

# **Local Response to Global Environmental Initiatives: A Study of Sikkim**

A Dissertation Submitted

To

**Sikkim University**



In Partial Fulfilment of the Requirements for the  
**Degree of Master of Philosophy**

By

**Namrata Rai**

Department of International Relations

School of Social Sciences

February 2017

Gangtok 737102 INDIA

Date:6/2/2017

## **DECLARATION**

I hereby declare that the dissertation entitled “**Local Response to Global Environmental Initiatives: A Study of Sikkim**” submitted to **Sikkim University** in partial fulfillment of the requirements for the degree of **Master of Philosophy** is my original work. This dissertation has not been submitted for any other degree of this university or any other university.

**Namrata Rai**

**Registration No: 13SU11884**

**Roll No: 15MPIR05**

**The Department recommends that this dissertation be placed before the examiner for evaluation**

**Dr. Manish**  
**Head of the Department**

**Dr. Sebastian N.**  
**Supervisor**



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(भारतके संसदके अधिनियमद्वारा स्थापित केंद्रीय विश्वविद्यालय)

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## CERTIFICATE

This is to certify that the dissertation entitled “**Local Response to Global Environmental Initiatives: A Study of Sikkim**” submitted to **Sikkim University** for the award of the degree of **Master of Philosophy** in International Relations, embodies the result of bona fide research work carried out by Namrata Rai under my guidance and supervision. No part of the dissertation is submitted for any other degrees, diploma, associate-ship and fellowship. All the assistance and help received during the course of investigation have been deeply acknowledged by her.

**Dr. Sebastian N.**

**Supervisor**

Department of International Relations

School of Social Sciences

Sikkim University

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**“Local Response to Global Environmental Initiatives: A Study of Sikkim”**

Submitted by Namrata Rai under the supervision of Dr. Sebastian N. of the Department of International Relations, School of Social Sciences, Sikkim University, Gangtok 737102, INDIA

Signature of the Candidate

Counter signed by the Supervisor

## **Acknowledgments**

*A note of gratitude to a number of people, whose genuine support and encouragements made this dissertation a successful work. The dissertation began and ended with the dedicated guidance and enormous help of my supervisor Dr. Sebastian N. Sir, without whom it would be almost impossible for the completion of the same. I would like to express my heartiest thankfulness and acknowledge him for the guidance and enduring support he bestowed upon me throughout. I also express my sincere thanks to the faculty members of my Department (International Relations/Politics), Dr. Manish and Ph Newton Singh for their valuable suggestions.*

*One of the major resources throughout the dissertation writing has been the Central Library of Sikkim, Forest and Tourist Department of Sikkim and Eco-tourism & conservation Society of Sikkim. Therefore, I am thankful to all the concerned authorities of these libraries, ECO-Tourism & Conservation Society of Sikkim and Forest and Tourist Department of Sikkim as they have provided me access to the library and procured relevant materials during the course of my research.*

*I am very thankful to my friends for helping me during my period of research. In the end, I extend my thanks to the entire family members especially my mom, dad, sister and my brother. It was indeed their constant support, encouragement and patience which contributed at large in the process of this research.*

*Namrata Rai*

*Dedicated to my Mom and Dad*

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# CHAPTER I

## Introduction

### 1.1 Introduction:

This study examines the local responses to global environmental initiatives with special focus on Sikkim, an environmentally sensitive Himalayan state in India. While doing so, this study also attempts to identify different policies and programs initiated at global and local level to address environmental issues and their inter-linkages. It also tries to examine how the state of Sikkim addresses both global and local aspects of environmental initiatives.

It is widely accepted that the sustainability of economic and social development depends on the protection of environment. It is a fact that environmental problems, which may have global impacts, are complex and often interrelated with socio-economic factors. These problems, such as water and air pollution, generation of solid and hazardous waste, soil degradation, deforestation, climate change and loss of biodiversity is not limited on any political borders and pose major threats to human safety, health and productivity on a global level. Due to these threats to human future, it is essential to address these problems at different levels.

As part of its initiative on environment, the General Assembly of UN in December 1972 established the United Nations Environment Programme (UNEP), to lead the efforts of the United Nations to protect global environment. Its current priorities are environmental aspects of disasters and conflicts, ecosystem management, environmental governance, harmful substances, resource efficiency, and climate change (UN, 1972)

In April 1987, the Brundtland Commission published the ground breaking report, “Our Common Future”. This brought the concept of sustainable development into the public discourse. The Commission defined sustainable development “as a process of change in which the exploitation of natural resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony

and enhance both current and future potential to meet human needs and aspirations” (Brundtland Report,1987). Sustainable development must not endanger the natural systems that life on earth: the atmosphere, the waters, the soils, and the living beings.

By 1992, the link between environment and development, and the imperative need for sustainable development was seen and recognized worldwide. The Earth summit held at 1992 in Rio de Janeiro adopted Agenda 21, a blue print for the protection of earth and its sustainable development. Agenda 21 represented the culmination of two decades of focused attention, which began with the United Nations Conference on the Human Environment, held at Stockholm in 1972 which established UN Environment Programme (UN, 1972).

In Agenda 21, governments outlined a detailed blueprint for action that could move the world away from its present unsustainable model of economic growth towards activities that will protect and renew the environmental resources on which growth and development depend. Areas for action included: protecting the atmosphere; combating deforestation, soil loss and desertification; preventing air and water pollution; halting the depletion of fish stocks; and promoting the safe management of toxic wastes.

All these developments were the outcome of an increasing realization among humanity that climate change is a global challenge and requires a global solution. Green House Gas (GHG) emissions have the same impact on the atmosphere everywhere. Consequently, action by one emission will do country to reduce emissions will do little to slow global warming unless other countries act as well. Ultimately, an effective strategy will require where commitments and action by all the major emitting countries may be merged.

In 1988, UNEP and the World Meteorological Organization (WMO) came together to create the Intergovernmental Panel on Climate Change (IPCC), which has become the pre-eminent global source for scientific information relating to climate change (UN, 1988). The main international instrument on this subject is the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992.

Kyoto Protocol is another important initiative taken up in the global level. Kyoto Protocol is an International agreement relating to the United Nations Framework Convention on Climate Change. It commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of common but differentiated responsibilities<sup>1</sup>.

The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP7 (Conference of Parties) in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." Its first commitment period started in 2008 and ended in 2012. The UN Climate Conference held in Doha in December 2012 has agreed to a new commitment period for the Kyoto Protocol – the treaty that limits GHGs output of some developed countries - and affirmed a previous decision to adopt a new global climate pact by 2015<sup>2</sup>.

The Millennium Development Declaration and the Millennium Development Goals (MDGs) adopted by the governments during UN Millennium Summit in 2000, has become a universal framework for “development” and are considered as a means for developing countries to work together with developed ones in the pursuit of a shared future. MDGs are eight goals to be achieved by the target year 2015. These include eradication of extreme poverty and hunger, promotion of gender equality, reduction of child mortality as well as ensuring environmental sustainability. The target of “ensuring environmental sustainability” envisages the integration of the principles of sustainable development into country policies and programme and reversing of loss of environmental resources<sup>3</sup>.

Some other UN bodies’ active in support of the environment and sustainable development includes the World Bank, the United Nations Development Programme

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<sup>1</sup> [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php) accessed on April 1/2016

<sup>2</sup> [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php) accessed on April 1/2016

<sup>3</sup> United Nation Millennium report, 2000 accessed on April 1/2016

(UNDP), the International Maritime Organization (IMO), the UN Industrial Development Organization (UNIDO), the Food and Agriculture Organization of the United Nations (FAO), the UN Human Settlements Programme (UN-HABITAT), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the International Atomic Energy Agency (IAEA). The UN Global Compact engages the international business community in the observance of environmental principles, and the Global Environment Facility (GEF), a World Bank-UNDP-UNEP initiative, helps to fund it all.

The United Nations Environment Programme (UNEP) stimulates worldwide awareness of the environment and enhances political attention and action through World Environment Day, commemorated each year on 5th June. The World Environment Day will highlight resources and initiatives that promote low carbon economies and lifestyles, such as improved energy efficiency, alternative energy sources, forest conservation, and eco-friendly consumption.

The other global initiative is the idea of common green ecology. Green ecology is defined as an economy that aims at reducing environment risks and ecological scarcities, and that aims for sustainable development without degrading the environment. A Green Economics among UNEP's key contributions to the Rio+20 processes and the overall goal of addressing poverty and delivering a sustainable 21st century. The report makes a compelling economic and social case for investing two per cent of global GDP in greening ten central sectors of the economy in order to shift development and unleash public and private capital flows onto a low-carbon, Resource-efficient path. A green ecology does not favor one political perspective over another. It is relevant to all economies, be they state or more market-led. Neither is it a replacement for sustainable development. Rather, it is a way of realizing that development at the national, regional and global levels and in ways that resonate with and amplify the implementation of Agenda 21.

