is the fourth since 1990 from the IPCC, which is overseen by the United Nations), which was released in February 2007, holds strong view on the human induced (anthropogenic) warming of the planet which affects the environment and the livelihood of the people across the globe. The IPCC is a body of 2,500 scientists that brings out reports that are considered the last word on the science of climate change. IPCC and its reports are accountable to all the governments in the world. The panel need to get approval for every word, so no government can go out and say, ‘we disagree with the IPCC report’ (“Climate change”, *The New Indian Express* 15 June 2007: 6). Each time IPCC releases a report, it is greeted with scepticism and controversy. This year, there has been no debate on the “how” and “what” of climate change. It is only the “when” that has been debated. The main theme of the latest IPCC report is about the scientific evidence on the global warming. “Warming of the climate system is unequivocal”, said the IPCC, pointing to the increased global air and the ocean temperatures, widespread melting of snow and ice, and rising sea levels. The certainty for this to happen is at more than 90 per cent mark (IPCC, 2007).

According to some reports, Asia would be the most affected region of the world, in terms of food security and health, due to global warming. Asian rice production could decline by an average 4 per cent due to climate change based on the present systems. Altered timing and magnitude of rainfall could induce drought or

flood injury to crop. Increased temperatures and / or changes in precipitation could have dramatic impacts on diseases and insects (“Abnormal rainfall patterns forecast”, *The Hindu* 11 October 2006: 11). Rapid urbanisation, increasing motorisation and energy consumption are listed as some of the challenges that Asian cities face. South Asia, particularly, is a compact geographic unit and it is one ecological zone. Increased emergence of vector borne diseases could also be the fallout of increased global warming in the region, which houses nearly 35 per cent of the world’s poor. Therefore, most of the environmental problems extend beyond national boundaries (like air pollution, global warming, etc) and are shared by more than one country (Dhalal, 2006: 35).

Global Warming and Sea Level Rise

One of the most important consequences of global warming is the risk of sea level rise, mainly due to the thermal expansion of the oceans- the increase in the volume of water brought about by a temperature increase (IPCC, 2007). Glacial recession and loss of ice from ice sheets will also add to sea-level rise. Millions of people around the world are likely to be affected by rising sea levels and stronger storm surges. Over 630 million people, accounting for a tenth of the world’s population, live within 10 metres above the current sea level. In order to identify places that would be affected by climate change-induced rises in sea level and bigger storm surges, the researchers combined terrain height information derived from radar observations during a space shuttle mission in February 2000 with databases giving the global spatial distribution of population and urban areas (“The heat is on”, *Frontline* 9 March 2007). This made it possible to identify vulnerable human settlements and estimate the number of people in the “low elevation coastal zone (LECZ)”, which scientists define as coastal areas within an elevation of 10 metres. Almost three - quarters of the people currently living in the low elevation coastal zone are Asians.

Problems facing the Maldives

Sea-level rise is of particular concern to small states as over half the countries classified as small states are islands, like Maldives. Island states are more vulnerable to the projected sea-level rise. Many large countries are also vulnerable, particularly

earthquake that triggered the tsunami, as well as the south-eastern coast of neighbouring Sri Lanka (Simpson, 2006: 5).

That doesn't mean that the country's beautiful and precious corals, flora and fauna and sandy beaches which attracts a lot of tourists, are spared from any devastation. In fact, the worst affected country in terms of environmental degradation and biodiversity loss was the Maldives. The protected areas infrastructure and management systems had been destroyed or severely damaged that these systems are likely to have been almost completely lost, putting back by years the conservation efforts for these areas. The effect on coral reefs have been disastrous, not only from the initial waves but then the settling of mud, silt and other sediment on the corals after the waves. "Some of the places I've visited look like they've been hit by a nuclear bomb," said Tom Bergmann-Harris, head of the United Nations Children's Fund in the Maldives (UN, 2005). More than 15,000 of the 300,000 population are homeless and the economy is reeling from the impact on tourism and fishing.

Impact on the Maldivian Economy

Before December 2004 the Maldives was well on the way to tackling poverty (it was about to be excluded from the least developed countries list of the UN). Since the early 1990's literacy has been close to 100 percent, under-five mortality has fallen from 11.5 percent to just over seven percent and safe water has been available to almost everyone, to name a few development achievements. Tourism, fisheries and other industries have boosted the economy and provided significant growth. But the tsunami, which devastated many countries in the region, has placed these achievements at risk.

Infrastructure was smashed by the incoming waves where nothing was left over in the fifty meters distance from the shoreline. Total damage to this small-island nation of nearly 300,000 people is estimated to be in the region of US\$ 470 million – just over 62 percent of GDP. Agriculture, fisheries, and basic livelihoods were washed away (Ministry of Planning and National Development, 2006). Vital infrastructure such as wharves, fish processing facilities, hospitals and schools disappeared. The tsunami has caused severe damages to the most vital industries of Maldives, fishing and tourism. This has resulted in the loss of employment and

thereby threatening the livelihood of the coastal settlers. This in turn has created a lot of problems for the Maldivian economy, since more money has to be allocated for the restoration of the houses and boats destroyed by the tsunami. The most vulnerable and poorest groups in society now face the spectre of an even more precarious future.

A report issued by the UN Environment Programme on 17 June 2005 found that the Indian Ocean Tsunami caused a number of significant impact on the Maldives' environment (Dhivehi Observer, 2006). The country's inhabited islands are confronting several environmental challenges and the report concluded that the Tsunami generated approximately 2,90,00 cubic meters of waste on the country's 69 inhabited islands. In some islands, the Tsunami hit at one side of the island and left on the other side wiping everything on its way. Coastal zones were eroded and vegetation, including food crops was destroyed (Latheef, 2005).

Damages to the Ecosystems

Maldives harbours many key marine and coastal ecosystems like coral reefs, mangroves, sea-grass beds, coastal dunes, mudflats, salt marshes, backwaters and lagoons, which all play a vital role in sustaining the living natural resources on which so many people are dependant (Connell 2006). The effect of the tsunami on these ecosystems was very severe ecologically as well as economically. Many coral reefs had lost both their structure and biota, and are now reduced to rubble due to mechanical damage. Further, there is significant contamination by run-off from land, with large quantities of wastes and pollutants, debris, soil, and organic matter. This had further increase the damage and hampered recovery process. Many coral reefs that did not sustain a direct or hard hit by the tsunami suffered from the exposure caused by the receding water as it approached, as aerial exposure can kill corals that are not adapted to it. Also, increased turbidity in the wake of the tsunami had suffocated large areas and killed many organisms that have survived the wave itself, like the reefs and sea-grass beds (Ministry of Fisheries and Marine Resources 2006).

There are a number of long-term implications including changed shorelines, loss of breeding fish populations, habitat and nursery grounds and loss of key attractions such as beaches and reefs which will affect the tourism industry, a vital source of income in Maldives (Connell, 2006: 3). Some patterns of the destruction are

more evident. It is clear that areas with healthier ecosystems have been less affected. For example, the coastal destruction is very patchy in some severely affected areas of Maldives, with less altered and more vegetated parts of the sea-land interface withstanding the tsunami to a much larger extent than areas where vegetation has been removed or the shoreline changed or encroached on. Structures in more obviously vulnerable locations, including many hotels and residential areas built too close to the sea have fared worse, and artificial canals that connect lagoons with the sea appear to have aggravated the damage by funnelling water inland, resulting in flash floods (Simpson, 2006: 19). Moreover, the salination on the island is deep and widespread due to the tsunami, that it potentially makes the soil on the island unfit for any kind of vegetation, which in turn could substantially increase the vulnerability of the island and its inhabitants to further erosion, extreme weather events and to the impacts of climate change.

Observations show that the ecological damage caused to the country's mangrove and other coastal forest ecosystems has been extensive, though varied from coast to coast. Tsunamis typically reach the shore with tremendous amounts of energy and can strip beaches of sand together with trees and other coastal vegetation. Many coastal wetlands have been affected by the large inflow of salt-water and wreckage during the tsunami, with longer-term effects including changes in their hydrology caused by changes to coastlines and damage to sea-defences. Although species will have adapted to such natural disasters during their evolutionary history, past habitat loss due to human activity will have reduced the availability of refuges (IUCN, 2005).

In many cases, the Tsunami worsened pre-existing environmental management problems on the inhabited islands. Water supplies were also contaminated with high level of nitrates, which causes health hazards. At the peak of all these problems there is a strong assumption, which is also a threat that Maldives would be flooded within 50 to 100 years and thus no trace of its existence. At last, in the area of marine activities, Maldives rely to a considerable extent on food from the sea for consumption and also for its huge fishing industry. Marine climate information is needed in supporting the management and exploitation of expanded coastal and deep-sea fisheries. The safety of all types of craft at sea also requires accurate weather

forecasts and warnings. All these need appropriate planning and implementation by the government, keeping in mind, the peculiarity of its problems and solutions.

Conclusion

The present environmental issues for Maldives are beach erosion, coral mining, dredging, biodiversity loss, population growth and its impact on distribution and lifestyles, fresh water availability, soil degradation, the effects of tsunami and most importantly, the rising sea-level due to global warming. Sea level rise is of great concern for Maldives and a lot of measures has to be taken for adaptation and mitigation, with the help of the international community. This is not only a livelihood issue for the nation, more than that it is a problem of its sovereignty. Finally, it should be noted that tourism and leisure industries are the major source of income in Maldives and most of these activities depend on climate. Clearly, any changes in climate which upset current weather patterns, or produce greater extreme conditions, would impact adversely on these activities and thereby affecting the livelihood of the poor which relays on them.

On this background, it has to be examined how the Maldivian government is prepared to tackle this menace in the context of its environmental security, and also securing its economy and sovereignty. It should be seen how successful was the government's attempt to sensitise its people about the environmental problem surrounding them. How the policy makers integrate these concerns into their national policies and programmes, and what are the feedbacks and benefits they had realised from such measures.

CHAPTER THREE

**THE ROLE OF MALDIVIAN
GONERNMENT IN
ENVIRONMENTAL SECURITY**

The Legal provisions

At the national level, two main laws have been formulated to provide a framework to guide the sustainable use, management and conservation of the country's natural resources, and to protect these resources from degradation and over-exploitation:

- the Fisheries Law (1970)
- the Environmental Protection and Preservation Act (1993)

In addition, a National Environment Action Plan was prepared in 1989 with the purpose of assisting the government to: a) maintain and improve the country's environment, including the marine and ocean area contained within its Exclusive Economic Zone; and b) manage the resources contained therein for the collective benefit of present and future generations. The National Environment Action Plan identified several high priority issues for urgent attention. In response, a number of actions are now being undertaken to address these issues and improve living standards in general, including a range of conservation measures to help recharge the severely depleted aquifer in Male.

The Fisheries Law

In Maldives, official conservation efforts for marine life were first initiated during the 1970s. The approval of the Fisheries Law by the Citizen's *Majlis* in 1970 was an important step towards establishing a legal framework for environmental protection at the national level. Under the Fisheries Law, regulations exist to protect marine resources, including turtles, whales, dolphins and certain fish. The Fisheries Law was subsequently reformulated during the mid 1980s to meet the challenges posed by the expansion of the fisheries industry and its position as one of the most important economic activities in the Maldives. Following reformulation, the law gained enhanced provisions for the conservation of living marine resources. The tenth clause of the Fisheries Law states:

“In the event of a special need for the conservation of any species of the living marine resources, the Ministry of Fisheries shall have the right to prohibit, for a

specified period, the fishing, capturing or the taking of such species or the right to establish special sanctuaries from where such species may not be fished, captured or taken” (Ministry of Justice, 2006).

As a follow up for this provision, the government of Maldives had declared some species as endangered and also prohibits the export and capture of those species. To safeguard its marine life, any import of new species has to undergo a strict medical check up as instructed by the government.

The Environmental Protection and Preservation Act

This act was approved by the Citizen's *Majlis* (National Assembly) in April 1993. This law was important in bestowing the erstwhile MPHRE with a wide range of statutory powers in the area of environmental regulation and enforcement. For instance, it empowered the MPHRE to draft guidelines for environmental protection and gave it responsibility for the identification and designation of protected areas and natural reserves. As a means to enforce environmental regulations, this act further empowered the Ministry of Environment to levy fines of up to 100 million Maldivian Rufiya (US\$10 million) in cases of breaches of the law (State of the Environment Report, 2002). This shows the importance which the government of Maldives is paying to the protection of its environment.

The Environmental Protection and Preservation Act (4/93), established a framework upon which regulations and policies can be developed to protect and preserve the natural environment and resources for the benefit of the future generations (Ministry of Environment, 2004). In brief, the Act consists of the following provisions:

- Concerned government authorities shall provide necessary guidelines and advice, including imposing of fines and compensation for environmental damage that may take place
- MPHRE is responsible for formulating policies as well as rules and regulations
- MPHRE shall identify and designate protected areas and nature reserves
- Mandatory Environmental Impact Assessment for any new projects

- Power to terminate developments causing significantly detrimental environmental impacts
- Disposal of waste, oil and poisonous substances shall be regulated
- Disposal and trans-boundary movements of hazardous wastes banned (Ministry of Justice, 2006).

