ENVIRONMENT AND CLIMATE CHANGE

AUDITING GUIDELINES

COMPTROLLER AND AUDITOR GENERAL OF INDIA

FOREWORD

The indiscriminate utilization of natural resources for meeting development demands, rapid industrialisation and unplanned urbanisation are adversely impacting the environment. Dumping of wastes into our rivers and lakes, clearing forest land for cultivation and increased emission of harmful pollutants into the environment have all contributed to degrading our environment. Degradation of the environment and its symptoms like global warming and climate change has become a cause of grave concern all over the world. Every society, small or big, is feeling the ill effects of environmental degradation and this poses a high level of risk to the existence of plant, animal and human life.

Trends towards environmental degradation can, however, be slowed and even reversed by active governmental interventions. In this context, it is important that public auditors play a greater role in the evaluation of governments' efforts in conservation and protection of the environment. Environment audit, which is an assessment of the performance of an entity/programme based on environment-related criteria, is an important tool available to auditors in this regard. Results of such audits not only inform the stakeholders about the adequacy of governments' efforts in protection and conservation of the environment but also aid the government in playing a more effective role in protection and conservation.

Over the last decade in India, there has been an increase in efforts in the area of conservation of the environment. Funds allocated for environmental programmes have also been increasing. This calls for more focus and more efforts in the area of environment audit by us. To enable more effective environment audits, especially at the state level, it was felt necessary to bring out a Manual for conducting audit of environment and climate change. This Manual draws from our experience of carrying out environment audits over the years and incorporates the good practices in environment auditing worldwide. It has been primarily framed for use by the officers and staff of the Indian Audit and Accounts Department and is expected to provide a logical framework for undertaking environment audits.

I hope the officers and staff of the Department will find the Manual very useful and practical. The Manual will need to be continuously updated and revised in the future based on experiences gained in this area.

(Vinod Rai)
Comptroller and Auditor General of India

30th August, 2010
New Delhi.

PREFACE

"Environmental Audit" is an important area of emerging audit and is of substantial interest to Supreme Audit Institutions (SAI) in view of the increasing recognition that global warming and climate change have already begun to take place, and cannot anymore be perceived as likely future events. It is generally accepted that the survival of the human kind (and of all living organisms for that matter) depends on the protection and sustenance of the environment and that no amount of cost incurred to achieve that purpose would be too high. The objective of safeguarding the environment and arresting its degradation cannot be achieved in isolation, and without the whole-hearted and close cooperation of the entire world community.

The Comptroller & Auditor General of India (CAG) has been aware of the need and the relevance of Environmental Audit in the context of the increasing concerns about global warming and climate change, and has already brought out several incisive and informative reports on the economy, efficiency and effectiveness of the environmental programmes and activities initiated by the Central and State Governments. The Environmental Audits carried out by the CAG in the past embrace a variety of issues such as biological diversity including forests and forest management, pollution control and regulations relating to air, water etc., waste management and coastal zone management. This Manual has been drafted with a view to reinforcing the percept and the practice of Environmental Audit in India in the context of the expanding horizon of this highly technical and specialized area and the large number of environment-related issues to be covered in audit. It is hoped that the officers and staff in the Indian Audit & Accounts Department (IA&AD) would find this Manual useful as a guide to plan and conduct Environmental Audit in a more structured and systematic manner.

The International Organization of Supreme Audit Institutions (INTOSAI) and its Working Group on Environmental Audit (WGEA) have been actively supporting Environmental Audits by its member countries and have brought out several guidance documents on the principles and procedures of the audit. This Manual derives substantial support from the publications of INTOSAI, apart from research papers and documents of other international organizations engaged in the field. These references have been acknowledged appropriately.

The focus of this Manual is primarily on three main areas of audit, namely, financial audit, compliance audit, and performance audit as they apply to environmental issues. Further, during the course of thematic discussions, the following areas of environment-related activities have been extensively covered with the objective of providing detailed guidelines to plan and conduct their audits:

1) *Biological Diversity including forests and forest management, wetlands, mangroves etc.*
2) *Air Pollution.*
3) *Water Pollution.*
4) *Waste Management.*
5) *Climate Change*
6) *Coastal Zone Management.*

Auditors could apply the general guidance provided in the Manual with suitable customization when a need arises to audit other environment- related issues, either existing or likely to emerge in the future.

The Manual has been drafted in two sections. The first section is intended to give general and comprehensive information on major issues related to environment and climate change. This section also includes references to the national and international efforts being made to arrest the trend of environmental degradation. The section also contains guidelines on planning and execution of Environmental Audits, along with checklists and questionnaires to assist in these processes.

The second section of the Manual provides detailed audit guidelines and questionnaires on selected areas of audit like Biological Diversity including forests and forest management, wetlands, mangroves etc., Air Pollution, Water Pollution, Waste Management, Climate Change and Coastal Zone Management. These guidelines may, however, need to be customized and supplemented with additional materials, specially state level initiatives like acts/programmes/schemes and information at the audit planning stage through independent research on the selected topic.

The increasing allocations for environmental projects and schemes, either directly or through other social welfare schemes, in the successive Five Year Plans would point to the need for dedicating substantial audit resources for Environmental Audit in the future; as also the need to emphasize value-for-money aspects during such audits. But equally important is the objective of supporting the cause and the efforts of various government and non-government agencies for environmental conservation and protection in the overall interest of generational equity. Auditors must keep this in mind, and use these guidelines constructively to support the objective of promoting awareness of the environment and the level of achievements of the national efforts to safeguard and ensure environmental protection.

This Manual is intended for use exclusively by the officers and staff carrying out work under the mandate and powers vested in the Comptroller and Auditor General of India. Suggestions and comments to enhance its utility and value to the auditors of the Indian Audit & Accounts Department would be welcome.

SECTION: I

INTRODUCTION TO AUDIT OF ENVIRONMENT AND CLIMATE

TABLE OF CONTENTS

CHAPTER I

UNDERSTANDING 'ENVIRONMENT' AND 'CLIMATE CHANGE'

Introduction

1.1 The very mention of the terms 'environment' and 'climate change' will evoke instantaneous reaction in the mind of everyone concerned with the future of mankind. The terms will also raise apprehensions about the well-being of successive generations, - the present and the future. The Secretary General of the United Nations, Ban Ki-Moon, aptly described these apprehensions in the following prophetic words: *'We have heard the warnings. Unless we act now, we face serious consequences. Polar ice will melt, sea levels will rise. A third of our plants and animal species will vanish. There will be famine, particularly in Africa and Central Asia'*. The Secretary General was only reflecting on what the United Nations Framework Convention on Climate Change (UNFCCC)[1] had pointed out earlier on the future effects of climate change – *'Yet those who suffer most from climate change will be those in the developing world'*. They have fewer resources for coping with storms, with floods, with droughts, with disease outbreaks, and with disruptions to food and water supplies. They are eager for economic development themselves, but they may find that this already difficult process has become more difficult because of climate change".

1.2 Assertions as those cited above would inspire public auditors to pay closer attention to policies, strategies, legislation and programmes of the Central and the State Governments meant for environmental governance and prevention of climate change. However, a basic requirement for taking forward environmental audit objectives will be familiarity and insight into the concepts and import of the terms themselves, their impact and the significance. Auditors will need to learn about the causes and factors which lead to environmental degradation and climate change, and acquire a sound knowledge of the means and measures to prevent, mitigate and adapt to the gravity of the global warming and climate change. The discussions which follow in this chapter are designed to provide information on important aspects of environment and climate change for the use of public auditors. The understanding derived from this Manual must be supplemented with the multifarious literature and materials available freely.

What is 'Environment' and why is Protection of Environment Important?

1.3 Environment is where we live, breath, eat, drink and survive. The term denotes the land we live on, the air that we breathe, the surroundings that we enjoy, the plants and animals that share the space on the earth with us and the atmosphere that provide us our

[1] UNFCCC was adopted in 1992 at the United Nations Conference on Environment and Development, also known as Rio Conference, held at Rio de Janeiro, Brazil. The convention sets an overall framework for intergovernmental efforts to tackle the challenges posed by climate change. The Convention enjoys near universal membership with 192 countries having ratified it.

sustenance. The Environment (Protection) Act, 1986 sets out that 'environment includes water, air and land and the interrelationship which exist among and between water, air and land, human beings, other living creatures, plants, micro-organisms and property'. It may be seen that the definition is very wide and covers the whole life support systems for the living organisms.

1.4 The word 'environment' means 'surroundings'. Biologists and natural scientists use it to signify the interaction of plants, animals, sunlight, air and water that collectively make 'nature'[2]. The Webster Dictionary refers to environment (cited in the "Guidance on Conducting Environment Audit"[3] brought out by the Asian Organization of Supreme Audit Institutions (ASOSAI)), as a *'complex of physical, chemical and biotic factors that act upon an organism or an ecological community and ultimately determines its form and survival'*. In other words, environment *'is a combination of different external physical conditions that affect and influence the growth, development and survival of organism'*. Such external conditions include plants, animals and other living beings and *abiotic* components like soil, weather, water, sunlight etc.

1.5 Environments are degraded for various reasons, mainly due to increasing thrust towards economic and social development which encourages urbanization, cutting down of forests, dumping of wastes, over-cultivation of crops etc. One result of degradation of the environment is global warming and climate change. According to the Intergovernmental Panel on Climate Change (IPCC)[4], climate change refers to a change in the state of the climate that can be identified by changes that persists for an extended period, usually decades or longer. Climate change also refers to any change in climate over time, whether due to natural variability or as a result of human activity.

1.6 Sustainable development involves the integration of social, environmental and economic objectives. Ideally, any human activity should bring about an improvement in all three objectives. However, progress on one front may be achieved at the cost of damage on another. Wherever possible, decisions should take into account the costs and benefits on all sides[5].The focus of policies and programmes should be to achieve a balance between the three objectives and to avoid the destruction or degradation of environmentally relevant features and characteristics that will impact future generations. The need for sustainable development *presages* protection of the environment and control of climate change, (which, incidentally, have made the process of environmental audit one of the mainstream activities of public audit.) An environmental and social safeguards policy, thus, aims at an integrated sustainable approach to policy making and project management. The objective of environmental governance is to prevent and mitigate undue harm to environment and people at the earliest planning stage; conservation and protection may be by way of a

[2] Generally excluding human creations and influences: Definition of Environment: Articles and Essays on Environment, e-nature web site.
[3] 8th ASOSAI Research Project.
[4] IPCC was formed in 1988 by United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO) to provide objective information about climate change to stakeholders. There are over 4,000 scientists and experts constituting IPCC and has so far submitted four assessment reports on climate change.
[5] INTOSAI: WGEA; Sustainable Development: Role of Supreme Audit Organizations (2004).

combination of mandatory policy provisions, minimum standards, best practice guidelines and administrative procedures. The need for an integrated sustainable approach to policymaking has been emphasized in several international and multilateral agreements including Millennium Development Goals (MDGs), World Summit on Sustainable Development (WSSD), UNFCCC etc. These are dealt with in subsequent paragraphs.

Human Activities are the major cause of Environmental Degradation

1.7 It is difficult to clearly delineate the causes and consequences of environmental degradation in terms of simple one-to-one relationships. The causes and effects are often interwoven in complex webs of social, technological and environmental factors. Environmental conservation is, in fact, the essence of all development[6].

1.8 Undoubtedly, the major contributing factors for the degradation of the 'environment' are human activities (anthropogenic), the other causative factors being geogenic, including natural calamities and disasters such as earthquakes and tsunamis. Anthropogenic factors include agricultural, industrial, social and all other form of human endeavors including urbanization, all of which impact the environment in one way or other. Environmental degradation occurs when nature's resources such as earth, water and air, habitat and trees are consumed faster than nature can replenish them, or when pollution results in irreparable damage to the environment or when human beings destroy or damage ecosystems in the process of development[7]. Most human activities (such as generating power from a coal station, using fossil fuel to drive vehicles) result in the release of what is known as *'Greenhouse Gases'* (GHG) which increases the density of carbon dioxide, methane and nitrous oxide in the atmosphere; this in turn contributes to global warming[8]. It is estimated that global GHG emissions have grown since pre-industrial times, with an increase of 70 *per cent* between 1970 and 2004 alone. Similarly, human activities also deplete the ozone layer which protects the environment from increases in the atmospheric temperature. Other factors responsible for the degradation of the environment include deforestation or depletion of the forest cover (since trees absorb carbon dioxide and act as carbon sinks) and desertification, overpopulation of humans and domesticated animals, and urban sprawl which all result in overexploitation of natural resources like water, over-fishing, generation and accumulation of waste materials, industrial pollution, etc.

1.9 Intensive agricultural operations also release chemicals and pesticides which lead to environmental degradation in no small measure. According to the estimation of IPCC, the

[6] National Conservation Strategy and Policy Statement on Environment and Development, Ministry of Environment & Forest, 1992.

[7] Guidance on Conducting Environment Audit: 8th ASOSAI Research Project.

[8] Energy from the sun warms the earth's surface and as the temperature increases, heat is radiated back into the atmosphere as infra-red energy. Some of the energy is absorbed within the atmosphere by 'greenhouse gases'. The atmosphere acts in similar way to the walls of a greenhouse, letting in the visible light and absorbing infra-red energy keeping it warm inside. This natural process is called "greenhouse effect". Without it, the global average temperature would be – 18°C whereas at the moment it is +15°C. However, human activities are adding greenhouse gases, particularly carbon dioxide, methane and nitrogen oxide to the atmosphere, which are enhancing the natural greenhouse effect and making the world warmer. This man-made extra warming is called "enhanced" greenhouse effect. Source: Environment: European Commission Website.

major anthropogenic contributing factors for environmental degradation could be summarized as follows.

WORLD GHG EMISSIONS BY SECTOR[9]

Sector	%age	Sub-sector	%age
Transportation	**13.5**	Road Air Rail, Ship, others	**9.9** **1.6** **2.3**
Electricity and Heating	**24.6**	Residential Buildings Commercial Buildings Transmission and Distribution Emission Losses	**9.9** **5.4** **1.9**
Other Fuel Combustion	**9**	Unallocated fuel combustion	**3.5**
Industry and Industrial Processes	**13.8**	Chemicals Cement Others	**4.8** **3.8** **5**
Fugitive Emission	**3.9**		
Land Use Change	**18.2**	Deforestation Harvest / Management Afforestation / reforestation etc.	**18.3** **2.5** **-2.6**
Agriculture	**13.5**	Livestock and Manure Agricultural soils Agricultural energy use	**5.1** **6** **1.4**
Wastes	**3.6**		

Break down of GHG emissions: Carbon dioxide: 77%
Methane: 14%
Nitrous Oxide: 8%
Others: 1%

1.10 When natural habitats are destroyed or when natural resources are threatened or depleted, environment degradation of serious proportion takes place. Degradation also occurs when the environment becomes less valuable or gets damaged by overuse, excessive consumption or similar other reasons. Other causes could be the loss of biodiversity including plants, animals and microorganisms. Environmental degradation can occur naturally (tsunami which destroys mangroves, earthquakes which destroy forests, human habitats etc.,) or through human activities (anthropogenic). Some of the major concerns in this regard are the loss of rain forests in tropical countries, (destruction of forests by logging industry, which also leads to destruction of natural habitats in adjoining areas), increasing air pollution and smog which threaten the life and health of urban population, ozone depletion of unprecedented scale resulting from the emission of chlorofluorocarbon (CFC), and widespread destruction of marine environment. Pollution is a well-recognized cause of degradation all over the world and triggers smog, acid rains and poor air quality; it also affects the oceans since untreated waste is allowed to flow into them, or through oil spills.

[9] Based on UNEP / GRID Arendal, 2009. Data relate to the year 2000.

Similarly, accumulation of wastes, including hazardous wastes, is a matter of extreme concern. Among anthropogenic causes, the increased industrial activity including among the developing countries and the galloping number of automobiles are adding to the problem of greenhouse gas emissions, which contribute to air pollution. Environmental degradation would result in severe multiple and disastrous consequences not only for the human kind, but for the entire ecosystem. Unless prevented by concerted action by policy makers, administrators, activists and civil society organizations and the citizens at large, the problem will continue unabated, threatening the future of the mankind. Public auditors could play an effective role in this regard by promoting awareness of these issues, and by verifying the economy, efficiency and effectiveness of the actions taken by the national and local governments to safeguard the environment as also by monitoring the progress of such activities.

1.11 Forests not only help to mitigate the buildup of Greenhouse Gases by absorbing carbon dioxide, but also prevent run off of water and soil erosion, thereby arresting environmental degradation. Unfortunately, these gifts of nature are destroyed when large scale, indiscriminate deforestation takes place, due to human desire to exploit the forest resources. According to IPCC, *'a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber or energy from the forests, will generate the largest sustained mitigation benefit'*.

1.12 Another major cause for environmental degradation is the unsustainable use and overexploitation of various natural resources. As Mahatma Gandhi famously pointed out, *'there is enough to meet everyone's need, but not the greed'*. Though human resources are an important resource for development, it is also a major source of environmental degradation when the population exceeds the threshold limits of the support systems[10]. It is generally accepted that one critical challenge for the maintenance of biodiversity and sustainable development is the increasing demand for biodiversity resources fueled by population growth and increased consumption.

Widespread pollution of air & water will cause degradation of environment

1.13 Widespread air pollution will be apparent from the increasing levels of smog, - the thick brown haze that hangs over most of our cities, and frequent acid rains. Technically, air is said to be polluted when it contains Suspended Particulate Matter (SPM) in high concentrations as is harmful to living organisms, namely, plants, animals and of course human beings. Mainly, human activities such as uncontrolled industrial pursuits, urbanization, burning of fossil fuels for transportation etc. are the principal causes for air pollution. The SPM usually found in the air include carbon monoxide and dioxide, sulphur dioxide, nitrogen oxide and methane. Smog cause severe health problems especially to the vulnerable populations such as children and the elderly. It also affects agriculture production, vegetation and buildings and materials. World Health Organization (WHO) has issued Guidelines on Air Quality to enable countries to set air quality standards, and

[10] National Conservation Strategy and Policy statement on Environment and Development, 1992.

developed a data base on air quality information based on an Information System which provides for collection and sharing of information regarding the quality of air in different cities and the country specific efforts to abate air pollution.

1.14 Acid rains are caused by sulphur dioxide and nitrogen oxide in the atmosphere mainly because of burning of fossil fuel. Acid rains affect soil, water, plants, buildings and all living organisms which come into contact with.

1.15 Following the *'Convention on Long-Range Trans-boundary Air Pollution'* (1972), which aims at limiting and gradually reducing air pollution of all sorts, several international efforts are being made in that regard. These cover reduction of sulphur emissions, acidification, reduction of ground level ozone etc. Other protocols in this regard include those to eliminate the release of persistent organic pollutants (POP) consequent to the use of pesticides and chemicals such as aldrine, DDT etc. Similarly, the Vienna Convention on the Protection of the Ozone Layer (1985) establishes an international legal framework which, along with the subsequent protocols, binds industrialized countries to reduce the consumption of chemicals which impact the ozone layer.

1.16 Water pollution has reached an unacceptable level in India due to increasing population, urbanization and industrialization, with widespread contamination of river and ground water sources. Oceans are also under threat due to expulsion of untreated sewage from cities, dumping of wastes and spills from ships etc. Agricultural nutrients, fertilizers and pesticides, as also vehicular and industrial pollutants cause water pollution which leads to waterborne and infectious diseases and serious health problems. It also diminishes the availability of water for consumption and sanitation from all recoverable sources. Water pollution, though may not directly result in global warming, causes the gradual elimination of the foliage and affects the sustenance and the expansion of the forest cover; it also affects mangroves and various living organisms as also marine life in the coastal areas.

1.17 The Water (Prevention and Control of pollution) Act, 1974 and the Rules under the Act aim to control and abate water pollution across the country through the operations of Central and State Pollution Control Boards. The Environment Protection Act and policies enunciated by the Central Government also have provisions for the conservation of environmental resources such as water. Initiatives of the Government for conservation include the National River Conservation Programme, of which the Ganga Action Plan is an important element. Another similar attempt is the National Lake Conservation Programme. CPCB's water quality monitoring network is a nation-wide network covering all water bodies such as rivers, lakes, creeks and canals. Audit of the water pollution measures and programmes will form an important segment of the environmental audit in India.

Wastes represent a threat to the environment; management of wastes is increasingly becoming complex

1.18 Wastes represent a glaring threat to the environment and to human health if not handled and disposed properly. Cities and towns, streets, roads, pathways, parks and public

places, lakes and tanks as also households and premises get highly polluted with the increasing loads of wastes of every description. Surface water and ground water get contaminated from wastes, with disastrous effect on the ecosystems. Wastes may also generate leachate, the liquid that forms as water trickles through contaminated areas, leaching out chemicals, which may form hazardous substances and contaminate surface and ground water. As per the Basel Convention, wastes include all substances that have no longer any use for people, and are either discarded or intended to be discarded or need to be disposed. Our routine and daily activities generate a large quantity of wastes, which is directly proportional to the standard of living and the rate of domestic consumption. Non-degradable wastes such as plastic bags create maximum problem in waste disposal and cause damage to the environment.

1.19 Wastes can be categorized as municipal wastes, industrial and hazardous wastes, biomedical wastes, construction and demolition wastes, mining and industrial wastes etc. A recent addition to the category is the E-wastes, the disposal of which is a major concern.

1.20 According to the European Union Directive on Wastes, waste management includes the collection, transport, recovery and disposal of wastes, including the supervision of such operations and the after-care of the disposal sites. The most widely accepted principle in waste management is to accord priority to extracting maximum practical benefits from products, apart from preventing/minimizing the waste generation itself. The general principles of waste management are prevention, minimization, reuse, recycling, energy recovery and disposal. Prevention is the most favored strategy for obvious reasons. The waste management strategy, thus, should focus on the *'reduce, reuse and recycle'* principle. Reducing wastes includes any process or activity that avoids, reduces or eliminates waste at its source or results in reuse or recycling. Reuse may include repeated use of the item for the same purpose (plastic containers) or new-life reuse where it is used for a new purpose (paper first for writing and subsequently for packing). Recycling involves the treatment or reprocessing of a discarded waste material to make it suitable for its subsequent reuse either in its original form or for other purpose. Recycling has twin benefits: it reduces inputs for the new product as also reduces the waste due for disposal.

1.21 The management and handling of different types of wastes such as municipal waste, hazardous waste, bio-medical wastes etc., are governed under specific rules made under the Environment (Protection) Act, 1986. Disposal of fly ash from thermal power plants and the disposal of used batteries are covered under separate rules. Management of other types of wastes such as from building demolitions, and E-wastes etc., require regulation which is awaited. Meanwhile, the Ministry of Environment and Forests launched a Charter on Corporate Responsibility for Environmental Protection (CREP) with the objective of conservation of water, energy etc., and reduction of the use of chemicals and pollutants in the manufacture and production through efficiency measures. It also envisages the management and disposal of residues and pollutants in environmentally sound manner.

Environmental Degradation and Global Warming are unequivocally established (IPCC)

1.22 According to IPCC, environmental degradation and global warming have been conclusively established. IPCC clarifies that warming of the climate system is very likely caused by an observed increase in the circumstances of human-induced greenhouse gas emissions in the atmosphere. Furthermore, the increase in the global air and ocean temperature will have an overall negative impact on human beings, species, and ecosystems. Climate change contributes to challenges such as decrease in the quality and quantity of fresh water and to a more uneven distribution of food resources[11].

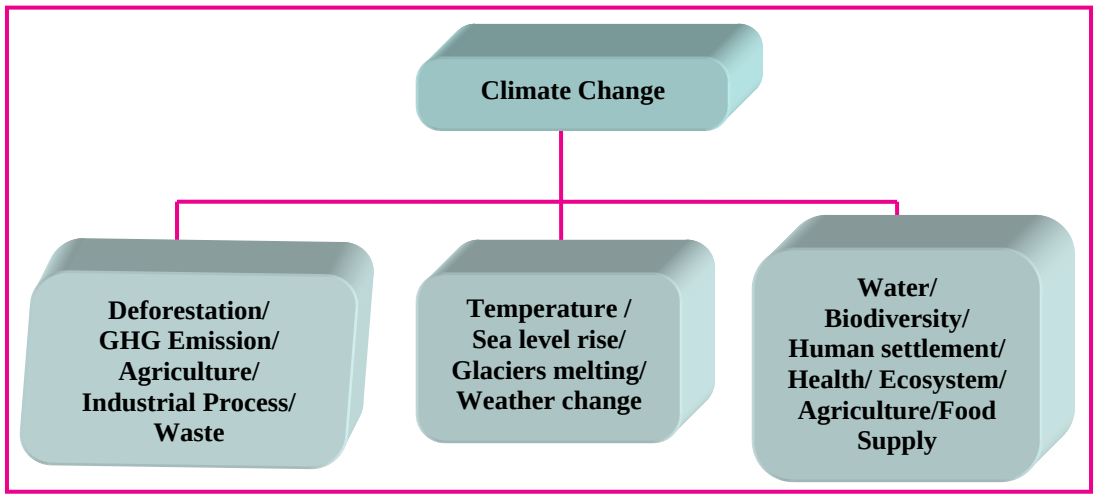
1.23 Environmental degradation has led to a grim picture of the state of natural resources in most parts of the world. Increase in water pollution, atmosphere pollution, pollution of coastal areas, deforestation, GHG emissions of unacceptable levels, pressure on land and land usage, and indiscriminate generation and dumping of wastes etc. have led to threats of biodiversity and ecology of the earth[12].

1.24 Climate change is a natural process, but it is the recent rapid change that is evident is what causes concern to environmentalists all over the world. The United Nations Development Programme (UNDP) is deeply concerned, for instance, that the increased exposure to draughts, floods and storms is already limiting opportunities and reinforcing inequality in the world. Since global warming is of such immense concern, it is imperative that the focus should be on mitigating the phenomenon by reducing GHG emissions and by enhancing carbon sinks. This has to be seen in distinction with adaptation to global warming which involves taking action to minimize the effects of such warming and is intended to reduce the vulnerability of natural and human systems to actual or expected climate change effects.

1.25 Current projections point to a global increase in temperature of 2.0^{o}F to 11.5^{o}F (1.1^{o}C to 6.4^{o}C) by 2100, which will result in additional sea level rise that will gradually inundate coastal areas and increase beach erosion and flooding from coastal storms, changes in precipitation patterns, increased risk of floods and draughts, threat to biodiversity, and a number of potential challenges to public health[13]. The above increase in global temperature cannot be addressed easily. The major target, however, should be the drastic reduction of emissions of carbon dioxide and other greenhouse gases by re-orienting the way nations power their economy. This demands shifting away from a century's legacy of unrestricted fossil fuel use and its associated emissions in pursuit of more efficient and renewable sources of energy. According to IPCC (Summary for Policymakers) changes in lifestyle and behavior patterns could contribute to climate change mitigation across all sectors; management practices also can have a positive role.

[11] INTOSAI (WGEA): Auditing Government Response to Climate Change.
[12] Guidance on Conducting Environment Audit: ASOSAI Research Project.
[13] PEW Centre on Global Climate Change.

1.26 The following chart (adapted from IPCC (2007), AR4, Synthesis Report 2.1) will give the interrelationship between the drivers of climate change and its impact.



1.27 The Rio de Janeiro Conference on Environment and Development held in 1992 had Agenda 21 as a plan of action which set out the direction and commitment in areas such as poverty reduction, education, water, waste, air, biodiversity, forests and energy. The subsequent World Summit on Sustainable Development (WSSD) held in Johannesburg evaluated the progress achieved towards the above common cause. Several countries have integrated their WSSD commitments into national action plan and sustainable development strategies. According to India's National Environment Policy, 2006, *'the key environment challenges that face the country relate to the nexus of environmental degradation with poverty in its many dimensions, and economic growth'*. The policy affirms that the proximate drivers for environmental degradation are population growth, inappropriate technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanization. Further, the Policy assumes that these factors give rise to environmental degradation only through causal linkages, in particular, institutional failures. Environmental degradation moreover impacts soil fertility, quantity and quality of water, air quality, forests, wildlife, and fisheries, all affecting the population, especially the rural poor. The impact on human health is tenacious, with 20 *per cent* of the burden of diseases in India attributable to environmental degradation.