The Global Initiative on Food Loss and Waste Reduction is a prominent output of FAO's new Strategic Framework. The Save Food Initiative was launched by FAO and Messe Düsseldorf at the Interpack2011 trade fair for the packaging and processing industry, held in Düsseldorf, Germany.

The global programme rests on four main pillars: Collaboration and coordination of worldwide initiatives on food loss and waste reduction, Awareness raising on the impact of, and solutions for, food loss and waste, Research on policy, strategy and programme development for food loss and waste reduction, Support to projects for piloting and implementing food loss reduction strategies by the private and public sectors.

Convention on international trade in endangered species (CITES) is an effort to eliminate the global trade in threatened and endangered species. NGOs play an important role in the implementation and enforcement of CITES. Agencies such as the world wildlife Fund (WWF) and International Union for the conservation of Nature (IUCN) have contributed extensively to the implementation of CITES.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework. The Paris Agreement requires all Parties to put forward their best efforts through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. World leaders from 175 countries signed the historic Paris Climate Accord Friday 22 April 2016, using Earth Day as a backdrop for the ceremonial linking of a long-fought deal that aims to slow the rise of harmful greenhouse gases (Paris Agreement, 2016).

## **1.2 Sikkim's Response to Global Environmental Initiatives**

Sikkim is a biodiversity rich mountainous State in the Himalayas with abundant natural resources. The state supports luxuriant tropical and alpine vegetation in its pristine virgin form. Its unique geographical position, varied topography, high precipitation, and minimum demographic pressure make the state one of the richest

botanical treasures houses of the country. Many initiatives have been taken up by Sikkim government towards the conservation and preservation of environment and biodiversity. These includes mass awareness drive, ban on non biodegradable substances including use of plastic, Ten minutes to earth, ParyavaranMahotsav, sustainable tourism, bio-diversity management and Sustainable tourism (Government of Sikkim,2016).

The government of Sikkim has been focused on developing natural resources based tourism as means of livelihood. The nongovernmental organization like Eco-Tourism & Conservation Society of Sikkim (ECOSS) an important role for environmental protection in Sikkim. ECOSS has been successful in making a lasting impact on the way tourism is now viewed especially in rural areas. Village tourism is a concept that has now spread to remote corners of the state while “ecotourism” has become a buzzword in the promotional brochures of the state. In 2002, the South Asian Regional Conference on Ecotourism was organized in Sikkim by The International Ecotourism Society (TIES) and Ecotourism and Conservation Society of Sikkim (ECOSS) with support from UNDP and the Ministry of Tourism. This was a milestone in introducing the concept of Ecotourism to Sikkim and the North East Region and in defining community-based tourism in the state. Ecotourism in Sikkim has also been one of the responses to global environmental initiative

Sikkim state is also taking initiatives with regard to climate change with a focus on mitigation and adaptation. Over the last two years various stakeholders including the civil society, government departments, academic institutions and others have come together to prepare the State Action Plan on Climate Change (SAPCC) for the state of Sikkim. After several rounds of consultation, the SAPCC has been formulated with support from German Technical Cooperation (GIZ).

These ongoing initiatives compiled from various departments are presented here. Strengthening the rural water storage infrastructure: Building household, community and village level storage tanks to strengthen the water storage infrastructure. The farmers innovatively utilize these storage tanks by harnessing the flow of springs during night time (which was earlier going waste) to fill up these tanks, which is used

during day time for domestic use as well as minor irrigation of kitchen garden, green house crops etc.

Rejuvenating dried up lakes: In mountain terrain, lakes play an important role in naturally recharging ground water. Reviving dried up lakes by improving their catchment, de-silting to enhance their water holding capacity and piping water from a perennial source has been initiated. Healthy lakes translate to adequate ground water recharge which in turn supplements the dry-period discharge (base-flow) of springs and streams located downstream.

State Green Mission aimed at mitigating climate change: The government's resolve to convert Sikkim into a model "GREEN" State, the State Green Mission is now an annual ritual observed on the 15th day of June every year. This Mission has helped in ensuring strict protection and development of the natural resources

Protecting the sanctity of natural heritage sites, Mt. Khangchendzonga (8,598m), the third highest peak on earth and the highest in the country is regarded as the guardian deity of the State. The whole landscape of Sikkim is considered sacred and the various mountains, rivers, lakes and caves revered. The State Government has put a blanket ban on scaling of sacred peaks and also defilement of sacred caves, sacred rocks, sacred lakes, and sacred hot springs. This has helped in protecting the sensitive mountain ecosystem of the State and safeguarding it from defilement and degradation.

Glacial and Climate Change Studies and Adaptation Programme: An Advisory Council- 'Sikkim State Council of Climate Change' for providing policy direction and institutional mechanism for effective implementation of various climate change adaptation programmes has been constituted by the State Government. Sikkim is the first Himalayan State to have carried out basin wise glacier inventory way back in 1999 by the Science & Technology Department of the State Government in collaboration with the Space Application Centre, Department of Space, and Government of India.

State policy of banning green felling in forests: Felling of trees in Reserve Forests has been restricted and export of timber outside the State has been banned. Tree felling

rules for private holding has also been framed and implemented. Only dead, dying and diseased trees are allowed to be removed for bona fide use. The State Government took up the task to protect the existing natural forests and to bring the degraded forests and agricultural fallows under afforestation since 1995.

Climate Change Related Vulnerability Assessment of the Rural Communities at the Gram Panchayat Level: climate change impacts have resulted in a reduction in the temporal spread of rainfall, and an increase in the intensity, with a marked decline in winter rain. Sikkim is the first state in the country to undertake a “Climate Change Related Vulnerability Assessment of the Rural Communities at the Gram Panchayat Level.”<sup>4</sup>

Universalizing Sanitation and becoming the First NirmalRajya in the Country: Sikkim is the first and only NirmalRajya in the country having achieved 100% sanitation in 2008. All the 165 Gram Panchayats and 4 Districts have achieved 100% coverage of toilets and open defecation has been eradicated. Sanitation was universalized by transforming an ongoing routine development program into mission mode by adopting a saturation approach with time bound targets.

Sikkim is the first and only NirmalRajya in the country, to have achieved 100% coverage of toilets in 2008 under the Total Sanitation Campaign (TSC), a National Program Participatory conservation of lakes: Some lakes of the State have become mass ecotourism destination. Tsomgo (Changu) in East Sikkim, Gurudongmar in North Sikkim and Khecheopalri in West Sikkim are the mainstay of the tourism industry of the state (Environmental Initiatives of Sikkim State Government 1994-2016, 2016).

Torrent Training Initiatives for Flood Control: Climate Change is expected to intensify the precipitation patterns and the frequency of extreme weather events like cyclones, hailstorms, cloudbursts etc is expected to further rise in the future. These events result in accelerated discharge owing to the steep terrain and convert the mountain streams into raging torrents during the monsoons. These torrents if not

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<sup>4</sup>[www.teriuniversity.ac.in/mct/pdf/assignment/Brijendra-Swaroop.pdf](http://www.teriuniversity.ac.in/mct/pdf/assignment/Brijendra-Swaroop.pdf)

trained cause immense soil erosion, damage to farmer's fields and landslides as well. Torrent Training (Jhora Training) has been provided a renewed emphasis to ensure that this flood water does not cause damage and is safely drained into the larger rivers. Funds from the national flagship program – MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) were used by the Rural Management and Development Department to fund these flood control works.

Converting Barren Sloping Lands to Productive Terraced Fields: Being the steepest and highest terrain in the country, large areas owned by the farmers are steep and barren and need investment to make them productive. These steep lands also contribute significantly to soil erosion and floods. Terracing of barren land is being taken up on a large scale by cutting the hill-slope into steps, providing supporting walls and leveling the land.

Green School Programme: In order to strengthen environmental education in schools, the Green School Programme (GSP) has been introduced in the year 2009, in all the 182 Senior Secondary and Secondary schools of the state. The Green School Programme enables the school eco-club students to play a part in the environment management system at the school level.

Ten minutes to earth: Planting trees has been a tradition in Sikkim. On 25th of June every year, people all over the State take timeout to participate in this annual ritual of plantation aptly named "Ten Minutes to Earth". This programme embarked on its unending journey from the year 2009 onwards when six lakhs saplings were planted. Since then this has become a yearly activity. Forest Department plays an important role in the distribution of saplings all over the state. This ten minutes activity is expected to help in sequestration of 1400 tons of carbon dioxide annually (Government of Sikkim, 2016).

National award for ground water augmentation from Ministry of Water Resources, Government of India: The National Ground Water Augmentation award of the Ministry of Water Resources, Government of India was awarded to the DharaVikasprogramme of the state in the NGO category. WWF-India received this

award for their work in supporting the State Government for providing technical support to this programme.

The other initiative the Red panda project in Sikkim. Recognizing this WWF-India initiated the Red Panda Project – currently working with communities and governments to conserve this rare species across its distributional range in northeastern India. Particularly the far northeastern states of Sikkim nestled in the high Himalayas. Red Pandas being the State animal of Sikkim, and also an endangered species of global importance, high precaution is being taken for their conservation in the Himalayan Zoological Park. The Forest Department of the Government of Sikkim is trying to save these pandas in the wild as well as in the captive condition.