Conservation and Protection in Practice

The concept of *in situ* conservation (it means “on-site conservation”. It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself, or by defending the species from predators) is fairly new to Maldives. Marine Protected Areas were demarcated for the first time in 1995. Although uninhabited islands and their reefs have been protected, protection has tended to result from limited resource extraction, as opposed to any concerted efforts at protection. *Ex situ* conservation (“off-site conservation” by placing it in a new location, which may be a wild area or within the care of humans) methods do not exist. For instance, there are no laboratories, aquariums, zoological or botanical gardens, or sacred gardens (land protected for religious uses) (Ministry of Marine Resources, 2005).

The main types of *in situ* conservation methods employed in the Maldives include:

- marine protected areas;
- uninhabited islands;
- resort islands (only 20 per cent of land is used and the remaining 80 per cent is left as wilderness); and
- agricultural islands, where wilderness areas have been demarcated.

Some research and management programmes aimed at strengthening the future management of biodiversity in the Maldives are currently being implemented. These include:

- Integrated Coastal Zone Management and Land Use Plan;
- Assessment of Marine Biodiversity;

- Protection of Marine Ecosystems along the Maldives Coast for Sustainable Development, supported by Global Environment Facility (GEF); and
- Initiation of Protected Areas System.

Marine Protected Areas

A recent but important development in conservation has been the designation of 14 Marine Protected Areas (MPAs) in the Maldives' central atolls, covering an area of approximately 12.55 sq. km. These areas have been identified for protection because of their outstanding diversity of corals, reef fish and sharks, as well as the existence of other organisms ranging from sponges and molluscs to bivalves. As protected areas, all extractive and human activities, including coral and sand mining, fishing, collecting, netting and anchoring are banned, with the exception of bait fishing. Catching bait fish is permitted in MPAs given its importance for local tuna fishing; however, the methods used for bait fishing in MPAs must not damage or harm any living organism.

The Government of Maldives is currently examining options to extend marine protected area status to cover other parts of the archipelago. In addition, opportunities to establish terrestrial protected areas are being considered and some national parks may be designated in the near future. A number of potential sites have already been identified, including islands, wetlands, natural heritage sites and other habitats of significant importance. Some of these sites have diverse birds populations, while others are uninhabited islands that serve as rookeries for sea turtles (Ministry of Marine Resources, 2005).

Environmental Impact Assessment

The Environmental Impact Assessment System (EIA) in the Maldives was established through the Environmental Protection and Preservation Act of Maldives, which came into effect in April, 1993. The legislation provides the basic framework for the EIA process in the country and the EIA procedures are laid out in the form of guidelines. According to article 5 (a) of the Act, an impact assessment study shall be submitted to the Ministry of Environment before implementing any activity that may

have an impact on the environment. Article 5 (b) states that the principles of EIA and the projects that require an EIA shall be determined by the Ministry of Environment. To streamline and facilitate the EIA process in the country the Ministry developed a set of guidelines outlining the procedures for EIA and these were approved by the Cabinet in December 1994 (Ministry of Planning and National Development, 2004).

In Maldives, the rule setting agency that has the authority to specify rules, procedures, and standards governing the EIA process is the Ministry of Environment, Energy and Water. It is also the responsible agency mandated to prepare the EIA or have it prepared for a proposed action. There are various licensing agencies authorized to issue an official permit to the action proponent to implement the proposed action. The main licensing agencies in the country are: Ministry of Trade and Industries; Ministry of Fisheries and Agriculture; Ministry of Tourism, and Ministry of Atolls Administration.

National Environment Action Plan (NEAP)

In 1989, the First National Environment Action Plan (NEAP I) was developed through a national workshop to address the planning and management needs of the country, which covers a period of 10 years. The Action Plan contains the overall strategy of the Government in the environment sector which represents a combined approach to managing and solving existing problems and establishing the mechanisms and procedures for future sound management of the environment. The principal aim of the National Environment Action Plan is "to help the Government of Maldives to maintain and improve the environment of the country, including the marine and ocean area contained within the Exclusive Economic Zone, and to manage the resources for sustainable utilization". Thus the NEAP is a comprehensive policy framework that is used in a six-yearly cycle to ensure environmental protection and sustainable development in the country. This compliments the National Development Plan (NDP), which is a policy framework for the development issues for five-year period (UNEP-RRCAP, State of the Environment Report, 2002: 23).

The Second National Environment Action Plan (NEAP II) of 1999 emphasises climate change and associated sea level rise as a primary concern of the Maldives.

Thus, the Maldives has continued to participate in international forum, calling attention to the fragile nature and special vulnerability of small islands. Current national environmental policies are based on the need to take an integrated approach to environmental management and to work to-wards the goal of sustainable development. This is reflected in the NEAP II, which is the main guiding document for developing national environmental policies. The NEAP-II has set its strategies and priorities with the aim to “protect and preserve the environment of the Maldives, and to sustainably manage its resources for the collective benefit and the enjoyment of the present and future generations” (NEAP II, 1999). The NEAP-II further indicates the need for strengthening the environmental law, environmental administration, education and public awareness, science and research, and the human resource capacity of the country. The issues identified as priorities were:

- climate change and sea level rise;
- coastal zone management;
- biological diversity conservation;
- integrated reef resources management;
- integrated water resources management;
- management of solid wastes and sewage;
- pollution control and managing hazardous waste;
- sustainable tourism development;
- land resources management and sustainable agriculture; and
- human settlements and urbanisation (UNEP, 2004).

Apart from the polices and measures outlined in the NEAP II, the importance of sound practices for environmental and natural resources management is stressed in various parts of the Sixth National Development Plan 2001 - 2005 (NDP-5). The NEAP II and the NDP-6 have been developed with the view to maximise the

sustainable use of natural resources, while paying due attention to the constraint that the island communities are small and widely dispersed over the country.

National Initiatives

The Maldivian government has taken a number of policy measures to protect its environment and to provide security for its people. Raising public awareness about environmental issues is a high priority for the Government of Maldives. A number of initiatives have been undertaken with the specific aim of encouraging environmental awareness and education. Most of these include and give importance to community level participation and the involvement of school students in the execution of certain projects. These include, but are not limited to, the following activities undertaken over the past 20 years (Maldives News Bulletin: 2006).

Awareness Programmes and Community Participation

- High priority has been given by the Government to raising public awareness on environmental issues. To accomplish sustainable development and lifestyles, environmentally sound actions at individual, household and community level need to be initiated. A number of Government agencies and NGOs have been involved in promoting environmental awareness. Wall posters, television and radio programs are used to disseminate information on specific issues of concern. These programs attempt to inform the public on the state of the environment within and outside the country including impacts of human activities (Dhivehi Observer, March 2005).
- The World Clean-up Day Programme, the Clean Maldives and the Independent Maldives campaigns were designed to involve people in the cleaning up of litter. This is a community programme aimed at sensitising the community about the environmental problems by their active participation. They are also given training in coastal zone management programme, and after the Tsunami, they are also trained in hazardous waste removal and disposal.
- Incorporation of environmental studies in the primary and middle school curriculum is given importance. “Thimmaveshi” (me and my surroundings) programme was

introduced in 1987, to create environmental awareness in children and to inculcate them with the sense of preserving their environment and securing it for their future generations. With the involvement of environmental clubs, regular environmental programs are conducted by prominent schools, where the students visit different islands to personally know about various methods and functioning of environmental protection and preservation (Maldives News Bulletin 17 April 2000: 9). By these kind of activities, younger generations are becoming more aware of the delicate nature of the ecosystem and its vulnerability to natural and man-made changes.

- The severe storms that swept the country in 1991 caused severe damage to more than 3000 dwellings and uprooting or damaging more than 190,000 trees. This provided evidence of the country's vulnerability to the elements of nature. To negate these kind of natural disasters, a large-scale tree planting programme (the "Two Million Tree" Programme) was launched in 1996 with the strong involvement of schools; in an effort to conserve the biological diversity of trees used for timber. This programme of the government seeks to replenish and expand good timber stock through the promotion of a number of tree species of timber and food value. Tree planting programmes were organised in schools every year on the World Environment Day of 5 June (Ministry of Environment, 2006).

- The Maldivian government is also conferring environmental awards to encourage the public to be more environmental friendly. The award is given to those who had made an outstanding contribution in the areas of protecting the environment, protecting the reefs and the marine ecosystem, safe disposal of waste, importing environmental friendly goods, and those working to create greater environmental awareness among the community such as schools, non-governmental organisations, private enterprises and individual people. This environmental award would be presented by the President on Environment Day 5th of June each year (Maldives News Bulletin 27 March 2004: 3).

- Development of national sustainable development policy statement, which includes the National Environment Action Plan (NEAP) and the National Development Plan (NDP). The NEAP is the comprehensive policy framework that is used in a six yearly cycle to ensure environmental protection and sustainable development in the Maldives. This complements the NDP, which is policy framework for the

development issues for five-year period. As a result, environmental awareness among the public is considered as reasonably high (Ministry of Environment, 2006).

- In Maldives the first NGO started was an environmental NGO in 1980's. With the encouragement of the government, they coordinate the overall programs like environmental day, community participation, issuing leaflets and a number of environmental awareness programs. Even the Women Development Committee in the islands have environmental programs, where they are involved in maintaining and keeping the island clean to ensure better health.

Apart from these national programmes and policies, the government is actively involved with the international community for securing its environment by organizing and participating in various conference and conventions. The following were some of those meetings, whose details are discussed in the next section.

- Participation in the Commonwealth study on the Implications of Sea level rise for the Republic of the Maldives in 1989.
- Hosting of the Small States Conference on Sea Level Rise in Male, in November, 1989. The outcome of the conference was the "Male Declaration on Global Warming and Sea Level Rise." which paved the way for the establishment of an Action Group among small island states, to co-ordinate a joint approach on the issues of climate change, global warming and sea level rise, and to pursue and follow up on global and regional response strategies. This Action Group later transformed into the Alliance of Small Island States (AOSIS) at the Second World Climate Conference (AOSIS, 2004).
- Hosting of the 13th session of the IPCC in the Maldives in September, 1997.
- The GEF Climate Enabling Activity hosted a policy workshop on climate change targeted at policy makers from various government sectors. This workshop was held on 15 March 2001 and 27 participants from 22 government offices took part in this workshop. Presentations were made on the latest science of climate change, the latest policy developments of climate change, the preparation of Maldives GHG Inventory

Only 68% of the beach length can be allocated to guest rooms as 20% has to be allocated to public use and 12% left as open space; and

d) constructions on reef flats and lagoons are discouraged. However, as over-water bungalows are very popular among tourists they are permitted provided equal open space is left on the land for each building developed on the lagoon.

Sustainable Tourism

In Maldives, the multi-use conflicts (usage of the resource by more than one party) in the reef areas are primarily between the two major uses - tourism and fisheries. To solve problems that arise due to conflict of interest between the tourism and fisheries sectors in exploitation and use of the marine resources, 15 important dive sites have been declared as protected areas where anchoring, and fishing except for traditional bait fishing, is strictly prohibited (NEAP II, 1999). Tourism in Maldives is carefully managed. The country's tourism master plan identifies both the underwater environment and the Robinson Crusoe factor as major attractions, but these are not seen as compatible with large-scale, low budget, mass tourism. The lack of local resources makes it necessary to import virtually everything a visitor need, from furniture to fresh vegetables, so that the Maldives cannot really compete on price. The strategy has been to develop a limited number of quality resorts, each on its own uninhabited island, free from traffic, crime and crass commercialization (Pandey, 2004: 153).

The concept of sustainable tourism, as developed in the United Nations sustainable development process, refers to tourist activities "leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems" (UN, 2005). These sustainability concerns are, therefore, beginning to be addressed by governments at national, regional and local as well as international, levels. In addition, given the leading role of the private sector in the tourism industry in most countries, many initiatives have also been taken by this sector. Broadly speaking, the main policy areas regarding sustainable tourism are:

- (a) the promotion of national strategies for sustainable tourism development, including the decentralization of environmental management to regional and local levels,
- (b) the use of both regulatory mechanisms and economic instruments
- (c) the support for voluntary initiatives by the industry itself, and
- (d) the promotion of sustainable tourism at the international level (Pandey, 2004: 180).

Generally speaking, the main priority of the Maldivian government is to incorporate tourism planning and development effectively into overall sustainable development strategies. Given that in Maldives, local and regional administrations already have important responsibilities for tourism development. Central government also supports capacity building programmes at lower levels in order to enable local and regional authorities to better respond to the challenges of sustainable tourism development in the areas under their jurisdiction. The national government also have some clear strategies to monitor progress towards sustainable tourism. It also reaps benefit from working in partnership with all major stakeholders, including local communities, to ensure their active participation in tourism planning, development and management, as well as in the sharing of benefits (Thakur, 2004: 9). Participation of local communities in decision-making and sharing of benefits also helps to generate better awareness of the environmental costs of tourism and thus provides strong incentives to conserve natural resources and protect local environmental assets.

Government, together with the tourism industry and other stake holders, promote or support various efforts to raise public awareness about the impact of tourists on destinations, to promote respect for local communities and their cultures and to protect the environment (UNEP, 2006). Such public awareness campaigns often succeed in promoting positive behavioural changes not only in tourists, but also in tourism workers and host communities as a whole.

Benefits of Sound Tourism Policy

Direct benefits from tourism to conservation can be clustered in five areas:

1. a source of financing for biodiversity conservation, especially in legally protected areas;

remarkable courage and strong sense of community shown by the people at a time of unimaginable loss and adversity, and in remembrance of those who lost their lives in the disaster, the Government decided to mark 26 December as Unity Day (Maldives News Bulletin, May 2005: 2).