1.28 The Kyoto Protocol which is linked to the UNFCCC was the first binding agreement covering 37 industrialized countries and the European Commission, aimed at emission reduction targets. The Protocol targets GHG reduction of 5 *per cent* against 1990 levels over the five-year period of 2008-2012. Detailed rules for the implementation of the protocol were adopted in the Marrakech accord in 2001, providing for national measures supplemented with market mechanism.

1.29 India being a developing nation is not bound by the Kyoto Protocol to reduce the GHG emissions, which in any case is far below the global average[14]. Nevertheless, India has adopted several policies, strategies and programmes aimed at arresting environmental degradation, references to which are included in the Annexure to this manual. For instance, the Government of India's Vision Statement on Environment and Health refers to the development strategy adopted by the Rio Declaration to reiterate that human beings are at the centre of concerns for sustainable development and that they are entitled to a healthy and productive life, in harmony with nature. Quoting from the World Summit on Sustainable Development held at Johannesburg on 26th September, 2002, the vision statement reaffirms that *inter alia*, health concerns arising from air pollution should be addressed by integrating them with strategies, policies, and programmes for poverty eradication, strengthen regional and national programmes including through public private partnerships with technical and financial assistance to developing countries, support the phasing out of lead in gasoline, and strengthen and support efforts for the reduction of emissions through the use of cleaner fuels and modern pollution techniques.

1.30 Various international conferences and summits with participation of almost all nations have been discussing the means and measures to mitigate the problem of environmental degradation. This underscores the fact that the parties involved have realized the magnitude of the problem though convincing and acceptable commitments are yet to be achieved. The latest exercise in this regard was the Copenhagen Summit which had given rise to high hopes, but failed to arrive at legally binding commitments.

Climate Change will impact society, environment and economy

1.31 Climate represents as the average weather which exists over a period of time, and may be referred to in terms of local, regional or global geographical confines. Climate change occurs when the climate deviates from the average weather over a long period of time[15]. According to IPCC, global warming, the cause of climate change in most cases, is evidenced by the following:

- Increase in average air and ocean temperature.
- Increase in average global sea level.
- Widespread melting of ice and snow.
- Changes in weather, wind pattern, precipitation, frequency of weather events (floods, storms, tsunami etc.)

1.32 The average temperature of the earth has increased by 0.74°C since the late 1800s. It is further expected to rise, according to the UNFCCC, by another 1.8°C to 4°C by the year

[14] Of the world carbon space that had been occupied till 2008, the Annex- I countries had taken roughly 73 *per cent*, though they account for only 19 per cent of the world population. India had a carbon space share of only 2.5 *per cent* against a fair share of 17 *per cent*. In terms of per capita emissions and tonnes of carbon equivalent, India had emitted only 0.5 tonnes of carbon equivalent against 6.5 tonnes by USA, 6.4 tonnes by Canada, 3.6 tonnes by Russia, and 1.1 tonne by China (2005) as per the estimates of the World Resources Institute.

[15] IPCC Glossary.

2100, unless prompt rectificatory actions to mitigate the global warming are adopted. UNFCCC points out that even if the minimum predicted increase takes place, it will be larger than any previous century-long trend in the last 10,000 years. According to the National Aero Space Agency (NASA), USA, *'because of rapid warming trends over the last thirty years, the earth is now reaching and passing through the warmest levels seen in the last 12,000 years'*.

1.33 The principal reason for the mounting global warming is none other than the feverish trend of industrialization; burning of ever-greater quantities of fossil fuel, the cutting of forests and the practice of certain farming methods[16]. It is assessed that the average sea level has risen by 10 to 20 cms during the 20th century. An additional rise of anything between 18 to 59 cms is expected by 2100. If the higher end of the scale is reached, the sea could overflow the heavily populated coastline of such countries as Bangladesh, cause the disappearance of some nations entirely (such as Maldives), foul freshwater supplies for billions of people and spur mass migrations.

1.34 IPCC estimates that climate change will impact the society, environment and economy with wide-ranging effects on ecosystems and socio-economic sectors. For instance, climate change will not only affect the quality and quantity of fresh water supplies, but will also lead to flooding due to sea level rise and extreme weather events. Similarly, it will impact agriculture and food supplies by affecting crop yields and irrigation demands. It will also result in destruction of the ecosystem and biodiversity, as also in loss of habitats and species. The impact on human health could be such as weather-related mortality, infectious diseases, air quality respiratory illness etc. In so far as settlements and the society are concerned, climate change may directly affect people living in coastal areas and river flood plains and those whose economies are dependent on climate-sensitive resources. Similarly, people who live in areas prone to extreme weather events (cyclone-prone coastal areas, earthquake-prone areas etc.,) would also become increasingly more vulnerable[17].

1.35 **Carbon Cycle:** The earth's four major reservoirs of carbon are the atmosphere, the terrestrial biosphere, the oceans and the sediments (including fossil fuels). Carbon cycle is the cycle by which carbon is exchanged between these reservoirs. This cycling of carbon is a pre-requisite for life on earth.

1.36 About half of the extra carbon dioxide released into the air by human activity has been absorbed by the land and the oceans. The processes, regions or systems that absorb Greenhouse gases are called Carbon Sinks. Sinks are important sources that influence the total quantity of greenhouse gases in the atmosphere. Any reduction in the capacity of sinks will result in increased global warming.

1.37 **Mitigation of GHG Emissions and Adaptation:** Addressing climate change is a complex task and would need the collective attention of all nations. The major objective of any such attempt would be drastic reduction of GHG emissions, which, in turn, would

[16] Feeling the Heat: UNFCCC
[17] Auditing Government Response to Climate Change (2009) INTOSAI (WGEA)

require a transition to better and technologically more efficient approach to various human pursuits through concerted efforts by involving the entire society. In this context, the efforts in ***'mitigation'*** to reduce the GHG emissions become significant. Mitigation involves taking actions to reduce GHG emissions and to enhance carbon sinks aimed at reducing the extent of global warming. (Mitigation is in contrast, but acts in tandem, with **'*adaptation*'** which involves taking actions to minimize the effects of global warming to reduce the vulnerability of natural and human systems against actual or expected climate change effects). In other words, mitigation tackles the causes of climate change while adaptation seeks to tackle its impacts. Improvements in efficiency and technological advancement could contribute to the reduction of harmful emissions, apart from changes in lifestyles and behavioral and consumption patterns. The sectors which are major polluters including energy, transport, construction, agriculture and industry need to be addressed in this regard.

1.38 UNFCCC is the main global response to the challenge of climate change; public auditors should familiarize themselves with the major provisions of the Framework. It sets out an overall framework for inter-governmental efforts to tackle the challenges posed by climate change. The Convention recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and associated Greenhouse gases. Under the Convention, governments are expected to share information on GHG emissions, national policies and best practices. They must also evolve national strategies for addressing the problem, and provide technical and technological support to developing countries in this regard. The Convention and its Kyoto Protocol spell out a number of commitments by the developed countries who are in the first place responsible for most of the GHG emissions in the past. In fact, auditors will find the Convention and the Protocol as suitable audit criteria and from that angle also, these are of extreme importance. The Protocol (1997) aims at stabilizing GHG emissions from human activities and establishes targets for the Annex I[18] Parties to the Convention. The rules for the first commitment period (2008-2012) were agreed upon in the so called Marrakech Accord of 2001. The total reduction to be achieved by these countries, as per the Protocol, comes to 5 *per cent* from the 1990 levels by the year 2012. Policies and measures to achieve this target include energy efficiency, protection and enhancement of carbon sinks, promotion of sustainable forms of agriculture, new technologies, phasing out of market imperfection in all GHG sectors, limitation of GHG emissions from transport and other sectors etc.

Biological Diversity is the 'Living Foundation' for Sustainable Development[19]

1.39 The importance of preserving biological diversity can be assessed from the fact that nearly 40 *per cent* of the global economy is based on biological products and processes. Biological Diversity or biodiversity is defined as *'the variability among living organisms from all sources including terrestrial[20], marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species*

[18] There are 32 developed countries and the European Commission in the Annexure I.
[19] For a discussion on "Sustainable Development", refer to Paragraph 1.41 and 1.42 below
[20] Relating to earth, earthly.

and of ecosystems'[21]. The term includes plants, animals and micro-organisms, their genes and the systems they inhabit and usually denotes the totality of genes, species, and ecosystems of a region.

1.40 There are 1.75 million known species in the world, but many are under threat and are categorized as *'endangered species'*[22]. The major threats to biodiversity arise from habitat change, loss or fragmentation (about 85 *per cent*), invasive alien species, overexploitation, pollution and nutrient loading, climate change and global warming. Other threats include urbanization, uncontrolled use of biotechnology, indiscriminate agricultural methods, desertification, biopiracy, and illegal trade of species[23]. Increasing growth of population leads to corresponding growth of consumption which, in turn, results in increasing demands for biodiversity. Loss of genetic diversity could also lead to the extinction of species; for instance, though there are 1,20,000 genetically distinct varieties of rice, only two species are widely cultivated. Further, about 90 *per cent* of the world's food comes from 20 plant species. There is close relationship between ecosystems (the interactions, inter-relationship and processes between plants and animals and their physical environment) and biodiversity. For instance, the marine and coastal ecosystems, including deep sea, coral reefs and mangroves act as the environs for a large variety of biodiversity. Protection of biodiversity calls for sustainable development practices which include sustainable and efficient agriculture, landscape level planning[24], avoidance of over-exploitation of the world's resources and protection of critical ecosystems. The Convention on Biodiversity recognizes that biodiversity remains the *'living foundation'* for sustainable development and has adopted a strategic plan (2010 Biodiversity Target) to significantly slow down the decline of biodiversity at all levels. One of the key elements of the Plan is to bring awareness of biodiversity into mainstream economic sectors and development planning. It is recognized that the effective way to conserve biodiversity is by preventing the degradation of the habitats.

1.41 India is a mega biodiversity country (characterized by high species richness and large number of endemic species) and accounts for 7-8 *per cent* of the recorded 1.75 million species of the world. But unfortunately, its wealth is being eroded due to various reasons[25]. Plans for conservation include intensified surveys and inventory, network of protected areas and natural habitats, reclamation of wastelands, protection and sustainable use of plants and animals through appropriate laws and regulations, application of tissue culture and biotechnology where appropriate, and restriction of exotic species. Government has also put in place a National Biodiversity Action Plan to strengthen *'biodiversity hotspots'*. The manufacture, use, import, research and the application of Genetically Modified Organisms (GMO) and products etc. are governed by the rules notified by the Ministry of Environment & Forests under the Environment (Protection) Act, 1986. The Department of Biotechnology

[21] United Nations Earth Summit, Rio de Janeiro,1992
[22] The International Union for Conservation of Nature and Natural resources (IUCN) estimates that more than 16,000 plants and animals are endangered and has included them in a 'Red List of Threatened Species).
[23] Convention on Biological Diversity, Earth Conference, Rio de Janeiro, (1992)
[24] Landscape level planning implies protection of areas rich in biodiversity and use of land already converted, including degraded land, to expanded agriculture, aqua culture and plantations.
[25] National Conservation Strategy and Policy Statement on Environment and Development (1992); Section 5.2.3.1: Biodiversity.

regulates all activities related to GMO[26]. Major legislations enacted to protect and conserve biodiversity in India include the Indian Forests Act, 1927, Wildlife (Protection) Act, 1972, Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986 and the Biological Diversity Act, 2002.

1.42 A network of over 600 protected areas with National Parks (96), Wildlife Sanctuaries (509) and Conservation Reserves (3) has been created in India for the conservation of biodiversity. Among other things, the adequacy, economy in the use of resources, efficiency in management and the effectiveness of the network would offer scope for environmental audit in India.

Survival and well-being of the nation depends on sustainable development

1.43 In 1987, the seminal report *'Our Common Future'* brought into focus the concept of *'Sustainable Development'*. This report gave rise to the then novel thinking about the relationship between economic development, environmental health and social prosperity. The report triggered a new thinking among governments and policymakers and brought together governmental policies, regulatory programmes and civil society organizations for a common cause.

1.44 As mentioned in the preamble to the National Conservation Strategy and Policy Statement on Environment and Development of the Ministry of Environment & Forests (1992), the survival and well-being of the nation depends on sustainable development; and to achieve this, it must be ensured that the demand on the environment from which all interest groups derive their sustenance does not exceed its carrying capacity for the present as well as the future generations. In this context, environmental governance becomes crucial as an instrument for sustainable development of the society. Sustainable development may have many interpretations, but it generally refers to non-declining human well-being over time[27]. Brundtland[28] Commission defined it as the meeting of *'the needs of the present without compromising the ability of future generations to meet their own needs'*. The concept of sustainable development involves the maximization of the benefits of economic activities, subject to maintaining the stock of productive assets over time and providing a safety net to meet the basic needs of all members of the society. Sustainable development would aim to step up economic and social development in an environmentally responsible manner keeping in mind, all the time, the requirements of inter-generational equity.

1.45 The World Summit on Sustainable Development (WSSD) held in 2002 described the essential requirements for sustainable development as eradication of poverty, changing

[26] India is the sixth largest country growing GM crops in the world, mainly due to the large scale cultivation of BT. Cotton (Bacillus Thuringiensis Cotton) for which approval was given by the Genetic Engineering Approval Committee (GEAC). A proposal seeking permission to cultivate Bt.Brinjal in India was however deferred by the Ministry of Environment & Forests in view of objections raised by scientists, environmentalists and farmers.
[27] Economic Survey, Ministry of Finance, 1998-99
[28] Brundtland Commission (World Commission on Environment and Development (WCED) : 1987)

consumption and production pattern, and management of natural resources base for economic and social development. As the National Conservation Strategy and Policy Statement on Environment and Development points out, unless the relationship between the multiplying population and life support systems can be stabilized, development programmes are not likely to yield the desired results. Accordingly, the National Environment Policy (2004) affirms that environmental protection will constitute an integral part of the development process in India.

Sustainable management of forests is essential for maintaining the forest carbon stock

1.46 Forests are an essential part of the ecosystem, and play an important role in environment stability and climate control. Forests act as efficient carbon sinks; the destruction of forests is known to lead to climate change, soil erosion, floods and landslides, and erosion of soil fertility. Forests play a vital role in harboring more than 45,000 floral and 81,000 faunal species. Protection and enhancement of forests cover is an essential part of all environment policies and action plans. According to IPCC, *'a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber fiber or energy from the forest, will generate the largest sustained mitigation benefit'*. However, population pressure, poverty and weak institutional framework cause depletion of the forest cover in developing countries through overexploitation of forest resources such as firewood, fodder, timber, raw materials for paper etc.

1.47 Forest is defined as 'land spanning more than 0.5 hectare with trees higher than 5 m and a canopy of cover of more than 10 *per cent*, or trees able to reach these thresholds in situ[29]'. India has recorded forest coverage of about 20.60 *per cent* of the total geographical area, but about 41 *per cent* of it is estimated to be degraded. The forests in India are classified into five major groups based on climatic factors and 16 forests types based on temperature. More than half of the total forest lands in India are declared as *'protected'* or *'reserved forests'* under the Indian Forests Act, 1927 which grants them protection from hunting, grazing etc., except for the special orders issued in favour of (tribal) communities who live on the fringes of the forests and traditionally earn their livelihood from forest resources. Forest cover is monitored by the Forest Survey of India using remote sensing techniques, and categorized into very dense, moderately dense and open forests depending on the canopy density.

1.48 **Mangroves:** India has about 4,500 Sq. kms of mangroves spread over the coastal areas, especially in West Bengal (Sundarbans), which offer substantial ecological protection. Mangroves are salt-tolerant forest ecosystems found mainly in tropical and sub-tropical inter-tidal regions and comprise of trees or shrubs that grow in shallow or muddy salt water or brackish waters, especially along shorelines and in estuaries. They offer protection for the coastal regions from large waves, impact of cyclones and tsunamis, and serve as a

[29] Food and Agriculture Organization (FAO). The Forest Survey of India has a less inclusive definition, namely, 'all lands, more than one hectare in area, with a tree canopy density of more than 10 per cent'.

nursery for fish species. They also absorb a substantial quantity of carbon dioxide and thereby inhibit global warming, and additionally, help to protect offshore coral reefs. However, in spite of coastal regulation norms which provide for a buffer zone of 500 meters, there has been significant loss of mangroves in India over the last three decades. Mangroves face threat from shrimp and aquaculture farms, beach tourism, tsunami etc. The increasing threats to mangroves and the inadequate efforts in their sustenance and development in India require the close attention of public auditors.

1.49 India has taken several measures to protect and conserve its forests. The important policy initiatives include the National Forest Policy, 1988, National Forestry Action Plan, 1999 etc. The Indian Forests Act, 1927, The Forest (Conservation) Act, 1980 and the Biological Diversity Act, 2002 are worth mentioning. The Forest (Conservation) Act is a landmark legislation enacted with the objective of maintaining a balance between the demands for development and forest conservation. Supported by the judiciary, the act has been instrumental in restricting and regulating indiscriminate diversion of forest lands for development needs. Under the National Forestry Action Plan, the Central Government has established a long term plan to convert one-third of the total land mass of the country under forest/tree cover and to arrest deforestation and to achieve sustainable forest development.

1.50 There are several international conventions and forums established to promote forest conservation, starting with the 'Convention on Biological Diversity' (CBD). The *'Earth Summit'* held in Rio de Janeiro adopted a statement of principles known as *'Forest* Principles' for a global consensus on management, conservation and sustainable development of forests. Following this, an Intergovernmental Panel on Forests (IPF) came into being at the instance of the United Nations which made several recommendations for the sustainable development of forests across the world. This was followed by the United Nations Forum on Forests (UNFF) which seeks to reverse the loss of forest cover worldwide through sustainable management, among other things.

Wetlands are biologically diverse and can help in arresting environmental degradation

1.51 Wetlands are the transitional areas between permanently aquatic and dry terrestrial ecosystems and are considered to be one of the most biologically diverse ecosystems. The Convention on Wetlands of International Importance (RAMSAR Convention) defines wetlands as *'areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters'*. Wetlands help to retain water during dry periods, thereby keeping the water table high and relatively stable, apart from supporting biological diversity in several ways. Further, during floods, they help to reduce the flood levels and prevent flotsam and nutrients flowing directly into lakes and water bodies. Wetlands are facing several anthropogenic threats and pressures. Absence of reliable date and information on the extent and status of wetlands, their conservation values and socioeconomic importance has been a major impediment in

the sustainable development and conservation of wetlands across the world, especially in India.

1.52 The Ramsar Convention, of which India is a signatory, aims to address the global concerns regarding wetland loss and degradation. The treaty encourages participants to list wetlands of international importance to promote their wise use, with the objective of preserving them by restricted access and through public awareness.

1.53 The territory of India includes a number of wetland including estuaries, backwaters, creeks, lagoons, lakes, swamps and marshy areas. However, lack of data coupled with increasing population pressure and greed for land have been resulting in their loss, pollution and destruction in no small measure. Under the National Wetlands Conservation and Management Programme, over a hundred designated wetlands in 25 States with areas ranging from 150 ha to 5, 53,000 ha are under conservation efforts. There are also 25 identified *'Ramsar Sites'* in India.

A proactive public policy is central to the mitigation of the impact of climate change

1.54 Climatic models project a global warming of about 1.4 to 5.8 degree centigrade by the end of the current century unless effective global policies are in place to regulate uncontrolled GHG emissions. The observed increase in the rise of the mean sea level during the 20th century alone comes to about 20 cms. Already, there are clear evidence of unprecedented weather changes, including variations in the levels of precipitation, frequency and intensity of draughts, changing pattern of monsoons in different parts of the world which impact, among other things, freshwater availability and lead to heat wave conditions, floods and ocean acidification. Anthropogenic warming could lead to abrupt and irreversible impacts depending on the rate and magnitude of the climate change. This may be of medium term (ocean circulation changes) or long term changes (ecosystem changes). In view of this, the need for *'mitigation'* as the central point of all conservation efforts is indisputable since prevention is clearly better than cure. However, *'adaptation'* should not be seen purely as a passive measure, but should be viewed as a process of active adjustment in response to new stimuli. Hence, Governments, both at the Centre as well as in the States and Union Territories, should adopt the policy of proactive options (*mitigation*) and must plan to face the consequences of global warming (*adaptation*). The framework for the efforts for the reduction of Greenhouse gases should, accordingly, be based on the recognition that lesser the mitigation, greater will be the climate change and the consequent need for more adaptive measures. In conclusion, mitigation and adaptation should not be viewed as possible alternative policy options, but as integral parts of the strategy to reduce emissions and the consequent climate change impacts.

1.55 It would be wise if the measures to control Greenhouse gas emissions are devised in terms of short, medium and long term solutions. For instance, while the promotion of fuel-efficient vehicles, energy efficient lights and appliances etc. may have a medium term impact, lifestyle changes and behavioral patterns will have a longer term, positive role. The public policy to be evolved to control Greenhouse gas emissions should therefore include

education and awareness programmes coupled with demand management, end-use energy efficiency and promotion of renewable energy etc., among other similar steps. It will also be crucial to integrate climate change-related policies in all broader development policies and programmes which would facilitate their ready acceptance and implementation by all concerned. There are several policy choices available to Governments in this regard including regulations, standards, taxes and charges (as well as tax credits and tax expenditures) and subsidies, to name a few. Voluntary agreements with industrial associations and units will be another available option. Similarly, policies which provide a real or implicit price of carbon could create incentives for producers and consumers to invest in low GHG products, technology and processes.

1.56 The National Action Plan on Climate Change (2009) (NAPCC) includes a number of steps to simultaneously advance the country's development and climate change-related objectives of mitigation and adaptation and aims at protecting the poorer and vulnerable sections of the society through an inclusive and sustainable development strategy sensitive to the climate change. The NAPCC has established eight national missions, of which two are for mitigation and five are for adaptation. However, since climate change policy involves a wide range of sectors and vested interests, there is considerable potential for conflicting objectives and targets and the major task of the Government will be to coordinate the efforts to ensure that the policy as a whole is effective. It is also essential to involve the public and the stakeholders in the formulation and implementation of the policy.

Carbon footprint is a powerful tool to understand the impact of personal behavior on global warming

1.57 Carbon footprint is defined as *'the total amount of greenhouse gas emissions produced to directly and indirectly support human activities, usually expressed in equivalent tonnes of carbon dioxide'*. The carbon footprint of an entity is the sum of all emissions of carbon dioxide which were induced by the entity's activities in a given timeframe. Usually, the carbon footprint is calculated for the period of one year. The generally adopted method is to compute the carbon dioxide emissions based on the fuel consumption. For instance, one liter of petrol would be equivalent to 2.3 kg of carbon footprint and one liter of diesel would generate 2.7 kg of the same.

1.58 Even most routinely performed activities of human beings will result in personal carbon footprints. For instance, drinking a two-liter packaged orange drink will result in the CO_2 emission of 1.7 kg in view of the processing, packaging and transportation involved. On the other hand, munching a locally grown orange will cause negligible footprint[30]. To illustrate, each of the following regular human activities will add to 1 kg of carbon dioxide in the atmosphere:

- travel by train or bus for a distance of 10-12 kms;
- driving a car for a distance of 6 kms (at 7.3litres of petrol for 100 kms);
- travel by air for a distance of 2.2 kms;

[30] What is Your Carbon Footprint? The Hindu, December, 21, 2009.

- production of 5 plastic bags or two plastic bottles.

1.59 Carbon footprint is a very powerful tool to understand the impact of personal behavior on global warming. It is estimated that in the medium and long term, the carbon footprint must be reduced to 2,000 kg of carbon dioxide per year per person for a sustainable living. The carbon dioxide emissions by a few selected countries in 2002 are given in the table below:

Country	CO_2 Emissions in Million Tonnes
United States of America	5,773
China	3,783
Russian Federation	1,534
Japan	1,213
India	1,106
Germany	863
United kingdom	541
South Africa	364
Denmark	52
Norway	38

(World Resource Institute)

{The CO_2 emissions for 2006 are about 12-15 *per cent* higher than the figures above. By 2009, China had overtaken USA in the total emission of CO_2, though in per capita terms, USA is still the leading polluter.}

'Carbon Intensity'- A preferred alternative to 'gross/per capita carbon emission' amongst developing countries

1.60 *'Carbon Intensity'* is a term which is increasingly gaining currency, especially among developing countries. In effect, it denotes the linkage of carbon footprint with economic growth and implies growth with equity. It refers to the quantity of fossil fuel consumed (and the corresponding carbon dioxide equivalent) to produce an economic unit, namely, Gross Domestic Product (GDP). Reducing carbon intensity will mean that GDP will continue to rise without, however, carbon dioxide emissions rising at the same rate or in proportion thereof, to be achieved through energy efficiency and investments in greener technologies. Developing countries, as a block, affirm that reduction of carbon intensity, rather than carbon footprint, will be the appropriate mechanism to regulate (and monitor) environmental degradation and global warming since economic growth and poverty eradication measures cannot be compromised at the stage of their development. However, efforts would be continued to control the per-capita carbon emissions. This argument also derives its force from the fact that developed countries are responsible for the high level of GHG emissions and concentrations in the world owing to their past (and continuing) industrial activities; and having already reached a high level of economic progress, they cannot expect the developing countries to be measured by the same yardstick.

1.61 In the recently held Copenhagen Summit, four major developing countries, Brazil, South Africa, India and China, known as the BASIC group, whose carbon dioxide emissions are on the increase due to their faster economic progress, took the lead to demand that developed countries should commit themselves to reduce their GHG emissions drastically in

terms of the Kyoto Protocol, while they themselves would volunteer to reduce their carbon intensity by 2015. It must be mentioned that as per the Kyoto Protocol, the 40 developed countries[31] and the European Union (who are Annex I parties of the UNFCCC) were to reduce their GHG emissions by 5 *per cent* (as compared to 1990) by 2012; but have actually increased their cumulative emissions by 10 *per cent* since the Protocol. (The USA has not only declined to ratify the Protocol, but has a 17 *per cent* higher emission as of now. Even though the USA has offered to reduce emissions by 17 *per cent* over the 2005 level, it only works out to 3% of the 1990 levels). It is interesting that the developed countries, including the USA, had insisted at the Copenhagen Summit that all countries must announce voluntary *'internationally monitored'* cuts in emissions, thereby jettisoning the so far adopted concept of 'differentiated responsibility' and imposing an unjust 'common' order, which would be detrimental to the economic growth of the developing countries. This turn of events led to sharp disagreement between the two blocks and the finally arrived at 'Copenhagen Accord' which has no binding effect.

1.62 The stand taken by developing countries at the Copenhagen Conference was in line with Article 4 of UNFCCC, which states that commitments under the Convention will *'take fully into account that economic and social development and poverty eradication are the first and overriding priorities of developing country parties'.*

1.63 The Government of India, with the approval of the Parliament, has held out the view that no binding emission cuts will be acceptable, and that there shall be no deadline for peaking of emissions by the developing countries. Subsequent to the summit, India has unilaterally announced its decision to reduce the carbon intensity by 20-25 *per cent* by 2025.

'Clean Development Mechanism' enables developed countries to invest in mitigation projects of developing countries in lieu of their commitments to reduce own GHG emissions

1.64 Clean Development Mechanism (CDM), a concept under the Kyoto Protocol, enables developing countries which, unlike the developed countries, are not obligated to reduce their emissions to participate, nevertheless, in joint GHG mitigation projects. This also allows the Annex I countries to meet their commitments in a flexible and cost-effective manner. This is managed by permitting them to invest in GHG mitigation projects in developing countries for which they would receive credits or '*certified emission reductions*' (CERs) which could be used to meet their own reduction commitments. Since the cost of such projects in developing countries would be lesser than in developed countries, they benefit from the investments while the host countries would derive advantage in terms of finance, technology and the outcome of sustained development. Projects starting from 2001 are eligible for CERs if they lead to measurable and long-term reductions in emissions. Renewable energy projects with installed capacity up to 15 MW, energy efficiency improvement projects with potential for savings up to 15 Gwh and projects that reduce emissions by sources and directly emit less than 15 kt CO_2 equivalent annually would receive fast track clearances from the Executive Board of UNFCCC which supervises CDM. A share

[31] Originally only 32 which has since increased to 40.

of the proceeds from the projects would be devoted for assistance to developing countries for adaptation to climate change.