### **1.3 Understanding Local Global linkages in Environmental Initiatives**

Environmental governance refers to the processes of decision-making involved in the control and management of the environment and natural resources. International Union for Conservation of Nature (IUCN), define Environmental Governance as the 'Multi-level interactions i.e., local, national, international level which interact with one another, whether in formal and informal ways; in formulating and implementing policies in response to environment-related demands and inputs from the society; bound by rules, procedures, processes, and widely accepted behavior possessing characteristics of good governance for the purpose of attaining environmentally-sustainable development'. A 1997 report observed a global consensus that sustainable development implementation should be based on local level solutions and initiatives designed with and by the local Communities. Community participation and partnership along with the decentralization of government power to local communities are important aspects of environmental governance at the local level (Mearns&Scoones, 1997).

Local level environmental governance shifts decision making power away from the state and governments to the grassroots. It is extremely important even on a global scale. Environmental governance at the global level is defined as international and as such has resulted in the marginalization of local voices. Local level governance is

important to bring back power to local communities in the global fight against environmental degradation. States play a crucial role in environmental governance, because however far and fast international economic integration proceeds, political authority remains vested in national Governments". It is for this reason that governments should respect and support the commitment to implementation of international agreements.

The National Mission for a Green India was announced by the Prime Minister as one of the eight Missions under the National Action Plan on Climate Change (NAPCC). It recognizes that climate change phenomenon will seriously affect and alter the distribution, type and quality of natural biological resources of the country. The NAPCC addresses the urgent and critical concerns of sustainable development and identifies the close linkage of the economy with its natural resource base, and cautions that climate-sensitive sectors such as forestry and agriculture may face a major threat because of the projected changes in climate. This will have repercussions on livelihoods of people in general and forest-dependent communities in particular. Under the National Programme for Organic Production in India 1991, the Government has embarked on a macroeconomic stabilization programme. Structural reforms in the foreign trade and payments regime, the tax system, industrial policy, and the financial sector have been undertaken, all of which are likely to have implications for the environment. With this realization the government is attempting to raise resources internally for sustainable development.

The International Council for Local Environmental Initiatives (ICLEI), which was of global GHG (green house gas) emissions and provides technical assistance to help them control network of local governments, facilitate action at other levels of governance. These funds typically come from the Environmental Protection Agency.

Local Governments for Sustainability, founded in 1990 as the International Council for Local Environmental Initiatives (ICLEI), is an international association of local governments and national and regional local government organizations that have made a commitment to sustainable development. It provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level.

ICLEI's basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, national, and global sustainability objective.<sup>5</sup>

ICLEI provides a broad range of concrete and globally accessible tools to help cities transition to more sustainable urban management, covering the areas of urban design, eco-budgeting, urbanization, sustainability management and sustainable procurement. ICLEI links aspiring and innovative cities and local governments in a global network to share experience and expertise in sustainable development, and to accelerate actions at all levels. ICLEI advocates for cities' greater involvement in international decision making processes by representing their interests at major sustainable conferences and multilateral bodies such as UN Commission on Sustainable Development, Rio+20 and the European Commission, as well as working with our global partners including UNEP, UN-Habitat and Aalborg Commitments<sup>6</sup>

Sustainable tourism and sustainable development is also linked to global environmental initiatives. In response to Intergovernmental Panel on climate change at the National Level there is National Action Plan on Climate Change and in local there is State Action Plan on Climate Change. The National Mission for Green India and Organic Mission, State Green Mission which is linked to global environmental initiatives. With regard to the Global Environmental Initiative Sikkim also have taken initiatives such as organic farming, eco tourism, and ban on bio degradable substances network.

#### **1.4 Survey of Literature**

The book entitled *Global Environmental Issues* written by Frances Harris (2007), deals with Environmental issues such as climate change and energy consumption, and our responses to them are of global concern. The underlying premise of the book is that while global environmental issues may be the result of natural and human-induced resource degradation, their root causes are due to more than just ecological factors and technological errors or problems. The book will illustrate how socio-

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<sup>5</sup>[www.iclei.org/about/who-is-iclei.html](http://www.iclei.org/about/who-is-iclei.html)

<sup>6</sup>[www.iclei.org/about/who-is-iclei.html](http://www.iclei.org/about/who-is-iclei.html)

economic and political factors determine why and how people use land, resources and technology, and how this in turn affects natural resource management.

*The Environment in Question Ethics and Global Issues* edited by David E. Cooper and Joy A. Palmer (1992), provides an introduction to the key environmental debates. This book focuses upon specific moral questions or upon particular issues concern to Environmental science. It also addresses more general themes and Concepts such as sustainable development and technological risk which permeate thinking about a wide range of specific matters.

The book *Global Environmental Issues: A Climatological Approach* is written by David D. Kemp (1994) .This book provides a balanced account of the global environmental issues which threaten our society and which we neglect at our peril. It also analyses both social and environmental components of the issues - global warming, ozone depletion, acid rain and drought etc.

Another is the *Global Environment Outlook 3* by United Nation Environment Programme (2002), provides a comprehensive and authoritative review and analysis of environmental conditions worldwide. This text describes policies and achievements in all areas of environmental concern. It analyses the he drivers of environmental change and uses modeling techniques to project the impacts of different policies between 2002 and 2032. It is a crucial assessment for the Earth Summit in Johannesburg in September 2002 and for environmental policy and research worldwide.

*Managing Global Issues: Lessons Learned* edited by P.J Simmons (2001), highlights globalization is pushing to the fore a wide variety of global problems that demand urgent policy attention. The book provides a comprehensive comparative assessment of international efforts to manage global problems. It identifies and explains successes and failures of such efforts, examines the roles of different actors, and outlines lessons that may guide future action by governments, international organizations, nongovernmental organizations, and the private sector.

The book entitled *Global Environmental Policy: Concepts, Principles, and Practice* written by Charles and Federic March (2010), which addresses the most significant environmental challenges facing our generation stressing policy implications and the current scientific accounts of global environmental threats. The book presents learning objectives, examples, and problems. It includes comprehensive case studies and discusses topics of interest to a domestic and international audience. It also presents a professional assessment of major global issues using current data and analysis from international policy organizations.

The book *Global Environmental Politics: Concepts, Theories and Case Studies* edited by Gabriela Kutting (2010), describes the most important environmental theories and concepts with a series of detailed case studies of the most pressing environmental problem.

The book entitled *Environmental Issues in India: A Reader* edited by Mahesh Rangarajan (2014), is the collection of essays from various authors within India and abroad. The book explores the pre colonial and colonial periods, and move on to independent India. The book examines various environmental movements and how India relates to global environmental concerns.

In this article *Beyond Global Warming: Ecology and Global Change* by Peter M. Vitousek(1994), highlights the three components of global environmental change that has several features in common. All are well documented, ongoing changes whose existence and global nature are beyond serious dispute, their proximate causes have been identified clearly, and all have direct casual connections to global climate change and the loss of biological diversity. The three components which are selected are the increasing concentration of carbon dioxide in the atmosphere, alteration of the global nitrogen cycle, change in land cover or land use. In each component it will describe how and why it is changing globally. The article also describes how the component of global environmental change drives global changes in climate and biological diversity and briefly discusses the proximate and ultimate cause of change. It also suggests several steps that have taken to influence the cause of global change.

The book *Conserving Biodiversity for sustainable Development* edited by P S Ramakrishnan and other editorial team (2003). This book is based on the basis of paper presented in the Indian and regional meets on Biodiversity. The book starts with the chapter on perspectives and constraints for meaningful research on the science of biodiversity and suggests the precautionary principle and the principle of flexibility have to be the cornerstone for coping with the uncertainties of the future world scenario. This volume covers the topics ranging from genes to ecosystem and landscapes, and with a variety of topics related to flora fauna, a variety of ecosystem and human dimension. This book also deals with the issues related to conservation strategies, local, regional and global issues, institutional issues and policy considerations.

The another book *Climate Change and Sustainability in Mountain Areas* edited by Mahendra P. Lama and other editorial team (2012), has discussed about the growing knowledge of the process of climate change and its impact on Himalayan ecology, livelihood practices, cultural and social ethos, environment and ecosystem. It also gives an understanding various aspects of climate change and its impact on climate change.

The book entitled *Biodiversity of the Sikkim Himalayas* written by J.R. Subba (2002), which has been reviewed. The book speaks of the flora fauna including the various crops of the Sikkim Himalayan region. It also mentions the diversity that is undergoing in them. This book also deals with the process of diversity that is work in animals and as well as in plants.

The book titled *Forestry and Environment Mission Sikkim- 2015* by Forests Environment & Wildlife Management Department Government of Sikkim (2011), basically discuss about the growing environmental problems. The department is preparing working plans which are having focus on sustainable forest management and conservation of biodiversity. The book also focuses on building the capacity to adapt and strengthen the social- ecological systems.