The Maldivian government with the help of UNICEF responded swiftly, and aid came quickly to those affected by the deadly waves. The island's excellent communication network allowed officials to make contact with the most devastated islands and to assess the damage in a matter of hours. A Crisis Task Force helped coordinate evacuations, mobilized emergency assistance, offered free transportation between islands and also ensured that the injured were brought to area hospitals (UNDP, 2006). The government worked with the help of UNICEF by providing training to volunteers, who removed the hazardous waste and provided sanitation and health facilities.

Responding to the emergency, the people, Government and international agencies worked closely to provide the basic needs of food, water, clothing and shelter. Temporary shelters were constructed for the displaced with the active participation of the private players. Exactly one month after the disaster the President laid the foundation stone for the first batch of permanent houses in A.Dh Maamigili, for the people of M.Madifushi, who requested for relocation upon the total destruction of their island (UNEP-RRCAP, 2006). Further, the livelihood component of the government programme provided loans for repairing and also to acquire new boats by the fishing community.

Tsunami Recovery and Reconstruction

When communities are impacted by natural disasters or developmental challenges, various efforts are made for reconstruction. The Government of Maldives has set up the National Disaster Management Centre to coordinate such trans-disciplinary efforts and services. The recovery and reconstruction programme in Maldives followed a unique trans-disciplinary approach with the active participation of the local communities, government machineries, NGOs and private players like the tourist and resort players.

While immediate attention was paid to restoring basic living conditions and re-establishing local infra-structure, long-term efforts focused on capacity building, increased resilience, disaster management and community empowerment. In the aftermath of the devastating tsunami, many communities are in need of coordinated and well planned models of redevelopment to ensure sustainable change and meaningful recovery.

The National Recovery and Reconstruction Plan was prepared by the Ministry of Planning and National Development with the assistance of the Ministry of Finance and Treasury in 2005. It has outlined the objectives and strategies for meeting urgent immediate needs in housing and infrastructure development, reviving livelihoods, and creating the conditions for sustained economic recovery (UNDP, 2006). Some of the major objectives and priorities under this plan is to protect and regenerate vulnerable marine ecosystems, strengthen disaster preparedness and mitigation measures, establish early warning systems, improve protection and mitigation measures against wave impact in major islands, cleaning up debris, implementing policies and measures for sustainability of vulnerable marine ecosystems.

The Plan contains projects and programmes proposed by different sectors to restore key industries and provide social and economic services and facilities. To meet these needs and other expenditures it would be necessary to mobilise within 3-4 years, approximately 3 times the normal public investment requirements. In the face of the projected revenue shortfall of US\$60 million due to the tsunami, the challenge for economic recovery is to meet the financing requirements without increasing the debt service ratio above pre-tsunami levels (Dhivehi Observer, April 2005).

Objectives of the Program

In response to the tsunami, the Government of Maldives with the assistance of the UNDP initiated a program for Disaster Risk Reduction for Sustainable development in the Maldives.

The objectives of the programme are to,

- Establish an Institutional Framework and Policy for Disaster Management

- Develop Multi Hazard Preparedness and Response Plans at the National, Atoll and Island level
- Awareness, Training and Capacity Building activities (UNDP, 2006)

Key Components of the Program and outcomes

- Support for setting up National level Early Warning Systems process was accelerated with the active participation of the SAARC and other international donors like Australia, US, Japan etc. An experimental system was put in place in the Indian Ocean at the end of 2006. In addition, Disaster Risk Reduction programme was mainstreamed into the developmental processes, where all the new projects would be evaluated with a component of disaster reduction and mitigation (Ministry of Planning and National Development, 2006).
- Develop a multi hazard disaster risk profile with vulnerability ranking for each island to facilitate better planning & judicious use of resources for development activities in the country. In conformity with this, the resort developers prepare their own safety measures with the consultation and guidance of the government. To support the Ministry of Tourism in a vision to make a “disaster risk free tourism environment” in the Maldives, a consultant facilitated the process of developing a framework for the disaster response plan within the Ministry.
- Facilitate setting up of National and Regional level Emergency Operations center with better communication facilities. This would compliment for the efficient and effective functioning of disaster risk systems set up in the country. Local communities were trained on how to respond and rescue in an eventual scene of disasters.
- Provide safe shelters to ten most vulnerable communities. The development of Early Warning system is being complemented by the community shelter for protection of the most vulnerable families in the event of a disaster. UNDP has through a consultation with the Ministry of Planning and National Development has prioritized ten islands for the construction of safe shelters. The first shelters were constructed in March 2007 in Felidhoo island of Vaavu Atoll. This was now integrated with the Safe

Islands programme of the government and the project is now jointly funded by the EU.

- Enhancing skills and capacities for management of natural disasters at the National, Atoll and Island levels and supporting the formulation of community preparedness plans in each vulnerable island. These tasks were effectively accomplished with the training provided by the international organizations in removing the hazardous waste, the emergency relief operation, etc (SAARC Secretariat, 2006). These programmes and policies have resulted in developing a relatively safer environment for most of the vulnerable communities.

Sea level Rise

The population (about 300,000) of the Maldives is widely dispersed over approximately 200 islands, making it unique even among small island archipelagic States. It also raises the cost of delivering social services and of public administration as there is hardly any scope to generate economies of scale as it is too expensive to provide education, health and administrative services on each of the 200 islands. The low-lying islands are vulnerable to rising sea levels and sea swells. This is so serious that some scientists predict that the Maldives could disappear by 2050 because of the projected sea-level rise caused by global warming.

As the Maldives is very vulnerable to the predicted climate change and sea level rise, attention is given to adaptation measures. Various programmes have been designed and implemented in areas such as coastal protection, freshwater management and coral reef protection. The Government has taken very important measures to protect the coral reefs by reducing import duty on construction materials and prohibiting use of coral for government buildings and tourist resorts and by banning of coral mining from house reefs.

In order to reduce the emission of greenhouse gases which is responsible for global warming and sea level rise, the Maldives has started pilot projects on alternate sources of energy. Solar power has been used to power telecommunication sets, navigational aids and government office buildings and mosques in the islands. The

main constraint to the widespread use of solar energy is the lack of technical backup and high installation costs (Dhivehi Observer, April 2006).

Coastal flooding has been experienced in the past and the risks of flood damage resulting from high tides have not reduced in recent years. The degree of severity of some of these events has been thought to have increased due to improper coastal zone management and construction of poorly designed coastal structures. Proper management methods of the coastal zone are now gradually being introduced in the Maldives, and some research and consultations are now carried out in the construction and design of seawalls and coastal structures, as well as in the reclamation of land.

The problem in Malé

Excessive migration to the capital city island of Male' with its higher standard of living and strong sea defences have caused overcrowding and a strain on the island's resources. There is now an urgent need to develop centres of growth in the atolls to improve the standard of living and to encourage people to remain there. Consequently, the Government of Maldives has given priority to its regional development strategy to develop larger, safer and more sustainable islands in the atolls where people can live more comfortably with improved job opportunities.

In 1998, the Government of Maldives established a policy of regional development and decentralisation to ensure services are delivered in a cost-effective manner to the people in the outer atolls and to reduce the drift of people towards Male'. The strategy promotes the development of one, larger 'focus island' per atoll, which is more economically and socially sustainable. Since 2004, the strategy has been enhanced to provide better protection from natural disasters and to ensure environmental sustainability. Migration is on a voluntary basis (Ministry of Atoll Administration, 2006).

One of the ambitious projects of the government was the land reclamation of the Hulhu-Male. In order to solve the housing problems facing Male, a project of reclamation was begun on 16 October 1997. Hulhu-Male project was the biggest

name of 'focus'/ 'safe' islands programme. This has now helped to expedite the project in a significant way (European Commission, 2007).

The specific objectives of the development of 'focus' islands, is to ensure that,

- the vulnerability of developed 'safe' islands to sea level rise is reduced through sustainable environmental planning and environmentally sound sea defences.
- the populations of developed 'focus'/' safe' islands have access to adequate educational, health and other social programmes within the framework of national policies, sustainable water, energy and waste facilities, quality housing resistant to damage by tidal waves and rising sea level, improved job prospects.

The Government of Maldives has set some criteria for the choice of 'safe islands'. It says that the islands must have;

- easy access to an airport.
- sufficient space and potential for reclamation and/or the possibility for connection with another island.
- sufficient space for subsequent population growth.
- a viable economy and social services (Ministry of Planning and National Development, 2006).

The World Bank (WB) will route the Commission's funds through the Tsunami Relief and Reconstruction Fund (TRRF), managed by the Ministry of Finance and Treasury, using the same implementation measures and social environmental and financial safeguards as those applied to the WB's own support, thus ensuring harmonisation of implementation methods.

Project assistance by the International Donors

The Maldivian government has initiated a lot of programs for the environmental sector with the help of the international donor community. They include:

- Disaster waste management
- Assessment of environmental threats to human health
- Coral reef impact assessment programme

- Biodiversity survey and recovery plans
- Strategic environmental assessment of overall rehabilitation and reconstruction programme
- Strengthening environmental governance at the national, atoll and island levels
- Coastal zone management
- Hazardous substances control programme
- Development of a national oil contingency plan
- Energy conservation and promotion of renewable energy, and
- Environmental awareness building (Ministry of planning and National Development March 2006).

The Future course of action

The Maldivian government has also identified some policies for effective implementation of the disaster risk management programme in future. Some of them has already been put in place, they include:

- Identifying possible disaster risks and developing frameworks to address the risks
- Strengthening the institutional and legal systems for disaster risk management
- Facilitating establishment of actionable early warning system
- Vulnerability assessment for disaster preparedness planning
- Enhancing disaster resilience of economic sectors and key infrastructure
- Alternative communications and network resilience
- Development and implementation of disaster preparedness plans and emergency response.
- Development of host islands for relocation from vulnerable islands (Dhivehi Observer March 2005).

In responding to the urgent and future needs of environmental protection, it is important to reconceptualise environmental mitigation measures. As such the Government has developed a strategy for increasing the safety of island communities by redesigning the physical development features of islands and incorporating measures such as wider environmental protection zones, creating elevated areas for vertical evacuation in the event of floods, and providing easy access during

emergencies. The new houses which have been built for the people affected by the Tsunami would be completed by the end of 2007. These houses have been built on the newly created elevated surface in the islands as a protection against future flooding.

Human Resource Development

One of the main drawbacks of Maldives is that it lacks trained personnel in coastal and environmental management. The number of trained environmental officers is in short supply, reducing their ability to enforce environmental and related legislation. For instance, the capacity of the Environmental Research Unit is limited in terms of both human resources and technical capability. As a result, the importance of overseas courses and local training centres in increasing the national capacity for environmental management has been recognised. Similarly, indigenous knowledge about natural resources and local community's genuine concerns to protect their island's biodiversity appear to play an increasing role.

The GEF Training Programme

The government of the Maldives has given priority to enhance the existing capacity of human resource development, especially in the field of coastal zone and environmental management. In this regard, postgraduate training has been given to the members of the climate change project team under the Global Environment Facility (GEF) Climate Change Enabling Activity. The project has further trained local residents in monitoring and assessing the changes in their island environment. The GEF Climate Change Enabling Activity facilitated a special post graduate level training for six members of the project staff in the following interest areas of the project. The contribution from these trained staff to the completion of the first national communication of Maldives shows the success of such training programs. One of the objectives of the Climate Change Enabling Activity was to train 75 local residents from selected islands (out of a total of 199 inhabited islands) in coastal management issues, with practical instruction in beach surveying and other monitoring and data collection procedures (GEF, 2006). This was aimed to build the capacity required to measure and monitor baseline environmental conditions against which to assess vulnerability to future changes on outer islands. This objective was

integrated into an existing program of training local residents. There have been three training rounds conducted under the project. A total of 63 locals have been trained so far. This number includes at least one person from each of the 20 administrative atolls. The project now aims to train one person from each of the 199 inhabited islands of Maldives (Ministry of Environment, 2006).

The third training round was conducted as a joint activity with the Southern Regional Development Management Office in Addu Atoll. The third training round not only included beach surveying and other monitoring techniques, but also aimed to increase awareness of locals on environmental issues. The course content was improvised and covered the following main modules: Basic meteorology, basic oceanography, solid waste management, beach surveying, coastal zone management, reef surveying, biodiversity and environmental law (Ministry of Planning and Development, 2006).

Research was also conducted in Maldives in the areas like the effect of climatic variation on fisheries and the effects of climate change on human health. Dengue and dengue hemorrhagic fever have been identified as potential climate change related diseases in the health section of the vulnerability assessment. It is necessary to further study the effects of climate change on the spread of dengue and dengue hemorrhagic fever. It is very important to establish partnerships with other international research institutions and also with other small island countries in research related to climate change and sea level rise.

Population and Development Consolidation Programme

To get first hand information, this researcher met some officials from the government of Maldives in New Delhi at a conference organized by The Energy and Resource Institute on 24th January 2007. Mr.Mohamed Shareef, Executive Director and Mr.Mohamed Imad, Director (Spatial Planning) from the Ministry of Planning and National Development, Government of Maldives, gave some important insights into the national planning and policies regarding the environmental protection. In the Coastal Zone Management program, priority is given to the training of locals in coastal zone to tackle beach erosion, where 60 per cent of the islands are subject to

erosion. They monitor by taking measurements of the erosion and send the information to the technical people for consideration.