1.65 It is the prerogative of the host country to confirm whether a CDM project activity assists it in achieving sustainable development. The CDM should also be oriented towards improving the quality of life of the very poor from the environmental standpoint[32].

[32] National Action Plan for Climate Change, Ministry of Environment & Forests

CHAPTER II

INTERNATIONAL TREATIES AND CONVENTIONS ON ENVIRONMENTAL SAFEGUARDS AND CLIMATE CHANGE

Introduction

2.1 Twenty years after the first global environment conference (United Nations Conference on Human Environment, 1972), the United Nations took initiative to help the international community to rethink economic development and find ways to halt the destruction of irreplaceable natural resources and pollution of the planet by convening the UN Conference on Environment and Development (UNCED), commonly known as the "Earth Summit", held in Rio de Janeiro in 1992. The summit's message was that "nothing less than a transformation of our attitude and behavior would bring about the necessary changes", and reflected the complexity of the problems facing the world community: poverty on the one hand and excessive consumption by the affluent population on the other, placing damaging stress on the environment. The Earth Summit resulted in what is known as Agenda 21 and the Rio Declaration on Environment and Development. The Earth Summit was followed by the World Summit on Sustainable Development (WSSD), held in 2002, in Johannesburg which focused attention on meeting the environmentally related difficult challenges facing the world, including improving people's lives and conserving natural resources in the wake of the increasing population and the consequent rising demands for consumption. In the following years, there was increasing realization that degradation of the environment and global warming could not be tackled except by joint and concerted efforts by all countries and societies, which has given rise to a multiplicity of international accords and agreements.

The most important among the various multilateral agreements on environment and sustainable development is the UNFCCC, supplemented with its operational arm, the Kyoto Protocol. The most notable achievements of the UNFCCC and its Kyoto Protocol are the establishment of a global response to the climate problem, stimulation of an array of national policies, the creation of an international carbon market and the establishment of new institutional mechanisms that may provide the foundation for future mitigation efforts[33]. The Protocol is aimed at establishing a first step towards achieving the main objectives of the Convention, namely, to stabilize greenhouse gas emissions from human activities, and lays down emission targets for 32 (since increased to 40) developed countries and the European Union, who are included in the Framework as Annex- I Parties. The rules for the first commitment period from 2008 - 2012 under the Protocol were agreed upon in a subsequent Conference of Parties (COP) at Marrakech in 2001, known as Marrakech Accord. India ratified UNFCCC on 1st November, 1993.

[33] Summary for Policymakers; Contribution of Working Group III to the Fourth Assessment Report on the Intergovernmental Panel on Climate Change (2007)

2.2 The objective of UNFCCC is to stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system within a timeframe sufficient to allow ecosystems to adapt naturally to climate change. The Framework also aims to ensure that food production is not threatened and that economic development takes place in a sustainable manner. The Framework came into force in 1994. It has a near universal approval since 192 countries are parties to it, and most of them, with exceptions of the USA, have ratified it. India is a strong votary of the Framework and has followed it up with a National Strategy and Action Plan, and appropriate legislative and regulatory measures. However, the commitments under the Framework are not binding; they are of general nature, and not country specific or time-bound, except for the commitment regarding reporting to the UNFCCC Secretariat by all parties. The reporting covenant provides for the timing of national communications for all countries and inventory submissions for the developed countries.

2.3 The Kyoto Protocol, which came into force in 1997[34], has laid down individual emission limitations and reduction commitments covering six main greenhouse gases. The emission targets for Annex -I Parties amount to a total reduction of at least 5 *per cent* from the 1990 levels by the scheduled commitment period of 2008-2012. As clarified earlier, the policies and measures proposed under the Protocol include energy efficiency, protection and enhancement of GHG sinks, promotion of sustainable forms of agriculture, new technologies, phasing out of market imperfection in all GHG sectors, limitation of GHG emissions from the sectors, limitation of methane emissions etc. The Protocol opts for cost-effective fulfillment of the commitments through flexible mechanisms[35], clean development mechanism (CDM)[36], and emission trading. Some of the commitments which auditors may find as useful audit criteria are given below:

- All parties shall formulate and implement, publish and regularly update national, and where appropriate regional, programmes containing measures to mitigate climate change by addressing anthropogenic emissions.
- All parties shall develop, update and publish national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases using comparable methodologies.
- All parties shall facilitate, and cooperate in preparing for, adaptation to and to the impact of climate change. They will also establish plans for activities aimed at adaptation to the adverse effects of climate change.
- All parties shall promote and cooperate in the development, application, diffusion including transfer of technologies, practices and processes that control, reduce or prevent anthropogenic emission of GHGs.
- All parties shall promote research, systematic observation and development of data archives with a view to reducing uncertainty about the causes and effects of climate change.

[34] Date of ratification by the Government of India: 26.08.2002.
[35] GHG emission is valued as tonnes of carbon dioxide or Equivalent of carbon dioxide (CO_2 Equivalent); price is based on MW operation.
[36] Annex- I Parties invest in projects that reduce GHG emissions in developing countries and get Certified Emission Reduction (CER) which could be used to offset their own carbon dioxide emissions or trade them. Such trading would be between Parties to the Protocol and not between the companies concerned.

- The developed countries included in Annex II[37] shall provide new and additional financial resources to meet the agreed full costs incurred by developing country parties in complying with their obligations under the Convention.

2.4 The following timeline of important international accords on climate change will be of interest:

1992	**UNFCCC**
1997	**Kyoto Protocol**
2001	**Marrakech Accord**
2005	**Kyoto Protocol Comes into Force**
2006	**Nairobi Work Programme on Adaptation**
2008	**Start of the 5-year Commitment Period of the Kyoto Protocol**
2009	**Follow Up Agreement to the Kyoto Protocol (Bali Action Plan)**
2009	**Convention of Parties, Copenhagen Accord**

2.5 Apart from UNFCCC and Kyoto Protocol, the following international agreements are also important from the audit criteria point of view.

1) Convention on Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (Basel Convention: 1989).

This convention, as the name indicates, seeks to control and reduce trans-boundary transportation of specified waste materials subject to the Convention and consistent with sound management principles. The Basel Convention has special significance to India in view of, among other things, the large ship-breaking industry on the west coast as also the flourishing Information and Telecommunication industry. The Government of India ratified the Convention effective from 24th June, 1992.

2) Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Convention: 1972).

The *'Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972', the 'London Convention'* for short, is one of the first global conventions to protect the marine environment from human activities and has been in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. Currently, 86 States are Parties to this Convention.
In 1996, the *'London Protocol'* was agreed to further modernize the Convention and, eventually, replace it. Under the Protocol all dumping is prohibited, except for possibly

[37] The Annex- II includes developed countries who have obligation to provide financial and technical support to developing countries while Annex I countries have obligation to reduce their greenhouse gas emissions.

acceptable wastes on the so-called *'reverse list'*. The Protocol entered into force on 24 March 2006 and there are currently 38 Parties to the Protocol.
India has not ratified this treaty.

3) International Convention for the Prevention of Pollution from Ships (1973) (MARPOL: 1973/1978)

The MARPOL Convention is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It is a combination of two treaties adopted in 1973(Convention) and 1978 (Protocol) respectively and updated by amendments through the years. The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations and covers pollution by oil, chemicals, and harmful substances in packaged form, sewage and garbage. India is a party to the agreement; and has specific laws, as for instance the Indian Merchant Shipping Act, 1958, which gives effect to the international convention for prevention of pollution of the sea by oil.

4) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR Convention: 1971)

This Convention is of substantial interest to public auditors since India has several wetlands coming under its scope, which require protection. The National Environment Policy (2004) points out that several wetlands in India such as the Chilka Lake and the East Kolkata Wetlands have sufficiently unique ecological character as to merit international recognition as RAMSAR Sites. The objective of RAMSAR[38] Convention is the conservation and wise use of wetlands through national action and international cooperation as means of achieving sustainable development. The Convention came into effect in December, 1975; India became a signatory to the Convention in February, 1982.

5) Convention to Combat Desertification (CCD: 1994)

India has large deserts in the north western region (Thar, Rajasthan) and this treaty is therefore of considerable importance to our country. The object of the Convention is to fight desertification and to mitigate the effects of draughts which accompany desertification. The application of the Convention is of special relevance to African countries. The Convention envisages action at all levels, namely, national, regional and international and has two parts for action, namely, by affected parties and by developed country parties, with varying obligations. The Convention came into effect in December, 1996 and was ratified by the Government of India simultaneously.

6) Convention on Biological Diversity (CBD: 1992)

The term biological diversity or biodiversity includes the totality of genes, species and ecosystems of a region, namely, plants, animals, and micro-organisms, their genes and the

[38] The Convention was held in Ramsar, Iran and hence the name.

system they inhabit. India is one of the sixteen mega-diversity countries and accounts for about 7 to 8 *per cent* of the recorded 1.7 million species of the world. The United Nations Conference on Human Environment (UNCHE) convened at Stockholm preceded CBD, which was signed at the Earth Summit held at Rio de Janeiro and recognized that biodiversity remain the foundation for sustainable development. The objective of CBD is to ensure the conservation of biological diversity and sustainable use of its components and to promote a fair and equitable sharing of the benefits from the utilization of genetic sources. CBD came into effect in December, 1993; and was ratified by the Government of India in February, 1994. Following the CBD, in 2002, another Conference of the Parties to CBD adopted a strategic plan and made a commitment designated *'2010 Biodiversity Target'* which sought to significantly slow down the decline of biodiversity at all levels. A key element of the strategic plan is to bring awareness of biodiversity into mainstream economic sectors and development planning. Other international accords related to biodiversity which could be referred to include the Cartagena Protocol on Bio-safety and the Bonn Convention on Migratory Species of Wild Animals (CMS). International Plant Protection Convention (IPPC) is also worth referring to.

7) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES: 1973)

The objective of this treaty is to ensure through international cooperation that the international trade in species of wild fauna and flora does not threaten the survival, in the wild, of the species concerned. It also aims at the protection of certain endangered species from over-exploitation by recourse to import / export permits issued by a management authority under the control of a scientific authority. Date of effect of the Convention is July, 1975 and India ratified it in 1977. Since our country has several species coming under the endangered category such as tigers, lions, elephants and so on, the implementation and oversight of CITES is of paramount importance for the survival of such species. The Convention offers excellent criteria for use by public auditors.

8) Vienna Convention on Protection of Ozone Layer (1985) and Montreal Protocol on Substances that Deplete the Ozone Layer (1987)

Ozone layer depletion is acknowledged to be a direct cause for global warming and climate change. The protection of the ozone layer is therefore of crucial interest. The object of the Conventions is to protect the environment and the human health from the adverse effects resulting or likely to result from human activities which modify or impact the ozone layer. It also aims to control, through agreed measures, human activities which are found to have adverse effects on the ozone layers. The Montreal Convention especially aims at protection of the ozone layer by taking measures leading to total elimination of global emissions of ozone-depleting substances (e.g. CFC) on the basis of developments in scientific knowledge, and taking into account technological and economic considerations and the need of developing countries. The Vienna Convention was ratified by India effective from 18th March, 1991 while the Montreal Protocol was ratified on 19th June, 1992.

9) United Nations Convention on Laws of the Sea (UNCLOS); International Convention for the Control and Management of Ships Ballasts Water and Sediments

Also called the *'Law of the Sea Convention'*, UNCLOS is the international agreement that resulted from the third UN Conference on the Law of the Sea and defines the rights and responsibilities of the nations in the use of the world's oceans, establishing guidelines for businesses, environment, and management of the marine 'natural resources'. UNCLOS came into force in 1994 and as of now, 158 countries and the European Community have joined the Convention. UNCLOS is also recognized as the codification of the customary international law on the issue, including setting limits, navigation, exclusive economic zones, continental shelf jurisdiction, deep sea bed mining, protection of marine environment, and scientific research, among others. India ratified this treaty in 1995.

10) The CARTAGENA Protocol on Bio-safety (January, 2000: Montreal, Canada)

This was the first legally binding agreement governing international movement of Genetically Modified Organisms (GMOs). The object of the Protocol is to ensure that GMOs that have potentially adverse effects on conservation, sustainable use of biodiversity, or on human health are safely transferred, handled, and used. The Protocol will provide substantive audit criteria for review of the conservation measures for plant genetic resources. India ratified this treaty in 2003.

CHAPTER III

ORGANIZATION AND POLICY INITIATIVES FOR ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE IN INDIA

Introduction

3.1 Ministry of Environment & Forests (MOEF) is the nodal agency responsible for all matters relating to environmental protection and climate change and is responsible for the planning, promotion, coordination, and implementation of national policies and programmes on environment and forests. Objectives of the Ministry include:

- conservation and survey of flora and fauna, forests, and wild life;
- prevention and control of pollution;
- afforestation and regeneration of degraded areas;
- protection of environment, and;
- ensuring the welfare of animals.

3.2 The Ministry has regional offices, Boards and research centers spread over the country.

3.3 Further, each functional ministry is responsible for the control and regulation of environmental matters relating to its own jurisdiction. Thus, the Ministry of Road Transport and Highways is responsible for the regulation of the vehicular emission standards; it notifies the emission norms and the testing procedures under the Motor vehicles Act.

3.4 The following major legislations are in place to enable the Ministry to carry out its allocated duties and responsibilities:

1) The Forest (Conservation) Act, 1980

The object of the Act is the conservation of the country's forests. It strictly restricts and regulates the de-reservation of forests or use of forest land for non-forest uses for which the approval of the Central Government is essential. This act has to be seen along with *'The Indian Forests Act, 1927'* which consolidates the law relating to forests, transit of forest produce and the duty leviable on timber and other forest produces. *'The Scheduled Tribe and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006'* supplements the efforts at sustainable conservation of forests.

2) The Water (Prevention and Control of Pollution) Act, 1974 and The Water (Prevention and Control of Pollution) Cess Act,1977

This is an important legislation enacted with a view to ensuring the prevention and control of water pollution by establishing Central and State Pollution Control Boards, the nodal agencies for the promotion of cleanliness of streams and wells in different areas of States,

and to advise the respective Governments on all matters concerning prevention of water pollution, among other things. The Boards are empowered to regulate the establishment of industries, operations or processes which are likely to pollute water bodies and sources, the Act provides for specified penalties for the violations of the directions given by the Boards.

3) The Air (Pollution and Control of Pollution) Act, 1981

Enacted to take appropriate steps to prevent and control air pollution in line with the objectives of the Stockholm Conference, 1972.

4) The Environment (Protection) Act, 1986

This Act empowers the Central Government to establish authorities charged with the mandate of preventing environment pollution in all its forms and to tackle environment problems that are specific to different parts of the country. Rules have been framed under the Act including for regulating the siting for independent projects, coastal regulation zoning, eco-sensitive zones, environment clearances etc.

5) The Wildlife (Protection) Act, 1972

The objective of the Act is to protect wild life and to control poaching, smuggling, illegal trade in wild life and derivatives. The Act has provisions for stringent punishment for violation of the Act.

6) The Biological Diversity Act, 2002

This act was born out of the attempt to realize the objectives of the international Convention on Biological Diversity (CBD: 1992) which recognizes the rights of nations to use their own resources and aims at the conservation of biological resources and associated knowledge, as well as facilitating access to them in a sustained manner and through a joint process. The provisions of the Act are implemented through the National Biodiversity Authority (NBA), located in Chennai.
(Also refer to Annexure IV in Section II)

Central Pollution Control Board (CPCB)/State Pollution Control Boards (SPCB)

3.5 The Central Pollution Control Board (CPCB) is an important arm of MOEF and plays a major role in the control and abatement of water and air pollution in the country. Its functions include advising the Central Government on all matters concerning prevention, abatement and control of water and air pollution, planning and management of programmes for the control and abatement of water and air pollution, coordination of the activities of State Pollution Control Boards, public awareness programme and establishment of standards for streams, water bodies, quality of air etc. CPCB has established a National Ambient Air Quality Monitoring Programme (NAAQMP) to monitor the air quality for sulphur dioxide, nitrous oxide and suspended particulate matter. The NAAQMP assesses air quality in terms of low, high and critical pollution for industrial, residential or mixed areas of cities and towns. The CPCB also operates a National River Water Quality Monitoring Programme (NRWQMP) which monitors water quality at about 500 stations to cover 126 rivers and tributaries, lakes, canals etc. CPCB also operates an Eco-Mark Scheme to label environment-friendly products and aimed at creating environment awareness through easy identification of such products. The CPCB also implements pollution control programmes in

respect of 17 categories of highly polluting industries; it has established a district-wise Zoning Atlas for siting of industries in India.

3.6 More or less similar functions are assigned to the SPCBs which function within the jurisdiction of the respective State.

Strategies and Policies

3.7 The Ministry has taken the initiative to promulgate the following policies and strategies among others:

- National Conservation Strategy and Policy Statement on Environment and Development (1992);
- National Environment Policy (2006);
- National Action Plan for Climate Change (2009);
- Vision Statement on Environment and Human Health.

3.8 The priorities brought under the strategy include population control, conservation of natural resources, survey, conservation and sustainable use of biodiversity resources, sustainable development of agriculture, irrigation and animal husbandry etc. The Government is also committed to prepare an 'annual natural resources budget' for natural resources accounting. Creating mass environmental awareness is another objective.

3.9 The National Environment Policy, 2006 aims at protection and conservation of critical ecosystems and resources and *'invaluable'* natural and man-made heritage which are essential for life support and livelihood. The Plan also aims to achieve intra and inter-generational equity and efficiency in environmental resource use. The emphasis of all programmes and projects would be that *'human beings are at the centre of sustainable development'*. Further, the Ministry has issued detailed procedures for seeking Environment Impact Assessment clearance for polluting industries, which is mandatory.

3.10 Under the National Action Plan for Climate Change (NAPCC) initiated by MOEF and under the Prime Minister's Council on Climate Change, there are 8 Core Missions running through 2017, of which 2 are for mitigation and 5 are for adaptation. These include National Missions for Solar Energy, Enhanced Energy Efficiency, Water, Habitat, Agriculture, Himalayan ecosystem etc.

3.11 The Vision Statement on Environment and Human Health of the Government of India underscores the influence of environment on human health, and highlights the importance of accurate Environmental Health Impact Assessments (EHIA) in the investigations of the possible effects of environmental pollutants on human health. The Statement advocates a strategy for health risk reduction through a comprehensive and systematic approach to environmental health management plans. The Vision Statement includes a road map for environmental health through risk assessment studies under

different types of pollutions and related scenarios, with special focus on children's environmental health. The nodal agency for implementing the Vision Statement is the Environment and Human Health Cell (EHHC) in the Ministry of Environment and Forests (MOEF).

National Environment Tribunal

3.12 The National Environment Tribunal was established under a 1995 act to provide strict liability for damages arising out of accidents caused from handling of hazardous substances. The Tribunal was to be replaced by the proposed National Green Tribunal, pending before the Parliament, when the Act gets approval. As per the proposal approved by the Cabinet, the National Green Tribunal will be the sole forum where civil litigations relating to the entire gamut of central environment related laws would be entertained.

National Environment Appellate Authority

3.13 National Environment Appellate Authority (NEAA) was established to address cases in which environment clearances are required in certain restricted areas. The Authority was formed under the NEAA Act, 1997 to hear appeals with reference to restrictions of areas in which any industries, processes, operations etc., shall or shall not be carried out subject to safeguards under the Environment (Protection) Act, 1986. The Authority will also become defunct upon passing of the National Green Tribunal Bill (2009), pending for parliamentary approval.

National Green Tribunal Bill

3.14 The National Green Tribunal (NGT) Bill was enacted by the Parliament in May 2010. The bill will set up special omnibus tribunals that would become the sole adjudicators on all *`green laws'*, A key change incorporated in the bill is to create benches of the tribunal on a circuit basis, which would make them mobile and allow the green benches to hear cases at places beyond their original location but within their jurisdiction. The bill allows *`any person aggrieved, including any representative body organization'*, to file an application for the grant of relief or compensation and settlement of disputes. The polluter pays and precautionary principle will now be the basic framework against which the tribunals will adjudicate. While the first puts the onus on the polluter to pay for any financial liability arising out of an incident, the latter requires that the tribunal put the onus on the group or party under the scrutiny to prove that their actions will not cause harm to public or environment even though complete and absolute scientific clarity on the possible impacts of such actions does not exist. Appeals against the tribunal are to be heard by the Supreme Court.

Compensatory Afforestation Fund Management and Planning Authority

3.15 The Forest (Conservation) Act, 1980 was enacted with a view to maintain a rational balance between the objectives of conservation and development. In unavoidable cases

where forest lands are required to be diverted for non-forest purposes, sanctions are given under the Act only subject to compensatory afforestation over an equivalent area of non-forest land. However, where adequate non-forest land cannot be located for given reasons, compensatory afforestation on degraded forest lands may be agreed to on an area twice equivalent to the diverted forest cover. In all such cases, the applicant is required to deposit the estimated cost of compensatory afforestation in Special funds to be created by the state Governments. Based on a Supreme Court directive regarding the creation of a body for the proper management of such Funds, the central Government established the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in 2004. The entire accretions into the special funds are managed by CAMPA and amounts approved as per the Annual Plans of Operation (APO) finalized by the State / union Territory concerned, through the respective State Level Management Committee. The scheme provides for an independent monitoring and evaluation system for the works carried out using the funds released by CAMPA.

Guidelines for establishing CAMPAs in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilizing funds received towards Compensatory Afforestation, Net Present Value (NPV), etc. had been introduced by the MOEF in 2009. The State CAMPA would presently receive monies collected from user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, Net Present Value (NPV) and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980 and presently lying with the Adhoc CAMPA. The State CAMPA would administer the amount received from the Adhoc CAMPA and utilize the monies collected for undertaking compensatory afforestation, assisted natural regeneration, conservation and protection of forests, infrastructure development, wildlife conservation and protection and other related activities and for matters connected therewith or incidental thereto. The State CAMPA would serve as a common repository of funds accruing on account of compensatory afforestation and NPV. It would deploy funds as per guidelines governing the use of funds for conservation, protection and management of forests. The amounts would also be deployed for wildlife preservation and enhancement of wildlife habitats. By the end of January 2010, following national-level sessions on the disbursement and use of CAMPA, 22 States/UTs have operationalized their accounts. Out of the received amounts of approximately Rs.13,000 crore in the ad hoc CAMPA, the State CAMPAs have so far been allocated approximately Rs.1,000 crore.

CHAPTER IV

ENVIRONMENTAL AUDIT AND CLIMATE CHANGE: PLANNING AND PROCESS

Introduction

4.1 Environmental audit is a highly skill-oriented task. It calls for not only a high level of professional audit skills, but also a deep understanding of environmental issues. The environmental auditor must also be familiar with international treaties and conventions on environmental issues apart from having an excellent grasp of the national policy, strategies and programmes for environmental protection and conservation and climate change control. Since this is an emerging area, the auditor will also have to periodically update himself with the latest developments on the subject, nationally as well as internationally.

4.2 The term *'environmental auditing'* is a convenient label generally used to describe a plethora of activities such as management audits, product certification, governmental control measures, and many other activities which bear little or no relation to an external audit[39]. SAI may occasionally carry out activities that, by definition, do not qualify as audits, but which, nevertheless, contribute to better governance. Basically environmental audit is not different from the audit approach practiced by the SAI and could encompass financial audit, regulatory and compliance audit and performance audit. According to the World Bank, environmental audit is a methodical examination of environmental information about an organization, a facility or a site, to verify whether, or to what extent, they conform to specified audit criteria. The criteria may be based on local, national or global environmental standards. Thus, it is a systematic process of obtaining and evaluating information about environmental aspects. In view of the increasing importance assigned to environmental issues and sustainable development, both at the national and international level, environmental audit has gained substantial currency and materiality. The allocation of substantial amounts of public funds for implementing environment programmes and schemes in the annual budgets enhances the scope of environmental audit.

4.3 Four Steps of Audit: According to the guidance issued by the INTOSAI on environmental audit, broadly there are four steps to be followed in environmental audits:

First step	:	Understanding the problem of environment, its impact on society, economy and environment.
Second step	:	Understanding the response of the government to the problem.
Third step	:	Selection of the audit topic and determining the audit priorities, and establishing the audit objectives.
Fourth step	:	Designing the audit.

[39] INTOSAI (WGEA): Guidance on Audit of Activities with An Environment Perspective (2001)

(i) Objectives of Environmental Audit

4.4 The main role of SAI in environmental audit is to respond to the expectations of the citizens by providing independent, credible and objective verification of the information provided by government agencies with respect to their activities and their impact on the environment[40]. Objectives of each audit will depend on the type of the audit carried out, namely, financial audit, regulatory and compliance audit and performance audit.

4.4.1 Financial Audit: The objective of financial audit is to enable the auditor to express an opinion on whether the financial statements are prepared in all material respects in accordance with an identified financial reporting framework. Material respects can be directly linked to the environmental costs, obligations, impacts and outcomes. The audit of financial statements also requires the auditor to consider environmental matters as part of regularity audit.[41] The International Auditing Practices Committee defines environmental matters in a financial audit as:

- initiatives to prevent/abate/remedy damage to the environment or to deal with the conservation of non-renewable and non-renewable resources required by legal, contractual or voluntary commitments.
- consequences of violating environmental laws and regulations, as also of vicarious liability.
- consequences of environmental damage done to others or natural resources.

4.4.2 Compliance Audit: In compliance audit, the objective will be to provide an assurance that governmental activities are conducted in accordance with relevant environmental law, regulations, standards and policies, both at the national and local levels as well as international levels (where appropriate and relevant).

4.4.3 Performance Audit: The objectives of performance audit are manifold[42] and may include ensuring that indicators of environmental related performance (where contained in accountability reports) fairly reflect the performance of the reported entity. Further, the audit verifies that the environmental programmes are conducted in an '*economical, efficient and effective*' manner. It also aims at improving the performance and accountability of government agencies and bodies '*by adding value'* through an effective examination of environment-related policies, strategies and programmes. Apart from verifying the extent to which the programme has achieved its objectives, the performance audit will also examine the intended and unintended, direct and indirect other impacts of programmes and activities subjected to audit as also the adequacy of data for evaluating such impacts. Identification of risks caused by pollution to health and environment would also form part of such exercise. Performance audit of environmental issues will also include the existence or adequacy of environmental policies and laws and strategies. Other objectives would include the compliance with commitments, if entered into or legally obligated, with international

[40] INTOSAI (WGEA): Environment Auditing and Regulatory Auditing.
[41] Also refer to Paragraph 37 of the Regulations on Audit and Accounts for the checks to be exercised.
[42] Objectives of Performance Audit: Performance Auditing guidelines: CAG of India; Paragraph 68 of Regulations on Audit and Accounts, CAG of India

treaties and commitments, where applicable. Adequacy of infrastructure to achieve the environmental targets of the agency and adequacy of funding will also be the subject of performance audits.

INTOSAI / WGEA guidance recommends the inclusion of the following areas within the scope of performance audit of environmental issues:

- Audit of government monitoring of compliance with laws;
- Audit of government's environment programmes;
- Impact of other programmes on environment;
- Audit of Environment Management systems; and,
- Evaluation of proposed environmental policies and programmes.

(ii) Importance of Environmental Audit

4.5 As observed by INTOSAI[43], the environmental problems of the world will not be solved overnight nor will they be solved by the actions of the SAI; but the trust reposed in the role and objectivity of the SAI would make environmental audit part of the solution. By establishing clear and precise objectives and by following a skillful and professional approach in audit, SAI can contribute to the efforts of the government and its agencies through objective analyses and constructive recommendations. The evaluation of the performance of the entity with reference to established standards and indicators and against authentic criteria will enable the entities to improve upon their performance; it will also assist policymakers and legislators to rectify the omissions and shortfalls, if any, and contribute to good governance. Considering the growing concern over environmental degradation and climate change across the world, the findings and conclusions of the SAI, especially in respect of economy, efficiency and effectiveness, will have increasing acceptance and are sure to influence the process of decision making at national and regional levels.

(iii) Mandate for Environmental Audit

4.6 The audit by the SAI is undertaken to ensure the legality, regularity, economy, efficiency and effectiveness of *'financial management and public administration'* mainly through assessments of the financial statements, compliance with Constitution, applicable laws, rules and regulations, and the extent to which an activity, programme or organization operates economically, efficiently and effectively[44]. In view of this, the mandate for environmental audit is inclusive. Read with the provisions of the Constitution and the Comptroller & Auditor General's (Duties and Powers) Act, 1971[45], the mandate of the SAI to undertake environmental audit in all its variations is evident.