The document *Governance for Sustaining Himalayan Ecosystem Guidelines and Practice (2001)* by Ministry of Environment & Forests Government of India, discuss

about the climate change adaptation strategy, puts key guidelines related the government and management of Himalayan ecosystem. This document attempts to collate key learning's from this literature at one place, embodied in a set of guidelines and best practices for various aspects of the governance and management of the Himalayan ecosystem. The guidelines in this document cover a wide variety of issues including urbanization, tourism, water security, energy, forest management and infrastructure.

The documents *Environmental Initiatives of Shri PawanChamling: A Glance (1995-2015)*, by Government of Sikkim, basically talks about the various initiatives that Sikkim government taken up for environmental problems since from 1995 -2015. The initiatives such as mass awareness drive, Ten minutes to Earth and ParyavaranMahotsav, which has led to a lasting effect towards promotion of environment conservation. The Government has been developing natural resources based tourism as a means of livelihood.

The Report *Plastics and the Environment: Assessing the Impact of the Complete Ban on Plastic Carry Bag* by The Ecotourism & Conservation Society of Sikkim (2014), discuss about the ongoing debate on the use of plastic bags across the world and many cities. various groups in the country have sought ban on manufacture and use of this product and many municipalities and state government have announced bans perhaps the only means to deal with visible concern .It also discuss the effectiveness of ban imposed by the Sikkim administration on the use storage, import, sale disposal of polythene carry bags by any person including a shopkeeper, wholesaler. A survey was conducted among various stakeholders focusing on vendors and consumers in the region.

The article *Environment and Development in Sikkim Himalaya: A Review* written by Pradyumna P. Karan (1989), discusses the problems of environment and development in Sikkim Himalaya. It attempts to assess the problem of environment and development in Sikkim Himalaya. The article *Tourism and Biodiversity Conservation: The Sikkim Himalaya* by Suresh C. Rai and Rakesh C. Sundriyal (1997), has given the dynamics of tourism growth and biodiversity and its impact on environment, local communities and state economy. It also gives a vast scope for increased tourism in

Sikkim that must be viewed with response to environment preservation and local communities must be evolved with such programme. It also illustrate how tourism activities may be implemented and managed sustainably so that vegetation and culture are protected and largest benefits can reach the local community.

### **1.5 Rationale and Scope**

The importance of this study is that it examines the issues related to local level responses to global environmental initiatives. The local response is crucial for global environmental initiative in a globalised world. It helps to understand and cope up with environmental challenges in future. The local response to global environmental initiatives is very much important to provide an effective and cost efficient way to achieve local, national and global sustainability.

This study mainly focuses on local responses in Sikkim on global environmental initiative. Sikkim at the local level had taken a number of initiatives on global environmental issues. It has a major role to play in addressing environmental issues in the Eastern Himalayan Region. All the development works being carried out in the state is done with an eye on the environment .Many initiatives ensure that environments remain the top priority of the state government. In this context this study unravels the issues involved in local-global linkages in addressing environmental issues.

### **1.6 Objectives of the study**

1. To identify the major global environmental initiatives.
2. To examine the environmental initiatives in Sikkim.
3. To analyze the nature of local responses in Sikkim to global environmental initiatives.
4. To discuss the role of governmental and nongovernmental organizations in Sikkim in framing the local responses to global initiatives on environment.

### **1.7 Research questions**

1. How far local-global environmental initiatives interlinked?
2. What is the nature of local level response in Sikkim to global environmental initiatives?

3. Which are the forces that shape local responses in Sikkim to global environmental initiatives?

## **1.8 Methodology**

The methodology used in the study is both qualitative and quantitative. It will make use of both primary and secondary sources. Primary sources such as observation, interviews, questionnaires documents, existing literature, agreements, reports, treaties and secondary include articles in refereed- journals, books, news report, e-resources and unpublished dissertation sources. This research also prescribes unstructured interviews with the resource persons, experts in the regions, academicians, policy makers and scholars. The Qualitative techniques used in the study are interviewing, case study and field study to get the answer for the questions raised in the study and for the new addition to knowledge.

## **1.9 Tentative Chapterization**

### **Chapter I**

#### **Introduction**

This gives an overview of the study briefly.

### **Chapter II**

#### **Global Environmental Initiatives: Dynamics and Dimensions**

This chapter deals with the various concepts and theoretical aspects related to the study. It also highlights various initiatives and debates on environmental issues and climate change negotiations.

### **Chapter III**

#### **Environmental Initiatives of Sikkim: An Overview**

This chapter discusses the trends and patterns of Local Responses to Global Environmental Initiatives with a special focus on initiatives taken in Sikkim in response to global environmental initiatives for sustainable development.

## **Chapter IV**

### **Local Global Linkages in Environmental Initiatives: The case of Sikkim**

This chapter deals with linkages between the local and the global level. It also looks into the responses of local level to the global environmental initiatives with regard to Sikkim.

## **Chapter V**

### **Conclusion**

The chapter presents the conclusions of the study and the answers to research questions

## CHAPTER II

### Global Environmental Initiatives: Dynamics and Dimensions

#### 2.1 Introduction:

Environmental Degradation is understood as the deterioration of environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife. It is defined as any change or disturbance to the environment perceived to be undesirable. Environmental Degradation is caused by the combination of a very large and increasing human population, continually increasing economic growth or per capita affluence, and the application of resource depleting and polluting technology. This chapter describes the history of Global Environmental Movements and discusses various concepts, theories and issues related to Global Environmental Initiatives. The chapter also focuses on various Environmental Organizations, and Acts which play a vital role in Environmental Initiatives.

Environmental Degradation has harmful effect on human world and also in the biophysical environment. Environmental Protection is a practice of protecting the Natural Environment on Individual, Organization or Governmental levels, for the benefit of both the environment and humans. Environmentalism, a social and Environmental Movement, addresses environmental issues through advocacy, education and activism.

Due to the pressures of overconsumption, population and technology, the biophysical environment is being degraded, sometimes permanently. This has been recognized, and governments have begun placing restraints on activities that cause environmental degradation. Since the 1960s, activity of environmental movements has created awareness of various environmental issues.

#### 2.2 Environmental Movements in the Early Years

Early interest in the environment was a feature of the Romantic Movement<sup>1</sup> in the early 19th century. Systematic efforts on behalf of the environment only began in the

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<sup>1</sup> Romantic period was an artistic, literary, musical and intellectual movement that originated in Europe toward the end of the 18th century and in most areas was at its peak in the approximate period from

late 19th century; it grew out of the Amenity Movement in Britain in the 1870s, which was a reaction to Industrialization, the Growth of Cities, and worsening Air and Water Pollution. Starting with the formation of the Commons Preservation Society in 1865, the movement championed rural preservation against the encroachments of Industrialization.

An early Back to movement, which anticipated the romantic ideal of Modern Environmentalism, was advocated by intellectuals such as John Ruskin, William Morris, George Bernard Shaw and Edward Carpenter, who were all against consumerism, pollution and other activities that were harmful to the natural world. The movement was a reaction to the urban conditions of the industrial towns, where sanitation was awful, pollution levels intolerable and housing terribly cramped (Gould, 1988; Wall, 1994).

The movement in the United States began in the late 19th century, out of concerns for protecting the natural resources of the West. In the 20th century, environmental ideas continued to grow in popularity and recognition. In 1916 the National Park Service<sup>2</sup> was founded by US President Woodrow Wilson.

The Forestry Commission was set up in 1919 in Britain to increase the amount of woodland in Britain by buying land for afforestation and reforestation. The commission was also tasked with promoting forestry and the production of timber for trade. During the 1920s the Commission focused on acquiring land to begin planting out new forests; much of the land was previously used for agricultural purposes. By 1939 the Forestry Commission became the largest landowner in Britain (Nail, 2008:332).

### **2.2.1 Environmental Movements in the Second World War Period:**

In the aftermath of the Second World War, the rise of the nuclear age introduced fears of a new kind of pollution from deadly radiation. The environmental movement

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1800 to 1850. Romanticism was characterized by its emphasis on emotion and individualism as well as glorification of all the past and nature

<sup>2</sup>The National Park Service (NPS) is an agency of the United States federal government that manages all U.S. national parks, many American national monuments, and other conservation and historical properties with various title designations. It was created on August 25, 1916, by Congress through the National Park Service Organic Act and is an agency of the United States Department of the Interior.

gained new momentum in 1962 with the publication of Rachel Carson's book *The Silent Spring*<sup>3</sup>, which warned about the agricultural use of synthetic chemical pesticides.

The book's legacy was to produce a far greater awareness of environmental issues and interest into how people affect the environment. With this new interest in environment problems such as air pollution and petroleum spills, and environmental interest got public attention. New pressure groups formed, notably Greenpeace and Friends of the Earth (US), as well as notable local organizations such as the Wyoming Outdoor Council, which was founded in 1967. In the 1970s, the Environmental Movement gained rapid speed around the world as a productive outgrowth of the counter culture movement (New York Times, 1994).