One of the very important programs undertaken by the Maldivian government was the Population and Development Consolidation (PDC). It consolidates the development of community by transferring the communities living in the endangered islands to other islands with the support of the government, which otherwise would cost a lot of money and burden for the community in danger. This facility is provided to all communities, irrespective of the size of the islands. These are all voluntary migration and no one is forced to leave their place. The only condition is that, all the people living in that particular island should give in writing that they are all willing to move, thus consensus was given importance. Regional growth centers are also developed and significant benefits like health, education facilities and employment opportunities are provided to attract migration from smaller and less populated islands, thus reducing the number of inhabited islands. This also helps in allotting more funds for environmental protection under the "Safe Islands Programme". The government is producing the State of the Environment report at regular intervals, which gives a detailed account of the policies and measures undertaken by it.

For the proper management of each island, master plan is being prepared separately and it's a continuous growth module (sustainable) for 30 years. Atoll chiefs are there to undertake all the policies and programs of the government. According to Mr. Mohamed Shareef, from 2007 onwards, elected councils will be there to act as local governments with more powers to levy taxes and charges. Atoll island councils will begin from the end of 2007. The National Commission for the Protection of environment (NCPE) is a major player where all the major issues related to the environment are discussed. Sectoral planning will be in line with the national policy, and the national policy is in line with the Vision 2020 set out by the government. Thus the government's policies were correlated to each program for effective implementation.

According to Mr. Mohamed Shareef, "since Maldives' problems were unique with respect to environment and natural resources, it is not following any model undertaken in other countries. Thus it was a big challenge to find all the solutions on

its own". Mr.Mohamed Imad, stresses the importance of cooperation among different ministries and of the infrastructure needed for better environmental protection.

Conclusion

Since the problem facing the Maldives is of larger concern with regard to sea level rise, natural disasters, biodiversity and vegetation loss, environmental pollution, it is important for the government to take appropriate policy measure with an integrated approach to ensure its environmental security. The Maldivian government has been successful in formulating this kind of structure for the effective implementation of programmes. The government should also be aware of the need to cooperate among other nations with regional and international implications. The next chapter would look into, how the Maldivian government was successful in projecting its environmental concerns at the international stage and what are the benefits it has got from the cooperation with other nations and, regional and international organisations.

CHAPTER FOUR

Regional and International cooperation

Introduction

The Maldives' survival as a sovereign nation is seemingly at stake. It is because of the environmental insecurity, mainly of global warming. Since environmental security is a global phenomenon, steps taken for its adaptation and mitigation should also be coordinated at the international level. Maldives is one among the first three countries predicted to be inundated by sea in the next 50 years, because of global warming and sea level rise. It also has its repercussions for its corals, flora and fauna which attracts tourists and forms its economic back bone. To be sure of its survival, Maldives have to be actively involved in the international environmental programmes and negotiations, which they have done with their utmost capacity in the past. This chapter deals with the central theme of this study, which looks into the cooperation of small island states and particularly Maldives with other nations in the field of environmental security. This will analyse the projects and programmes undertaken and completed in Maldives, with the help of the international community. It will also look into, how the Small Island Developing States acts as a pressure group to put their concern at the international stage and try to avert their problems of environmental insecurity by actively participating in the environmental negotiations and policies formulated for the betterment of the humanity.

Maldives was the first country to sign the Kyoto Protocol, which sets targets for cuts in industrialised countries' greenhouse gas emissions. Male, the capital, is surrounded by a 3m-high (9.8ft) wall, which took 14 years to construct at a cost of \$63m. Unable to foot the bill themselves, the government happily accepted aid from Japan, which paid for 99 per cent of the cost (UNDP, 2005). But the wall offers protection for just one of the Maldives' 200 inhabited islands and then only against tidal surges rather than the rising sea level, the longer-term threat. In Kandholhudhoo, a densely-populated island in the north of the Maldives, 60 per cent of residents have volunteered to evacuate their island. Over the next 15 years those remaining behind will eventually be compelled to do the same. Tidal surges flood their homes every fortnight and recently hammered down a 3m (9.8ft) hole in their concrete flood defences (Ministry of Planning and National Development, 2007). This would be a

This Study had the following components:

- a) Regional measures in sharing experiences, scientific capabilities and information on climate change; and
- b) Global collaboration in Monitoring Climatology, Sea Level Rise, Natural Disaster, Technology Transfer and Finance etc (SAARC Secretariat, 1998: 4).

These Studies have since provided a strong basis for cooperative regional initiatives both short and long-term programmes.

SAARC Plan of Action on Environment

The Third Meeting of Environment Ministers (Malé, 1997) adopted the SAARC Plan of Action on Environment. The Plan seeks to evaluate the status of SAARC cooperation in the field of environment, identifies the concerns of member states at regional and global levels, and sets out parameters and modalities for enhanced cooperation. The Action Plan on Environment provides for the establishment of two Regional Centres of Excellence in the field of environment. Member states are called upon to mobilise financial resources from regional and international organizations. The main responsibility for the implementation of the Action Plan rests with the member states. In order to make an environment assessment to facilitate the implementation of SAARC Plan of Action on Environment, member states are called upon to produce a National State of the Environment Report. A SAARC State of the Environment Report was then prepared based on these reports and on an agreed common format. The SAARC Plan of Action also highlights the need to study the feasibility of a Regional Treaty on Environment, which will ensure a sound environment protection regime for the region. The Fourth Environment Ministers Meeting adopted the Common Environment Programme (Colombo Declaration, 1998). The Programme recalled various major international instruments and declarations on environment and noted the importance of enhanced cooperation in sharing information in the region to promote effective management of the environment for the benefit of all the member countries. The Common Environment Programme, while calling for early implementation of the SAARC Plan of Action on Environment recommended, inter-alia, compilation of a regional

directory of scientific and technological institutions in the field of environment and state-of-the-art report on eco-friendly technologies.

The twelfth SAARC summit called for expediting the preparation of the report and the drafting of the treaty. The twelfth summit welcomed the early establishment of the Coastal Zone Management Centre in Maldives. The Centre has since been established and the First Meeting of the Governing Board of SAARC Coastal Zone Management Centre was held on 30 June-1 July 2004 (Dhivehi Observer, 2004).

SAARC and its response to Tsunami

The 13th SAARC summit held in Dhaka in November 2005, was significant for the member countries because it was the first summit held in the aftermath of the Tsunami. This summit underscored the importance of cooperation among member countries in the field of environmental security. In the summit declaration, the head of the states decided to consider the modalities for having a Regional Environment Treaty in furthering environmental cooperation among the SAARC member states. They expressed deep concern at the continuing degradation of environment and reaffirmed the importance of concerted action in the protection and preservation of environment.

As a response to the Indian Ocean Tsunami of 2004, they endorsed the recommendation for elaboration of regional programmes and projects for early warning, preparedness and management of tsunami and other natural disasters. They decided to further enhance the capacity of the existing SAARC institutions namely, SAARC Meteorological Research Centre and SAARC Coastal Zone Management Centre, to carry out their mandated tasks. The heads of State or government underscored the urgency to put in place a permanent regional response mechanism dedicated to disaster preparedness, emergency relief and rehabilitation to ensure immediate response. The concerned national authorities were directed to coordinate their activities in such areas of disaster management as early warning, exchange of information, training and sharing of experiences and best practices in emergency relief efforts. They decided to proclaim the year 2007 as the Year of Green South Asia devoted to a region-wide afforestation campaign (SAARC Secretariat, 2005).

South Asia Co-operative Environment Programme (SACEP)

An intergovernmental expert's group meeting of the South Asian countries was held in Bangalore, India, in 1980 to identify and discuss the common ecological problems of the region. The meeting unanimously adopted that it would be mutually beneficial to establish a sub-regional organisation, devoted for protection and management of the environment. In 1981 a ministerial level meeting held in Colombo, Sri Lanka, approved the Colombo Declaration and the Articles of Association for the initiation of South Asia Co-operative Environment Programme (SACEP). SACEP became a legal entity in 1982, when Bangladesh, Bhutan, India, Maldives, Pakistan and Sri Lanka ratified the Articles of Association. This programme promotes co-operative activities which would be beneficial to member countries in priority areas of mutual interest (SACEP, 1995).

The first Governing Council meeting of SACEP in 1983 approved the 15-priority subject areas identified by SACEP with necessary support from UNEP and UNDP. In 1989, SACEP initiated a programme for the establishment of a regional information network in the countries of region with the technical and financial assistance of Asian Development Bank (ADB). In the field of environment a MoU was signed in 2003 between UNEP and SACEP. This was followed by a MoU on cooperation for the protection of environment of the region signed by SACEP and SAARC in 2004 (SACEP, 2005).

Maldives and International Cooperation

Australian assistance to the Maldives aims to ensure that the Maldives development momentum continues and that its vulnerabilities and unique circumstances regarding problems of global warming, the lack of a degree-granting institution and therefore to rely heavily on tertiary training provided overseas, are recognised. Australia continues its bilateral assistance to the Maldives through the Australian Development Scholarships program. Since 1987, over 220 Maldivians

have received scholarships from the Australian government to study in Australia. The programme, which provides scholarships for Maldivians to study in Australia, makes a significant contribution to strengthening the human resource capacity in priority sectors determined by the Government of the Maldives in consultation with AusAID. The priority sectors are environment and science, health, education, and governance and public administration. In addition, partial scholarships can be accessed through the Endeavour Programme run by the Department of Education, Science and Training. There are nearly 35 students from Maldives undertaking courses in Australian institutions at undergraduate and master levels (AusAID, 2006).

After the Tsunami of 2004 struck Maldives, the Australian Government provided significant immediate humanitarian assistance through the World Food Program, UNDP and others. Six Australian engineering and construction experts, who were deployed soon after the tsunami, continue to work with the Maldives Ministry of Planning and Development to help restore essential infrastructure. In response to a request from President Gayoom of the Maldives, the Australian Prime Minister Mr Howard committed a team of Australian marine scientists to assist in the assessment of damage to the coral reefs of the Maldives following the 26 December 2004 tsunami. AusAID provided co-ordination and funding for the team's mission, and an AusAID officer accompanied the team to the Maldives. The Australian team joined with scientists from the Maldivian Marine Research Centre (Australian Government Mission and the Maldives Marine Research Centre, 2005: 1).

The International Conference on Japan-SAARC cooperation, held in July 2004, adopted some recommendations to engage/provide/facilitate in mitigating disasters both in terms of disaster preparedness and disaster management and environmental protection in SAARC region through technical assistance, capacity building programmes and projects-development, where Japanese have expertise and can contribute in substantial way for human security. Japan was an active partner in the Male sea wall project which resulted in the construction of a protection wall around Male against tidal surges. Nearly 99 per cent of the expense was aided by the Japanese government (Maldives News Bulletin, April 2004: 19). These commitments

by the developed countries had immensely reduced the financial burden of Maldives on the environmental front.

EU assistance to Maldives

The European Union has always shown some special interest in providing technical and financial assistance to Maldives, in its quest for a safer environment. Since 1981 the Maldives has benefited from the European Commission (EC) aid totalling €5 million. A further €20 million was sanctioned in 2005-2006 for post-tsunami humanitarian and reconstruction assistance. All current aid programmes were identified in the context of the post-tsunami actions. In 2005, the country benefited from €2.7 million in humanitarian aid for the installation of water tanks in damaged schools, repairs of sewage systems, restoration of cold rooms in damaged hospitals, repairs to houses and restarting of livelihoods. In 2005 - 2006, €2 million has been identified for restoring livelihoods and €14 million for the development of 'safe islands' (European Commission, 2005: 12).

The EC support aims to develop safer and more sustainable islands for the population, according to the government's policy. An important component of the 'safe islands' strategy is environmental sustainability. It aims to fight poverty by realising economies of scale in the provision of public and private services in the atolls and by strengthening the quality of services offered, as the remoteness of the islands and lack of infrastructure is the main cause of poverty. It also encourages people to remain in the atolls by reducing the risks of rising sea levels through better environmental planning. The European Investment Bank (EIB) loan of EUR 50 million for rehabilitation and reconstruction of infrastructure in the tourism sector was also granted at concessional rate. This makes the EU one of the most significant contributors to the Maldives post-tsunami reconstruction efforts. As a member of the South Asian Association for Regional Co-operation (SAARC) the Maldives benefits from the Community Generalised System of Preferences (GSP), subject to compliance with its rules of origin (Ministry of Planning and National Development, 2004).

The Maldives' social indicators have also shown significant improvements, as reflected in falling infant mortality rate (14 per 1000 live births, down from 19 in 2000), expanding school enrolments and rising literacy rates. To compliment this achievement, in its 2007-2013 Country Strategy Paper (CSP), the Commission pledged its commitment and continue to address the challenges faced by the Maldives, in particular since the tsunami will continue to affect the country for many years. The CSP 2007-13 is built on this range of issues affecting the country and has therefore some strategic priorities, namely to:

- address regional development in the context of the Tsunami reconstruction, in order to help the government promote larger, safer and sustainable islands.
- Support the economic development of the country by strengthening its trade capacity, as well as easing its transit from LDC status (EC, 2007).