[43] INTOSAI (WGEA): Environmental Auditing and Regulatory Auditing
[44] Regulations on Audit and Accounts, CAG of India: Chapter 2, Rule 4
[45] Performance Audit Guidelines; CAG of India, Section 1.40

4.7 According to the INTOSAI Guidelines[46], it is not necessary to have a separate performance audit mandate to conduct an audit with environmental focus. The costs to governments for developing and implementing environmental policies and obligations are increasingly significant. The environmental costs, liabilities and asset impairments affect the preparation of financial statements and would naturally invite their audit by SAIs.

(iv) Scope of Environmental Audit

4.8 Environmental audit is not significantly different from other audits practiced by the SAI. The scope and limitations of environmental audit are accordingly circumscribed by the Regulations on Audit and Accounts.

4.8.1 Financial Audit: The primary purpose of financial audit is to verify whether the accounts are properly prepared, are complete in all respects and presented with adequate disclosures. Apart from the examination of books of accounts and financial statements for compliance with standards and rules, completeness, accuracy and disclosures, the audit will also focus on items affected by environmental matters, particularly liabilities, contingencies, commitments, asset impairments provisions etc. An environmental audit from a financial perspective is conducted to ensure that public funds were spent efficiently and for their intended purposes.

4.8.2 During an audit of financial statements related to environmental matters, the following issues will merit special attention:

- Initiatives to prevent, abate, or remedy damage to environment;
- Conservation of renewable and non-renewable resources;
- Consequences of violating environment laws, rules and regulations;
- Consequences of vicarious liability imposed by the government, courts etc.

4.8.3 Audit of financial statements and the establishment of its scope will find additional application in respect of the audit of Government Companies and Undertakings.

4.8.4 Compliance Audit: Compliance audit with respect to environmental issues will relate to providing assurance that governmental activities are conducted in accordance with the relevant laws, rules, notifications, regulations and standards as also policies and strategies[47]. Compliance with commitments made under International Treaties and Conventions will also need verification, where applicable. Governmental agencies concerned with environmental matters are legally obliged to exercise stringent oversight and control on specified sectors and human activities and the scope of compliance audit will extend to verifying the process adopted by them in fulfilling their statutory role. For instance, environmental audit from

[46] INTOSAI (WGEA); Environmental Auditing and Regularity Auditing
[47] For Broad Principles of compliance Audit, refer to Paragraphs 43 to 45 of Regulations on Audit and Accounts; CAG of India

compliance perspective can examine the enforcement of environmental regulations on toxic substances, the transportation of hazardous hospital waste, or the protection of endangered species. Auditors may also examine whether government activities are conducted according to relevant environment laws, standards and policies, both at the national and international levels[48].

4.8.5 Performance Audit: The most important aspect of the environmental performance audit is to ensure that the indicators of environment-related performance fairly reflect the performance of the entity and that the environment programmes do yield value for money. The performance audit will also provide credible assurance on the performance of the entity with regard to compliance with established law, rules, regulations and standards. The adequacy or absence of legal and other instruments to safeguard the environment will also be the subject matter of the examination. The strength and weakness of the government's policy framework to mitigate and adapt to global warming and environment degradation will also be analyzed, with the assistance of experts in the field, where called for.

4.8.6 The audit will also embrace a detailed examination of selected environmental programmes of the government and the agencies with a view to offer a fair and objective opinion on the level of their performance. The direct and indirect impacts of other governmental programmes on environment would also be subject to review. Availability and the level of efficiency of an Environment Management System (EMS) and its compatibility with national or international standards[49] should be tested as part of the exercise. Finally, from performance perspective, environmental audits may embrace audits of environmental indicators, programmes, and policy decisions to see if those activities were completed economically, efficiently and effectively.

(v) Coverage and Evaluation of Policy Matters in Environmental Audit

4.9 In environmental audit, often, analysis of government policies and strategies in the context of their adequacy, completeness, and facility of implementation becomes unavoidable. However, adequate caution should be exercised not to trespass the borderline to the political territory (policy)[50]; but the correctness of the information or inputs that were considered in framing the policy and the unintended impacts of the policy, including the feasibility of its implementation by co-relating to the programmes under the policy, could be brought to notice. Further, it must be remembered that analysis of policies will require the expertise and skills of outside experts or panels of specialists including scientists, legal experts and environmental specialists[51]. Further, SAI must not be seen as taking sides or being judgmental; a safer strategy would be to project the views of such experts and refer to credible and objective evaluations by widely respected outside experts and organizations.

[48] INTOSAI (WGEA): how to audit Multilateral Environment Agreements.
[49] International Standard Organization has set standards (ISO 14001) in this regard.
[50] Performance Audit Guidelines; CAG of India: section 1.25, page 7.
[51] Refer to Paragraph 173 of Regulations on Audit and Accounts, CAG of India.

(vi) Selection of Audit Criteria

4.10 Audit criteria refer to the established standards and indicators against which the performance of the entity could be evaluated. It denotes what the normative and 'best practice' performance level should be as distinguished from the current status. When the current performance of the entity is compared with the criteria, audit findings get generated. It is essential to identify reasonable and enforceable criteria *prior* to the audit in order that the audit may be conducted successfully. The two basic considerations for establishing the audit criteria are the type of audit to be carried out and the purpose and the likely source of the criteria. The criteria may be either 'authoritative' or 'persuasive'. The former provides the auditor with a reasonable amount of certainty as to the acceptability of the criteria as a sound basis for the audit while the latter will act as a guidance material and a source of persuasive thinking, though it may not have any statutory or legal mandate. Regulations on Audit and Accounts issued by the CAG will be authoritative criteria whereas the guidance issued by the ICAI may be used as non-authoritative, but persuasive criteria.

4.11 It would add to the credibility of audit findings if the entity is suitably notified of the audit criteria in advance, preferably at the entry conference. The basic criteria for environmental audit could be derived from article 48A of the Constitution of India, which enjoins that *'State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife in the country'*. The National Environment Policy and Strategies and Plans offer scope to develop appropriate audit criteria. Additionally, the objectives, parameters and performance indicators of environmental programmes and organizations offer scope to develop audit criteria. It should, however, be ensured that the adopted criteria are specific, auditable, measurable, reliable, and generally accepted.

Financial Audit

4.12 The audit criteria may include the following:

- Accounting standards issued by international bodies such as IFAC, IPAC, PSAB etc.
- Accounting standards issued by a national standard setting authority like the Institute of Chartered Accountants of India.
- Guidance notes issued by the above agencies or other professional bodies.
- Guidance issued by INTOSAI, ASOSAI, etc.
- SAI's auditing standards and guidelines.
- Judicial pronouncements relating to specific environmental issues related to the entity subject to audit.
- Directives and notifications of regulatory bodies responsible for environmental oversight under law.

Compliance Audit

4.13 The criteria for compliance audit will be subject-specific, apart from the following general items:

- National Environment Laws, Rules under them and Regulations.
- Policy documents and strategies issued by the Government.
- Notifications issued by the Government and the agencies under them.
- International Conventions and Treaties which have binding force.
- Standards issued by responsible bodies such as those for Environment Impact Assessments, ISO 14001 for Environment Management System, pollution control orders and standards issued by oversight and implementation bodies such as CPCB etc.
- Sanctions and permits issued in respect of the entity by the regulatory bodies concerned.
- EIA reports, consultant's certificates, reviews by independent organizations and NGOs etc.

Performance Audit

4.14 The criteria for performance audit may include:

- Performance indicators prescribed by law, government policy, orders and notifications, licenses, own management etc.
- Performance indicators used by similar entities or others engaged in similar activities.
- Environment laws and regulations of the country which will be relevant to the entity's activities.
- Standards issued by empowered bodies and organizations.
- Codes of professional practice and ethics issued by professional bodies.
- Opinions and advice of external experts and academics.
- International and multilateral treaties and agreements which may have tangential application to the activities of the entity.

(vii) Environmental Audit Planning

4.15 Like in all other types of audit, detailed planning is of crucial importance in environmental audit as well. Good audit planning is an essential pre-requisite for the efficient conduct of the audit and will contribute significantly for the successful and timely completion of the audit.

4.16 The planning for environmental auditing should begin with the collection of all required data and information about the selected topic (see next item), research on the background, status, visibility and auditabilty of the subject, and establishing the audit scope, objectives and audit criteria. Other aspects for consideration will include the materiality and risk perceptions (to the environment and for sustainable development), importance of the environment problem to be addressed and the magnitude of the intended effect on implementing the programme. The resource requirement will be another major issue; the audit team should have skillful professionals with sufficient knowledge of environmental issues, national and international developments in this regard and familiarity with the type of audit planned. Audit planning should also review the advantage of focusing on a single policy or entity or a basket of policies and associated issues in one audit.

4.17 It will be advantageous to prepare a detailed audit plan with information about the entity, its objectives and activities, funding pattern, information culled out from the Five Year Plan documents and administrative reports, budget documents, press reports and research papers if available, and performance indicators and the criteria for audit for the use of the audit team. The audit plan should have the following inputs:

- description of the environmental issues which would form the focus of the audit;
- description of the entity, its objectives, programmes, environmental commitments and obligations, funding, organizational structure etc,
- preliminary analysis of the programme under audit, progress of implementation, status, performance indicators and other criteria;
- audit objectives, scope, limitations and audit risks, if any;
- composition of the audit team, recourse to external resources and experts where applicable, audit period and schedule for field visits;
- suggested areas for close scrutiny, documents and audit evidence to be checked, audit methodology (including interviews, questionnaires, statistical surveys) to be followed;
- details of previous audits, and evaluations by outside agencies including environmental experts;
- expected outputs of the audit with focus on environmental issues, and;
- reference to international and national/regional laws, regulations and conventions etc.

(viii) Gathering Background Information for Environmental Audit

4.18 There are several sources from which information on the subject/entity selected for audit could be obtained. These include:

- Five Year Plan Documents/Budget Documents (Outcome Budget).
- National Plan/strategy/financial policies relating to the environment governing the audited entity/project/scheme.
- Environmental clearances obtained by the entity from government agencies/regulatory authorities/environment policy of the entity.
- Rules and regulations governing the entity relating to environmental compliance.
- Annual Performance Budget of the entity/Annual Administrative Reports.
- Internal audit reports of the entity/evaluation reports by external experts, if available.
- Commitments and assurances provided by the entity to government agencies, regulatory bodies etc.
- Materials from civil society organizations, peer review reports, media reports, academic reviews etc.

(ix) Selection of Topics

4.19 Primarily there are three types of organizations and institutions which are subject to audit:

a) Those whose operations directly or indirectly affect the environment; positively or negatively.

b) Those with powers to make or influence environment policy formulation and regulation;
c) Those with powers to monitor and control the environmental actions of others.

4.20 A comprehensive knowledge of the environmental issues and sustainable development with particular reference to the regional and national perspectives will enable the audit office piloting the audit programme to prioritize the topics of audit. The field to be covered in environmental audit being vast, several options may be available. However, in order to optimize the limited resources, a careful choice from the available options will need to be made at the planning stage.

4.21 To start with, the audit office piloting the environmental audit should build a comprehensive library of information and construct portfolios on all important topics related to environmental degradation and climate change. Thrust areas should be identified through risk analysis, materiality and visibility. The feasibility of influencing the policymakers and subscribing to good governance through the audit process should be kept in view. In other words, the audit office 'should take care in selecting and scoping an audit of a government environment programme taking into account of the performance risks that the audit would address, materiality and auditability. For this purpose, the auditor will need to have a firm grasp of the programme objectives and the instruments used to address them[52].

4.22 Another important issue to be kept in mind in the selection of the subject for audit is the need to consider the holistic impact on the environment and to address the accountability process at various levels in the government. This would call for testing the adequacy of the information and control system and the availability of an efficient evaluation and reporting system within the government departments and their agencies. The following issues would sum up the requirements:

- the risk & materiality, resources involved, importance of the programme, magnitude of intended effects;
- intended and achieved overall results;
- availability of audit criteria, especially where there are no statutory requirements;
- feasibility of comparing results with best management practices, and parallel management practices;
- data availability (clear, reliable, relevant and appropriate).

4.23 In the case of autonomous bodies and companies, the selection of financial statements for environmental audit will have special significance. Audit of compliance with international treaties and conventions is a sensitive issue and will need careful consideration at the highest level before it is selected for audit.

[52] INTOSAI (WGEA): Guidelines on Conducting Audit with Environment Perspectives.

(x) Selection of the Audit Team

4.24 Although environmental audit is similar to other forms of audit, the selection of the audit team requires careful consideration. The following attributes are expected of environmental auditors:

i) Adequate knowledge in all aspects of auditing and capability to carry out financial, compliance and performance audits. In other words, the team should have a mix of different professional expertise.
ii) Comprehensive knowledge of environmental and climate change issues.
iii) Adequate knowledge of environmental auditing acquired through training followed by practical experience.
iv) An independent and unbiased approach, with aptitude for research.
v) Being an emerging and expanding field of audit, inclination to develop and apply new techniques and methodologies to assess the environmental related performance of the entity, by drawing experience from elsewhere.
vi) Good human relations and communications skill.

(xi) Environmental Audit Methodology and Process

4.25 Environment Audit is not significantly different from other audits and the audit methodology adopted by the SAI in the ordinary course would embrace environment audits as well. However, the audit methodology for each audit will depend on the established objectives and the type of the audit to be carried out. For instance, in a financial audit, the audit attention may be devoted to the disclosure of environmental assets and liabilities, while in the compliance and performance audits, the emphasis and the methodology will focus towards the compliance with legislation and conventions, both national and international, as well as to measures instituted by the audited entity to promote economy, efficiency and effectiveness[53]. A prime issue for inclusion in the methodology would be the examination of whether the entity has used valid and reasonable environment performance measures, which could be depended on in the audit.

4.26 Since the audit will not cover all entities involved in a particular environmental activity, it will be necessary to design a methodology that will allow drawing supportable conclusions about how a given function or activity is implemented nationally or in the State concerned. Interviews, document and file searches, data verification, analysis etc. may be used as part of the methodology, duly supplemented with field audit, standard questionnaires, statistical sampling etc.

4.27 Entry and Exit Conferences: Entry conference provides an opportunity to clarify to the management of the entity the audit objectives, the criteria adopted and the audit plan, along with the methodology being followed. In view of the technical nature of the activities of the entity, it is not uncommon for the entity officials to raise apprehensions about the

[53] Guidance on Audits of Activities with an Environment Perspective (2001)

competence of the audit team to conduct environmental audit of their activities. The entry conference could be effectively used to dispel such doubts. Appropriately, the audit team leader may give a presentation of the audit plan, highlighting the scope, audit objectives, audit criteria, test programmes, duration of the audit, and the locations where the audit would be conducted[54]. The entry conference will help to secure the entity cooperation for the audit. The Performance Audit Guidelines of the CAG of India may be referred to for details.

4.28 Similarly, at the end of the audit, the audit team may hold an exit conference to clarify to the management of the entity the major audit findings and conclusions arrived at and to seek expeditious responses to them.

4.29 Compiling Checklists: It would be useful to consolidate important audit issues, in line with audit objectives, in the form of checklists for the use of the audit team. This will also assist in ensuring that appropriate audit evidence is gathered and that conclusions against various audit objectives are logically arrived at.

4.30 Field Visits: Field visits should be planned well in advance and a list of documents and information required should be sent to the entity in advance. The entry conference may also be used to follow up the requirement. Field visits may be utilized to check the entity's compliance with environmental laws and regulations and the standards and emission limits prescribed for the entity, details of actions taken to control pollution/emissions, and fulfillment of the conditions subject to which the entity was granted permission to carry out its activities or the object for which it was established. The main focus of field visits should be to gather adequate, acceptable and material audit evidence to support the audit findings and conclusions. Audit evidence could be collected through written queries, questionnaires, interviews, photographs, testing of samples etc. Detailed examination of files and documents maintained by the entity in compliance with its own procedures, management systems and internal controls would offer convincing audit evidence.

4.31 Sampling: Various sampling techniques like random sampling, stratified random sampling, judgmental sampling, purposive sampling etc. could be used in the audit methodology. An example is the selection of a representative number of districts in a State to check the adherence to established rules and procedures and the extrapolation of the findings to the whole State.

4.32 General Issues for Consideration: The global nature of environmental matters must be kept in view in developing the audit methodology. The incompatibility of national regulations, if any, with the international practices which may inhibit the adoption of desirable standards could be verified by comparing with international conventions and practices. The methodology should be closely attuned to the objectives and the purpose of the entity being audited as also with the relevant laws and regulations. The need to point out lapses and shortfalls in legislation, regulations and standards should form part of the methodology.

[54] Implementing the Performance Audit Plan: Performance Audit Guidelines: CAG of India.

4.33 Environmental impact assessment is complex and auditors should rely on expert assessments in this regard, and provide for the same in the methodology. A starting point for such assessments could be the government's own assessments of the impact. The audit methodology may provide for verification of the compliance aspects with relevant regulations and implementation by the entity with environment requirements, as also the mitigation effects arising from such actions.

4.34 **Engaging External Experts**: Since environmental matters are technical in nature, and may involve divergent views among the experts themselves, their engagement for audit evidence should be designed with extreme care. Where such engagements are necessary, the experts should be sourced from scientific institutions with unimpeachable record, industry, government agencies, environment organizations etc. In appropriate cases, it may be useful to engage a panel of experts for advice rather than relying on one or two experts. In selecting the experts, the following attributes may be considered:

- educational and technical background;
- length of time he / she has practiced;
- relevancy of work experience;
- accreditation by professional body.

4.35 Ideally, auditors must look for their consensus in the matters referred to them, as also their concerns about the entity's policies and programmes. In order to provide a balanced view, it would be ideal to include factual information in the audit conclusions instead of being judgmental. Utmost care must be taken in drafting the audit recommendations since policy choices should be left to the entity to dwell upon rather than for the audit to recommend. Similarly, it would be advisable to rely on analysis carried out by the experts and other established organizations rather than attempting own analysis of impact assessments etc.

(xii) Audit Risks

4.36 Audit risks may include the following:

i) Challenge of the selected criteria on grounds of inapplicability, bias or inappropriateness.
ii) Challenge of the samples selected for verification.
iii) Doubts about the capability of the audit team in view of the technical nature of the audit.
iv) Doubts about the competence and independence of the external experts selected to support the audit.

4.37 Most concerns could be addressed by careful planning and communication. The entity should be advised of each and every aspect of the above at the beginning of the audit itself and any valid issues raised by it should be clarified appropriately at the entry conference or through appropriate interaction.

(xiii) Inclusion of environmental perspectives in other audits

4.38 In view of the increasing concerns of environmental impacts and global warming on the ecosystems, there is an apparent need to include environmental audits as part of the regular audits conducted by the SAI. This arises from the fact that organizing full scale environmental audits of every activity which impacts the environment may not be feasible as most human activities result in greenhouse gas emissions and contribute to global warming. Given the circumstances, it would be only appropriate to include the verification of environmental impacts as part of the regular audits by the SAI. For instance, in the course of the financial audits of public undertakings and autonomous bodies, the audit teams concerned may be required to verify whether the audited entity has conducted its due environment activity in compliance with all applicable legislations and regulations, and recognized and reported the environmental costs, liabilities and assets appropriately. Similarly, in the audit of manufacturing units (E.g., power generating company), the assigned regular audit team should invariably verify whether the entity has carried out an environmental impact assessment, adhered to the specified environmental obligations, have a proper system to control and mitigate pollution and put in place a system for waste management, etc. In other words, audit plans relating to all relevant activities of the SAI should include a section regarding environmental aspects for testing and verification by the audit teams, as appropriate.

(xiv) Audit Reporting

4.39 Audit reports should be complete, precise, accurate and balanced[55]. It should also include constructive and precise recommendations. If drafted and communicated cogently, audit reports could be persuasive and instrumental in inspiring the managements of entities to take corrective actions. The scope and the contents of the audit report will depend on the type of audit carried out. For instance, in the case of financial audits, the auditors should give attention to the fact that items affected by environmental matters, particularly liabilities, contingencies, commitments or asset impairment provisions, which are often complex, should be recognized and reported on in accordance with the Generally Accepted Accounting Standards. In cases of observed weak or insufficient internal controls, the reporting should include recommendations for improvement; but since these measures may involve significant costs for implementation, audit recommendations should be drafted carefully and subjected to review at an appropriate level. It is important to recognize that in order to encourage the audited entities to institute effective systems of internal environment control, the SAI should avoid using the findings and conclusions on their internal environmental controls to put the entities in a negative light[56].

4.40 In order to promote transparency and accountability in matters relating to environmental issues and management thereof, audit reports on compliance and performance audits may contain recommendations to the effect that government departments and agencies concerned should report impartially and regularly on their own

[55] Refer to "Characteristics of Good Report"; Paragraph 6.4 ; Performance Auditing Guidelines, CAG of India
[56] INTOSAI; WGEA: Guidelines on Conducting Audit with an Environment Perspective.

environmental performance and programmes (and violations and omissions, if they occur) to the legislatures concerned and for the information of the public, as appropriate.

4.41 *'Public auditors have to play an important role not only with timely, relevant and evidenced reporting, but also with constructive suggestions which enable public administration to tackle these (environment-related) concerns more effectively'*[57]. Further, contents of environmental audit reports should be easy to understand and free from vagueness or ambiguity, include information which is supported by complete and relevant audit evidence, and be independent, objective, fair and constructive.

[57] Key note address of Vinod Rai, CAG of India at the International Conference on Environment-Water Pollution, April,2010.

CHAPTER V

DETAILED GUIDELINES FOR FINANCIAL, COMPLIANCE AND PERFORMANCE AUDITS

Introduction

5.1 The Manual of Standing Orders (Audit) and the Regulations on Audit and Accounts issued by the CAG of India are to be followed as guidance material in conducting environmental audit. Further, the guidance of INTOSAI (WGEA) on specific aspects of environmental audits may be referred to, as appropriate. The following guidelines will supplement the above guidance.

(i) Financial Audit

5.2 As indicated earlier, the main objective of financial audit is to enable the auditor to express an opinion whether the financial statements subjected to audit have been prepared in all material respects in accordance with an identified reporting framework. Material respects can be directly linked to environmental costs, obligations, impacts and outcomes[58]. Further, according to the Regulations on Audit and Accounts (CAG of India), the primary purpose of financial audit is to verify whether the accounts are properly prepared, are complete in all respects and are presented with adequate disclosures.

5.3 The International Auditing Practices Committee (IPAC) defines environmental matters in a financial audit as:

- Initiatives to prevent/abate/remedy damage to the environment or to deal with the conservation of renewable and non-renewable resources. Such initiatives may be required by environmental laws and regulations or by contract, or they may be undertaken voluntarily.
- Consequences of violating environmental laws and regulations.
- Consequences of environmental damage done to others or natural resources.
- Consequences of vicarious liability imposed by law.

Based on these considerations, an audit opinion can be expressed on adequacy of compliance to the various national and adopted international financial regulations. The following environmental matters, *inter alia*, will find inclusion in financial statements:

- Obligatory items of expenses to be incurred by the entity under legal or regulatory directives and mandates. (Compulsory installation of a furnace oven to treat organic wastes in a hospital; installation of a coal dust precipitator in a power station).

[58] Environmental audit and Regularity auditing; INTOSAI (WGEA) (2004)

- Initiative to prevent, reduce and abate damages to the environment. (Effluent treatment plant in a process factory).
- Conservation of renewable and non-renewable resources. (Rainwater harvesting in a factory complex).
- Consequences of violation of environmental rules and regulations (Fine imposed by a SPCB on a factory for discharging untreated effluent into a lake).
- Consequences of vicarious liability imposed by a regulatory body (present owners being held liable for environmental damage caused by the previous owners).

5.4 Environmental audit of financial statements imply that the entities are not only accountable to its shareholders, but also to the society for the management and conservation of the environment in which it operates. It also implies the responsibility of the entity to disclose all environmentally related costs and liabilities for the information of the stakeholders. It must be borne in mind that the impact of environmental issues may extend to a longer timeframe than the accounting period and the entity should measure and quantify the related costs and disclose them in the financial statements appropriately. These may include the legal responsibility to recognize the impairment of environmental assets and to write down their value from time to time, obligation to control emissions and to manage wastes etc., and the associated costs, energy costs in appropriate cases, environmental obligations for carrying on the business such as the conditional grant for mining activity and so on.

5.5 Often, the costs involved with the environmental obligations of the entity may be of indeterminate nature for given reasons and the accruing contingent liability would need disclosure. In appropriate cases, the entity may need to create a provision in the accounts to meet such liabilities. The audit team should identify all such cases and comment on any deficiencies noticed, in its report.

5.6 Questions which may be useful in the audit of financial statements are summarized below. As regards qualification of accounts based on issues given below, it would be necessary for the auditor to ensure that such requirements have been prescribed by the accounting standards and reporting framework being followed by the entity.

Sl. No	Area of Examination	Sl. No	Audit Enquiry
I	**Background Check**	1	Is the sector in which the entity operates prone to and known for a high level of pollution/environmental impact? Does it fall within the notified industries as per CPCB's notifications? Has the fact been disclosed in the statements?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
II	**Environmental Initiatives and Activities**	1	Has any reliable assessment of the level of greenhouse gas emissions/generation of wastes/extent of pollution of the environment attributable to the entity's operations been made? Are the actions taken by the management to mitigate/abate the environmental impacts adequate? Has the sanctioning authority reviewed the same and given its approval? Have the costs for the same assessed properly?
		2	Was the entity legally required to carry out any EIA prior to starting its operations? Was it carried out? And was the cost thereof reflected correctly in the financial statements?
		3	Did the entity apply for and obtain environmental clearance, as required under the relevant laws and regulations? What were the conditions subject to which the clearance was granted?
III	**Capital Costs for Environmental Safeguard**	1	What was the cost of meeting its environment obligations as per the project report/EIA report? Was it adequate to meet the actual requirement?
		2	If any equipment/machinery has been installed for conservation of renewable/non-renewable resources have the due expenses been brought into the financial statements and clearly recorded as relating to environmental expenses?
		3	What was the actual cost and was the full cost reflected in the accounts?
IV	**Environment-related Operational Costs and Savings**	1	Has the entity taken action to measure and quantify the pollution level, emission level etc. during its construction and operations separately and quantify the same?
		2	Is there an annual operating cost attributable to the environmental obligations of the entity and are such expenses clearly and distinctly recorded in the accounts?
		3	Has the entity carried out periodical energy audits and taken measures to conserve energy? Has the entity quantified and disclosed the extent of savings and the resultant reduction of the environmental impact in the accounts?
		4	If there is environmental asset impairment of the entity due its operations, is this reflected in its accounts clearly and adequately?
V	**Contingent/Vicarious Liabilities**	1	Is there any vicarious environmental liability arising from a court decision, regulatory order etc., which is to be borne by the entity and has this been reflected in the financial statements?
		2	Is there a contingent liability arising from the entity's environmental obligations and is it disclosed properly and adequately in the statements?
		3	Is there any judicial or regulatory order which creates a current or future liability on the entity which needs to be disclosed in the accounts?
		4	Has the entity made adequate provision in the financial statements to meet its future and contingent environment liabilities?

(ii) Compliance Audit

5.7 The objectives of environmental audit, according to the Manual of Standing Orders (MSO) (Audit) issued by the CAG of India are to ensure that appropriate and adequate policies and procedures are in place and duly complied with in order to achieve the goal of sustainable development. According to the MSO, regularity and compliance audit on environmental matters would extend to the examination of the EIA procedures of the Central Government, compliance with related government legislation and regulations. According to the Regulations on Audit and Accounts also, compliance audit examines transactions relating to expenditure, receipts, assets and liabilities of the government for compliance with applied laws, rules, regulations and instructions issued by the competent authority either in pursuance with the provisions of law or by virtue of the powers formally delegated to it by a superior authority.