The first green party in Europe was the Popular Movement for the Environment, founded in 1972 in the Swiss canton of Neuchâtel. The first national green party in Europe was PEOPLE, founded in Britain in February 1973, which eventually turned into the Ecology Party, and then the Green Party. Protection of the environment also became important in the developing world; the Chipko movement<sup>4</sup> was formed in India under the influence of Mohandas Gandhi and they set up peaceful resistance to deforestation by literally hugging trees. Their peaceful methods of protest and slogan ecology is permanent economy were very influential.

Another milestone in the movement was the creation of an Earth Day. Earth Day was first observed in San Francisco and other cities on March 21, 1970, the first day of spring. It was created to give awareness to environmental issues. On March 21, 1971, United Nations Secretary-General U Thant spoke of a spaceship Earth on Earth Day, hereby referring to the ecosystem services the earth supplies to us, and hence our obligation to protect it. Earth Day is now coordinated globally by the Earth Day Network, and is celebrated in more than 175 countries every year (Earth Day, 1971).

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<sup>3</sup>The book documented the detrimental effects on the environment particularly on birds of the indiscriminate use of pesticides. Carson accused the chemical industry of spreading disinformation and public officials of accepting industry claims unquestioningly. A scientist and writer, Ms. Carson stressed the need to respect the ecosystem in which we live, in order to protect human health as well as the environment.

<sup>4</sup>The Chipko movement was primarily a forest conservation movement in India that began in 1973 and went on to become a rallying point for many future environmental contrast and movements all over the world; it created a precedent for non-violent protest started in India.

With the ending of the tumultuous decade of the 1960s, its highest ideals and visions began to be translated into practical form. Among these was the environmental vision now, quite literally, a Global Phenomenon. As universal concern about the healthy and sustainable use of the planet and its resources continued to grow, the UN, in 1972, convened the United Nations Conference on the Human Environment, in Stockholm (Baylis& Smith. 2005: 454).

It was a landmark event, and its final Declaration contains 19 principles that represent an environmental manifesto for our times. In addressing the need to inspire and guide the peoples of the world in the preservation and enhancement of the human environment, it laid the groundwork for the new Environmental Agenda of the United Nations System (Stockholm Conference 1972).

Picking up on the energy generated by the Conference, the General Assembly, in December 1972, established the United Nations Environment Programme (UNEP), which leads the efforts of the United Nations family on behalf of the global environment. The Declaration of the UN Conference on the Human Environment held at Stockholm declared the priorities of UN as Environmental Aspects of Disasters and Conflicts, Ecosystem Management, Environmental Governance, Harmful Substances, Resource Efficiency, and Climate Change (UN Report, 1972).

By the Mid-1970s, many felt that people were on the edge of environmental catastrophe. The Back-to-the-land movement started to form and ideas of environmental ethics joined with anti-Vietnam War sentiments and other political issues. These individuals lived outside normal society and started to take on some of the more radical environmental theories such as Deep Ecology<sup>5</sup>. Around this time more mainstream environmentalism was starting to show force with the signing of the Endangered Species Act in 1973<sup>6</sup> and the formation of CITES in 1975. Significant

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<sup>5</sup>Deep ecology is an ecological and environmental philosophy promoting the inherent worth of living beings regardless of their instrumental utility to human needs, plus a radical restructuring of modern human societies in accordance with such ideas. Deep ecology argues that the natural world is a subtle balance of complex inter-relationships in which the existence of organisms is dependent on the existence of others within ecosystems.

<sup>6</sup> The Endangered Species Act Of 1973 is one of the few dozens of us environmental laws passed in the 1970s, and serves as the enacting legislation to carry out the provisions outlined in The Convention On International Trade In Endangered Species Of Wild Fauna And Flora(CITIES)

amendments were also enacted to the United States Clean Air Act<sup>7</sup> and Clean Water Act.<sup>8</sup>

In 1983, the Secretary-General of the United Nations invited Dr. Gro Harlem Brundtland, a medical doctor, master of public health and former Prime Minister of Norway, to establish and chair a World Commission on Environment and Development. In April 1987, the Brundtland Commission, as it came to be known, published its groundbreaking report, “Our Common Future” which brought the concept of sustainable development into the public discourse (The Brundtland Report, 1987).

The Earth Summit also led to the adoption of the UN Convention on Biological Diversity (1992) and the UN Convention to Combat Desertification in Countries Experiencing Serious Drought and Desertification, Particularly in Africa (1994). In 1994, a Global Conference on the Sustainable Development of Small Island Developing States, held in Barbados, adopted a Programme of Action that set forth policies, actions and measures at all levels to promote sustainable development for these states (Barbados Programme of Action Report, 1994).

In 1988, UNEP and the World Meteorological Organization (WMO)<sup>9</sup> came together to create the Intergovernmental Panel on Climate Change (IPCC)<sup>10</sup>, which has become the pre-eminent global source for scientific information relating to climate change. The main international instrument on this subject, the United Nations Framework Convention on Climate Change (UNFCCC)<sup>11</sup> was adopted in 1992. And its Kyoto Protocol<sup>12</sup>, which sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions, was adopted in 1997 (Kyoto Protocol 1997).

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<sup>7</sup> Clean Air Act Extension of 1970, 84 Stat. 1676, Pub. L. 91–604

<sup>8</sup> The Clean Water Act (CWA) is the primary federal law in the United States governing water pollution.

<sup>9</sup> A specialized agency of the United Nations whose mandate covers weather, climate and water resources.

<sup>10</sup> The IPCC assesses the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change.

<sup>11</sup> In 1992, countries joined an international treaty, the United Nations Framework Convention on Climate Change, as a framework for international cooperation to combat climate change by limiting average global temperature increases and the resulting climate change

<sup>12</sup> The Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gases emissions.

### 2.3 Theoretical Perspectives

Green politics is a political Ideology that aims to create an ecologically sustainable society rooted in environmentalism, nonviolence, social justice, and grassroots democracy. It is also known as ecopolitics. It began taking shape in the western world in the 1970s; since then Green parties have developed and established themselves in many countries, and have achieved success.

In the early 1990s, Green Politics was not so prominent in the field of international debate. By 1991 the literature on Green political ideas had expanded rapidly, a development that reflects the increasing international public concern over environmental issues and the growing international prominence of Green political parties during the latter half of the 1980s(Scott, Andrew et.al,2005:235).

Green politics emerged as a significant political force in many countries from the mid-1970s onwards. Many of the writings of Green thinkers, and the practices of Green movements, contain both analyses of the dynamics of global politics, and normative visions concerning the restructuring of world politics (Scott, Andrew, et.al, 2005:235).

Eckersley (1992)suggests that the defining characteristic is ecocentrism<sup>13</sup>the rejection of an anthropocentric world-view which places moral value only on humans in favor of one which places independent value also on ecosystems and all living beings (Eckersley 1992). In addition to this, rejection of anthropocentrism, Dobson (1990) suggests that a second key feature of Green politics is the limits to growth argument about the nature of the environmental crisis. Greens suggest that it is the exponential economic growth experienced during the last two centuries which is at the root cause of the current environmental crisis (Scott, Andrew, et al, 2005:235).

Green Political Theory is the most recent of schools of political thinking. On the one hand, it focuses on issues that are extremely old in politics and philosophical inquiry such as the relationship between the human and nonhuman worlds. There is a common distinction often made in the literature between ‘environmentalism’

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<sup>13</sup>Ecocentrism a term used in ecological political philosophy to denote a nature-centered, as opposed to human-centered, system of values.

and 'ecologism' (Dobson, 2007), with environmentalism denoting a form of 'single issue' green politics solely concerned with, for instance, pollution and resource management, and ecologism denoting a full-fledged political ideology with views on non-resource and non-environmental concerns. In this respect what is offered here is closer to ecologism than environmentalism, but nevertheless uses green political theory as the appropriate term since even ecologism conveys a definite sense that green politics is largely or exclusively concerned with the non-human world and human-non human relations (Barry, 2014: 153).

The emergence of a general Green philosophy and Green political parties in the late 1970s and 1980s may be seen as representing this third emancipator moment. That is, although Green political thought sometimes draws on the New Left participatory thinking of the 1960s and some aspects of the survivalist or so-called doomsday environmental literature of the early 1970s, it nonetheless represents a new, ecologically inspired political orientation that has raised new political issues and called into question old political responses (Scott, Andrew, et al. 2005:235).

Green is an extraordinarily elastic one that has been applied to, or appropriated by, all manner of environmental and political positions over the past decade. However, from the point of view of participants in the Green movement and in Green political parties, the word Green represents a distinctive body of ideas and a new political force. GPT provides a normative foundation for a Green view of global politics; 'Global Ecology' provides an explanatory foundation.