UNDP's support to Maldives

UNDP support in the environmental sector promotes the integration of ecosystem management and biodiversity conservation principles into national sector plans and activities. The UNDP's renewable energy project seeks to reduce the growth rate of greenhouse gas emissions from fossil fuels by removing the major barriers to the development, application and commercialization of renewable energy-based systems in the Maldives. It involves developing appropriate policies and strategies, and building necessary institutional capacities to support greater application and use of renewable energies, including in particular wind technology and solar energy (UNDP Maldives, 2007). Advocacy and awareness campaigns are critical to the introduction of renewable energy in Maldives. In this regard, awareness programmes have been conducted on six atolls. Capacity building has involved training a staff from the environment ministry in solar energy and further short training conducted for all staff of the ministry. Data on the current use of renewable energy on resorts was gathered and their willingness to adopt and invest in renewable energy was explored.

The Atoll Ecosystem-based conservation project seeks to implement a biologically diverse conservation project. In the Maldives, atoll ecosystems provide

since tourism brings the major share of its GDP and pollution. So it is important to have some policy initiatives in the tourism industry, where the Maldives have some commendable record. It is also because of some abiding commitment made by it at the international fora.

During the seventh session of the United Nations Commission on Sustainable Development (CSD) in 1999, UNEP reemphasized the growing recognition that “the involvement of local communities in tourism development and operation appears to be one important condition for the conservation and sustainable use of biodiversity. Obligations of donors and governments by giving importance on sustainable use of and benefit sharing, has resulted in the Guidelines on Sustainable Tourism in Vulnerable Ecosystems, approved in the convention’s Scientific and Technical advisory body in march 2003 (Pandey, 2004: 175). Taking direction from this obligation, Maldives has since formulated a number of policies like the local community level participation programme in cleaning the environment, capping the extraction of ground water by the resorts for sustainable use, and training the locals in the coastal zone management programmes, etc. The “Global Code of Ethics for tourism”, introduced by the World Tourism Organisation in late 1999, sets a frame of reference for the responsible and sustainable development of international tourism, which was also adopted by the United Nations general Assembly in 2001.

The major challenge for the international community is not only to minimise the negative impact of tourism but also to ensure that the economic benefits of tourism can contribute to environmental protection and the sustainable use of natural resources. The international year of ecotourism was officially launched at the United Nations headquarters in New York on 28 January 2002. It offered an ideal opportunity not only to review ecotourism experiences around the world, but also to promote worldwide recognition of the important role of sustainable tourism in the broader international sustainable development agenda.

Increased Environmental Demands in South Asia

In the South Asian region with increasing population and economic demands on coastal resources, more people are generating at least part of their livelihood from

activities that directly affect the coastal environment. This poses a big problem in the face of global warming and sea level rise. Food, income generation, medicine and building materials are drawn from the environment which deeply affects the natural formations and ecosystems (The World Conservation Union, 2003: 3). The way in which coastal resources are used and institutional and policy conflicts in coastal areas (like the coastal development programmes and the limitations put upon the coastal communities) create conditions that further degrade the environment, causing livelihoods to become more vulnerable and poor people to be more marginalized from lack of access to resources.

The Asian Development Bank (ADB) and its partners, World Conservation Union (IUCN) and the Governments of India, Maldives, Pakistan, and Sri Lanka - were determined to address these issues through a regional technical assistance project on Coastal and Marine Resources Management and Poverty Reduction in South Asia. The effort started in October 2002. Given the regional implications of the work and the importance of effective proactive government coordination and action, the South Asia Cooperative Environment Programme is also playing a key role in the effort.

Using an integrated approach to coastal zone management as a planning and development tool, participating countries have made significant headway toward long-term coastal-zone planning. Coastal zone issues and threats are systematically categorised and a list of priority areas is developed for each country in this project. National site-specific plans using integrated coastal zone management are being developed in areas with the highest concentration of poor communities. Outcomes so far have included analysis of institutional and policy barriers and constraints to effective integrated coastal zone management. With a clearer understanding of the relationships between poverty and the environment, a regional strategic action plan for South Asia is being developed.

Key to the project's success has been the improved exchange of information through electronic mail and a web site (www.iczm-sa.org), where stakeholders and the international community involved in ICZM planning and implementation can exchange experiences and lessons learned. The Sustainable Development Network of

Pakistan led the initiative to set up the tools for exchanging information. A sense of ownership has been developed among stakeholders through regular meetings and updates, consultative regional and national workshops, and site visits (IUCN, 2004: 9). This has resulted in creating a bond of confidence and belief among the member states of the region that, whatever action they take for the betterment of environmental security will be useful for the region as a whole.

Conclusion

In Maldives, the latest series of wave surges, took place on 15 - 17 May 2007, of varying magnitude hit approximately 88 islands across 18 atolls, with some of the surges reaching as far inland as 600 metres. Southern atolls of Maldives were particularly affected due to their flatness and their location in the open sea. A rapid assessment team, comprising government personnel as well as International Federation and UN staff, was deployed on 19 May 2007 to conduct an assessment of the affected islands. The International Federation and its member national societies are continuing to coordinate with the government and UN agencies to determine future response and required interventions (International Federation of Red Cross and Red Crescent, June 2007).

This shows clearly that, in spite of some of the major environmental projects being undertaken in Maldives, it is still vulnerable to natural disasters and its environmental security in danger. It is pertinent to mention here that the Regime theory framework discussed before holds good for the explaining the emerging international institutional order to mitigate the environmental dangers. Likewise, the framework also proves to be very suggestive for an ideal setup of international cooperation to deal with the impending environmental dangers. Such an ideal environmental regime could help Maldives, which is badly in need of international cooperation not only in terms of financial support but, to a greater extent, in the realms of cutting down the greenhouse gas emissions mainly by the developed countries to change its predicted fate of inundation.

CHAPTER FIVE

CONCLUSION

The Maldives is among the most vulnerable and least defensible countries to the projected climate change and associated sea level rise. This is mainly due to its low elevation and fragile ecosystems, smallness, remoteness, geographical dispersion, lack of natural resources, small human resource base, vulnerability to natural disasters, a highly limited internal market and an extremely sensitive and competitive external market. Further, rising sea levels associated with warmer climate could submerge or erode coastal properties and endanger the economy by affecting tourism and fishery.

Adaptation options in the low-lying islands of Maldives are limited and response measures to climate change or its adverse impacts are potentially very costly. Adaptation in this context covers two main types of activities. Firstly, there are adaptive measures involving activities targeted at specific sectors, where environmental impacts have been identified like tourism, fishery and marine resources. Secondly, another important group of adaptive measures will enhance the capacity of the Maldives to effectively implement adaptations regarding to disaster management, global warming and sea level rise. This study follows the Regime theory approach, where the institutional mechanisms and co-ordinations among nations are important for the effective implementation of the programmes for environmental security.

To evaluate the problems and to identify the vulnerability and the response towards the environmental security of Maldives, certain variables like the problems of land loss, beach erosion, coral depletion, coastal protection and population consolidation, impact of tourism on the environment, human resource development and institutional strengthening, and the extent of international cooperation were taken into consideration and analysed.

To conceive a broad analytical framework of environmental security, the first chapter has analysed the changing perception of security and the importance of environmental security as a form of non-traditional security. The linkage between environment and security was also clearly demonstrated with the problem of global warming and sea level rise with regard to the security of small island states. To have a deep understanding of the nature of threats facing Maldives, the geography,

population and the sources of vulnerability were discussed along with the impact of tourism, and the Tsunami on its environment. It also looks into the linkage between the IPCC report of 2007 and its repercussions for small island states in general and Maldives in particular in the context of sea level rise.

When dealing with the national response of the Maldivian government in providing environmental security, the institutional structures and the legal provisions were discussed. Then the national programmes, policies and projects are analysed where the community participation is important. The government's projects like the safe islands programme, tsunami reconstruction, and its attempt to improve its human resource were widely discussed. The chapter on the regional and international cooperation evaluates the formation of the AOSIS and its influence on the international community for its environmental security in the light of the Regime theory approach. The regional cooperation in terms of SAARC and SACEP were discussed. It is also clear that the vital cooperation in terms of finance and technical assistance for Maldives comes from the international community like the EU, UNDP, UNEP, GEF, etc. With this, some of the problems addressed by the Maldivian government together with the help of the international community for the environmental security are dealt with.

Land loss and beach erosion

The beach system found on the islands of the Maldives is highly dynamic, and thus land loss and beach erosion is already a very widespread and a significant problem on inhabited, uninhabited and resort islands. Some are seriously affected, with loss of not only shoreline, but also of houses, schools and other infrastructures, compelling the government to initiate urgent protection programmes. The extent of erosion and land loss may be exacerbated by consequences of the projected rise in sea level. Though it is important to protect all the islands of the Maldives, including uninhabited islands, priority has been given to protect the human settlement and infrastructure by focusing first on protecting the inhabited and resort islands.

Coastal Protection and Population consolidation

As regards the vulnerability, human settlements and vital infrastructure lie very close to the shoreline in the Maldives. Therefore, it is very important to develop adaptation measures to protect the human settlement and infrastructure. The response options recognized by the Coastal Zone Management Subgroup (CZMS) for the IPCC Second Assessment Report include retreat, accommodation and protection.

Applying solid protection structures such as seawalls seems to be one of the realistic options along well-developed coasts, where vital infrastructure and human settlement are at immediate risk. As the seawall along the coast of Male protects the high investments and resident population, similar protective structures will be needed in almost all the inhabited islands to protect the rest of the population. This will require enormous financial investment, and technical capacity, which will have to be obtained from international aid agencies and donors. The initial cost estimate has been projected at US\$ 1.8 billion for 50 of the inhabited islands and this would mean approximately US\$ 7.2 billion for the 200 inhabited islands.

Population consolidation may be considered as another adaptive strategy for the Maldives. In the past, population consolidation has occurred for various reasons such as damage from natural disasters, religious reasons and others. Based on the cost of protection and the population status of islands, building seawalls around the 199 inhabited islands is not a feasible option. If the population can be consolidated into fewer islands with an assessed lower vulnerability to climate change, protection will be less costly, and more practical given the high cost of building sea walls.

The government has already committed to reduce the number of inhabited islands by developing regional growth centres, which is apparently seen in its “safe islands” programme, to provide significant benefits including health and education facilities and employment opportunities to attract migration from smaller and less populated islands. Long-term climate change considerations are also factored into this policy measure.

Coral Protection

Coral reefs perform crucial environmental functions in the formation, maintenance and protection of coral islands, while contributing significantly to the economic resource base of the Maldives. This vital ecosystem is highly sensitive to changing sea surface temperature and other climatic factors. Coral mining for building purpose will collapse the protective barrier function of the reef, which could result in greater coastal erosion, increased vulnerability and an increase in the stress on the natural coral systems, and also increased the vulnerability of the islands to the projected sea level rise. Currently, the government has designated 25 reefs as protected areas. These reefs are protected from human activities except bait fishery and diving. The creation of a national park and protected areas system of the Maldives will go a long way towards establishing a long term protection, management, and monitoring system for the Maldives as well as provide for the recovery of stressed systems across the archipelago. However, a complete ban on coral mining would be more beneficial.

This could also be complimented by encouraging change in user behaviour by providing incentives to promote the use of imported construction materials, because modern building practice will reduce the traditional coral mining. This can be achieved by providing imported construction materials as an alternative to traditional coral rock, at a reasonable price in all the inhabited islands. The Government can reduce or exempt import duties on construction materials to facilitate this process of changing traditional habits.

Proper adaptive measures to protect the coral reefs are also essential. The climate change impacts, such as elevated sea surface temperatures and sea level rise, are beyond the control of resource managers. However, the impact of these can be minimised indirectly by reducing the human impacts on coral reefs. Healthy reefs are more resistant to stresses and are likely to recover faster than damaged reefs after coral bleaching events. Careful planning and implementing of strict management procedures are therefore required to protect the reefs from anthropogenic stresses, so that they are in a position to respond optimally to global climate change. Continuous

monitoring of the health of the reef should also be incorporated into the planning process. Reduction of land based sources of pollution through strict policies, particularly on sewage treatment and safe disposal of sewage and solid waste, can be considered as an adaptive measure to protect the reef from anthropogenic stress.

Water Resources

Intrusion of saltwater and a reduction in the sustainable yield from the freshwater lens are seen as impacts associated with climate change and sea level rise. Some of the water resources, especially in the low-lying atolls, may be degraded beyond their ability to recover and may not be exploitable by residents in the short term. Additionally, changes in the average annual and temporal patterns of the rainfall would also lead to localised water stress on some islands requiring augmentation of desalination alternatives. Appropriate technologies to extract water sustainably from the groundwater lens, such as developing water galleries, which has proved successful in the Pacific (Falkland, 1999), can be used in some islands of the Maldives. Water reuse and recycling on tourist islands needs to be examined to reduce the demand for freshwater and the heavy dependence in resorts.

Coastal protection of resort islands and Tourism

Shoreline protection of resort islands is critical to safeguard the tourist facilities, which represent massive capital investments. Stressing the importance of beaches for retaining the tourist attraction, beach nourishment by pumping sand from the lagoon seems a better option for resort protection, rather than building coastal structures such as sea walls. Beach nourishment is relatively cheaper and aesthetically more pleasing than man-made structures. Nonetheless, beach nourishment may not be the ideal solution for Maldives as sand is often a scarce resource and the amount of sand required to maintain a beach in the face of long-term sea level rise is uncertain. In addition, the implication of removing near shore deposits must be carefully considered in terms of its effect on the coastal sediment budget and the near shore wave climate. Moreover, beach nourishment requires maintenance in the form of periodic sand replenishment, sometime every 5-10 years or less. Such a requirement

could prove to be unsustainable in small economies. Hence, a more feasible and practical option to protect the resort islands needs to be explored.