5.8 Compliance audit embraces the following aspects[59], among others:

i) attestation of financial accountability of accountable entities, involving examination and evaluation of financial and other relevant records;
ii) attestation of the financial and environmental accountability of government administration;
iii) audit of related systems and transactions including an evaluation of compliance with applicable laws and regulations;
iv) audit of internal control and internal audit functions;
v) audit of the probity and propriety of administrative / environmental related decisions taken within the audited entity;
vi) report of any other matter arising from or relating to the audit that, according to the auditors, would merit disclosure.
vii) audit of compliance with the objective of providing assurance that the activities of the government agency subjected to audit are conducted in accordance with the relevant environment laws, regulations, standards and policies at the central and state governments' level.

5.9 Compliance audit of environmental matters and agencies will not only assist governments to facilitate compliance with their own primary and secondary legislations, but also will provide assurance of compliance with them. It will also reduce the risks and cost of non-compliance with established laws, regulations and rules apart from helping to reduce or eliminate minimizing wastes.

5.10 The audit methodology will vary according to the nature and objectives of the audited entity; but the following questionnaire may be useful in regularity/compliance audit:

[59] INTOSAI (WGEA): Environmental audit and regularity Auditing (2004)

Sl. No	Area of Examination	Sl. No	Audit Enquiry
I	**Objectives and Mandate**	1	What are the objectives of the entity? Are they clearly established?
		2	Are there clearly specified orders and notifications empowering the entity with its entrusted/delegated powers and duties?
		3	What is the organizational set up of the entity? Is it adequate to meet the liabilities and obligations of the entity? If the entity is an implementing agency, has it created an enforcement arm to monitor and follow up its supervision and oversight responsibilities?
		4	Are the laws, rules and regulations related to the entity and the powers and sanctions issued in its favor by the government adequate? Are they sufficient to enable the entity to carry out its objectives and tasks efficiently?
		5	Has the entity established proper systems and procedures to pursue its environmental obligations and to translate its objectives into action?
II	**Strategy Analysis**	1	Does the sector/area in which the entity operates entail any special environment risks and scope for high pollution levels or require special considerations?
		2	Is there a plan of action or strategy document to pursue and implement the objectives of the entity?
		3	Has the entity developed adequate standards and procedures to accomplish its objectives and are they really efficient and viable?
		4	Has the entity developed indicators and indices to measure and monitor the performance of the units under its surveillance/jurisdiction? Are they reasonable and workable?
		5	Are the outcomes expected of the entity and included in its Outcome Budget clearly specified and achievable?
III	**Funding & Budget**	1	What is the source of funding for the entity? Is it required to collect fees, cess or charges? Are there proper systems and procedures to realize them?
		2	Is the budget of the entity prepared efficiently and is it generally adequate to meet its environmental obligations and tasks?
		3	Does the entity generally overspends or spends less than its allocation and reasons for both?
IV	**Environmental Management System**	1	Is there an environmental management system of acceptable level and size within the entity?
		2	Is there an appropriate and reliable environmental reporting system which will meet the requirements of the entity?
		3	Is the system for issuing licenses (if applicable) and permits for controlling the emission/pollution level etc. well designed? Is there any scope for misuse or misapplication in the management of such functions?
		4	Does the entity keep track of the environmental sanctions issued by it/other government agencies and take remedial action if misuses or violations are noticed?
V	**Performance Reporting**	1	Is the entity required under the relevant law, regulation etc. to submit periodical environment performance reports to the government/legislature/international agencies? Is the reporting system satisfactory?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
VI	**Internal Control System**	1	Is there a suitable control system to ensure that the entity's operations achieve the intended purpose?
		2	Does the entity carry out risk analysis in accordance with specified schedules?
VII	**Enforcement Machinery**	1	Is the enforcement system in position designed to meet the environmental objectives of the entity? Does it provide for regular verifications and physical monitoring?
		2	Are the penalties for violation of the environmental conditions and breaches of rules and regulations stringent and effective?

(iii) Performance Audit

5.11 The techniques to be applied to performance audit of subjects relating to sustainable development and environment management are generally similar to those applied to the audit of other sectors. However, the audit will cover distinct areas, namely, programmes and activities in the context of explicit commitments arising from or related to international treaties and conventions, followed by those relating to national environment policy, legislation and strategy. Additionally, the performance audit of development projects should address the environmental impacts[60] of such projects and associated issues distinctly, apart from verifying their value for money aspects. The Performance Audit Guidelines also emphasize the need to address whether environmental concerns were given due consideration in formulating programmes and whether timely steps were taken to address them with due regard for economy, efficiency and effectiveness[61].

5.12 Performance audits of environmental matters may include, among other things, the following:

- audit of government's/agency's monitoring of compliance with laws;
- audit of government's environment programmes;
- impacts of other programmes on environment;
- audit of environment management systems; and,
- evaluation of proposed/in situ environmental policies and programmes[62].

5.13 The scope for performance audit of environmental issues being vast, a careful selection of the subject for audit would help the SAI to make the best use of its resources and contribute to good governance. Several such audits have already been carried out in India and in other countries. The auditors specializing in environmental audit would do well to go through them and familiarize themselves with the performance audit reports from such sources. A selected list of recommended reports for reading are attached at Annex II.

[60] The Manual of Standing Order (Audit) (Paragraph: 3.19.4) issued by the CAG of India defines Environmental Impact Assessment (EIA) as a useful aid for decision-making , based on an understanding of the environmental implications, including social, cultural and aesthetic concerns, which could be integrated with cost-benefit analysis of projects. The objective of EIA is to identify and evaluate the potential beneficial as well as adverse impacts of development projects on the environmental and ecological systems.

[61] Performance Auditing Guidelines : CAG of India; Sustainable Development: Paragraph:2.25

[62] Guidance on Audit Activities with an Environmental Perspective: INTOSAI (WGEA): 2001.

5.14 The methodology and approach to audit will depend on the area for audit selected on each occasion. However, the following questions of general nature may be helpful.

Sl. No	Area of Examination	Sl. No	Audit Enquiry
I	**Strategy**	1	Is the government/agency clear in its objective regarding it's the role and responsibility for the specified area of environmental conservation?
		2	Has adequate analysis of the available alternatives (regarding conservation of the selected area of environment) been carried out involving experts and all stakeholders in environmental matters including the civil society?
		3	Are there any international conventions and treaties which place obligations and commitments on the government/agency for compliance and reporting? Have they been built into the strategy appropriately?
		4	Does the strategy take into account the policy and actions required to be taken on long term/medium term basis?
		5	Is the strategy sound in all respects and developed with well-defined objectives, plans and targets?
		6	Is there a general consensus among the experts about the wisdom, enforceability and merits of the strategy?
		7	Does the strategy look at the environmental issues on a holistic manner and factor in the closely associated issues for environmental safeguard?
II	**Law, Regulations and Rules**	1	Is the legislation related to the subject comprehensive, and considered to be adequate to meet the requirements?
		2	Do the law/rules/regulations take into account national commitments and the current strategy adequately?
		3	Do the law/rules vest adequate authority on the entity/agency responsible for the implementation/monitoring/oversight of the environmental action to carry out its tasks efficiently?
		4	Are there any clause or provision which may be ambiguous and need updating in line with international/scientific current thinking?
		5	Does the laws/rules vest with adequate enforcement authority to guard against violations by entities granted licenses and permits?
		6	Do the provisions in the enactments for creation of implementing/enforcing agencies and authorities meet the actual requirements?
		7	Does the relevant subordinate legislation provide sufficient authority to the agency/entity to discharge its responsibility competently?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
III	**Policy, Planning and Implementation**	1	What is the spelt out policy objectives of the government/agency for environmental safeguard?
		2	Is the policy in line with the environment strategy of the government and the national/international commitments?
		3	Does the policy bring out the government's targets and goals and the methodology for implementation, along with timelines clearly?
		4	Does the policy framework have a definite plan of action?
		5	Is the policy supported with an efficient planning and monitoring mechanism?
		6	Does the policy planning instrument take into account the resource requirements and expected outputs and outcomes?
		7	Does the policy planning consider alternatives and select the best available?
		8	Are the performance indicators in position? Are they clearly and precisely developed?
		9	Are the costs of inputs estimated with accuracy? Is the cost of implementing the policy assessed in full?
		10	Are responsibility centers clearly defined? Are timeline for achievement of each task specified clearly?
IV	**Implementing/ Enforcement Agency/Entity**	1	Is the implementing agency identified and vested with clear responsibilities and powers?
		2	Is the design of the organization adequate to meet its tasks and obligations?
		3	Is the staffing pattern and availability suitable to meet the envisaged requirements?
		4	Is the agency entitled to sanction permits that limit the quality and concentration of pollutants/emissions which will be discharged? Is the entity equipped to carry out the task efficiently?
		5	Is monitoring the levels of pollution/emission part of the entity's responsibility? Is the entity tasked to monitor the compliance of licensees with the issued permits? Does it have the expertise, staff and equipments to carry out the monitoring regularly and effectively?
		6	Have the entity established appropriate, efficient and clear rules and procedures for the issue of permits and for verifying and reporting compliance with rules, permits etc?
		7	Is the entity vested with adequate powers to enter premises of licensees and monitor the compliance with permits etc. and to take action for violations if any?
		8	Is the monitoring system regular and efficient?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
		9	Is there a proper monitoring and oversight mechanism to check against violations by permit holders etc?
		10	Is the monitoring system capable of locating and identifying potential breaches of environment restrictions by others than licensees and permit holders and to take suitable actions for such violations?
V	**Verification of Data and Information**	1	Is there a system to collect regularly the required data and information from all over the country/state/region, as required?
		2	Are the required data and information received regularly and in time?
		3	Is the reliability of the data verified independently through test checks? Alternatively, how does the entity/agency ensure the accuracy of the data and information received?
		4	Are the data and information recorded systematically and easily accessible?
		5	Is there a system to examine the data and information and analyze them for testing for efficiency of programmes/level of compliance etc? Are the results of such analysis reported to higher authorities/government?
		6	Are the data and information and results of analysis published periodically and put in public domain?
		7	Is follow up action taken to remedy/rectify any deficiencies and shortfalls found through the data analysis?
VI	**Value for Money Examination** ***(a) Economy***	1	Are the operations of the entity (including policy formulation, planning, and implementation and reporting) carried out economically?
		2	Is there a proper system of internal control to ensure that appropriate standards and norms are in position to set criteria for the economic operation of the entity's activities?
		3	Are there standards and norms tested against criteria/standards set by expert agencies to ensure that the operations are carried out economically?
		4	How are the achievements against targets monitored and evaluated periodically? Are they reviewed against established performance indicators?
		5	Is there a competent internal audit system in position? Are the reports of the internal audit reviewed at the highest level in the entity and action taken to remedy deficiencies reported?
	(b) Efficiency	1	Are activities broken into modules and sub-activities for facility of operation and monitoring?
		2	Are the performance targets and indicators efficient? How are they developed? Do they meet with approval of experts in environment science?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
		3	Are international and/ or national standards available for environmental safeguards in the related area? Have they been factored into in developing the indicators and targets?
		4	Was an environmental Impact Assessment (EIA) required to be carried out by the entity/licensee concerned under the law and regulations prior to or as part of the operation? Was it carried out efficiently?
		5	What were the findings and recommendations of the EIA?
		6	Was adequate action taken by those responsible to implement the recommendations satisfactorily?
		7	Did the entity/agency ensure that all required actions were taken on the basis of the EIA before issuing permits and approvals?
		8	Is follow up action including monitoring etc carried out regularly and efficiently to secure the policy implementation?
	(c) Effectiveness	1	Is the effectiveness of the policy implementation required to be monitored as per established standards/expert norms through independent studies and analyses?
		2	Do the regulation/standards define the measures of concentration/level of pollution/extent of achievements to be reflected through effectiveness analysis?
		3	How is the effectiveness of the environmental actions monitored by the entity? Are there established guidelines and are they precise and verifiable?
		4	Is the periodicity prescribed for verifying the effectiveness appropriate?
		5	Are the sampling methods, if adopted, representative and adequate to provide an unbiased view?
		6	Is there a proper system for rectification and follow up of the shortfalls and deficiencies, if noticed?
VII	**Reporting System**	1	Is there a proper system for reporting the results and achievements which lead to wide dissemination of information?
		2	Does the reporting system clearly lead to accountability norms within the organization?
		3	Are the periodicity and the objectives of the reporting system efficient? Are they submitted as per schedule and in time?
		4	Is there a peer review to verify the facts and statements included in the reports before they are submitted to higher authorities and public?
		5	Do the reports truly reflect the performance of the entity?
		6	Are the achievements and shortfalls compared with performance indicators and comparators?

Sl. No	Area of Examination	Sl. No	Audit Enquiry
		7	In case there are international commitments for reporting (UNFCCC) by the government, are they complied with efficiently?

SECTION: II

DETAILED GUIDELINES FOR THE AUDIT OF ENVIRONMENT AND CLIMATE CHANGE

TABLE OF CONTENTS

CHAPTER I

AUDIT OF BIOLOGICAL DIVERSITY

Introduction

1.1 Biodiversity is the living foundation of sustainable development. Protection of the species is a *sine qua non* for the continued sustenance and well-being of our future generations. An estimated 1.75 million species belonging to five categories, known as 'kingdoms', have been identified till now of which about 1.3 million belong to the animal kingdom followed by 0.27 million belonging to the plant kingdom. The rest are fungi, protoctists[63] and bacteria. We depend on biodiversity for our existence and sustained development, including for food, purification of air and water resources, and for multifarious economic resources and opportunities. Loss of biodiversity would lead to the extinction of species, loss of genetic diversity, and major changes in the way the ecosystems function. The most acknowledged threats to biodiversity include *habitat change (loss and fragmentation), invasive alien species or bio-invasion, overexploitation, pollution and nutrient loading, climate change and global warming*[64]. Other known threats include harmful agricultural methods, desertification, biopiracy and biotechnology etc. Human activities such as illegal hunting, poaching, destruction of natural habitats and over-exploitation over the last 50 years are responsible for the sixth largest extinction event in the history of Earth[65].

1.2 According to the Millennium Ecosystem Assessment (2005), "the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted. The loss of biodiversity, caused by habitat destruction, pollution, invasive species, illegal hunting, overexploitation and more, is occurring at rates unprecedented in human history,- at the global, regional and local levels. Humanity is, in essence, impairing the very foundations of our health and prosperity. Governments have a key role to play in reversing these trends and in protecting our national heritage. So do environmental auditors".

1.3 Biological diversity is closely connected to the ecosystems in which it survives. Loss of biodiversity can disrupt the way ecosystems function, making them vulnerable to shocks and disturbances, which makes them less resilient and less able to supply us with necessary resources. Ecosystems could be grouped as marine and coastal ecosystems, inland water ecosystems, forest ecosystems and dry land ecosystems. This categorization will help in organizing the audit of biodiversity as well.

[63] Algae and Protozoa are examples
[64] International Convention on Biological Diversity (1992)
[65] INTOSAI (WGEA); Auditing Biodiversity: Guidelines for Supreme Audit Institutions (November,2007)

Biodiversity in India

1.4 India is one of the 16 mega-diversity countries in the world, characterized by the high richness in species and the larger number of endemic species. Although we have only 2.4 *per cent* of the land area of the world, our country accounts for about 7-8 *per cent* of the recorded 1.75 million species in the world. The wide variety in its physical features and regional climatic variations have resulted in a diversity of habitats and ecosystems evolving within the country, such as forests, grasslands, wetlands, coastal and marine habitats and deserts. This variety and diversity will make the task of the environmental auditor fascinating as well as challenging.

Strategies and Policies for Protection of Biodiversity: International Treaties

1.5 There are several international treaties and agreements relating to biodiversity, which have been adopted and ratified by India. They offer useful audit criteria apart from providing a deep understanding of the conservation efforts across the world. A reference is invited to Chapter II of Volume I of this Manual in this regard. The Table below may be used in the planning of the audit of biodiversity; and the Treaties and Conventions as audit criteria, where appropriate.

Treaty/Convention	Year	Ratification by India	Subject Matter
Convention on Biological Diversity (CBD)	1992	1994	Conservation and sustainable use of genetic resources, species and ecosystems.
The Cartagena Protocol on Bio-safety under the Convention on Biological Diversity	2000	2003	Legally binding agreement governing the trans-boundary movement of Living Modified Organisms (LMO)
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1975	1976	Legally binding on participating countries. Framework to establish own legislation for implementing CITES.
Ramsar Convention (The Convention of Wetlands of International Importance, Especially Waterfowl Habitats)	1971	1982	Conservation of wetlands and resources.
United Nations Convention to Combat Desertification (UNCCD)	1994	1996	Promote effective action to limit desertification through local programmes and international cooperation
Bonn Convention on Migratory Species of Wild Animals	1979	1983	Conservation, management and wise use of migratory species of wild animals and habitats.
Convention for the Protection of World's Cultural and Natural Heritage	1972	1977	Protection and conservation of cultural and natural heritage.
International Treaty on Plant Genetic Resources for Food and Agriculture			The Treaty aims at recognizing the enormous contribution of farmers to the diversity of crops that feed the world; establishing a global system to provide farmers, plant breeders and scientists with access to plant genetic materials; and

			ensuring that recipients share benefits they derive from the use of these genetic materials with the countries where they have been originated.

Legislation on Biodiversity in India

1.6 The major legislations related to biodiversity in India include the Indian Forest Act (1927), Forest (Conservation) Act (1980), Wild Life (Protection) Act (1972), Environment (Protection) Act (1986), and the Biological Diversity Act (2002). These Central Acts are supported by several State Laws and rules and regulations, as required.

1.7 The Ministry of Environment and Forests (MEF) is the nodal ministry for protection and conservation of biodiversity; but there are several other ministries, departments, attached offices and subordinate offices which play a crucial role in the matter of management and conservation of biodiversity. One ministry which requires specific mention in this regard is the Ministry of Biotechnology.

1.8 Policies for biodiversity management include the National Forest Policy (1988), the National Conservation Strategy and Policy Statement on Environment and Development (1992), National Policy and Macro-level Action Strategy on Biodiversity (1999), the National Wild Life Action Plan (2002-2016), and the National Environment Policy (2006).

1.9 Among the various enactments mentioned above, special mention needs to be made of the Biological Diversity Act (2002). This was enacted to give effect to the provisions of CBD including regulation of access to biological resources and associated traditional knowledge by foreign individuals, institutions and companies so as to ensure equitable sharing of benefits arising out of their use. All matters related to this will be decided by the National Biodiversity Authority (NBA) established under the Act whereas similar issues relating to nationals will be dealt with by the State Biodiversity Boards (SBB). State Governments are required under the Act to set up Biodiversity Management Committees to promote conservation, sustainable use and documenting of information and knowledge related to biodiversity through People's Biodiversity Registers.

1.10 The Wildlife (Protection) Act (1972) aims to provide protection to wild animals, birds and plants and create a network of ecologically important protected areas. It also empowers the Central and State Governments to declare designated areas as a wild life sanctuary, national park or closed area, with a blanket ban on industrial activities in such areas. The Act provides for stringent penalties for violation of its provisions, including illegal hunting, trade in wild animals and species etc.

1.11 Forest (Conservation) Act (1980) is a seminal legislation which has been generally successful in conserving the forest resources in the country, ever since its promulgation. The Act restricts de-reservation of forests or use of forest land for non-forest purposes. It

also rightly takes away the rights of state governments to de-reserve forest lands or their assignment by way of lease or otherwise.

Strategies and Policies for Protection of Biodiversity in India

1.12 The National Forest Policy (1988) aims to ensure environmental stability and ecological balance for sustainable development. The Policy targets that one-third of the land mass of the country should be brought under forest or tree cover, along with two-thirds of mountainous regions to be brought under that category. Under the Policy, a programme for the afforestation of degraded forest lands and other areas by involving all stakeholders, including the local communities, have been mooted.

1.13 Forest coverage in India is being monitored by using remote sensing and satellite technology and the findings in the recent years have been encouraging since the overall canopy has reportedly been on the increase.

1.14 The National Environment Policy (2006) is another major policy instrument to be noted as an eligible audit criterion. The Policy professes that the most secure basis for environmental protection is by ensuring that people dependent on identified resources obtain better livelihood from the effects of conservation than by degradation of resources. In other words, human beings are at the centre of concerns for sustained development and are entitled for a productive and healthy life in harmony with nature.

Conservation Efforts in India

1.15 Protection of biodiversity is the responsibility not only of the governments, but of all citizens as well. Several schemes and practices are employed for the protection of biodiversity including creation of protected areas such as national parks and conservation areas. These are referred to as *'in-situ'* conservation, which is the 'conservation of the ecosystems and natural habitats and the maintenance and recovery of viable population of species in their natural surroundings'. As against this, '*ex-situ*' conservation is the conservation of components of biodiversity outside their natural habitats, and includes zoological parks, botanical gardens, gene banks etc.

1.16 India has a total of over 600 declared Protected Areas under *in-situ* conservation through a network of National Parks (96), Wildlife Sanctuaries (509), Important Bird Areas (IBA) and Conservation Reserves (03). The Eleventh Five Year Plan has proposed a centrally sponsored scheme known as the *'Integrated Development of Wildlife Habitats'* outside the protected areas as an additional measure. Another significant scheme is the establishment of 16 *'Biosphere Reserves'*, aimed at the conservation of representative ecosystems, four of which have been recognized by the UNESCO.

1.17 Further, the Scheduled Tribes and Other Traditional Forest Dwellers' (Recognition of Forest Rights) Act, 2006 aims at conservation through people participation. The Coastal

Zone Regulation Rules, 1991 under the Environment (Protection) Act, 1986 is another landmark regulation towards the protection and conservation of coastal zones and protection of marine-based biodiversity.

Guidelines for the Audit of Biodiversity

1.18 According to INTOSAI (WGEA), an audit that touches on ecosystems, watersheds, forests, agricultural practices, marine environments and other such topics could be considered an audit of biodiversity. The checklists and audit queries given in the following table may be used in the audit of biodiversity-related topics in addition to the general guidance provided in Section I of these Guidelines.

Sl. No	Area of Audit Examination	Sl. No	Audit Checklists
I	**Assessment of Biodiversity Resources**	1	Has the Government made a *reliable and scientific assessment* of the biodiversity (BD) resources in the country? Is the assessment readily accessible to stakeholders?
		2	Does the Government or an entrusted agency (e.g. Central Statistical Organization) prepare annual Natural Resources Budget/Accounts as contemplated in the National Environment Policy? Are these accounts comprehensive and based on extensive research and current?
		3	Does the Government carry out *comprehensive and periodical threat analysis to identify the risks and dangers to species of all types*? What are the major findings? Have the findings been appropriately classified and registered for possible mitigation efforts? Are proposals for mitigation in place? Are they well-designed?
		4	Is there a system of identifying all *endangered species* across the country, listing them out for conservation measures, public education and research initiatives? Does the entrusted agency monitor the status regularly, and plan remedial/mitigation activities by involving all stakeholders?
		5	Is there a system to collect *traditional knowledge* on biodiversity from local communities and to register them appropriately?
II	**Review of Legislation and Treaties**	1	Does the National/State legislation on biodiversity cover all essential BD conservation issues? Was the effectiveness of the law tested in courts of law and guarded against any loopholes?
		2	What is the *extent of commitment of the Government for conservation* incorporated in the law? Are they being followed up through strategies and plans?
		3	Is the law in line with the country's commitments and obligations under relevant *international conventions and treaties* (such as the Convention on Biological Diversity) to which it is a party?
		4	Are the commitments in respect of international treaties (e.g., Reporting to CBD Secretariat periodically) being fulfilled regularly?

Sl. No	Area of Audit Examination	Sl. No	Audit Checklists
III	**Strategy and Action Plans/ Government's Response to Threats**	1	Has the Government at the Central/State level prepared a strategy, in consultation with experts on BD and the affected local community, for the protection and sustenance of biodiversity resources in the country?
		2	Is the strategy followed up with suitable action plans and programmes by including in the Five Year/Annual Plans?
		3	Does the action plan and regulations framed under the law include, in particular, *the need, principles and procedures for Environment Impact Assessments (EIA)* of relevant industrial and development projects and programmes?
		4	Do the strategy/action plans provide for incentives and charges to encourage/stimulate biodiversity protection by project sponsors and corporate entities? Are performance indicators and targets for achievements included appropriately in the plans and programmes?
		5	Have the Government/entrusted agencies categorized industries and activities with reference to their potential for pollution and likely impact on the degradation of biodiversity, for necessary mitigation activities and limiting the likely damage?
		6	Are biodiversity issues and conservation programmes essentially factored into the Governments' other development plans?
IV	**Implementing Agencies and Responsibility Centers**	1	Has the Government identified and notified the *responsibility centers and agencies liable for the implementatio*n of its biodiversity policy?
		2	Are these organizations adequate to meet the requirement? Are the *organizational structure and the allocation of duties* logical and administratively efficient?
		3	Are there sufficient *legally binding orders and notifications* delegating the required powers and tasks for protection of biodiversity to these bodies?
		4	Have the Government/responsible agencies issued *environment standards and norms* for the conservation and protection of biodiversity, as required?
		5	Has the Government drawn up clear and transparent schemes and rules for the *restoration and development* of endangered species?
		6	Are there *adequate and effective coordination and interaction* between the Central/State/Local Administration in carrying out the tasks related to the conservation of biodiversity?
V	**Monitoring and Evaluation of Biodiversity Conservation Programmes**	1	Have specific and designated agencies/ organizations been tasked *with regular monitoring of the threats to biodiversity from all sources* and reporting the status to the Government?

Sl. No	Area of Audit Examination	Sl. No	Audit Checklists
		2	Is there a system of regular *monitoring and evaluation* of the progress of the various schemes and programmes for biodiversity conservation? Are they effective?
		3	Are independent agencies involved in such evaluations?
		4	Is the reporting on such monitoring and evaluations *timely and efficien*t? Is prompt and effective action taken on the findings?
		5	Are there any cases of action taken by the government on violation of biodiversity conservation rules/programmes?
VI	**Funding and Staff Adequacy**	1	Has the government provided adequate *budget provisions and funding* to the entrusted agencies to meet their reasonable requirements of programmes and projects in order to complete them on time and effectively?
		2	Are the department/agencies *prompt and efficient in utilizing the allocation? Is there economy in spending?*
		3	Is the *outcome budget* prepared by the department/agencies efficient? Are they achieving their targets every year?
		4	In case the programme/activity has a segment for collection of revenue/cess etc., what is the level of performance?
		5	Does the organization possess *adequate technical and scientific staff* to carry out its assigned duties and tasks?
VII	**Public Awareness and Education**	1	Have the Government/agencies drafted a suitable *Public Education and Awareness Programme* to spread the message of biodiversity conservation and sustenance?
		2	Does the Programme seek to target all possible stakeholders? Was it developed by involving appropriate technical experts, media, and civil society organizations for the widest possible reach?
		3	Is there a system for receiving *periodical feedback* from the stakeholders, programme managers and evaluators on the Programme's efficiency and effectiveness?
		4	Are National Parks and facilities, which have wide reach to tourists, being used effectively to spread the message?
		5	Is the working of the Environmental Education Centers, (EEC) (including their objectives, terms of reference and overall functioning) of the expected standard and efficiency level?
VIII	**Efficiency in the Oversight of Implementing Legislations**	1	Is there an Environmental Redress System (ERS) in practice to *assess and repair damage* to environment and biodiversity, with established and appropriate procedures?
		2	Does the system provide for attaching the various feasible liabilities against defaulters without exception:–criminal, civil, fault-based etc?

Sl. No	Area of Audit Examination	Sl. No	Audit Checklists
		3	Does the implementation of biodiversity conservation policies and legislations encourage the *participation of the local communities?*
		4	Do the law/policy/programmes include *access to and utilization of local and traditional knowledge* on biodiversity matters?
		5	Are the sanctions against/penalties leviable for ingress into and illegal activities inside/ on the periphery of National Parks/IBA/ sanctuaries, and Protected Areas adequately stringent as to dissuade prospective violators?
		6	Are there special and adequate laws and rules to safeguard the requirements of *environmental hotspots* in the country?
IX	**Mainstreaming Biodiversity into Economic Sectors and Development Planning**	1	Are EIA studies mandatory for all major projects with likely impact on biodiversity? Is there an established procedure to review the findings and to ensure their proper consideration while granting project approvals?
		2	Does land-use planning policy and regulations integrate biodiversity considerations as an essential factor? Are the restrictions implemented stringently?
		3	Do the guidelines of the Government relating to policy and programme development in various sectors include biodiversity considerations and preservation measures?
		4	Do the Five Year/Annual Plans of the Government incorporate biodiversity concerns into the sectoral and cross-sectoral plans, programmes and policies in relation to trade, economy, land-use planning, and other related activities?