This green political theory associated most centrally with the writings of Wolfgang Sachs (1993), Pratap Chatterjee (1994) and Matthias Finger (1992), Vandana Shiva (1993) and magazines such as *The Ecologist* and *Third World Resurgence*. A central tenet of Green thought is the rejection of anthropocentric ethics in favour of an eco-centric approach. For Eckersley (1992: 49), ecocentrism has a number of central features. Empirically, it involves a view of the world as ontologically composed of inter-relations rather as individual entities. All beings are fundamentally 'embedded in ecological relationships' (ibid: 53).

Ecocentrism therefore has four central ethical features which collectively distinguish it from other possible ethical positions towards the environment (ibid: 46). First, it recognizes the full range of human interests in the non-human world, as opposed simply to narrow, instrumental, economic interests in resource use. Secondly, it recognizes the interests of the non-human community. Thirdly, it recognizes the interests of future generations of humans and non-humans. Finally it adopts a holistic rather than an atomistic perspective that is, it values populations, species, ecosystems and the ecosphere as a whole, as well as organisms individually (Scott, Andrew, Richard, Jack, Matthew, Christian & Jacqui, 2005:235).

A second plank of a Green position is the belief in limits to the growth of human societies. It argued that the exponential economic and population growth of human societies was producing an interrelated series of crises. Exponential growth was producing a situation where the world was rapidly running out of resources to feed people or to provide raw material for continued industrial growth (exceeding carrying capacity and productive capacity), and simultaneously exceeding the absorptive capacity of the environment to assimilate the waste products of industrial production (Dobson 1990: 15; Meadows et al. 1972).

Environmentalism concentrates on ‘sustainable development’, a concept originally used in the World Conservation Strategy (IUCN 1980) and popularized by the World Commission on Environment and Development (WCED 1987). Sustainable development presumes the compatibility of growth with responding successfully to environmental problems. Greens reject this, arguing that sustainability explicitly requires stabilizing and, in the industrialized countries almost certainly reducing, throughputs of materials and energy, and thus economic output (Lee, 1993).

#### **2.4. Current Environmental Issues:**

Current Global environmental issues include Ozone Layer Depletion, Global Warming, Acid Deposition, Over Population, Resource Depletion, Environmental Degradation, Deforestation, Climate Change issue, Pollution problems in developing countries, Endangered Species, Marine Pollution, and trans-boundary movement of Hazardous wastes. It is because their impacts and damages affect not only the

countries that caused the problems, but go beyond their national boundaries and can reach a global level. It is because these are problems which require international efforts for solution.

**Climate Change:** Climate Change is one of the biggest issues facing the world today. Climate Change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

The North-South divide has been widely explored as an analytical tool to explain the processes and outcomes of climate negotiations (Mejia, 2010: 10). In fact, upon closer inspection shows how the UNFCCC process and Kyoto Protocol have been defined by, built upon, and, as a result, institutionalized the North-South conflict within the climate regime. In this sense, the North-South conflict has been an underlying and omnipresent element in negotiations.

Since there is a lack of a socially shared understanding, there has been disagreement between the two blocs about burden sharing. With the Kyoto Protocol, the notion of Common but Differentiated Responsibilities has been embraced, which has been the source of the construction of a divided regime (Kyoto Protocol 1997).

All of UNEP's work on climate change is shaped by the negotiations process of the United Nations Framework Convention on Climate Change (UNFCCC). While negotiations continue towards reaching a legally binding agreement, the UNFCCC meeting in Copenhagen in 2009 has signaled the importance of immediate actions and the need to support developing countries in their mitigation and adaptation efforts (United Nations Climate Change Conference 2009).

UNEP's sub-programme will provide these critical support services, and will also help countries prepare for and participate in the Cancun climate talks. Within the United Nations Framework Convention on Climate Change, legal instruments may be adopted to reach the goals of the convention. For the period from 2008 to 2012, greenhouse gas reduction measures were agreed in the Kyoto Protocol in 1997 (Kyoto Protocol Report 1997).

During the 2011 United Nations Climate Change Conference, the Durban Platform was established with the aim to negotiate a legal instrument governing climate change mitigation measures from 2020. The resulting agreement was to be adopted in 2015. At the conclusion of COP 21 (conference of the parties), on 12 December 2015, the final wording of the Paris Agreement was adopted by consensus by all of the 195 UNFCCC participating member states and the European Union to reduce emissions as part of the method for reducing greenhouse gas. In the 12 page Agreement the members promised to reduce their carbon output as soon as possible and to do their best to keep global warming to well below 2 degrees Celsius (Paris Agreement 2015).

The Paris Agreement is open for signature by States and regional economic integration organizations that are Parties to the UNFCCC from 22 April 2016 in UN Headquarters in New York. 175 Parties signed the treaty on 22<sup>nd</sup> April 2016 (Paris Agreement, 2016).

**Pollution:** Pollution is the introduction of contaminants into the natural environment that causes adverse change. Environmental pollution is the greatest danger that the whole civilization is facing. Pollution is the addition to the ecosystem of something, which has a detrimental effect on it. One of the most important causes of pollution is the high rate of energy usage by modern, growing populations. Pollution is of different types. They are air pollution, water pollution and land pollution.

Pollution of air, water and soil requires millions of years to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution. While water pollution is caused by oil spill, acid rain, urban runoff air pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that deprives soil from essential nutrients.

**Global Warming:** Global warming is the result of human practices like emission of Green House Gases. Global warming leads to rising temperatures of the oceans and the earth's surface causing melting of polar ice caps, rise in sea levels and also unnatural patterns of precipitation such as flash floods, excessive snow or desertification. The Intergovernmental Panel on Climate Change (IPCC), established in 1988 by the World Meteorological Organization (WMO) and the United Nations

Environment Programme (UNEP), two organizations of the United Nations concluded that increasing greenhouse gas concentrations resulting from human activity such as fossil fuel burning and deforestation are responsible for most of the observed temperature increase since the middle of the 20th century.

National Oceanic and Atmospheric Administration NOAA's global analysis for 2015 lists 2015 as the warmest year on record since 1880 at 0.90°C above the 20th Century average. The year 2014 is the second warmest at 0.74°C above the average. The year 2013 was the fourth warmest at 0.66°C above the average (National Oceanic and Atmospheric Administration, 2016).

The combined average temperature over global land and ocean surfaces for September 2016 was the second highest for September in the 137-year record, 0.04°C (0.07°F) cooler than the record warmth of 2015. A few months after the end of one of the strongest El Niños<sup>14</sup> in at least the past half century, this month effectively snapped the 16-month streak of record warm monthly global temperatures (National Oceanic and Atmospheric Administration, 2016).

**Over Population:** The population of the planet is reaching unsustainable levels as it faces shortage of resources like water, fuel and food. Population explosion in less developed and developing countries is straining the already scarce resources. Intensive agriculture practiced to produce food damages the environment through use of chemical fertilizer, pesticides and insecticides. Overpopulation is one of the crucial current environmental problems.

In demographics, the world population is the total number of humans currently living. As of August 2016, it was estimated at 7.4 billion (World Population Data Sheet, 2016). The United Nations estimates it will further increase to 11.2 billion in the year 2100.<sup>15</sup> World population has experienced continuous growth since the end of the Great Famine of 1315–17 and the Black Death in 1350, when it was near 370 million (Biraben, 1980). The highest population growth rates global population

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<sup>14</sup>El Niño is a climate cycle in the Pacific Ocean with a global impact on weather patterns. The cycle begins when warm water in the western tropical Pacific Ocean shifts eastward along the equator toward the coast of South America

<sup>15</sup>World Population Prospects - Population Division - United Nations. *esa.un.org*.

increases above 1.8% per year occurred between 1955-1975 peaking to 2.06% between 1965-1970. The growth rate has declined to 1.18% between 2010-2015 and is projected to decline to 0.13% by the year 2100 (Biraben, 1980)

World population reached 7 billion on October 31, 2011 according to the United Nations Population Fund (UN Report, 2011). The median age of the world's population was estimated to be 30.1 years in 2016, with the male median age estimated to be 29.4 years and female, 30.9 years.<sup>16</sup>

**Natural Resources:** Natural Resource depletion is another crucial current environmental problem. Fossil fuel consumption results in emission of Greenhouse gases, which is responsible for global warming and climate change. Globally, people are taking efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy. The cost of installing the infrastructure and maintaining these sources has plummeted in the recent years.

This results in serious environmental damages through the extraction process itself, but also due to the ever longer transport distances between extraction, processing and final consumption. Large-scale exploitation of minerals began in the Industrial Revolution around 1760 in England and has grown rapidly ever since. Global resource extraction grew more or less steadily over the past 25 years, from 40 billion tons in 1980 to 58 billion tons in 2005, representing an aggregated growth rate of 45%<sup>17</sup>.

The United Nations and the World Bank created programs such as Reducing Emissions from Deforestation and Forest Degradation (REDD), which works especially with developing countries to use subsidies or other incentives to encourage citizens to use the forest in a more sustainable way (UNFCCC. 2009).