The Maldives has been advertised as a diving destination on the international market. Since coral reefs are highly vulnerable to the changing climatic factors, the Maldives should try to reduce the dependency on a single product through product diversification, as well as presenting the islands as a premium destination by offering better quality of services. Product diversification is essential for the sustainability of the tourism industry. It could include cultural components and adventure activities, such as traditional sailing, as well as establishing convention centres to host international meetings and promoting ecotourism. Climate change can be used as a positive impact on tourism by focusing on ecotourism. Diving in the Maldives could be promoted as an opportunity for divers to participate in the long-term monitoring of changes on the health of the reefs. In this way, climate change can be used to attract the sophisticated, educated divers of the world. Research and training centres could be established on the dive resorts.

Human resource development

Though possible adaptation strategies have been identified, Maldives lacks the capacity to adapt both financially and technically. Hence, for the Maldives to respond successfully and implement appropriate adaptation strategies, financial resources and technological capability, including human resource development in various fields, are urgent requirements. Human resources capacity building in all major sectors is identified as a critical component in successfully responding to the impacts of climate change. However, the emphasis has been given to the most immediate requirements of the coastal sector since coastal erosion and land loss has been identified as potentially life-threatening to the inhabitants of the Maldives.

The Maldives lacks technical capacity in all areas of coastal zone management. Therefore, training is required in specific fields, such as surveying and coastal engineering, to develop effective coastal zone management and to implement adaptation projects. To meet these needs Maldives has been sending its trainees

abroad like India, Australia, Japan, etc to be better equipped with better capabilities for the adaptation strategies and environmental protection.

Institutional strengthening

Subscribing to the Regime theory approach would mean strengthening the institutional capacities, which is an essential requirement for the successful implementation of the adaptation strategies for environmental security in Maldives. This includes the legal, institutional and administrative arrangements of the agencies that are either related to climate change activities, or need to respond the effects of such changes. Since activities related to climate change involve various government and agencies, a mechanism to strengthen the coordination and cooperation between the departments is essential. Enhancing data collection and monitoring capacity through acquisition and upgrading of surveying, mapping, hydrological and GIS equipment and software is integral part of effective policy implementation and also strengthening and enhancing the national capacity to adapt to climate change. This could be done with the active participation with the international community.

International Cooperation

As climate change is a global issue, coordination and cooperation of programmes at international and regional level is viewed as an integral part of institutional capacity building. To mitigate the worst effects of the greenhouse gases (the main reason for global warming) at the national level, a National Implementation Strategy has been developed to accommodate the main policy elements into the national planning. Through such policies, the Maldives is already getting benefits from the arrangements, such as the Global Environment Facility, SAARC convention on air pollution, etc. Maldives should also strive to put in place of its commitments in different Conventions, and the Clean Development Mechanism under the Kyoto Protocol, resulting from the international climate change negotiations. Maldives has ensured continued active participation in regional and international climate change related activities by strengthening and portraying a collective voice for all small island states at international forums for their collective environmental security.

Maldives would have not come to its normal life back from the destructive Tsunami without the active participation of the international organisations and the donor community. The immediate response of the UNDP, Australia, SAARC nations, etc proved to be extremely helpful for this tiny nation. The tsunami reconstruction and rehabilitation work is being done under the support, supervision and guidance of various international organisations. Their expertise coupled with the government's commitment and community participation has been successful in creating a more secured place for living.

The problem of sea level rise is also given high priority by the international community, which is apparent in the EC's financial and technical support for the "safe islands" programme of the government of Maldives. Japan's contribution towards building the sea wall around Male is internationally recognised in protecting the capital from sea level rise and storm surges. Apart from all these measures regarding sea level rise and tsunami, there has also been cooperation in protecting the water resources, biodiversity, corals, flora and fauna, and other rich marine resources of the country through training, research and technological assistance, thus ensuring the environmental security of Maldives.

Thus, the national response of the Maldivian government with regard to its environmental security is highly dependent on external support like financial aid, material support, technical guidance and training of their staff, etc. Their national policies and programmes are also integrated with the international projects undertaken by the organisations like UNEP, UNDP, GEF and SACEP, etc. The community level participation in the environmental security programmes and projects have been more effective, since it makes the people more aware of the causes and consequences of environmental degradation and climate change scenarios.

Finally, at the international fora, Maldives is left out with the only option of exerting moral pressure and press its strong scientific case for the damages caused by global warming on the international community. But at the same time, the developed nations on their part, should also realise their responsibility and should not shied away pointing to the differential treatment offered to the developing countries, as seen in

the case of US with regard to the Kyoto Protocol. Global justice could be meted out only through the active cooperation of all the stake-holders of humanity; otherwise it will lead to the “tragedy of the commons”, where self interest of every nation spoils the environment and increases the vulnerability, leading to the environmental insecurity of the humankind. So the international community has the responsibility to respond to its call for environmental security and save this tiny paradise from extinction, before it disappears.

APPENDICES

List of Appendices

Appendix 1: Map of Maldives

Appendix 2: Key Facts on Maldives

Appendix 3: List of SIDS Countries (as of 2007)

Appendix 4: Contributions to GDP growth (supply), 2002 - 2006

Appendix 5: Tourist arrivals, 2002-2006

Appendix 6: Tourism Sector Resort Operations , June 2005

Appendix 7: Marine Protected Areas (as of 2006)

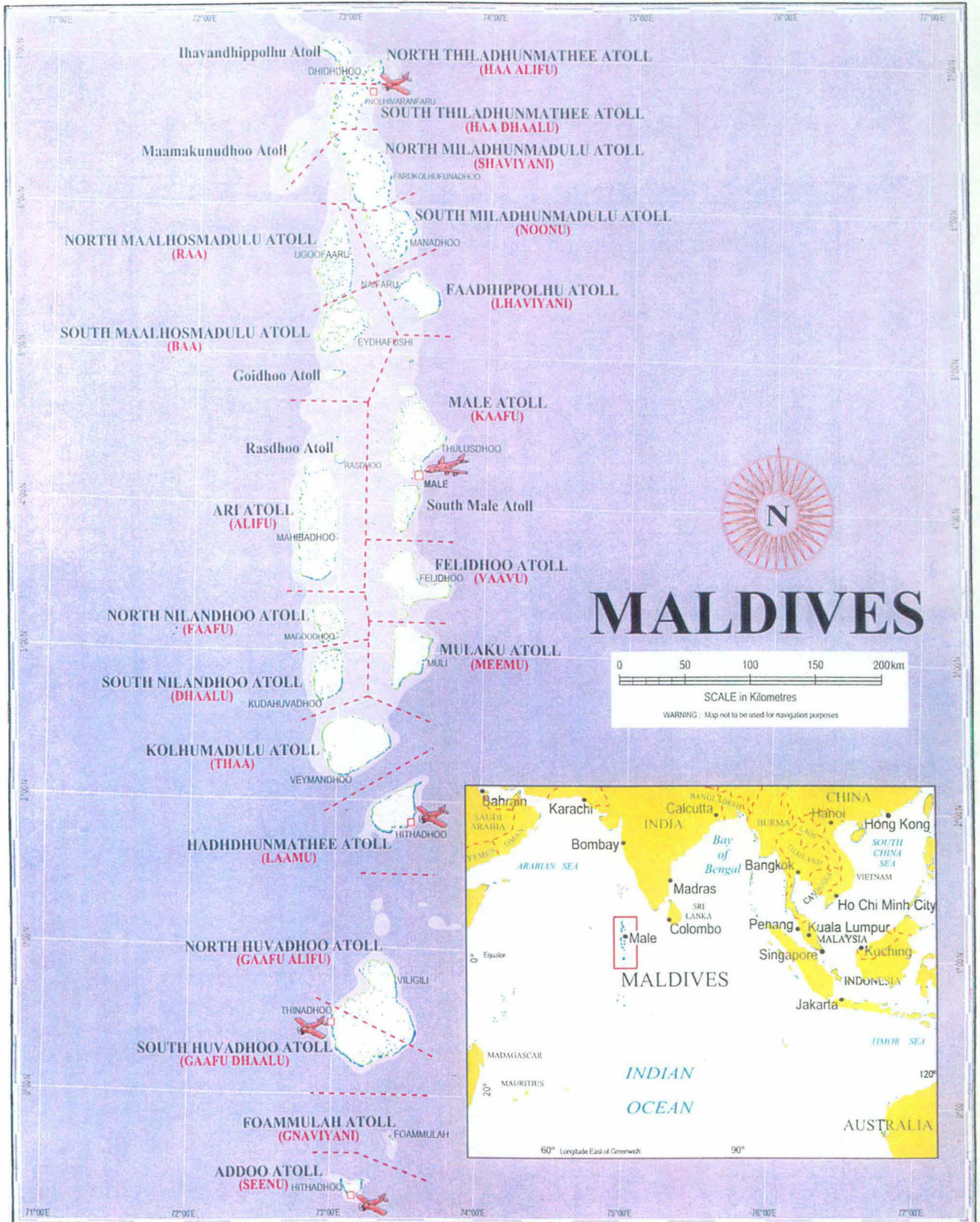
Appendix 8: Number of Island that have reported severe erosion, 2006

Appendix 9: Waste transported to Thilafushi from Male, 2000-2004

Appendix 10 : Gross Domestic Product, Growth Rates (by kind of activity), 1996-2004

Appendix 11 : Examples of International Environmental Agreements

Map of Maldives



Key Facts on Maldives

Official name :	Republic of Maldives
Territory	300 sq km
Population:	298,968 (2006)
Population growth rate	2.78% (2006 est.)
Life expectancy at birth	72 years
Population below poverty line	21% (2004)
Literacy (% of population age 15+):	97.2%
Labour force by occupation	agriculture: 22%, industry: 18%, services: 60%
Religion:	Sunni Muslim
Languages	Maldivian Dhivehi (dialect of Sinhala, script derived from Arabic), English spoken by most government officials
GDP - per capita (PPP):	\$2,668 (2006)
GDP growth rate:	18.2% (2006)
Currency	Rufiyaa (MVR) - pegged to the US\$. 1€=17 MVR (March 2007)
Inflation rate (consumer prices):	6% (2005 est.)
Trade	Exports - partners: Japan 22.8%, Thailand 22.7%, Sri Lanka 16.4%, UK 12.6%, Singapore 5.8%, Germany 4.8%, France 4.3% (2005) Imports – partners: Singapore 24.1%, UAE 15.7%, India 11.3%, Malaysia 7.2%, Sri Lanka 5.7%, UK 4.5% (2005)
Head of State and Prime Minister	President Maumoon Abdul GAYOOM (since 11 November 1978)

Source: Ministry of Planning and National development, The Republic of Maldives, 2007.

List of SIDS Countries (51)

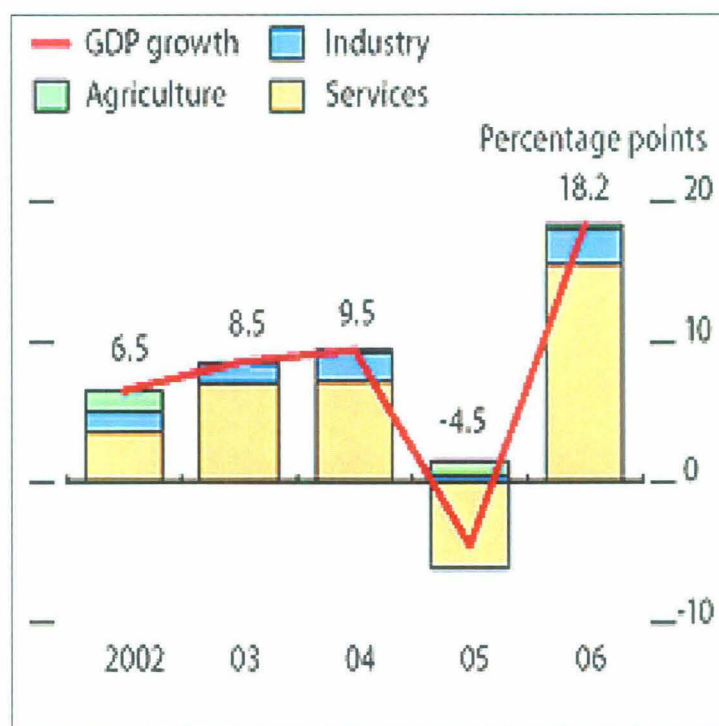
Africa	Oceania	Caribbean
 Cape Verde*	 American Samoa	 Anguilla
 Comoros*	 Cook Islands	 Antigua and Barbuda
 Guinea-Bissau*	 Fiji	 Aruba
 Mauritius	 Federated States of Micronesia	 Bahamas
 São Tomé and Príncipe *	 French Polynesia	 Barbados
 Seychelles	 Guam	 British Virgin Islands
Asia	 Kiribati*	 Cuba
 Bahrain	 Marshall Islands	 Dominica
 Maldives*	 Nauru	 Dominican Republic
 Timor-Leste*	 New Caledonia	 Grenada
Central/South America	 Niue	 Haiti*
 Belize	 Northern Mariana Islands	 Jamaica
 Suriname	 Palau	 United States Virgin Islands
 Guyana	 Papua New Guinea	 Montserrat
	 Samoa*	 Netherlands Antilles
	 Solomon Islands*	 Saint Vincent and the Grenadines
	 Tonga	 Trinidad and Tobago
	 Tuvalu*	 Puerto Rico
	 Vanuatu*	 Saint Kitts and Nevis
		 Saint Lucia

* also member of the LDC's

Source: SIDS, New York, 2007.