Audit of Forest Resources and Forest Management

1.19 The audit of conservation of forests and forest management forms an important element of the environmental audit. In addition to the guidelines given in the above Table, the audit enquiries given on the following page may be applied in the audit of forest conservation. The major threats to forest resources include deforestation, fragmentation, degradation, conversion into agricultural and industrial use, overgrazing, unsustainable management, illegal logging, introduction of invasive species, infrastructure projects such as roads, railways and hydropower projects, urban sprawl, and climate change[66].

1.20 The National Forest Policy (1988) lays emphasis on environment stability and maintenance of ecological balance, with stakeholders' active participation and sharing of benefits, and envisages that one-third of the total geographical area of the country should be brought under forests and tree cover. The Forest Survey of India undertakes forest cover mapping on biennial basis. Auditors should familiarize themselves with the policy and the

[66] INTOSAI (WGEA) : Auditing Biological Diversity : Guidance for Supreme Audit Institutions (November, 2007)

enactments relating to forest conservation and management, which have been given in Chapter III of Volume I of this Manual.

1.21 As mentioned above, under the Forest Conservation Act (1980), the powers of State Governments to de-reserve forest lands or permit the diversion of forest lands for any non-forest purposes have been severely restricted. Further, the Act and the Rules made under it make EIA studies compulsory when proposals for investments in projects involving forest lands are submitted. In cases where approvals are granted for such investments, however, compensatory afforestation on an equivalent area of non-forest land or twice the area of degraded forest land, as may be, is stipulated. The project sponsor is mandated to deposit the stipulated amount for such afforestation into a special fund created and managed by the State Government concerned. Based on the intervention of the Supreme Court in a pioneering judgment of 2002, a body named *'Compensatory Afforestation Fund Management and Planning Authority'* (CAMPA) has since come into being, aimed at pro-active management of compensatory afforestation funds. In fact, the vital importance of forest conservation had prompted the judiciary to impose stringent restrictions on the powers of the Executive in matters of diversion of forest lands for non-forest use; auditors would benefit substantially by perusing the relevant judgments as an input to the audit planning process.

Sl. No.	Area of Examination	Sl. No.	Audit Checklists
I	**Adequacy of Legislation**	1	Has the government enacted rules and regulations relating to conservation of forests and are these adequate to meet the purpose? Are they comprehensive and devoid of loopholes?
		2	Do the legislations meet the *country's/state's assessed needs and commitments under international conventions and treaties* to which it is a party?
		3	Does the government/entity *comply with the law, rules and regulations* in entirety and fulfill its obligations under the legal and administrative mandates satisfactorily?
II	**Assessment of Forest Resources and Identification of Threats**	1	Have the Government/entity made a *comprehensive assessment of the forest resources under its jurisdiction*? Is the system of periodical forest survey efficient and reliable? Does the satellite mapping support the findings?
		2	Has a *national/State-wise database* with appropriate format to include all forest resources (fauna and flora) been created? Is there a machinery to update it from time to time?
		3	Has the entity assessed the *threats to the forest resources from all possible sources* and analyzed them for initiating remedial actions? Has the Government identified the lacunae in the (erstwhile) policies and practices which may have led to the degradation of the forests in the past?

Sl. No.	Area of Examination	Sl. No.	Audit Checklists
III	**Strategies and Action Plans for Forest Conservation**	1	Are appropriate *strategies and action plans to meet the perceived threats to forest conservatio*n and sustenance in position? List out the measures such as National Parks, Protected Areas etc., and review their objectives, as also the strength and weaknesses which may impact the objectives.
		2	Do these strategies and action plans *get incorporated in the planning and budgeting* of the Government concerned and are they of adequate dimensions?
		3	Are appropriate bodies and agencies in position to implement the action plans and programmes?
		4	Is the implementing agency *adequately equipped with technical and auxiliary trained staff and materials* (vehicles, protective guards, weapons, communication facilities etc.) to carry out their tasks?
		5	Are the *sanctions and penalties envisaged for infractions of the law of sufficient severity and effectiveness*? Review a sample of such cases in audit (poaching, illegal logging, mining etc.) to assess their efficacy and effectiveness.
		6	Is there an *effective system of surveillance* in the forest area to prevent/detect illegal activities (poaching, mining, logging etc.) and take prompt actions against the offenders?
		7	Are the conservation programmes wide-based and include *restoration measures for degraded forest*s, re-forestation etc?
		8	Are the programmes devised taking into account the needs of the *communities dependent on the forest and by including provisions for facilities* such as alternate sources of fuel wood, fodder, grazing for their animals etc.? Do the programmes involve the participation of the local communities through the concept of '*Joint Forest Management*'?
		9	Are clear-cut instructions and directives in position to tackle *disasters such as forest fires and flooding* etc. in a time-bound and efficient manner?
IV	**Diversion of Forest Land for Non-Forest Uses**	1	Was any instance of *diversion of forest land for non-forest use* noticed? If so, did the department/agency comply with all stipulated conditions and rules both in letter and spirit, before sanctioning such diversion?
		2	Did the EIA of the project bring out any e*nduring damage to the ecosystem* and if so, what action was taken to safeguard the species before granting permission?

Sl. No.	Area of Examination	Sl. No.	Audit Checklists
		3	Was *compensatory afforestation* insisted upon before granting approval for the project? Has the calculation for the compulsory afforestation been made according to the established guidelines? Were the estimated cost and the money deposited into the CAMPA Funds adequate to meet the entire actual expenses of afforestation, future maintenance etc.? Was the funds released from CAMPA utilized for the purpose and within the stipulated time period? If reforestation was involved, was there monitoring of the actual reforestation done?
		4	Was there any *displacement of local tribal communities* as a sequel to the project approval? Did the approval include appropriate rehabilitation package for the affected people without impacting the forest resources?
V	**Protected Areas and National Parks**	1	Is the network of *Protected Areas and National Parks* adequate to meet the requirements of conservation and sustenance of all species and ecosystems which are facing or likely to face threats from various sources?
		2	In case expert opinions and scientific evaluations project the need for *expanding the network of protected Areas and Parks*, has the government initiated steps to establish them in time? Are these plans adequate and efficient?
		3	Are these Areas and Parks of adequate dimensions and size, as evaluated by scientists and technical experts, to meet the needs of the species concerned?
		4	Is the standard of maintenance and preservation of the Areas and Parks of the *required level and efficiency?* Is there a *mechanism to monitor their performance* (from the angle of protection and development of the species etc.) from time to time?
		5	How effective are the *actions being taken to counter illegal activities* such as mining, poaching etc. and to follow up any infractions?
		6	Is the machinery to *prevent/detect illegal trade in endangered species* efficient and effective? Review a few selected cases to ascertain the efficacy of the system.
VI	**Invasive Species**	1	Is there a machinery to identify the intrusion of *invasive species* into the forests and Protected Areas for taking preventive actions?
		2	Is *the information regarding such species shared* regularly with all stakeholders, including other countries?
		3	Is there an action plan (including research and monitoring) to contain/prevent *damage from the invasive species*?
		4	Are there adequate legislation/rules to prevent/control *import/export of invasive species* into the borders of the country?

Sl. No.	Area of Examination	Sl. No.	Audit Checklists
VI	**Forest Law Enforcement and Administration**	1	Is the agency entrusted with the implementation of forest-related enactments and programmes adequately equipped with requisite legal authority, resources and facilities for information-sharing with all stakeholders?
		2	Is the whole forest area appropriately classified into relevant categories through issue of legal notifications?
		3	Are the statutory and administrative provisions adequate to control illicit felling, illegal timber trading, and other offences such as unauthorized grazing, grass-cutting, collection of produces including medicinal, hunting and poaching etc?
		4	Is the machinery of forest administration adequate to prevent illegal mining of the forest area, and are the actions taken against offenders adequate and exemplary?
		5	Do the Pollution Control Boards play an effective role in preventing and arresting forest degradation?
		6	Are there any encroachments into the forest area? Have effective actions been taken to remove the encroachments and prevent recurrences?
		7	Does the agency coordinate with the local community to encourage the conservation of forests and to prevent threats to the forest resources?
		8	Is there a structured system of monitoring and evaluation of all programmes for conservation of forests and joint forest management?
		9	Are the R&D programmes to provide support for conservation efforts monitored and evaluated for their efficiency and effectiveness?
		10	Does the strategy include public education and awareness programmes about the need for conservation of forest wealth to safeguard environment? Are these implemented efficiently?

CHAPTER II

AUDIT OF AIR POLLUTION

Introduction

2.1 Air pollution is a major concern all over the world; more so for India, in view of the fast rate of industrialization and the increasing vehicle populations in our cities. Air pollution occurs when the presence of 'foreign' substances in the atmosphere is of such high concentration as would cause harmful effects to living organisms. The main cause of air pollution is anthropogenic, including emissions from industrial plants, especially thermal power plants, and motor vehicles, burning of fossil fuel for cooking and other purposes etc. Overpopulation, especially the high rate of urbanization, and the excessive and inefficient rate of energy consumption are also among the root causes for air pollution in cities.

2.2 Substances that are generally recognized as air pollutants include suspended particulate matter (SPM), carbon monoxide and carbon dioxide, sulphur oxides, nitrogen oxides, methane, ozone depleting substances such as CFC[67] etc. The visible symptoms of air pollution include smog and acid rains which are common in our cities and affect day to day life apart from causing injury to human health and means of transportation.

2.3 Use of industrial chemicals and pesticides such as DDT which are known as *'persistent organic pollutants'* (POP) also contribute to significant air pollution. These chemicals remain in the environment for several decades in view of their high stability and travel great distances, carried by winds, touching on oceans and water bodies, till they eventually gather in colder climates. The POPs affect the food chain through fish, birds and animals. POPs are carcinogenic in nature and could cause other health problems as well.

Effects of Air Pollution

2.4 Air pollution affects human health adversely in several aspects. Increase in the incidence of respiratory illness including asthma, bronchitis, emphysema and possibly cancer of the respiratory organs could be attributed to intense air pollution. For instance, the presence of lead fumes in vehicle exhaust gases and use of asbestos fibers as construction materials are known to be carcinogenic in nature. Inhalation of carbon monoxide, even in small quantities, may lead to asphyxiation or related problems.

2.5 Smog and the presence of harmful particulates in the air may also cause damage to vegetation and to agriculture. Particulates can also affect weather conditions by increasing the frequency of fog formation and rainfall.

[67] Chlorofluorocarbons

2.6 Quite like smog, acid rains, namely, rain, snow, or fog that is polluted by acid in the atmosphere could severely damage the environment. Acid rains are primarily caused by the presence of oxides of nitrogen and sulphur in the atmosphere due to the burning of fossil fuels. The effect of acid rains are wide and far between; it has damaging effect on human health, as well as animals and plants (especially those living in water bodies with which the contaminated rain water merges), and results in corrosion of minerals and materials which are exposed to the acid rains.

2.7 The worst effect of air pollution is the Greenhouse Gas (GHG) effect which leads to global warming and climate change.

Policies and Regulations on Air Pollution

2.8 There are several international conventions, treaties and standards on air pollution; India is a party to some of them. These include the Air Quality Guidelines issued by the WHO, the Helsinki and Oslo Protocols signed by European Union members. The Vienna Convention on the Protection of Ozone Layer (1985) and the subsequent Montreal Protocol on Substances that Deplete the Ozone Layer have established a legal framework aimed at the phased elimination of the use of harmful chemicals (e.g. CFC by 2010) by participating countries. The Male' Declaration on Control and Prevention of Air Pollution and its Trans-boundary Effects (1998) will also be useful criteria for the audit of air pollution in India.

2.9 The Air (Prevention and Control of Pollution) Act, 1981 is an important legislative measure aimed at the prevention and control of air pollution in India, framed in line with the proclamation adopted in the United Nations Conference on Human Environment (UNCHE), Stockholm, 1972. The Act mandates adherence to the emission standards to be set by the Pollution Control Boards, and provides for sanctions in case of violations by industrial units etc. Government has issued subsidiary rules under the Act which detail the procedures to be followed by the central pollution Control Board in the conduct of its business. Some other enactments which may be useful as criteria for the audit of air pollution are the following:

- The Environment (Protection) Act (1986) and Rules made there under.
- The Motor Vehicles Act (1988) and the Central Motor Vehicles Rules.
- The Environment (Siting for Industrial Projects) Rules, 1999.
- The Ozone Depleting Substances (Regulation and Control) Rules, 2000.
- The Noise Pollution (Regulation and Control) Rules, 2002.

Monitoring Air Quality and Pollution Levels

2.10 World Health Organization (WHO) has developed a database on air quality information that can be used to compare data across cities in respect of pollution levels. Further, it has also developed an Air Management Information System (AIMS) to share relevant information on the air quality in cities between participating countries. Monitoring and measurement of the concentration of pollutants in the atmosphere is essential to evaluate and design appropriate pollution control standards and systems. This could be done through air quality sampling techniques which would help to verify whether the established standards are being met, as also to forecast the possible pollution episodes in advance for adaptation measures. Sampling at the sources of the polluting agents such as the exhaust pipe of an automobile would help authorities to assess the levels of emission and to control it through appropriate regulations. In the audit of air pollution, the efficiency of air quality monitoring and evaluation should receive special attention. CPCB has set up the National Air Quality Monitoring Programme (NAMP) which is a nation-wide network consisting of 308 operating stations covering 115 urban agglomerations across the country. NAMP provides data and technical base regarding air pollution for the formulation of policies aimed at improving air quality for protecting public health and environment through constant monitoring and evaluation of air pollution status, trends, violations of standards, and the natural cleansing process such as dispersion, wind movements etc.

Guidelines for the Audit of Air Pollution

2.11 The audit of air pollution will be primarily a compliance and regulatory audit. The following checklist may be applied with suitable customization during the course of such audits.

Sl. No	Area of Examination	Sl. No	Audit checklist
I	**Assessment of the Pollution Levels**	1	Has the department/entity *assessed the level of pollution in the geographical confines* for which it is responsible? Has such assessment identified the level of the various components present in the atmosphere, with accurate estimation of each contributing particulate and element?
		2	What is the method followed for the assessment? Is it based on *established procedures*? If samples were collected, what are the techniques applied and were they *adequately representative*? Was the testing done as per the approved scientific practice and overseen by a designated expert?
		3	Did the analysis *identify the sources, nature, causes and locations* of the pollution?
		4	Did the assessment include the *quantum and type of pollution from each source* separately?
		5	Did the assessment include the quantum and the rate of *increase/decrease* in the pollution level from each source with reference to a base -line?

Sl. No	Area of Examination	Sl. No	Audit checklist
		6	Does the assessment estimate the *direct and indirect effects* of the pollution from each source/type on the environment, population, human health, animals and plants etc. for chalking out preventive measures?
II	**Application of Law /Rules/ Regulations**	1	Is the legislation/policy of the government adequate to *meet the requirements of prevention and control of air pollution* in the country/State?
		2	Do the law/rules *cover all possible sources and areas of air pollution* and are they comprehensive? Have they been tested in courts of law for ease and efficacy of implementation?
		3	In case there are *multiple agencies responsible for the implementation* of pollution control measures, is there adequate *coordination and interaction* between them so as to avoid omissions and loopholes in application?
		4	Are the *process and procedures for the implementation of the law, including the provisions for sanctions and penalties* for infraction of stipulated standards, stringent enough to have the desired effect?
III	**Standards and Norms**	1	Has the authority entrusted with the responsibility established *legally valid standards for emission/pollution levels* for each sector/ industry/category? How and on what considerations were they arrived at and how are they enforced? Are they updated periodically?
		2	Are permits and licences issued to applicant units limiting their emission levels only after *satisfying the technical parameters and the efficiency level of the technology installations* to control emissions and pollutions? Are they inspected periodically to ensure their satisfactory working?
		3	Is the agency authorized to control air pollution empowered with *adequate powers to enforce the law*? Is it adequately *staffed and provided with required equipments and appliances?*
IV	**Monitoring the Levels of Pollution/Emissions**	1	Is there an appropriate *network of agencies/sub-agencies to carry out the task of monitoring* the pollution/emission at micro levels?
		2	Is the monitoring mechanism to check pollution efficient? Are the *monitoring samples of polluting sources/units sufficiently representative* to derive accurate results in terms of the level of pollution?
		3	How are the findings and reports on pollution levels followed up? For instance, *is prompt action taken to penalize the units exceeding* the emission limits as per the rules?
V	**Macro Management**	1	Does the policy of the government provide for increasing *energy efficiency*[68] in all major sectors through concerted efforts?

[68] National Mission for Enhanced Energy Efficiency may be referred to in this regard.

Sl. No	Area of Examination	Sl. No	Audit checklist
		2	Does the policy aim at closing/modifying *existing highly polluting units* through a mechanism of incentives and disincentives?
		3	Is the *utilization of fly ash from thermal stations* being carried out as per the relevant enactments and the directives of the Pollution Control Board? Is this monitored regularly?
		4	Do the strategy and programmes include steps to promote *renewable forms of energy*[69]?
		5	Is the programme to encourage improved cooking methods in rural areas being implemented effectively?
		6	Is there a well-designed and efficient *public awareness programme* in place to create awareness of the injurious effects of air pollution and to control it through public cooperation and civil society participation?

[69] National Solar Mission is an example.

CHAPTER III

AUDIT OF WATER POLLUTION

Introduction

3.1 The objective of water management is to maintain adequate supplies of water of good quality for the entire population, adapting human activities within the capacity limits of nature, and combating vectors of water-related diseases[70]. For sustainable development, it is essential to ensure (i) adequate drinking water supply and sanitation for both urban and rural development, (ii) adequate water availability for irrigation purposes, (iii) protection of water resources, water quality and aquatic ecosystems, and (iv) integrated water resources development and management. The periodical assessment of water resources (including the evaluation of the impact of global warming and climate change on water resources) is also an essential requisite for sustainable development. Most of our cities and towns face acute water shortage, even aggravating to water famines (droughts) on a regular basis. Unfortunately, even in areas with plentiful rainfalls, the problem becomes acute during the summer months. Water shortages occur due to several reasons including overpopulation, excessive and unplanned consumption pattern, heavy pollution of water resources, indiscriminate use of groundwater resources, and above all, the inefficient and unscientific water management and water policy.

3.2 The magnitude of the problem is exacerbated by the fact that just about 2.5 *per cent* of the total volume of water on the earth's surface is fresh water, of which even less than one *per cent* is actually available for human use. Worse still, the available water is unevenly distributed across the world. In view of this and the increasing populations in urban conglomerations, the diminishing availability of fresh water for drinking, sanitation, agriculture and industrial purposes pause a huge challenge before the policymakers; this is especially so in the developing countries of Asia and Africa.

3.3 Water pollution affects all sources of water; surface water, ground water, onshore and marine water resources. Pollution can occur either directly (as when sewerage and other harmful substances are discharged directly into water bodies) or indirectly (when they are carried through transportation as in the case of pesticides from farmlands getting mixed with rainwater which flows into lakes and rivers). Another water-related issue is the excessive growth of aquatic plants and algae which clogs the waterways and block light to the deeper water layers when they are alive. They also use up the oxygen dissolved in the water when they decompose after they perish, thereby affecting water quality and the aquatic life. Other causes of water pollution include oil spills, and drips from automobiles and industrial units which ultimately find their way to water bodies. Mining is another source of water pollution as the process exposes metals and sulfur compounds, formerly locked away under the earth, to water bodies through tailings and rains. Rainwater leaches

[70] Agenda 21 of World Commission on Sustained Development (1992).

the metal compounds out of the exposed earth resulting in "acid mine drainage" and also transports the pollution from tailings. Chemicals and industrial processes also contribute heavily to water pollution.

3.4 According to a survey conducted by the Central Pollution Control Board, the ground water in 22 major industrial zones of the country was not potable because of the high elements of hazardous liquid wastes in them. The untreated discharge of sewage effluents into lakes, rivers and the sea also causes severe water pollution in cities and neighboring areas as also in coastal towns.

Effects of Water Pollution

3.5 Water-borne diseases such as diarrhea, typhoid etc., occur because of the presence of bacteria and parasites that are transmitted by polluted water, and are very common in cities and other overpopulated areas. Pollution also results in water-based diseases like schistosomiasis, which is wide-spread. Further, malaria is spread by mosquitoes, the larvae of which grow only in water. The toxins found in large water bodies and marine resources originate from pesticides and chemicals used for agriculture and untreated sewerage etc., and pass through fish and other marine products to people who consume them. Depending on the nature and properties of such chemicals, the adverse impact of water pollution may vary, and could be of disastrous effect. Moreover, the severe and different types of water pollution may lead to the gradual destruction of biodiversity itself, thereby impacting sustainable development.

Water Pollution in India

3.6 The estimated useable fresh water resources in India come to roughly 1090 kms^3 which is expected to meet the demand only till the year 2050. Though the country has some 45,000 kms length of rivers, the quality of water in most rivers and lakes do not even meet the 'bathing-quality requirement' standards and keep deteriorating continuously in the absence of remedial measures. Moreover, most rivers that depend on monsoon are devoid of even a semblance of flow of water in the summer months and get dry after the monsoon. With the expected rate of global warming and climate change and with the glaciers in the Himalayan Region melting at a very high pace, the endurance of the rivers originating from the Himalayas is also suspect. Additionally, the perennial discharge of untreated sewerages from cities and municipal areas[71] and industrial effluents from factories and establishments continue to pollute and destroy our rivers and water bodies.

Policies and Strategies on Water Pollution in India

3.7 The Water (Prevention and Control of Pollution) Act, 1974 and the Rules made under the Act provide for the prevention and control of water pollution in the country. There is also an enactment for collection of cess in the furtherance of the objectives of the Act. The

[71] According to Central Pollution Control Board, the installed capacity to treat waste water in the country comes to only 23 percent of the total of 17,600 million liters of waste water generated every day.

Act is to be read along with associated legislations including the Environment (Protection) Act, 1986 and the National Conservation Strategy and Policy Statement, the National Environment Policy and others.

3.8 Among the key water conservation programmes of the Central Government, mention needs to be made of the National River Conservation Programme, which includes the Ganga Action Plan (GAP), and other river action plans. The objective of these Programmes are to improve the water quality of major rivers of the country and has a wide coverage including pollution abatement works in 167 towns along the polluted stretches of 38 rivers located in 20 States. Another important scheme is the National Lake Conservation Programme (NLCP) which has similar objectives and is a Centrally Sponsored Scheme (CSS).

3.9 Central Pollution Control Board (CPCB) has established a nation-wide network for water quality monitoring comprising over a thousand stations in 27 States, to monitor the quality of water in surface water bodies on quarterly basis and groundwater resources on half-yearly basis. There are three levels of water quality monitoring carried out, namely, the Global Environment Monitoring System (GEMS), Monitoring of Indian National Aquatic Resources System (MINARS), and Yamuna Action Plan (YAP). Water quality is analyzed for the presence of several parameters and pollutants at varying lengths of periods; CPCB has also established standards for the discharge of effluents from industrial and chemical units into water bodies. Additionally, the Central Government has initiated a scheme to enable clusters of small scale industries units to jointly set up common effluent treatment plants to control pollution emanating from them. The CPCB / SPCBs also required monitor the level of pollution from the discharge of sewerage from municipalities and local bodies.

Guidelines for the Audit of Water Pollution

3.10 The following Audit Checklists are suggested for use in the course of the audit of water pollution.

Sl. No	Subject	Sl. No	Audit Checklist
I	**Assessment Evaluation**	1	Has the Government/agency *estimated the total fresh water resources available in its geographical confines*, from different sources such as rivers, lakes, groundwater etc separately?
		2	Has the water availability been *graded according to the level of purity/pollution level*, and type of resource/pattern of use?
		3	Has the government/agency estimated the *current and future water requirements* by correlating to the population growth, urban sprawl, agricultural and industrial requirements etc? As also the likely/ planned availability of the required quality of water?

Sl. No	Subject	Sl. No	Audit Checklist
		4	Have the Government/agency carried out *an analysis of the current and future risk perceptions* for water pollution and used the data and information for planning its strategy and programmes?
II	**Monitoring & Evaluation**	1	Has the government/agency established a *network to monitor water quality* at different locations and resources? Is this additional to the MINARS? Is its working satisfactory?
		2	Is the system of monitoring *reliable, and of adequate quality and standards?*
		3	At what *periodicity and from how many locations* are the samples taken? Is this adequately representative?
		4	Is the *quality analysis* done at well-equipped laboratories under proper guidance and supervision?
		5	Are the findings *reported in time* to the nominated authority responsible for the analysis and follow up actions? Is *the procedure followed* in regard to follow up actions appropriate and effective?
III	**Strategy/Policy for the Control and Prevention of Water Pollution**	1	Has the government established a *policy for wise and prudent use of water resources* by all consumers and to control and prevent water pollution?
		2	Is the policy followed up by *appropriate strategy and plans* including Five Year / Annual Plan Programmes?
		3	Are there sufficient legislations / rules / regulations in position aimed at the *conservation and protection of water bodies* and to preserve their quality?
IV	**Standards and Regulations**	1	Have the Government / the entrusted agency established *appropriate standards of water quality* covering all water resources? Are they comparable to national / international standards?
		2	Are there competent regulations to prevent / control the *discharge of untreated waste water and effluents* from municipal / industrial / chemical units into water bodies?
		3	Does the entrusted authority examine the proposals, layouts and plans of entrepreneurs from pollution angle before they are allowed to establish *manufacturing / processing plants*? Are strict control and prevention measures insisted upon, prior to the *grant of permissions,* to avoid pollution of water resources by such units?
		4	Do an entrusted agency / its representatives monitor the *presence / level of polluting agents and nutrients* in the discharge of effluents regularly to ensure the units' adherence to the permit conditions?
		5	Is effective follow up action taken in all cases of *violation of the permit conditions*?

Sl. No	Subject	Sl. No	Audit Checklist
		6	Are waste water/effluents *treatment plants a mandatory requirement* for specified industries and establishments of highly polluting nature?
		7	Have the government / agency initiated steps to encourage/ mandate the industrial units *which were in existence prior to the establishment of standards and regulations* to establish treatment plants and anti-pollution devices?
		8	Are there appropriate regulations in position to mandate the installation of waste water treatment plants in *all large buildings and commercial complexes*?
V	**Efficiency Rating**	1	Do the Government / agency monitor and review *the quality and availability of water from all sources* on a periodical basis?
		2	Has the water quality *improved* or *has it deteriorated over time* since the Government's water policy and strategy came into being?
		3	Are there any *independent studies and evaluations* relating to the quality and standard of water from different sources and what do they reveal?
VI	**Groundwater Resources**	1	Has the Government instituted a mechanism to control and regulate the *overexploitation of groundwater* resources by all users?
		2	Do the studies indicate the extent of *depletion of groundwater* and is it within acceptable limits or beyond? What is the rate of depletion during given time-periods such as 5 /10 year profiles?
		3	In case the groundwater resources are noticed to be polluted over time, what is the level and extent? What are the *types of pollution*: - salt water infiltration / leaches from landfills / chemicals and nutrients / any other?
		4	Are the *steps taken by the Government* to check / prevent the pollution *well-designed and sufficient*? Are there any scientific evaluations on their effectiveness?
		5	Are the efficiency and effectiveness of the programme for *re-charging the groundwater* of the expected levels?
		6	Is *rainwater harvesting* (RWH) compulsory for houses, building complexes, factories etc? Is there a stringent policy and is it implemented successfully?
		7	Does the Government's water policy aim at involving *the local community / civil society* in the conservation measures?
		8	Is there a programme to divert the *runoff from rains into lakes and ponds* etc. by constructing check dams and other devises?
VII	**Abatement of Pollution in Lakes and Rivers**	1	Does the entrusted agency monitor the *quality, quantity and pollution levels in large water bodies* such as lakes and rivers regularly?
		2	Is there a machinery to prevent and control *excessive and unregulated drawal* of water from these bodies by agricultural and industrial units?