In addition to making sure that emissions from deforestation are kept to a minimum, an effort to educate people on sustainability and helping them to focus on the long-term risks is key to the success of these programs. The New York Declaration on Forests and its associated actions promotes reforestation, which is being encouraged

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<sup>16</sup>CIA, The World Factbook: Field Listing: Median Age. [www.cia.gov](http://www.cia.gov).

<sup>17</sup>[info@worldresourcesforum.org](mailto:info@worldresourcesforum.org).

in many countries in an attempt to repair the damage that deforestation has done (Foley, Jonathan, et al. 2005).

**Natural Resources:** The over consumption of resources and creation of plastics are creating a global crisis of waste disposal. Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and, less developed countries. Nuclear waste disposal has tremendous health hazards associated with it. Plastic, fast food, packaging and cheap electronic wastes threaten the well being of humans. Waste disposal is one of urgent current environmental problem.

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**Loss of Biodiversity:** Human activity is leading to the extinction of species and habitats and loss of bio-diversity. Eco systems, which took millions of years to perfect, are in danger when any species population is decimating. Balance of natural processes like pollination is crucial to the survival of the eco-system and human activity threatens the same. Another example is the destruction of coral reefs in the various oceans, which support the rich marine life.

Globally important wilderness areas despite being strongholds for endangered biodiversity, for buffering and regulating local climates, and for supporting many of the world's most politically and economically marginalized communities are completely ignored in environmental policy. The researchers mapped wilderness<sup>18</sup> areas around the globe. The researchers then compared their current wilderness to one produced by the same methods in the early 1990s.

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<sup>18</sup>This wilderness being defined as biologically and ecologically intact landscapes free of any significant human disturbance.

This comparison showed that a total of 30.1 million km around 20 percent of the world's land area now remains as wilderness with the majority being located in North America, North Asia, North Africa, and the Australian continent. The comparison between the two shows that an estimated 3.3 million km almost 10 percent of wilderness area has been lost in the intervening years. Those losses have occurred primarily in South America, which has experienced a 30 percent decline in wilderness, and Africa, which has experienced a 14 percent loss (Wildlife Conservation Society, 2016).

**Deforestation:** Our forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall. Deforestation simply means clearing of green cover and makes that land available for residential, industrial or commercial purpose. An estimated 13 million hectares of forests were lost each year between 2000 and 2010 due to deforestation. In tropical rainforests particularly, deforestation continues to be an urgent environmental issue that jeopardizes people's livelihoods, threatens species, and intensifies global warming. Forests make a vital contribution to humanity, but their full potential will only be realized if we halt deforestation and forest degradation. Between 1990 and 2015, the world lost some 129 million ha of forest, an area the size of South Africa (WWF Global Report).

**Ozone Layer Depletion:** The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful rays. Depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chlorine and Bromide found in Chloro-floro carbons (CFC's).<sup>19</sup> Once these toxic gases reach the upper atmosphere, they cause a hole in the ozone layer, the biggest of which is above the Antarctic. The CFC's are banned in many industries and consumer products. Ozone layer is valuable because it prevents harmful UV radiation from reaching the earth. This is one of the most important current environmental problems.

**Acid Rain:** Acid rain occurs due to the presence of certain pollutants in the atmosphere. Acid rain can be caused due to combustion of fossil fuels or erupting volcanoes or rotting vegetation which release sulfur dioxide and nitrogen oxides into

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<sup>19</sup>A chlorofluorocarbon (CFC) is an organic compound that contains only carbon, chlorine, and fluorine, produced as a volatile derivative of methane, ethane, and propane.

the atmosphere. Acid rain is a known environmental problem that can have serious effect on human health, wildlife and aquatic species.

**Public Health Issues:** The current environmental problems pose a lot of risk to health of humans, and animals. Dirty water is the biggest health risk of the world and poses threat to the quality of life and public health. Run-off to rivers carries along toxins, chemicals and disease carrying organisms. Pollutants cause respiratory disease like Asthma and cardiac-vascular problems. High temperatures encourage the spread of infectious diseases like Dengue. Since the 1970s, newly emerging diseases have been identified at the unprecedented rate of one or more per year. (World health report 2007). Current global health threats sparking such as Ebola, for instance the world couldn't have foreseen the 2014 outbreak, particularly in West Africa, which had never before experienced it (Humanosphere Report 2016).

**Natural Resource Depletion:** If Natural Resources are misused or overused, they may not be available in the future. Non-Renewable Resources such as oil, minerals and coal, once exhausted, cannot be replenished. This is called Depletion of Resources. Unfortunately, our technological society is consuming natural resources at a very fast speed and in an unchecked manner. So the natural resources are being depleted at a great speed at the earth.

When looking at the world's forests, one finds a depletion of natural resources; "The net loss of the global forest area in the last decade of the 20th century was about 94 million hectares, the equivalent of 2.4 percent of total world forests. Deforestation of tropical forests is almost 1 percent annually" (Viotti & Kauppi, 2013: 498). When looking at natural resource depletion in places such as Latin America, one will find that issues such as tropical deforestation is a very real and continued threat to natural resources and the environment as a whole (Rowntree, Lewis, Price, & Wyckoff, 2015).

In fact, tropical forests are among the most at risk areas of earth as it pertains to deforestation. Thus, not only are plant and animal life affected with this tropical deforestation, but these actions also lead to an increase of additional CO<sub>2</sub>s. According to scholars, Current estimates suggest that fully 20 percent of all human-causes GHG

emissions result from cutting and burning tropical forests (Rowntree, Lewis, Price, & Wyckoff, 2015: 59).

## **2.5. Major Global Initiatives on Environment: An Overview**

**2.5.1. Major Conferences on the Environment:** The major global environmental conference had been building since the mid-1960s as cross boundary problems such as air and water pollution raised awareness of the need for international cooperation. A Swedish representative first proposed the idea in 1968 at the Economic and Social Council Biosphere meeting hosted by the UN. Stockholm was the very first global meeting about a single issue; it was the first coordinated attempt to discuss an international issue at a global level. Since Stockholm, various conferences have been held on many global issues. It was a groundbreaking advancement in this respect and provided a stage for future environmental conferences to set global agendas (Seyang, Jordan, 2002:19-39).

### **The Stockholm Conference (1972):**

The Stockholm Conference heralded the beginning of environmental awareness in the international community. When it was convened, the environmental movement itself was new. To the extent that any countries recognized environmental problems, they were primarily the industrialized ones. The problems that they identified were generally the correctable by-products of industrialization, including water pollution and smog. In 1972, even the United States, World Environmental Affairs leader, had an Environmental Protection Agency (EPA) that was barely two years of age. The few existing treaties dealt primarily with shared natural resources, such as Antarctica or the high seas, and no formal international arena existed in which countries could raise environmental issues (UN, 1972).

Stockholm placed the environment on the international agenda for the first time and set the stage for international actions over the course of the next twenty years--until Rio. From an international legal perspective, the 1972 conference's single most important achievement was the Stockholm Declaration, a non-binding statement of principles, to inspire and guide the peoples of the world in the preservation and enhancement of the human environment. Principle 21<sup>20</sup>, its most famous, held a state

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<sup>20</sup>Principle 21, States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own

responsible for actions within its own borders that cross over those borders and harm another state; it has since become a binding international law. Institutionally, Stockholm's most impressive achievement was the creation of the United Nations Environmental Programme (UNEP), which today remains the world's primary international body that addresses global environmental problems from its headquarters in Nairobi, Kenya (Stockholm conference 1972).

The Stockholm Conference was the pivotal event in the growth of the Global Environmental Movement. It was the first occasion on which the political, social and economic problems of the global environment were discussed at an intergovernmental forum with a view to actually taking corrective action.

The Conference has four major results. First, the conference confirmed the trend towards a new emphasis on the Human environment. Before Stockholm, people usually saw the environment, as something not connected to humanity. Stockholm recorded a fundamental shift in the emphasis of our environmental thinking.

Second, Stockholm forced a compromise between the different perceptions of the environment held by developed and developing countries. Before Stockholm, developed countries used to largely determine environmental priorities. After Stockholm, the needs of least developed and developing countries became a key factor in determining international policy.

Third, the presence of so many NGOs at the conference and the role they played marked the beginning of a new and more insistent role for Governments and Intergovernmental Organizations.

Fourthly, the most tangible outcome of Stockholm was the creation of the United Nations Environment Programme (UNEP). It had limitations and difficulties. But it was probably the best form of institution possible under the circumstances and it became the focus of a new interest in global responses to global problems (UN Conference on the Human Environment, 1972)

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environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

### **Brundtland Commission (1987):**

The World Commission on Environment and Development is popularly known as the Brundtland Commission. The Brundtland known by the name of its Chair Gro Harlem Brundtland was convened by the United Nations in 1983. The commission was created to address growing concern about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development.

In establishing the commission, the UN General Assembly recognized that environmental problems were global in nature and determined that it was in the common interest of all nations to establish policies for sustainable development. It firmly combines economy and environment through its promotion of sustainable development. It defines Sustainable Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The report concluded that environment and development were interrelated and the policy responses were handicapped by the fact that existing institutions tended to be independent, fragmented, too narrowly focused and so tended to address issues such as acid pollution as discrete policy problems (The Brundtland Commission, 1987).