Contributions to GDP growth (supply)

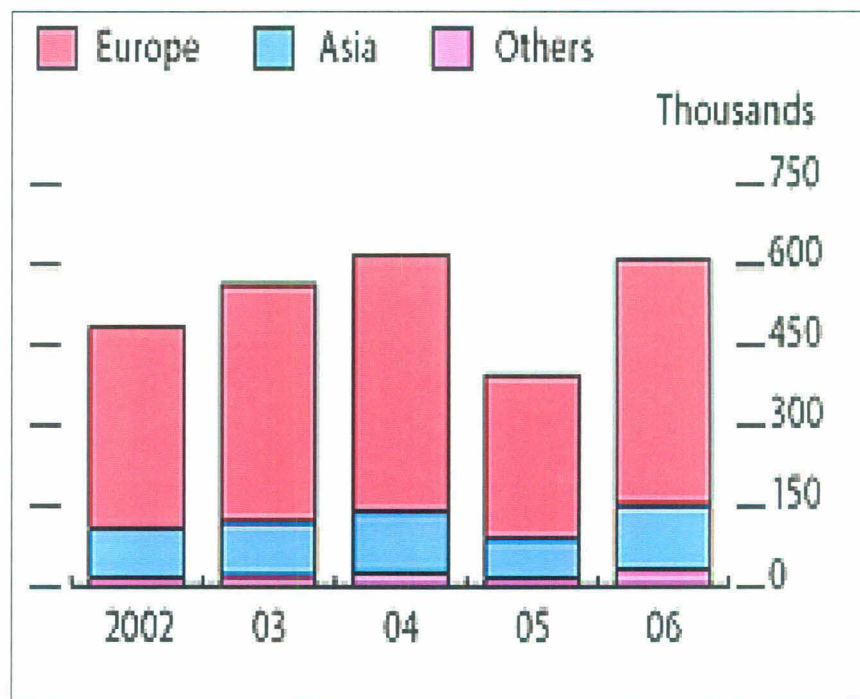
(before and after the Tsunami of 2004)



Source: Maldives Monetary Authority, Monthly Statistics, Vol. 8, No. 2, February 2007.

Tourist arrivals

(before and after the Tsunami of 2004)



Source: Maldives Monetary Authority, Monthly Statistics, Vol. 8, No. 2, February 2007.

Appendix 6

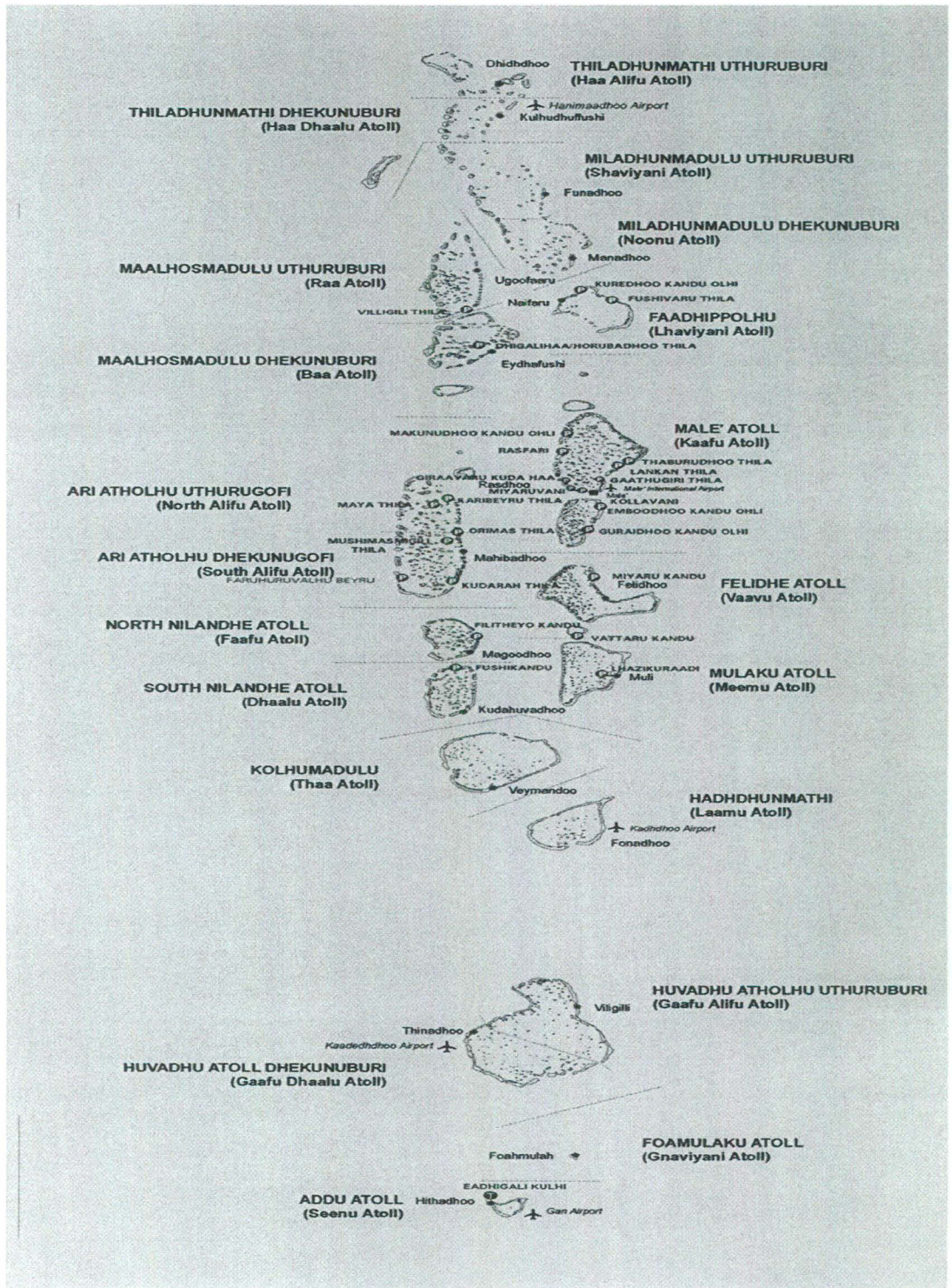
Tourism Sector Resort Operations (as of June 2005)

	No of Resorts	%	No of Beds	%
Total	87	100	17,126	100
Not in operation (due to Tsunami)	11	12.6	3,320	19.4
In operation	66	75.9	12,250	71.5
Under renovation	10	11.5	1,556	9.1

* Resorts closed due to Tsunami are Dhigufinolhu, Club Med Faru, Club Med Kani, Fun Island, Hakuraa Club, Kandooma, Medhufushi, Olhuveli, Taj Exotica, Veligandu Huraa and Four season

Source: Ministry of Tourism

Marine Protected Areas (as of 2006)



Source: Ministry of Environment, Environment Research Centre, Male.

Number of Island that have reported Severe Erosion, 2006

Locality	No of island that have reported	
	Total no of islands severe erosion	
North Thiladhunmathi (H.A)	16	15
South Thiladhunmathi (H.Dh)	16	11
North Miladhunmadulu (Sh)	16	14
South Miladhunmadulu (N)	13	14
North Maalhosmadulu (R)	15	12
South Maalhosmadulu (B)	13	13
Faadhippolhu (Lh)	5	5
Male' Atoll (K)	9	9
North Ari Atoll (AA)	8	6
South Ari Atoll (A.Dh)	10	10
Felidhu Atoll (V)	5	5
Mulakatholhu (M)	9	7
North Nilandhe Atoll (F)	5	4
South Nilandhe Atoll (D)	8	8
Kolhumadulu (Th)	13	13
Hadhdhunmathi (L)	12	12
North Huvadhu Atoll (GA)	10	8
South Huvadhu Atoll (G.Dh)	10	9
Fuvahmulah (Gn)	1	1
Addu Atoll (S)	6	6

Source: Ministry of Environment.

Waste transported to Thilafushi from Male, 2000-2004

(in tons)					
Type of waste	2000	2001	2002	2003	2004
Industrial	42,073	41,084	37,517	42,944	33,055
Construction debris	39,560	36,160	34,450	38,880	28,390
Scrap Iron	492	1,356	662	1,062	789
Oil & Fuel	-	192	282	4	78
Saw Dust	1,556	2,724	1,502	2,354	3,078
Wood	465	652	621	645	720
Domestic	71,925	65,623	61,554	60,604	67,243
Non-organic	41,055	36,253	28,233	31,703	42,651
Organic	30,800	29,197	33,033	28,679	24,240
Plastic	-	38	48	7	222
Glass	70	135	240	215	130
Total	113,998	106,707	99,071	103,548	100,298

Source: Waste Management Section,
Ministry of Environment.

Appendix 10

Gross Domestic Product, Growth Rates (by kind of activity) 1996-2004

(Estimated using production approach)

(In percent , at 1995 constant prices)

ISIC	Industry / Economic Activity	1996	1997	1998	1999	2000	2001	2002	2003	2004
	GDP at basic price	9.1	10.4	9.8	7.2	4.8	3.5	6.5	8.5	7.8
	Primary	1.8	2.1	7.0	3.5	-0.7	5.1	15.9	1.8	2.7
A	Agriculture	3.3	1.8	1.8	2.0	3.5	3.8	4.0	4.1	4.3
B	Fisheries	1.6	1.1	8.6	3.8	-1.8	5.6	22.9	0.7	2.0
C	Coral and sand mining	-3.4	15.2	14.9	7.0	-6.9	6.0	-0.3	5.2	2.5
	Secondary	3.7	20.5	17.2	12.4	1.6	8.1	10.4	8.3	5.0
D	Manufacturing	-0.4	16.0	12.0	11.0	4.5	5.4	15.5	4.5	-0.9
	<i>fish preparation</i>	<i>5.9</i>	<i>9.7</i>	<i>1.1</i>	<i>0.3</i>	<i>0.5</i>	<i>12.1</i>	<i>43.2</i>	<i>-3.7</i>	<i>0.2</i>
E	Electricity and water supply	39.2	23.3	17.5	14.1	14.3	11.0	9.4	11.1	13.7
F	Construction	-6.9	30.3	29.7	14.0	-13.8	11.9	-0.6	15.7	10.2
	Tertiary	11.0	10.0	8.9	6.8	6.0	2.4	4.7	9.6	9.0
G	Wholesale and retail trade	4.0	7.3	3.6	3.2	3.2	0.4	2.3	4.3	5.8
H	Tourism (Resorts, etc)	10.8	7.4	5.7	6.9	5.6	0.0	3.3	14.8	8.3
I	Transport and communications	21.6	17.0	21.4	3.5	7.6	1.6	6.8	8.1	17.0
J	Financial services	8.4	8.8	-9.2	7.3	3.1	2.5	6.7	6.8	6.2
K	Real Estate	5.4	5.7	6.0	5.1	2.6	2.1	4.6	3.6	3.4
K	Business services	8.4	8.8	9.2	7.3	3.1	2.5	6.7	5.0	4.5
L	Government Administration	13.5	18.5	9.9	14.8	10.7	11.0	6.1	6.7	9.1
M,N,O	Education, health and social services	2.2	2.1	2.1	2.0	2.0	1.7	1.7	1.6	1.5
	Fisim	8.4	8.8	9.2	7.3	3.1	2.5	6.7	10.1	9.1
Memorandum items:										
	GDP per capita (% change)	6.8	8.1	7.6	5.1	2.7	1.7	4.8	6.8	6.1

Note: ISIC - International Standard Industrial Classification of all Economic Activities

Note: Financial services indirectly measured (Fisim)

Source: Ministry of Planning and National Development

Appendix 11

Examples of International Environmental Agreements

Name of the agreement	Opened for signature	Entered into force
Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Convention)	1972	1975
Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1973	1975
Convention on the Conservation of Antarctic Marine Living Resources	1980	1982
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	1989
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1989	1992
Convention on Biological Diversity	1992	1993
United Nations Convention on the Law of Sea (LOS)	1982	1994
Stockholm Convention on Persistent Organic Pollutants (POPs)	2001	2004
Kyoto Protocol on the United Nations Framework Convention on Climate Change	1997	2005

Source: UNEP, 2007.

SELECT BIBLIOGRAPHY

Primary sources

AOSIS (1995), *Barbados Programme of action*. Second World Climate Conference at Barbados, SIDS

Commonwealth Advisory Group (1997), *A Future for Small States : Overcoming Vulnerability*, Commonwealth Secretariat, London.

Commonwealth Consultative Group (1985), *Vulnerability: Small States in the Global Society*, Report of the Commonwealth Consultative Group on the Special Needs of Small States, Commonwealth Secretariat, London.

European Commission (2007), *National Indicative Programme 2007-2010*, Brussels.

Gommes, R., Du Guerny, J., Nachtergaele, F., and Brinkman, R. (1998), *Potential Impacts of Sea-Level Rise on Populations and Agriculture*, Food and Agriculture Organisation, Rome.

IPCC (2001), *Climate Change 2001: Synthesis Report, A Contribution of Working Groups I, II, and III of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge.

Intergovernmental Panel on Climate Change - Report 2007. United Nations.