Sl. No	Subject	Sl. No	Audit Checklist
		3	Is the mechanism to prevent / control the discharge of *effluents and untreated water* into these bodies efficient?
		4	Is the system efficient to control the *escapement of chemicals and nutrients* from agricultural and farm lands into water bodies?
		5	Is there a system of detecting and preventing any *encroachments of the river beds and bank*s?
		6	Is there a mechanism to detect and prevent *illegal quarrying for sand and minerals* from the river / lakebeds and are such measures adequate?
		7	In the case of high level of pollution of lakes and rivers, has the Government initiated any *plans and programmes for their restoration*?
		8	Are the *allocations for such programmes* adequate to meet the requirements? Review *the economy and efficiency* of such programmes from Performance Audit point of view and comment.
		9	Are there *external agencies monitoring the pollution levels of lakes and rivers* and do their findings vary from that of the entrusted agency? If so, analyze and record findings.

CHAPTER IV

AUDIT OF WASTE MANAGEMENT

Introduction

4.1 Waste management is becoming an increasingly complex issue, thanks to the high population growth rate in developing countries, high level of migration to cities and towns, higher economic growth and the consequent increasing trend and pattern of consumption, among other things. Waste accumulation and its improper handling and disposals represent a major threat to the environment as also to the health of all living organisms, especially of human beings. A direct and severe impact of poor and inadequate waste management is the high level of pollution of both the surface water and the ground water. Particularly, leachate, namely, the liquid that forms as water trickles down through areas contaminated with waste such as landfills, effluent treatment plants, waste disposal sites etc., may result in hazardous substances entering the surface and ground water thereby creating serious health concerns. Pollutants from wastes and landfills may also lead to soil contamination, air pollution and greenhouse gas emissions, with the consequential detrimental effects on environment. The adverse effects of chemical, electrical and electronic wastes are particularly pronounced and these wastes would need careful, scientific means and methods of disposal.

4.2 There are different types of wastes which we come across in day to day life, such as municipal waste, industrial and hazardous waste, biomedical waste, construction and demolition waste, mining waste, e-waste, radio-active waste and other wastes (such as discarded motor vehicles, packaging wastes, agricultural and forestry waste and so on). Municipal wastes are mostly generated by households and include organic wastes as also other items generated by households and commercial establishments. Some wastes are required to be disposed off in terms of the law on the subject (such as biomedical wastes, radio-active wastes etc.) The collection, transport, recovery and disposal of all types of wastes throw up a great challenge to policymakers and administrators. The audit of waste management accordingly forms an important part of the environmental audit; and its planning and execution will call for a high degree of attention to details.

Principles of Effective Waste Management

4.3 The mantra for an efficient waste management policy, it is generally recognized, is the principle of *'reduce, reuse and recycle'*. The preferred strategy for waste management (among developed countries) is to classify the strategies in accordance with their "desirability"; namely, to extract the maximum practical benefits out of products and to prevent and minimize the waste generation arising from them.

4.4 Emphasis on waste prevention and minimization would help in the generation of lesser waste materials, which would be an ideal objective to be aimed at. Waste prevention should be attempted through resource efficiency, reduction of hazardous substances and products in the manufacture, increased life cycles etc. This would involve the promotion of clean technologies and eco- friendly products, establishments of technical standards, eco-audit, reuse of (scrap) materials, incentive schemes such as deposit refunds, promoting refill packs and so on. All such techniques would need to be built into the core of an efficient waste management policy.

Waste Management Strategies in India

4.5 In India, traditionally, people were generally used to recycling and reusing of essential articles of daily use and were averse to conspicuous consumption which, in turn, would lead to greater waste generation. But in the recent years, the increasing economic prosperity and exposure to media has been resulting in significant attitudinal changes in regard to the pattern of consumption, and our societies are also becoming increasingly 'consumer-oriented'. Consequently, the quantum of waste generation is on the increase, and the problems associated with waste handling and disposals are also getting more complex.

Rules and Regulations on Waste Management in India

4.6 The Central Government has issued several notifications to regulate the prevention and control of wastes in the country. These have been issued under the provisions of the Environment (Protection) Act, 1986. They include the management and handling of *fly ash* (generated from thermal power projects), municipal wastes, biomedical wastes, hazardous wastes, recycled plastics, and used batteries. Management and handling of several other forms of wastes are yet to be brought under appropriate notifications. It is to be noted that the rules issued by the Central Government are applicable to States also; but States may make them more stringent by exercising the powers vested in them.

4.7 The national policies and strategies established by the Central Government on the protection of environment also include references to waste management at appropriate places. Auditors should make use of them as audit criteria where appropriate. These include the National Conservation Strategy and Policy Statement on Environment and Development (1992), Policy Statement on Abatement of Pollution (1992) and the National Environment Policy (2006). The nodal ministry, namely, the Ministry of Environment and Forests (MOEF), has also pioneered a Charter on Corporate Responsibility for Environmental Protection (CREP) to encourage the corporate sector to assist in the prevention and control of pollution through, *inter alia,* waste minimization, in-plant process control and adoption of clean technologies. CREP contains not only targets for conservation of water, energy etc., but also action points for pollution control of highly susceptible industries such as the tannery sector, rubber products and electro-plating industry etc.

4.8 The Central and State Pollution Control Boards (CPCB / SPCB) are the principal agencies tasked with monitoring and controlling waste management and handling. These bodies have established standards and procedures for waste management and handling and are responsible for the enforcement and monitoring of the implementation of the notified pollution limits, standards, rules etc.

Guidelines for the Audit of Waste Management

4.9 The following audit enquiries may be used, with appropriate changes, for the audit of waste management. They cover both compliance audit as well as performance audit issues. Since there are different types and categories of wastes, (and only some are covered by the enactments, rules and regulations issued for their control and regulations till now), the audit plans will need to take into account the status of each category of notifications and devise specific audit plans and methodology, as appropriate. The audit may cover both macro and micro issues, namely, the policy and strategy aspects at the government level, as well as the actual implementation at the field level; but this issue will have to be decided at the planning stage and the audit research guidance may be adopted to suit the selected approach.

Sl. No	Area of Audit Enquiry	Sl. No	Audit Checklist
I	**Quantum of Waste and the Assessment of Risk Perceptions**	1	Has the government / entity assessed the *types and categories of wastes* related to each source of waste generation (municipal / industrial / chemical / hazardous / biomedical/ E-waste) which need to be addressed to?
		2	Has an assessment of the quantum of each category of wastes at the current level of generation been *estimated accurately*? Is the *estimation scientific and reliable*?
		3	Has the *likely growth in the waste generation*, based on reliable data and indicators, been made to project the *future planning requirements* and parameters?
		4	Are the *data and parameters* adopted for the assessment of the growth rate *comprehensive and wide-based*?
		5	Are the details of the *current capacity to handle the waste* from different sources readily available? Is the *information updated* from time to time and reliable?
		6	In case the current capacity is inadequate to meet the requirements, how is the deficit being met? Has an assessment in terms of *physical and monetary requirements* been made to meet the shortfall?
		7	Has a realistic *assessment of the risks from each type of waste material* to human health, animals and plant life been made through scientific studies?
		8	Are reports and evaluations on the *impact of the improper waste management on the environment* being used by the entity for the future planning of waste management?
II	**Strategies, Legislation and Programmes**	1	Has the government/ entity established a comprehensive policy / strategy to *prevent/minimize* the waste from each identified source, for effective implementation by the stakeholders?

Sl. No	Area of Audit Enquiry	Sl. No	Audit Checklist
		2	Are there rules/standards/regulations on the handling and disposal of the waste *from each identified source*? Are they comprehensive and clearly worded and being enforced strictly?
		3	Does the strategy reflect the principles of *'prevent/ reduce/minimize/recycle/reuse'*?
		4	If there are *gaps in the notifications/regulations* relating to any given aspect of the strategy or regarding the waste generated from any given sources, is action being taken to close such gaps?
		5	Are the *enforcement provisions and the prescribed process and procedures* for handling / storing /disposal of the waste reasonable, easy to understand, easy to implement/ Do they include adequate disincentives and penalties for non-observance of the procedures by stakeholders?
		6	Are the legislations/regulations in line with the *international conventions and commitments* to which India is party? If there are variations, are they material?
		7	Are there appropriate action plans and programmes under implementation to tackle the problem of (increasing) waste generation and disposal by involving all stakeholders? Review the programmes/plans and comment on the *planning and implementation aspects*.
III	**Implementation of the Policy/Strategy**	1-(i)	Are the agencies/entities responsible to implement the policy/strategy at various levels vested with adequate *powers* to carry out the task?
		1-(ii)	Is the policy to manage wastes from different sources *transparent and comprehensive?* Are the entities/agencies responsible to oversee the management of wastes provided with *clear guidelines and required resources*?
		2	Have the oversight bodies been entrusted with regulatory powers to issue *standards and limits for pollution and waste* management? Have the standards been notified? Are they current?
		3	Is the mechanism to monitor and oversee the *adherence to standards and limits* by those responsible to do so under the law/rules/permits, and to take follow up actions for any breach in conditions efficient?
IV	**Municipal Solid Wastes** **(i) General issues** **(ii)Transportation of Wastes**	1	Are there *specific and clearly laid down rules and standards* applicable for the management of solid wastes generated in municipalities / corporations/other local bodies?
		2	Is the waste management programme of the local body aimed at *reducing and preventing waste* by applying the principles of modern waste management?

Sl. No	Area of Audit Enquiry	Sl. No	Audit Checklist
	(iii) Waste Disposal Facility/Sites	3	(i) Is there a *Public Awareness Programme*, involving the local communities and civil society organizations (a) to educate the public about the need to reduce and minimize the wastes and (b) to segregate them according to *organic, hard, plastic wastes* etc, to facilitate the handling and disposal? (ii) Are the traders and the public discouraged *from using and indiscriminately disposing of plastic and other non-degradable* (packing) materials, to limit the associated problem? (iii) Does the Programme provide for *incentives and rewards* for the return/recycle/reuse of waste materials like metal cans, plastic containers and other such items to minimize the wastes?
		4	Are the established *standards and criteria for the collection, transportation and disposal* of the wastes enforced strictly and judiciously?
		5	Are appropriate *financial disincentives* imposed on households, commercial establishments and others to discourage the generation of wastes by levy *of taxes and fees* for the collection and disposal of wastes?
		6	Are stringent penalties imposed on violators (traders, shops, establishments, construction engineers) for *dumping garbage and waste materials indiscriminately and at unauthorized places*?
		7	Is the system of collection, transportation and disposal of municipal wastes designed and implemented *efficiently and economically?*
		8	Is there a mechanism to *segregate the wastes according to their environmental impact* (bio-degradable/hazardous/organic etc.) prior to disposal?
		9	Is there a proper and hygienic *storage system/facility for waste materials* within the municipality, if required, prior to their transportation to the disposal sites?
		10	Is the transportation of wastes carried out *hygienically and without spilling* through efficient supervision arrangements?
		11	Is the *waste disposal facility including landfills managed scientifically*? Is the location of the facility/landfills safe and hygienic and away from populations, and with controlled pollution parameters?
		12	Is care taken to *prevent the possibility of water and air pollution* from the waste disposal sites by appropriate means?
		13	Are the *disposals of plastic and other non-degradable* wastes being done/supervised as per law?
V	**Hazardous/ Biomedical Wastes**	1	Has the State Pollution Control Board issued specific instructions regarding the *handling, transportation and disposal of hazardous/bio-medical wastes* by industrial and hospital establishments and others? Is their implementation being monitored regularly?

Sl. No	Area of Audit Enquiry	Sl. No	Audit Checklist
		2	Are the availability of *technical and management requisites and facilities* (for handling and managing hazardous wastes by the applicant) verified in detail, as per law, *prior to granting permits* to applicants?
		3	Is the system of verifying the *compliance with the rules and regulations* by the permit- holders satisfactory and followed up strictly?
		4	Are the rules and regulations for the *import / export of hazardous materials* and wastes (for ship-breaking, recycling etc.) strictly enforced by the concerned authorities?
		5	Does the SPCB inspect/monitor the *arrangements for transporting hazardous wastes* by permit-holders and *the disposal at approved sites* to ensure the safety aspects and environmental safeguards?
		6	Is the disposal of bio-medical wastes done as per law? Are there sufficient *incinerators established as per law* in the premises (or elsewhere) of hospitals and health centers to meet the statutory requirements? Are they environmentally benign?
		7	Are the bio-medical *wastes segregated and labeled prior to storage and disposal*, as required under the rules and regulations?
		8	Is the *monitoring and follow-up machinery* for the hazardous and bio-medical wastes efficient, effective and stringent?
VI	**Industrial Waste Disposal/ Fly Ash Utilization** **(i) Industrial Wastes**	1	Does the industrial waste management policy of the Government form *part of the general industrial development policy* and seek to promote prevention/minimization/ reuse/recycling of such wastes to the maximum extent possible?
		2	Are the permits for industrial units issued only *subject to ensuring the scientific management and disposal of the wastes* generated from them?
		3	Is the system to *monitor and follow up waste management practices* by the permit-holders efficient? Are timely actions taken against violations?
		4	Are the *existing and older units with inadequate waste disposal facility* encouraged through regulations and incentives to establish the required facilities and equipments to reduce pollution arising from their wastes?
		5	Are common *waste management facilities* established for small industrial complexes and clusters to encourage economical and efficient waste management practices?
	(ii) Fly Ash Utilization	1	In the case of existing thermal/lignite power generating units, what action is taken to ensure that they observe the conditions for *the gradual full utilization of fly ash* within the stipulated period under the law?
	(iii)Construction and Demolition Waste	1	Has the entity/local body issued *notifications to regulate* the collection, handling, storage, transportation and disposal of wastes arising from construction and demolition of buildings and structures?
		2	Are the *regulations adequate, comprehensive and stringent* to avoid accumulation of wastes and indiscriminate disposals?

Sl. No	Area of Audit Enquiry	Sl. No	Audit Checklist
		3	Are there *earmarked areas* where such wastes could be disposed off safely and without causing water and atmospheric pollution?
		4	Are the provisions for *temporary or permanent storage* of the materials for their eventual recovery/recycling etc?
		5	Do the regulations insist on *segregating the wastes and removal of hazardous items* (asbestos sheets, paints and chemicals) prior to their disposal?
		6	Is the *transportation of construction and demolition wastes* regulated to ensure that there is no spilling and pollution en route?
		7	Is the entity/authority providing/managing the disposal sites compensated for the expenses and efforts on the principle of *"polluter pays"?*
	(iv) E-wastes	1	Are the rules / regulations to control the E-wastes *adequate and comprehensive*?
		2	Do the rules provide for *re-use/cannibalization of the useable parts* before disposal to minimize the wastes?
		3	Do the rules require the *removal of all hazardous parts* (cadmium/lead etc.) before storage and disposal?
		4	Are there strict guidelines for the control and supervision of *segregation of wastes and labeling them* prior to handling and disposal?
		5	Are there earmarked *special zones/areas* where the E-wastes could be stored / disposed?
		6	Is there appropriate *monitoring system* to ensure that the rules are strictly followed and violators are dealt with according to law?
VII	**Monitoring**	1	Is there a system of regular monitoring of disposal by various authorities like municipalities, hospitals, industries etc.
		2	Have effective penalties been imposed by the government /regulatory agencies for improper disposal of waste, in accordance with the polluter pay principle?
VIII	**Evaluation and Impact Assessment**	1	Has the Government/entity/an external agency conducted any *evaluations/reviews of the effectiveness of its waste management strategy/policy*? If so, have they identified the *strength and weakness of the strategy/policy* and modified it after taking into account the findings and suggestions from such studies?
		2	Have the efforts to *prevent/minimize waste generation through public awareness and through* the *establishment of standards* been successful in reducing the volume/types of waste generation? If not, what measures are taken to improve the strategy formulation and implementation?
		3	Is the entity/agency implementing the waste management policy and programme *equipped with adequate financial and human resources* to carry out their tasks efficiently? Are there appropriate means to *raise revenue from the policy implementation* to meet the needs of the entity?
		4	Is the principle of *"polluter pays"* incorporated into the policy? Are there incentives for reducing/reusing/recycling of wastes and to penalize those who go against the principle?

CHAPTER V

AUDIT OF CLIMATE CHANGE

Introduction

5.1 The National Action Plan on Climate Change (NAPCC) recognizes that climate change is a global challenge and seeks to establish *'an effective, cooperative and equitable global approach based on the principle of common but differentiated responsibilities and respective capabilities, enshrined in the UNFCCC'*. Accordingly, the NAPCC advocates the promotion of not only sustainable production processes, but equally, sustainable lifestyles across the globe. The approach of NAPCC is to initiate measures and steps to stimulate the *simultaneous* advancement of the country's development and the climate-change-related objectives of adaptation and mitigation. Eight National Missions have been established as the core of the NAPCC which are indicated below:

1) National Solar Mission.

2) National Mission for Enhanced Energy Efficiency.

3) National Mission on Sustainable Habitat.

4) National Water Mission.

5) National Mission for Sustaining the Himalayan Ecosystems.

6) National Mission for a Green India.

7) National Mission for Sustainable Agriculture.

8) National Mission on Strategic Knowledge for Climate Change.

5.2 The efficient and effective implementation of the Missions will be a key factor in the Government's resolve for sustained development and will demonstrate its determination to support the global efforts to control climate change. From the angle of audit, the economy, efficiency and effectiveness of the design, management, outputs and outcome of the above Missions will offer substantial scope for compliance and performance audit by the SAI.

Evaluation of the Policies for Control of Climate Change

5.3 Four main criteria are generally used to evaluate policies and instruments related to climate change: *environmental effectiveness, cost effectiveness, distributional effects including equity, and institutional feasibility*[72]. The IPCC Working Group's findings of the

[72] Summary for Policymakers: Contribution of Working Group III to the Fourth Assessment Report of the IPCC (2007)

performance of policies by governments also concluded, among other things, that the integration of climate policies in broader development policies makes implementation and overcoming of barriers easier. Similarly, regulations and standards generally provided the required certainty about emission levels. It also noticed that the economic costs of subsidies and tax credits (concessions) given away as part of the policies are high, but were essential to overcome barriers.

5.4 The following table will act as useful criteria to evaluate the national policy instruments on climate change:

INSTRUMENT		CRITERIA		
	Environmental Effectiveness	**Cost effectiveness**	**Distributional Considerations**	**Institutional Feasibility**
Regulations and Standards	Emission level set directly, though subject to exceptions	Depends on design; uniform application often leads to higher overall compliance costs.	Depends on level playing field: small or new players may be at a disadvantage.	Depends on technical capacity; popular with regulators in countries with poorly functioning markets.
Taxes and charges	Depends on ability to set taxes at a level that induces behavioral change.	Better with broad participation; higher administrative costs where institutions are weak.	Regressive: can be ameliorated through revenue recycling.	Often politically unpopular; difficult to enforce if institute-ions are under-develop-ed.
Tradable permits	Depends on emission cap, participation, compliance.	Decreases with limited participation and fewer sectors.	Depends on initial permit allocation. May entail difficulties for small emitters.	Requires well functioning markets and complementary institutions.
Voluntary agreements	Depends on programme design, clear targets, a baseline scenario, third party involvement in design, and review and monitoring provisions.	Depends on flexibility and the extent of government incentives, rewards and penalties.	Benefits only accrue to participants.	Politically popular; requires a large administrative staff.
Subsidies and other incentives	Depends on programme design; less certain than regulations and standards.	Depends on level and programme design; can result in market distortion.	Benefits selected participants; possibly some that do not need it.	Popular with residents; potential resistance from vested interests. Can be difficult to phase out.
Research and development	Depends on consistent funding, when technologies are developed and policies for diffusion. May produce great benefits in the long	Depends on programme design, the degree of risks and time scale.	Benefits initially selected participants; potentially easy for funds to be misallocated.	Requires many separate decisions; depends on research capacity and long term funding.

	term.			
Information policies	Depends on how consumers use the information; most effective in combination with other policies.	Potentially low cost, but depends on programme design.	May be less effective for groups that lack access to information.(e.g. low income category)	Depends on cooperation with special interest groups.

(Source: The Fourth Assessment Report, IPCC, Chapter 13, box 13.1)

Guidelines for the Audit of Climate Change

5.5 The audit of climate change may include both mitigation and adaptation audits and the relevance of both must be carefully considered at the planning stage. One audit could cover certain elements from both; for instance, the same audit may include the climate change mitigation and adaptation funding or synergies and conflicts between the national mitigation and adaptation policies. For reasons of time and span of control, separate mitigation and adaptation audits might however be preferable[73]. The following audit guidelines may be used with appropriate modifications in conducting the field audit of climate change.

Sl. No	Theme	Sl. No	Audit Checklist
I	**Assessment of the Dimension of the Emissions[74]**	1	Has the Government identified the *various sources from which GHG emissions take place* (as well as likely to take place) in the medium and long term, within its territories?
		2	Has the Government assessed the *quantum of GHG emissions* separately from each source?
		3	Has an assessment of the *trend of GHG emissions* during a given period, with reference to a baseline, been made?
		4	Does the assessment include the *source-wise/ sector-wise emission trends, location, zones, growth projections etc*. for planning for the future?
		5	Has an assessment of the *current and future impacts of the GHG emissions* from each source / sector on vulnerable sections (water/air/ ecosystems/forest/biodiversity/human health etc.) been scientifically made?
		6	Does the assessment include the *extent of mitigation* attributable to existing (carbon) sinks and the future requirements to meet the estimated growth rates in emissions?
		7	Does the assessment include the *technical advancements and the extent of investments required* for research and development to combat the increasing trend in GHG emissions and its impact?

[73] INTOSAI (WGEA) : Auditing Climate Change

[74] The main objective is to identify the past, present and future GHG emissions and how the emissions break down by sector / source. INTOSAI (WGEA): Audit of climate Change.

Sl. No	Theme	Sl. No	Audit Checklist
II	**Government Response to Climate Change**	1	What are the various *commitments of the Government with regard to International Conventions and Agreements* (such as UNFCCC, Kyoto Protocol etc.)? Is the Government fulfilling those obligations?
		2	Are the *national database*[75] */ inventory of sector-wise emissions and removal by sinks* periodically updated and reliable?
		3	Is there a regular and established procedure in the nodal ministry to collect the required information and report to the UNFCCC as mandated under the Protocol?
		4	What are the *established targets for the mitigation of GHG emissions* in the country and is this worked out on the basis of scientific studies and research?
		5	Are the National Policy and Action Plans developed with *adequate data, targets and institutional support* to ensure their effective working in the long term?
		6	Does the Policy *prioritize the sources of GHG emissions for effective and speedy action*? Are the approach and the action programmes scientific and well-designed taking into account the urgency and the magnitude of the problem?
		7	Are the *tax credits, subsidies and other incentives* provided under the policy effective in achieving the intended objectives?
		8	Are the National / State Policy in tune with the UNFCCC requirements for mitigation and adaptation by the country? Do they envisage international cooperation as provided in the Convention?
		9	Do the designs of the Policy / Plans measure up to the requirements *of adaptation* to meet the likely adverse impacts of GHG emissions on climate change, especially relating to water, health, food supply etc?
		10	Are the legislations and regulations intended to regulate and control GHG emissions *comprehensive?* Do they meet the actual requirements?
III	**Effectiveness of the Policy and Plans**	1	Was the implementation of the Plans and Programmes relating to Climate Change really *effective*? Have they succeeded in *reducing and mitigating* the GHG emissions? Is there an efficient monitoring and evaluating system to verify the results of the programmes?
		2	Have responsibilities and tasks relating to mitigation and adaptation been clearly defined? Have appropriate agencies and organizations been put in place to implement the programmes efficiently?

[75] Specialists and external experts can assist in deciding whether the data is reliable.

Sl. No	Theme	Sl. No	Audit Checklist
		3	Are there adequate *procedures for regulating and controlling emissions* from each source separately and are they working properly?
		4	Is there a good system to monitor *compliance by permit-holders and licensees?* Are violations and non-compliances dealt with stringently as per law?
		5	Do the Plans/Programmes provide for the *diffusion of information*, (especially those relating to reduction, prevention and control of anthropogenic emissions) and *promotion of the transfer of technology* to all levels effortlessly?
		6	Does the Policy encourage research on technologies to combat climate change by providing *tax concessions, fiscal incentives, awards and recognitions* etc? Are they efficient and effective?
		7	Are promotional efforts directed towards the development and analyses of data to reduce *uncertainties about the causes and effects of climate change*?
		8	Has the Government taken suitable measures to encourage *investments by developed countries* in technology-related projects in the country, in terms of UNFCCC?
IV	**Clean Development Mechanism**	1	Are the policy guidelines for CDM approvals *transparent, easy to follow and comprehensive*?
		2	Is there appropriate machinery in position to *receive, examine, approve and follow up* CDM proposals submitted by interested parties?
		3	Is the system to examine the CDM projects from technical and financial angles efficient and prompt?
		4	Does a review of an appropriate sample of sanctioned CDM cases bring out any major deficiencies or shortcomings?
		5	Do the criteria for approval of CDM projects take into account the need for helping the *disadvantaged sections of the society*?
		6	Do the EIA studies and project evaluations of CDM proposals adequately justify granting approvals to them, based on their claims as reliable sources for reduction of GHG emissions? Will the GHG *emissions from the project be lower than they would have been without the project?*
		7	Do they bring in *new and advanced technologies eligible* and available for transfer to indigenous industries?
		8	Have the CDM projects achieved their targets on implementation?

Sl. No	Theme	Sl. No	Audit Checklist
V	**National Missions[76] Under the National Action Plan**	1	Were the objectives and goals of the missions arrived at on the basis of *reliable data, risk assessment, and aimed at significant GHG emission reduction targets*? Do they cover both *mitigation and adaptation*? If not, are there separate programmes to cover adaptation measures?
		2	Are there *clearly defined goals and objectives* for each mission and necessary inter se relationships among the various missions?
		3	Have appropriate *performance indicators based on goals and outputs/outcomes* been developed to measure the performance of each mission?
		4	Are there *safeguards to identify and manage the key risks* in time under each mission?
		5	Are there provisions and mechanisms to make *mid-term corrections and adjustments* to the missions, based on the findings and evaluations from time to time?
		6	Is there a *suitable management framework* for implementing the mission? Has responsibility for carrying out the mitigation/adaptation activities under the mission been clearly specified? Are there adequate *delegation to other ministries and agencies* to carry out the tasks effectively?
		7	Is the *funding pattern* quite adequate and appropriate?
		8	Are principles of economy built into the pattern of appropriations? Are systems and procedures in place for ensuring *sound financial control and management* of the mission? Are the outlays and costs for plan and non-plan expenditures worked out realistically and carefully?
		9	Has an efficient and effective systems established in each mission for *monitoring, coordination, integration, assigning clear responsibility, performance measurement, reporting and accountability*?
		10 (i)	Have the reviewed mission activities achieved the expected results in reducing the GHG emissions? Were they achieved *economically, efficiently and effectively*?
		10(ii)	Were the missions successful in contributing to the expected achievements of their *broader short-term commitments and long-term goals* (if due for the assessment) for the GHG emission reductions?
		11	Do managers regularly compare the *results with performance indicators* and is the system working well? Do they identify the key risks and take timely corrective measures?

[76] The Audit Plan may cover the audit of one or Missions depending on the audit objective. The audit enquiries given here are for general use and they may be supplemented with appropriate queries relevant for each mission.

Sl. No	Theme	Sl. No	Audit Checklist
		12	Is there a machinery to ensure that the *quality of information available to different levels* is complete, reliable and updated in time?
		13	Is there a suitable evaluation machinery and system *external to the management* to verify and report independently on the results of the missions and programmes periodically?
		14	Is there adequate *involvement of the community and civil society* to ensure the smooth and transparent implementation of the missions?
		15	Is there a well-designed *public education and awareness programme* forming part of each mission and is its implementation successfully managed?

CHAPTER VI

AUDIT OF COASTAL ZONE MANAGEMENT

Introduction

6.1 India has about 7500 kms of coastal areas including islands, many segments of which are fragile and sensitive from the environmental angle. Apart from the high population density, the coastal areas are also vulnerable and sensitive to the impacts of possible sea level rising, rise in the high tide levels, cyclones and storms etc. which are influenced by climate change. Development activities in the coastal areas are regulated by means of the Coastal Regulation Zone (CRZ) Notifications and Integrated Coastal Zone Management (ICZM) Plans made under them. The National Environment Policy (NEP) recognizes that there is need to ensure that the regulations are firmly founded on scientific principles, in order to ensure effective protection to valuable coastal environmental resources without impeding livelihoods or legitimate coastal economic activity or settlements, or infrastructure development. The NEP accordingly envisaged an action plan to strengthen the ICZM and review the same at pre-determined intervals. The Plan also provided for decentralization of the responsibility for the clearances of specified projects to State Environmental Authorities, exempting activities which do not cause significant environmental impacts and are consistent with approved ICZM plans.

Policy Initiatives for the Protection of Coastal Zones

6.2 Coastal environmental resources include mangroves, coral reef, estuaries, coastal forests, genetic diversity, sand dunes, geomorphologies, sand beaches, and land for agriculture and human settlements, coastal infrastructure, and heritage sites. The NEP notes that in the recent years there has been significant degradation of coastal resources mainly on account of poorly planned human settlements, improper location of industries and infrastructure, pollution from industries and settlements, and overexploitation of living natural resources[77]. Impact of climate change by way of sea level and high tide rising will have direct and indirect adverse impact on coastal reaches in the future. The NEP accepts that the main cause of these 'proximate factors' is the inadequate institutional capacities for, and participation of local communities in, the formulation and implementation of coastal management plans, the open access nature of many coastal resources, and lack of consensus on means of provision of sanitation and waste treatment. The specific measures proposed include construction of coastal protection infrastructure and cyclone shelters (Adaptation) as well as plantation of coastal forests and mangroves (Mitigation). The National Action Plan (NAP) aims to focus mainly on two elements, namely, coastal area

[77] Para 5.2.6, National Environment Policy 2006.

protection (Mitigation) and early warning systems (Adaptation). The NAP includes several programmes for coastal area development and protection. In the audit of coastal management, all the above factors should receive adequate attention.

6.3 The relevant Notification[78] issued by MOEF on Coastal Zones declares the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action in the landward side up to 500 m from the High Tide Line (HTL) and the land between the Low Tide Line(LTL) and HTL as Coastal Regulation Zone (CRZ). HTL is the line on the land up to which the highest water line reaches during the spring tide. The distance from the HTL will apply to both sides in the case of rivers, creeks, and backwaters etc. to be notified on a case-by-case basis. The Notification envisages that the HTL would be demarcated by authorized agencies uniformly. However, this is yet to be done.

Restrictions on Establishing Industries and Processes on Coastal Zones

6.4 Several restrictions have been imposed on setting up of and expansion of industries, operations and processes etc. in the CRZ. These include restrictions on setting up of new industries except those directly related to waterfront or directly needing foreshore facilities and the projects of the Department of Atomic Energy. Further, the handling and storage of hazardous materials, setting up or expanding fish processing units etc. also fall within the restricted list. As per the classification, CRZ I which falls between HTL and LTL is the most ecologically sensitive area and no new constructions are permitted over them. On the other hand, as regards to CRZ II, which is the next in classification, State authorities are to prepare plans for their protection, but buildings will be permitted only on the landward sides of existing roads, structures etc. Moreover, the design and construction of any buildings permitted under the rules have to be environment-friendly. Areas up to 200m from HTL are to be marked as 'No Development Zones'. However, subject to certain guidelines, designated areas within the CRZ III may be earmarked for development of tourism resorts and hotels.

6.5 Recently, Central Government has approved an ICZM project at a cost of Rs.1156 Crores to develop capacity and institutions to effectively implement the CRZ Notification, 1991 aimed to control pollution of coastal waters and to expand livelihood options for coastal communities. The project includes the proposal for hazard mapping along the 7500 km coastline, which was long overdue and will be carried out by the Survey of India. All fragile coastal areas will also be identified and demarcated as part of the project and the 'Critically Vulnerable Coastal areas' will be assigned special attention for initiating protectionary measures.

Guidelines for the Audit of Coastal Zone Management

6.6 The following audit checks may be exercised when the audit of Coastal Management is taken up.

[78] Notification under Section 3(1) / 3(2) (v) of Environment (Protection) Act, 1986 and Rule 95) (3) (d) of Environment (Protection) Rules, 1986.

Sl. No	Area of Examination	Sl. No	Audit Checklist
I	**Identification and Demarcation of Coastal Areas**	1	Has the Government/authority *identified and demarcated the total coastal areas* to be brought under its coastal zone management plans? How was the demarcation done? Is it scientifically done and strictly as per the relevant Notification?
		2	Was the coastal zone *classified as per the established zonal criteria*? Have the Government/agency issued appropriate notifications to officially declare the classifications for information of and adherence by all concerned?
		3	Has the authority made an *inventory of existing buildings, industries and processes in each zone* (CRZ I / II / III) with reference to a base date and notified the findings? Has a prohibitory order been issued *against the construction of new units and expansion of existing ones* as per the Rules and has it been given adequate publicity?
II	**Assessment of Threats to Coastal Environment**	1	Has the Government/agency conducted a *comprehensive survey of its coastal environment resources and identified the current and future threats* to them from pollution and other sources?
		2	Are the *local communities* involved in the exercise in order to make them aware of, and become part of, the solutions?
		3	Has the authority classified the coastal area into CRZ I/II/ III etc., and evolved *appropriate regulations* to control and prevent degradation of the zones?
		4	Do the Government plans and programmes take into account the *special and fragile characteristics* of the identified coastal areas and target the control and protection of the zones through appropriate measures and steps?
III	**Rules and Regulations for Protection of Coastal Areas**	1	Are the rules and notifications issued for the protection of the coastal areas *adequately comprehensive and stringent* as to ensure the necessary control and protection of the concerned coastal areas and environmental resources?
		2	Are the regulations and rules sufficient *in scope and contents* to prevent unauthorized constructions, setting up and/or expansion of restricted units etc., on the coastal zones?
IV	**Management of Coastal Regulations and Rules**	1	Were the management and implementation of the coastal environment protection measures, plans and programmes *efficient and effective?*
		2	To *what extent* was the identification and demarcation of the coastal areas completed *according to the plan*? If there was delay, what were the reasons and were they justified?
		3	Is there a realistic assessment of the *degradation already suffered* by the coastal areas under review, with reference to a given date and a baseline? Has the Government identified the cause of degradation *by source*? (E.g., discharge of untreated municipal wastes, industrial and chemical effluents, unregulated setting up of industry, human settlements etc.)

Sl. No	Area of Examination	Sl. No	Audit Checklist
		4	Are *plans and programmes* in position to control and prevent the future degradation of the coastal areas?
		5	Are these plans and programmes supported with *adequate resources*? Are they prepared with focus on economy, *efficiency and effectiveness* as required?
		6	Is there an appropriate *designated agency with adequate powers and delegation and resources* in position to implement the coastal regulatory orders and rules? Is the agency's working subjected to monitoring by a suitable higher authority?
		7	Are the *inventory of constructions, industries and processes existing on the coastal areas* as at a base date, prepared by the agency, reliable and comprehensive? Does the agency have a suitable system of *inspecting and surveying the area* to prevent unauthorized constructions?
		8	Is the agency taking prompt actions, strictly as per the rules, in all cases of *violations of the zonal regulations*?
V	**Other Mitigation and Adaptation Measures**	1	Has the Government/authority identified the *appropriate measures to be initiated to protect the coastal areas* (such as construction of sea walls, development of mangroves etc.) taking into account *the local and specific requirements* in consultation with experts on the subject?
		2	Are these plans and programmes implemented by involving the local communities? Are the *achievements and outputs in line with the targets and goals* included in the programmes?
		3	Has the implementation of the programme *actually resulted* in the control and preservation of the coastal area from degradation? Was any evaluation carried out by the Government/agency to verify the impact of the programme?
		4	Has the Government taken measures to *prevent the discharge of pollutants* (municipal waste/chemicals and industrial wastes etc.) into the coastal waters? If not, what are the plans in this direction?
		5	Are there any regulations to prevent *illegal sand mining,* among others, to avoid degradation of the coastal areas?
		6	Is the Government promoting the *development of mangroves* on the coastal areas? What is the current status of such development programmes initiated for the preservation of the coastal zone?

ANNEXURES
TO
ENVIRONMENT AND CLIMATE CHANGE: AUDITING GUIDELINES

ANNEXURE I

ABBREVIATIONS USED IN THE CONTEXT OF ENVIRONMENTAL AUDIT AND CLIMATE CHANGE

ABBREVIATIONS	EXPANSION
AIMS	Air Management Information System
ASOSAI	Asian Organization of Supreme Audit Institutions
AWBI	Animal Welfare Board of India
BASIC Group	Brazil, South Africa, India and China
BHS	Biodiversity Heritage Sites
BMC	Biodiversity Management Committee
BSI	Botanical Survey of India
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CBD	Convention on Biological Diversity (1982)
CBF	Central Board of Forestry
CCD	Convention to Combat Desertification (1994)
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CITES	Convention of International Trade in Endangered Species of Wild Fauna and Flora (1973)
CFC	Chlorofluorocarbons
CPCB	Central Pollution Control Board
CO_2	Carbon Dioxide
COP	Conference of the Parties (to the Convention)
CREP	Charter on Corporate Responsibility for Environment Protection
CRZ	Coastal Regulation Zone
CSO	Central Statistical Organization
CSS	Centrally Sponsored Scheme
CZA	Central Zoo Authority
DBT	Department of Biotechnology
DDT	Dichloro Diethyl Trichloro Methane
EIA	Environment Impact Assessment
ENVIS	Environmental Information System
ERS	Environment Redress System
EMS	Environment Management System
EU	European Union
FCA	Forest (Conservation) Act, 1980
FSI	Forest Survey of India
GAP	Ganga Action Plan
GEF	Global Environmental Facility
GEMS	Global Environment Monitoring System
GHG	Greenhouse Gas
GDP	Gross Domestic Product
HTL	High Tide Line
IBIS	India Biodiversity Information System
ICAI	Institute of Chartered Accountants of India

ABBREVIATIONS	EXPANSION
ICZM	Integrated Coastal Zone Management
IFAC	International Federation of Accountants
IPAC	International Public Accountants Charter
IPCC	Inter-governmental Panel on Climate Change
INTOSAI	International Organization of Supreme Audit Institutions
INTOSAI (WGEA)	International Organization of Supreme Audit Institutions (Working Group on Environmental Audit)
IUCN	International Union for the Conservation of Nature and Natural Resources
JFM	Joint Forest Management
LTL	Low Tide Line
LMO	Living Modified Organisms
MINARS	Monitoring of Indian National Aquatic Resources System
MOEF	Ministry of Environment and Forests
NAEB	National Afforestation and Eco-development Board
NAPCC	National Action Plan for Climate Change
NAQP	National Air Quality Planning
NAAQMP	National Ambient Air Quality Monitoring Programme
NBA	National Biodiversity Authority
NCEPC	National Committee on Environmental Planning and Coordination
NCSPSED	National Conservation Strategy and Policy Statement on Environment and Development
NEAA	National Environment Appellate Authority
NEERI	National Environment Engineering Research Institute
NEMP	National Environment Monitoring Programme
NEP	National Environmental Policy
NET	National Environment Tribunal
NGT	National Green Tribunal
NLCP	National Lake Conservation Plan
NRAP	National River Action Plan
NASA	National Aero Space Agency
NWQMP	National Water Quality Monitoring Programme
POP	Persistent Organic Pollutant
PPM	Parts Per Million
RWH	Rain Water Harvesting
SAI	Supreme Audit Institution
SD	Sustainable Development
SFM	Sustainable Forest Management
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
UNCCD	United Nations Convention to Combat Desertification
UNCHE	United Nations Conference on Human Environment
UNCLOS	United Nations Convention on Laws of the Sea
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework on Climate Change
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
YAP	Yamuna Action Plan

ANNEXURE II

GLOSSARY OF TERMS

Acid Rains	Acid rains are caused by sulphur dioxide and nitrous oxide present in the atmosphere mainly arising out of the burning of fossil fuels. Acid rains affect soil, water, plants and living organisms as also buildings and structures which come into contact with it.
Adaptation	Actions taken to minimize the effects of global warming and would reduce the vulnerability of natural and human systems against actual or expected climate change effects.
Afforestation	Development/generation of new forests on lands and areas where none existed previously or recently.
Annex A countries of Kyoto Protocol	The List of six Greenhouse gases and the sources of emissions covered (and regulated) under the Kyoto Protocol. They include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydro fluorocarbons (HFC5), per fluorocarbons (PFC5) and sulphur hexafluoride (SF6).
Annex B countries of Kyoto Protocol	A List of 38 developed countries and the European Community included in the Kyoto Protocol which agreed to Quantified Emission Limitation and Reduction Emission targets (QELRs) along with the QELRs each one accepted. The List is similar to the Annex I Parties listed in the UNFCCC, with the exception of a few (Belarus / Turkey)
Annex-I Parties of Kyoto Protocol	The 40 developed countries and the European Economic Community listed in Annex I of the United Nations Framework on Climate Change (UNFCCC) who had agreed to work for limiting their GHG emissions by 2015.
Anthropogenic Emissions	Emissions of Greenhouse gasses resulting from or attributable to human and human-related activities.
Base Year	The year which is adopted as the reference year (standard) for achieving emission reductions. Under the Kyoto Protocol, 1990 is the base year for most (developed countries) for achieving the targeted reductions for major Greenhouse gases.
Basket of Gases	The group of six Greenhouse Gases regulated under the Kyoto Protocol, and listed under Annex A (see above).
Biodiversity	The variety of organisms found within a specified geographic region. It also represents the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part of, including diversity within species, between species and of ecosystems. The term includes plants, animals and micro-organisms, their genes and the system they inhabit and denote the totality of genes, species, and the ecosystems of a region.
Carbon Dioxide Equivalent (CO_2e)	The emissions of a gas, by weight, multiplied by its "global warming potential". The term denotes how much global warming a Greenhouse gas may cause, using carbon dioxide as the base unit.

Carbon Cycle	The cycle or process by which carbon is exchanged between the earth's four major reservoirs, namely, atmosphere, the terrestrial biosphere, the oceans and the sediments (including fossil fuels).
Carbon Footprint	Refers to the total amount of Greenhouse gas emissions produced to directly or indirectly support human activities, usually expressed in equivalent tonnes of carbon dioxide. The carbon footprint of an entity is the sum of all emissions of carbon dioxide which were induced by the entity's activities in a given timeframe. Usually carbon footprint is calculated for a period of one year.
Carbon Intensity	Denotes the linkage of carbon footprint with economic growth and implies growth with equity. Refers to the quantity of fossil fuel consumed (and the corresponding carbon dioxide equivalent required) to produce an economic unit, namely, GDP. Reducing carbon intensity will, according to the BASIC Group, allow the GDP to continue to rise without carbon emissions rising at the same rate through greater energy efficiency and investments in green technology.
Carbon Tax	A direct tax on activities that result in carbon emissions. Its effectiveness as a mechanism to deliver an exact cut in overall emissions is, however, to be established.
Clean Development Mechanism	Clean Development Mechanism, a concept under the Kyoto Protocol, enables the Annex I countries to meet their commitments under the UNFCCC in a flexible and cost-effective manner by investing in GHG reduction projects in developing countries for which they receive credits/certified emission reductions (CER) which could be used to meet their own reduction commitments.
Carbon/Emission Trading	A market mechanism under the Protocol that allows emitters (countries, companies and facilities) to buy 'emissions' from or sell 'emissions' to other emitters. Emission trading is expected to bring down the costs of meeting emission targets by allowing those who can achieve reductions less expensively to sell excess reductions (e.g., reductions in excess of those required under given regulations) to those for whom achieving reductions is more costly.
Carbon Sinks	Processes, regions, activities, mechanisms or systems that remove or absorb (or result in net removal of) Greenhouse gases from the atmosphere. Both the terrestrial biosphere and oceans can act as carbon sinks. In practice, about half of the carbon dioxide released into the air by human activities is absorbed by the land and the ocean. Reduction in the capacity of carbon sinks is closely linked to increased global warming. As against sinks, *sources* are processes or activities that result in the net release of Greenhouse gases into the atmosphere.
Climate	Represents the average weather that exists over a period of time and may be referred to in terms of local, regional, or global geographical confines. Climate change occurs when the climate deviates from the average weather over a long period of time, say a decade.

Environment	A complex of physical, chemical and biotic factors that act upon an organism or an ecological community and ultimately determines its form and its survival. It is a combination of different external physical conditions that affect and influence the growth, development and survival of organisms, namely, plants, animals and other living beings as also a-biotic components such as soil, water, sunlight, weather etc.
Forests	Land spanning more than 0.5 hectare with trees higher than 5 meters and a canopy of cover of more than 10 *per cent* or trees able to reach these thresholds in situ. (FAO)
Global Warming	The progressive gradual rise of the Earth's average surface temperature, thought to be caused in part by increased concentrations of Greenhouse gases (GHGs) in the atmosphere.
Mangroves	Salt-tolerant forest ecosystems formed mainly in tropical and sub-tropical inter-tidal regions and comprising of trees or shrubs that grow in shallow or muddy salt water, or brackish water, especially along shorelines and in estuaries.
Mitigation	Efforts and actions taken to reduce the GHG emissions from human and other activities and to enhance carbon sinks aimed at reducing the extent of global warming.
Offsetting	Paying for reductions in emissions elsewhere to compensate for polluting activities by an entity. Airlines have been encouraging this on a voluntary basis from air travelers.
Peak Emissions	The time at which global Greenhouse gas emissions should stop growing and begin to fall. According to scientists, the peak emissions should take place in 2015 if dangerous climate change is to be averted, though an agreement under the UNFCCC is yet to be arrived at.
Reforestation	Replanting of forests on lands that have been harvested recently or where previously forests existed or where forests have been degraded due to any reason.
Sequestration	Opportunities to remove atmospheric carbon dioxide either through biological processes (e.g., plants and trees), or through geological processes through its storage in underground reservoirs etc.
Sustainable Development	Refers to economic and social development without impacting the sustainability of the environment and without leading to environmental degradation. In other words, it is the 'meeting of the needs of the present without compromising the ability of future generations to meet their own needs'. The requisites for sustainable development include eradication of poverty, changing consumption and production patterns, and the prudent management of natural resources base for economic and social development.
Vector-borne Diseases	Diseases that result from an infection transmitted to humans and other animals by blood-feeding arthropods such as mosquitoes; malaria is an example.
Waste	All substances that have no longer any use for people, and are either discarded or intended to be discarded or need to be disposed off. (BASEL Convention)

Waste Management	The process of collection, transport, recovery and disposal of wastes, including the supervision of such operations and the after-care of the disposal sites. Waste management is based on the principles of prevention and minimization of the wastes generation, supplemented with competent techniques for reduction, recycling, reuse, energy recovery and disposal.
Wetlands	Transitional areas between permanently aquatic and dry terrestrial ecosystems with extreme biological diversity ecosystems. These may include areas of marsh, fen, peat land or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 meters. (RAMSAR Convention)

ANNEXURE III

SUGGESTED REFERENCES

Sl. No.	*Title*
I	***GUIDELINES FROM INTOSAI (WGEA)***
1	Guidance on Conducting Audits of Activities With an Environmental Perspective (2001)
2	Environmental Audit and Regulatory Auditing (2004)
3	Evolution and Trends in Environmental Auditing (2007)
4	Auditing Biodiversity: Guidance for Supreme Audit Institutions (2007)
5	The World Summit on Sustainable Development: An Audit Guide for Supreme Audit Institutions (2007)
6	Sustainable Development: The Role of Supreme Audit Institutions
6	Auditing Government Response to Climate Change (Draft) (2009)
7	Audit of International Environmental Accords
8	Auditing Multi Lateral Agreements (2009)
9	Improving Governance and Accountability in Environmental Protection (Reference Article)
10	Auditing Water Issues: Experience of Supreme Audit Institutions (2004)
11	Auditing Forests: Guidance for Supreme Audit Institutions (Draft)
12	Auditing Mining: Guidance for Supreme Audit Institutions (Draft)
13	Auditing Sustainable Energy: Guidance for Supreme Audit Institutions (Draft)
14	Auditing Sustainable Fisheries Management: Guidance for Supreme Audit Institutions (Draft)
15	Environmental Accounting: Current Status and Options for SAIs (Draft)
16	Towards Auditing Waste Management (Article)
II	***GUIDELINES FROM ASOSAI***
1	Guidance on Conducting Environment Audit: 8th ASOSAI Research Project.
III	***INTERNATIONAL ASSOCIATIONS/BODIES***
1	Assurance on A Greenhouse Gas Statement : International Auditing and Standards Board (IFAC) (Consultation Paper: October: 2009)
2	Adopting to Climate Change in Europe and Central Asia: World Bank
3	Mapping Tourism's Global Footprint: Tourism and Biodiversity: UNEP (2003)
4	Feeling the Heat: UNFCCC Secretariat
5	Fact Sheet: An Introduction to UNFCCC and Kyoto Protocol (UNFCCC Secretariat)
6	Biosafety and the Environment: CBD Secretariat (2003)
7	Our Common Future: Report of the World Commission (Brundtland Commission) on Environment and Development (1987)
8	Intergovernmental Panel on Climate Change (IPCC), Climate Change (2007)
9	IPCC; Assessment Reports (Four Reports)
IV	***National Plans and Policies Documents***
1	National Environment Policy, 2006
2	National Water Policy (2002)
3	National Forest Policy (1988)
4	National Conservation Strategy and Policy Statement on Environmental

Sl. No.	Title
	Development.
5	National Action Plan on Climate Change
6	Vision Statement on Environment and Human Health
7	Policy Statement for Abatement of Pollution, MOEF(1992)
8	National Energy Map of India; Technology Vision 2030 (The Energy Research Institute)
9	India's Greenhouse Gas Emission Profile: Results of five Case Studies (MOEF)
10	Addressing Energy Security and Climate Change (MOEF and Bureau of Energy Efficiency)
11	The Road to Copenhagen: India's Position on Climate Change Issues (MOEF)
V	***General Reading***
1	An Inconvenient Truth: The Planetary Emergency of Global Warming and What Can Be Done about It: Al Gore, Former Vice President, USA and Nobel Laureate.
2	Emerging Areas of Professional Development: Taking Professional Care of Nature : The Environmental Audit; Thirumoorthy Paramasivan, Chartered Accountant: 2002
3	Ethical Investing: the Green Guide: 2009 / 2010
4	Glossary of Key Terms: PEW Centre; Global Climate Change.
5	Policies in Key Countries: India/China Fact Sheet; Climate Plan Summaries, European Union's Climate Action Plan Summary; Emission Trading in the European Union etc. PEW Centre/Global Climate Change.

ANNEXURE IV

NATIONAL ACTS, RULES AND NOTIFICATIONS

Sl. No	Name of the Act, Rules and Notifications
I	***Biodiversity***
1	The Biological Diversity Act, 2002
2	Establishment of National Biodiversity Authority (SO 1147 (E); October, 2003)
3	Biological Diversity Rules, 2004
4	The Protection of Plant Varieties and Farmers' Rights Act, 2001.
5	The Plant Quarantine (Regulations of Import Into India) Order, 2003.
II-1	***Wildlife Preservation***
1	The Indian Wildlife (Protection) Act, 1972.
2	The Wildlife (Protection) Amendment Act, 2002.
3	The Wildlife (Protection) Rules, 1995.
4	The National Board for Wildlife Rules, 2003/2007.
5	Declaration of Wildlife Stock Rules, 2002.
6	The Wildlife (Specified Plants Stock Declaration) Central Rules, 1995.
7	The Wildlife (Specified Plants condition for Possession by License) Rules, 1995.
8	The Wildlife (Protection) Licensing Rules, 1983.
9	The Wildlife (Stock declaration) Central Rules, 1973.
10	The Wildlife (Transaction and Taxidermy) Rules, 1973.
11	Loss of Ecology (Prevention and Payments of compensation) Rules
12	The Recognition of Zoo Rules, 1992.
II-2	***Animal Welfare***
1	The Prevention of Cruelty to Animals Act, 1960; Establishment and Regulation of Societies for Prevention of Cruelty to Animals Rules, 2001; (Slaughter House) Rules, 2001; (Capture of Animals) Rules, 1972; (Application of Fines) Rules, 1978; (Licensing of Farriers) Rules, 1965; Prevention of Cruelty to Draught and Pack Animals Rules, 1965 and 1968; Prevention of Cruelty to Animals (Restrictions to Exhibit and Train as Performing Animals) Rules.
2	The Breeding of and Experiments in Animals (Control and Supervision) Amendment Rules, 2006.
3	The Prevention of Cruelty to Animals (Transport of Animals on Foot) Rules, 2001.
III	***Forests***
1	The Indian Forests Act, 1927.
2	The Forest (Conservation) Act, 1980; as amended in 1988.
3	The Forest (Conservation) Rules, 1981, as amended in 1992 and 2003.
4	The State/Union Territory Minor forest Produce (Ownership of Forest Dependent Community) Act, 2005.
5	Guidelines for Diversion of Forest Lands for Non-Forest Purposes under Forest (Conservation) Act, 1980. (Notification No.5-5/ 86 FC dated 25/11/1994.)

Sl. No	Name of the Act, Rules and Notifications
6	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forests Rights) Act, 2006.
IV-1	***Environment Protection***
1	The Environment (Protection) Act, 1986, as amended in 1991.
2	The Environment (Protection) Rules, 1986.
3	Environment (Siting for Industrial Projects) Rules, 1999.
IV-2	***National Environment Standards and Rules***
1	Environment (Protection) Amendment Rules, 2009 (Incinerator for Pharmaceutical Industry); (Incinerator for Pesticide Industry); (Coffee Industry); (Common Hazardous Waste Incinerator); (Sponge Iron Plant); Sulphuric acid Plant); (Petroleum Oil Refinery); (Refractory industry).
2	Environment (Protection) Rules, as amended.
3	The Batteries (Management and Handling) Rules, 2001.
4	The Municipal Solid Waste (Management and Handling) Rules, 2000.
5	The Re-cycled Plastic Manufacture and Usage Rules, as amended in 2003
6	The Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms, Genetically Engineered Organisms or Cells 1989, as amended.
7	The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989, as amended.
8	The Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008.
9	The Biomedical Waste (Management and Handling) Rules, 1998, as amended.
10	Fly Ash in Construction Activities, Responsibilities of Thermal Power Plants and Specifications for Use of Ash-based Products / Responsibilities of Other Agencies Rules.
11	Dumping and Disposal of Fly Ash Discharged from Coal and Lignite-based Thermal Power Plants on Land, Notification of 14/9/1999.
12	Environmental Impact Assessment Notification, 2009 and the Notification dated 27/1/2001 regarding Restrictions and Prohibitions on the Expansion and Modernization of any Activity or New Projects.
12	The Ozone Depleting Substances (Regulation and Control) Rules 2000.
13	The National Environment Tribunal Act, 1995.
14	The National Environment Appellate Authority Act, 1997.
15	The Scheme for Labeling Environment Friendly Products (Ecomark).
V	***Air Pollution Regulations***
1	The Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987.
2	National Ambient Air Quality Standards; Notification dated 11/4/1994.
3	The air (Prevention and Control of Pollution) (Union Territories) Rules, 1983.
4	Ambient Air Quality Standards for Ammonia; Notification dated 14/10/1998.
VI	***Water Pollution***
1	The Water (Prevention and Control) of Pollution Act, 1974.
2	The Water (Prevention and Control of Pollution) Cess Act, 1977.
3	The Water Quality Monitoring Order, 2005.
4	The Water Quality Assessment Authority; Notification dated 29/5/2001.

Sl. No	Name of the Act, Rules and Notifications
V	***Noise Pollution***
1	The Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2006.
VII	***Other Relevant Legislations***
1	The Fisheries Act, 1897.
2	The Mining and Minerals Development (Regulation) Act, 1957.
3	Territorial Water, Continental Shelf, Exclusive Economic Zones and Other Maritime Zones Act, 1976.
4	The Maritime Zones of India (Regulation and Fishing by Foreign Vessels) Act, 1980.
VII	***Coastal Zone Regulations***
1	Constitution of National Coastal Zone Management Authority; Notification dated 26/11/1998; Aquaculture Authority; Notification dated 6/2/1997.
2	Declaration of coastal stretches as Coastal Regulation Zone; Notification dated 19/2/2001, as amended.
3	Coastal Management Zone Notification, 2009.