Latheef, Mohamed, Address of the Permanent Representative of the Republic of Maldives to the UN on the tsunami debacle on 18 Jan. 2005.

Pacific Islands Climate Change Conference (3-7 April 2000), *Linking Science and Climate Change Policy*, Address by H.E. Ambassador Tuiloma Neroni Salde, Permanent Representative of Samoa to the United Nations and Chairman of the Alliance of Small Island States (AOSIS).

Regional Surveys of the World- *South Asia 2005*. Routledge, London.

Salde, Tuiloma Neroni (1999), *Inter-Sessional Ad-Hoc Working Group Report*, Chairman of the Alliance Of Small Island States (AOSIS), New York.

UNCTAD (2002), *Country Backgrounds*, United Nations Conference on Trade and Development, New York.

UNDP, *Maldives Country Report* 2006.

UNEP (1999), *Pacific Islands Environment Outlook*, Apia.

UNEP (2006), *Maldives : State of the Environment Report* 2006.

Books

(eds) Ahmad, Imtiaz et al. (2003), *The Value of Nature: Ecological Politics in India*, New Delhi: Rainbow Publishers

(eds) Bestill, Michele M. et al. (2006), *Palgrave Advances in International Environmental Politics*, UK: Palgrave

Bayliss-Smith, T., Bedford, R., Brookfield, H., and Latham, M.: 1988, *Islands, Islanders and the World*, Cambridge University Press, Cambridge

(ed) Dahal, Dev Raj (2006), *Comprehensive Security in South Asia*, New Delhi: Manohar Publishers

Gaan, Narottam (2000), *Environment and National Security – The Case of South Asia*, New Delhi: South Asian Publishers

Godfrey, Tim (1996), *Dive Maldives*, Australia: Atoll Editions

Harris, Francis(2004), *Global Environmental Issues*, London: John Wiley

Heywood, Andrew (2006), *Political Ideologies*, New York: Palgrave

Jeong, Ho Won (2001), *Global Environmental Policies: Institutions and Procedures*, London: Palgrave

Maslin, Mark (2004), *Global Warming: A Very Short introduction*, New York: Oxford University press

Obasi, Godwin.O.B (1996), *Climate, Climate Change Variability and Predictability*, New Delhi : Rajiv Gandhi Institute for Contemporary studies

Pandey.V.C (2004), *Environmental Security and Tourism in South Asia ; vol-3*, New Delhi : Isha Books

Ravenhill, John (2005), *Global Political Economy*, New York: Oxford University Press

(eds) Thakur, Ramesh et al. (2004), *Broadening Asia's Security Discourse and Agenda : Political, Social and Environmental Perspectives*, New Delhi: Book Well

Webb, Paul.A (1998), *Maldives: People and Environment*, Thailand: Media Transition Limited

Journal and Magazine Articles

Barnett, Jon and Dovers, Stephen (2001), "Environmental Security, Sustainability and Policy", *Pacifica Review*, 13(2): 157-169

Booth, K (1991), "Security and Emancipation", *Review of International Studies*, 17: 13- 326

Davis, W. Jackson (May 1996), "The Alliance of Small Island States (AOSIS): The International Conscience", *Asia-Pacific magazine*, 2: 17-22

Dyer, Hugh (2001), "Environmental Security and International Relations: The Case for Enclosure", *Review of International Studies*, 27(3): 441-450

Gaan, Narottam (2001), "Rethinking Security: The Environmental Approach", *International Studies*, 38(3): 299-310

Khan, Habibur Raman (1997), "Challenges of Economic Liberalization and Environment in Small States of South Asia: Bhutan and the Maldives", *BISS Journal*, 18(4): 470-496

Myers, Norman (2002), "Environmental Refugees: A Growing Phenomenon of the 21st Century", *Philosophical Transactions: Biological Sciences*, 357(1420): 609-613

Morner, Nils.Axel (2004), "The Maldives Project: a future free from sea-level flooding", *Contemporary South Asia*, 13 (2): 149-155

Pernetta, John C. (1992), "Impacts of climate change and sea level rise on small island states: National and International responses", *Global Environmental Change*, 2(1): 19-31

Peter G.G. Davies (1998), "Global Warming and the Kyoto Protocol", *The International and Comparative Law Quarterly*, 47 (2): 446-461

Raghavagan, Sudha (2002), "Concept of Security: from military to non-military; environment as a factor", *Journal of Indian Ocean Studies*, 10(3): 375-387

Sanders, Roland.M (1997), "The Growing Vulnerability of Small States-The Caribbean Revisited", *The Round Table*, 343: 371-179

Shaljan .A.M. (2004), Population, Gender and Development in Maldives, *Economic and Political Weekly*, May 1: 1835-1840

Internet Sources

AOSIS (2004), *Barbados Programme of Action*, [Online: web] Accessed 16 Feb. 2007 URL: <http://www.sisdnet.com/info>

AusAID (2006). *Tsunami Relief to Maldives*, [Online: web] Accessed 21 Feb. 2007 URL: <http://www.ausaid.gov.au/country/ South Asia>

Australian Government Mission and the Maldives Marine Research Centre (2005), [Online: web] Accessed 15 May 2007 URL: <http://www.ausaid.gov.au/country/country>

Commonwealth Secretariat (1997), *Small Island states*, [Online: web] Accessed 18 March 2007 URL: <http://www.pewclimate.org/ search/results>

Connell, John (2006), *Global Warming and The Third World: An Atoll state in peril*, IUCN, [Online: web] Accessed 25 April 2007 URL: <http://www.iucn.org.mv>

Dhivehi Observer March (2005), [Online: web] Accessed 26 June 2007
<http://www.dhivehiobserver.com/specialreportsin>

Dhivehi Observer (2007), [Online: web] Accessed 26 March 2007 URL:
<http://www.dhivehiobserver.com/specialreports>

Dhivehi Observer (2007), [Online: web] Accessed 28 June 2007 URL:
<http://www.dhivehiobserver.com/specialreports>

European Commission (2005), EU-Maldives Relations, [Online: web] Accessed 25
June 2007 URL:
http://www.ec.europa.eu/comm/external_relations/maldives/intro/index

GEF (2003), [Online: web] Accessed 25 Feb. 2007 URL: <http://www.gefweb.org/interior.aspx>

GEF (2003), *Maldives Country Programme*, [Online: web] Accessed 27 Feb. 2007
URL: <http://www.gefweb.org/interior.aspx>

GEF Secretariat (2006), [Online: web] Accessed 25 Feb 2007 URL:
<http://www.gefweb.org/interior.aspx>

International Federation of Red Cross and Red Crescent, [Online: web] Accessed 12
July 2007 URL: <http://www.ifrc.org/maldives/tsunami>

IUCN (2004), *Coastal Zone Management*, [Online: web] Accessed 15 April URL:
<http://www.iczm-sa.org>

Japan-SAARC cooperation (July 31, 2006), [Online: web] Accessed 17 Feb. 2007
URL: <http://www.mofa.go.jp/region/asia-paci/saarc.htm>

Ministry of Atoll Administration, *Training and Community development*, The
Republic of Maldives, [Online: web] Accessed 20 June 2007 URL:
<http://www.atolls.gov.mv>

Ministry of Justice (2006), *The Fisheries Law*, The Republic of Maldives, [Online:
web] Accessed 4 July 2007 URL: <http://www.justice.gov.mv>

Ministry of Education (2006), *Environmental Education*, The Republic of Maldives, [Online: web] Accessed 7 June 2007 URL: <http://www.maldivesgov.mv/edu>

Ministry of Environment (2004), *National Environment Action Plan 1999*, The Republic of Maldives, [Online: web] Accessed 25 Feb, 2007 URL: <http://www.environment.gov/maldives>

Ministry of Environment (2004), *State of Environment Report 2002*, The Republic of Maldives, [Online: web] Accessed 25 Feb. 2007 URL: <http://www.environment.gov/maldives>

Ministry of Environment (2006), *The Tsunami Assessment Report 2005*, The Republic of Maldives, [Online: web] Accessed 29 March 2007 URL: <http://www.environment.gov/maldives>

Ministry of Environment (2006), *The Tsunami Reconstruction programme 2006*, The Republic of Maldives, [Online: web] Accessed 16 April 2007 URL: <http://www.environment.gov.mv/>

Ministry of Environment, Energy and Water (2006), The Republic of Maldives, [Online: web] Accessed 5 July 2007 URL: <http://www.environment.gov/maldives>

Ministry of Fisheries and Marine Resources (2006), The Republic of Maldives, [Online: web] Accessed 23 May 2007 URL: <http://www.maldivesgov.mv/fisheries>

Ministry of Marine Resources (2006), *The Marine protected areas*, The Republic of Maldives, [Online: web] Accessed 17 June 2007 URL: <http://www.marineresource.gov.mv>

Ministry of Planning and National Development (2005), The Republic of Maldives, [Online: web] Accessed 8 May 2007 URL: <http://www.planning.gov.mv/publications/yearbook2005/yrb05/yearbook/18%20Tsunami/18.6.htm>

Ministry of Planning and National development (2006), *Country report 2006*, The Republic of Maldives, [Online: web] Accessed 19 March 2007 URL: <http://www.planning.gov.mv/en/>

Ministry of Planning and National Development (2005), *National Recovery and Reconstruction Plan*, The Republic of Maldives, [Online: web] Accessed on 24 March 2005. URL: <http://www.planning.gov.mv/en/>

Ministry of Planning and National development (2005), *Vulnerability and Poverty Assessment Report 2005*, The Republic of Maldives, [Online: web] Accessed 27 March 2007 URL: <http://www.planning.gov.mv/en/>

Myers, Norman (1993), "Environmental Refugees in a Globally Warmed World", *American Institute of Biological Science*, 43(11), [Online: web] Accessed 11 Feb. 2007 URL: <http://www.links.jstor.org/sici?>

SAARC Secretariat (1998), *Colombo Declaration*, [Online: web] Accessed 9 March 2007 URL: www.saarc-sec.org/old/freepubs/11summitdec.pdf

SAARC Secretariat (2005), *SAARC Declaration*, [Online: web] Accessed 5 March 2007 URL: www.saape.org.np/news_events/peoples_saarc05/declaration.htm -

SACEP (1995), [Online: web] Accessed 2 June 2007 URL: www.sacep.org/html/projects_ongoing_icran.htm - 26k

SIDS (2006), Least Developed Countries, [Online: web] Accessed 15 April 2007 URL: <http://www0.un.org/special-rep/ohrlls/ohrlls/UNOHRLLS/new/en/ldc/159/index.html> - 97k

Simpson, Murray (2007), *Innovation in Tourism: Adapting to Change*, [Online: web] Accessed 5 June 2007 URL: http://www.unwto.org/afiliados/pdf/en/secnews/murray_simpson.pdf

Simpson, Murray (2006), *Post-Tsunami Environment Assessment*, UNDP. [Online: web] Accessed 12 March 2007 URL: http://www.unep.org/tsunami/tsunami_rpt.asp
[on](#)

Spc (Secretariat of the Pacific Community): 2000, *Oceania Population 2000*, SPC, Noumea. [Online: web] Accessed 17 July 2007 URL: <http://www.asia-eci.org>

The World Conservation Union (2003), [Online: web] Accessed 11 March 2007 URL: <http://www.iucn.org/tsunami/maldives/proj>

UN (2005), [Online: web] Accessed 18 April 2007 URL: [http://www.UN.org/small islands](http://www.UN.org/small_islands)

UN (2006), *Global Warming and Small Island States*, [Online: web] Accessed 19 April 2007 URL: www.un.org/esa/agenda21/natlinfo/countr/maldives_freshwater.pdf

UN (2001), *Special Session on SIDS*, [Online: web] Accessed 9 March 2007 URL: <http://www.un.int/permreps/maldives>

UNDP Maldives (2005), *Supporting the future of the Maldives*, [Online: web] Accessed 25 June 2007 URL: www.mv.undp.org/images/UNDP%20Maldives%202006%20Report.pdf

UNDP (2005), [Online: web] Accessed 18 April 2007 URL: <http://www.bluepeacemaldives.org/about/bluepeace>

UNEP (2004), Asia-Pacific Region, [Online: web] Accessed 17 June 2007 URL: <http://www.countryprofiles.unep.org/south-asia>

UNEP (2006), [Online: web] Accessed 17 March 2007 URL: <http://www.countryprofiles.unep.org/maldives>

UNEP-RRCAP (2002), [Online: web] Accessed 15 July 2007 URL: http://www.rrcap.unep.org/reports/soe/maldives_part1.pdf

UNEP Regional Resource Centre for Asia-Pacific (UNEP RRC.AP), [Online: web] Accessed 15 July 2007 URL: <http://www.rrcap.unep.org/reports/soe/maldives>

Upreeti, B.C. (2000), "Environmental Security and International Cooperation", [Online: web] Accessed 27 Jan. 2007 URL: <http://www.links.jstor.org/sici>

WCED (1987), "*Our Common Future*", [Online: web] Accessed 19 Jan. 2007 URL: <http://www.un.org/wced/report1987>

World Meteorological Organisation 2005, Tsunami, [Online: web] Accessed 22 April 2007 URL: <http://www.tsunami.net/southasia/maldives>

News Papers

Frontline, March 2007

Maldives News Bulletin

Maldives News Bulletin

The Hindu

The New Indian Express

The Outline, March 2007

The Times of India