### **The Earth Summit (1992)**

The Earth Summit in Rio de Janeiro was unprecedented for a UN conference, in terms of both its size and the scope of its concerns. Twenty years after the first global environment conference, the UN sought to help Governments rethink economic development and find ways to halt the destruction of irreplaceable natural resources and pollution of the planet. Hundreds of thousands of people from all walks of life were drawn into the Rio process. They persuaded their leaders to go to Rio and join other nations in making the difficult decisions needed to ensure a healthy planet for generations to come. The outcomes of Earth Summit can be summarized in five key agreements (Earth summit 1992).

a) The Framework Convention on Climate Change: The major significance of the Rio Convention was that it established the principle that climate change was a serious problem that needed precautionary measures that could not await the resolution of questions about scientific certainty. It also emphasized the role of Developed countries in the production of green house gases (Earth summit 1992).

b) The Convention on Biological Diversity: Negotiated under the auspices of UNEP, this convention was aimed at preserving global biological diversity through the protection of species and ecosystems. Since most of the threats were being experienced in least developed countries and most biotechnology was based in Developed countries, discussions were again based around attempts to reach a compromise between the needs of the two sides.<sup>21</sup>

c) Agenda 21: This was an action plan for sustainable development, integrating the goals of environmental protection and economic development, and based on local community and free market principles. Agenda 21 ensured that the concept of sustainable development became an important principle of the United Nations. A recommendation was made for the creation of a UN Commission on Sustainable Development to oversee the implementation of Agenda 21<sup>22</sup>.

d) The Rio Declaration on Environment and Development: This consisted of 27 principles guiding action on environment and development. The declaration tried to maintain a balance between the least developed countries and the Developed countries<sup>23</sup>.

e) The Forest Principle: It emphasized the sovereign right of individual states to exploit forest resources within the general principles of forest protection and management<sup>24</sup>.

Rio drew unparalleled levels of public attention to the problems of environment and represented another major step along the road to a workable resolution of the tensions between environmental management and economic development.

### **The Johannesburg Summit (2002)**

The Johannesburg Declaration on Sustainable Development was adopted at the World Summit on Sustainable Development (WSSD), sometimes referred to as Earth Summit 2002, at which the Plan of Implementation of the World Summit on Sustainable Development was also agreed upon (Johannesburg Declaration on Sustainable Development, A/CONF.199/20).

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<sup>21</sup> <http://www.un.org/en/index.html>, United Nation

<sup>22</sup> <http://www.un.org/en/index.html>, United Nation

<sup>23</sup> <http://www.unep.org/documents.multilingual/default.asp?documentid=78&articleid=1163>

<sup>24</sup> <http://www.un.org/en/index.html>, United Nation

It provided the fundamental principles and the programme of action for achieving sustainable development. The summit generated an incredible range of interests from heads of states to epistemic community. The summit reaffirmed sustainable development as a central element of the international agenda and paved the way for the practical and sustained steps needed to address many of the world's pressing challenges. By any account, the Johannesburg Summit had laid the groundwork and paved the way for action. The Johannesburg Declaration was the main outcome of the Summit; however, there were several other international agreements.

**2.5.2 International Environmental Agreement:** There are many environmental issues such as Air Pollution, Deterioration of the Ozone Layer, Climate Change, and Ocean Pollution are transboundary or Global in nature, countries cannot achieve desired results by acting alone. Countries have increasingly recognized this and have developed a wide range of international environmental agreements to enable them to work together on global environmental issues.

**Kyoto Protocol:**

This is one the important initiative taken up for the global environmental problems. The Kyoto Protocol is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gases emissions, based on the premise that (a) global warming exists and (b) man-made CO<sub>2</sub> emissions have caused it. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. There are currently 192 parties (Canada withdrew effective December 2012) to the Protocol.

The Kyoto Protocol implemented the objective of the UNFCCC to fight global warming by reducing greenhouse gas concentrations in the atmosphere to "a level that would prevent dangerous anthropogenic interference with the climate system" (Art.2). The Protocol is based on the principle of common but differentiated responsibilities: it puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere.

**Paris Agreement:** The Paris Agreement builds upon the Convention and for the first time brings all nations into a common cause to undertake take ambitious efforts to

combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

In 2015, all 196 then parties to the convention came together for the UN Climate Change Conference in Paris 30 November - 12 December and adopted by consensus the Paris Agreement, aimed at limiting global warming to less than two degrees Celsius, and pursue efforts to limit the rise to 1.5 degrees Celsius (UN, 2015).

It was opened for signature on 22 April 2016 (Earth Day) at a ceremony in New York. As of December 2016, 194 UNFCCC members have signed the treaty, 118 of which have ratified it. After several European Union states ratified the agreement in October 2016, there were enough countries that had ratified the agreement that produce enough of the world's greenhouse gases for the agreement to enter into force (Paris Agreement 2016). The agreement went into effect on 4 November 2016.

**Montreal Protocol:** The Montreal Protocol on Substances that Deplete the Ozone Layer, a Protocol to the Vienna Convention for the Protection of the Ozone Layer is an International treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for Ozone Depletion. It was agreed on 26 August 1987, and entered into force on 26 August 1989, followed by a first meeting in Helsinki, May 1989. Since then, it has undergone eight revisions, in 1990 London, 1991 Nairobi, 1992 Copenhagen, 1993 Bangkok, 1995 Vienna, 1997 Montreal, 1998 Australia, 1999 Beijing and 2016 Kigali (UNEP, 2006).

As a result of the international agreement, the ozone hole in Antarctica is slowly recovering (Ewen, et al. 2014: 10). Climate projections indicate that the ozone layer will return to 1980 levels between 2050 and 2070 (Soloman, Douglass, et al. 2014).

Recent International Agreement under Montreal Protocol was held in Kigali, Rwanda on October 15, 2016. Parties to the Montreal Protocol have adopted historic global Agreement mandating controls on hydro fluorocarbon (HFC) consumption and production after eight years of protracted negotiations. The Agreement will avoid more than 70 billion tones of Co<sub>2</sub> equivalent HFC emissions. The Kigali amendment will cap and phase down HFC consumption starting in 2019, with developed countries taking action first and developing countries starting in 2024.

Most developing countries, including China by far the largest HFC consumer and producer have committed to freeze HFC consumption in 2024. A second later schedule was agreed for small number of countries including India, Kuwait, Pakistan and Saudi Arabia (Environmental Agency Report, 2016).

### **2.5.3 Other important global initiatives:**

**Idea of Common Green Ecology:** The green economy is defined as an economy that aims at reducing environmental risks and ecological scarcities, and that aims for sustainable development without degrading the environment. It is closely related with ecological economics, but has a more politically applied focus. The idea of common green ecology is the major global initiative for the environmental issues. It helps for the sustainable growth and development in the country.

**Development And Sustainable Tourism Planning:** The Manila Declaration (1980) of the World Tourism Organization (WTO), the most comprehensive international statement adopted on the goals of modern tourism, emphasizes the importance of both natural and cultural resources in tourism and the need for conservation of these resources for the benefit of both tourism and local residents of tourism destinations.

Following on the Manila Declaration, the joint declaration of WTO and United Nations Environment Programme (UNEP), which formalized inter-agency coordination on tourism and the environment, states: “The protection, enhancement and improvement of the various components of man’s environment are among the fundamental conditions for harmonious development of tourism. Similarly, rational management of tourism may contribute a large extent to protecting and developing the physical environment and cultural heritage, as well as improving the quality of life” (The Manila Declaration, 1980).

At the international level several branches of the UN take tourism seriously. These include The World Health Organization, The World Tourism Organization, The World Heritage Programmes of UNESCO and United Nations Development Programme (UNDP). Among their activities is help for developing nations in protecting their environment, their heritage and their health.

**Conservation and Management of Biodiversity Resources:** Biodiversity both affects and is affected by climate change. Climate change is a major cause of

biodiversity loss. Thus, the protected areas such as parks and nature reserves have been the corner stone of efforts to conserve the world's species and ecosystems. They also play a vital key role in sustaining local livelihoods and contributing to economic and social well being. Protected areas also have an important role in reducing risks from natural disasters and in helping counteract climate change impacts with avoided deforestation and support maintaining ecosystem services within and beyond their boundaries. Conservation and Management of Biodiversity Resources is important global initiative which leads to sustainable development.

**Global Waste Management Programme:** Global Waste Management is one of the essential utility services a basic human need and a basic human right that underpins society in the 21st century, particularly in urban areas. Ensuring proper sanitation and Solid Waste Management sits alongside providing potable water, shelter, food and energy, and also transport and communications, as essential to society, business and the economy. The public and political profile of solid waste management is often lower than other utility services. Waste is a global issue. If not properly dealt with, waste poses a threat to public health and the environment. It is a growing problem that results from the way we produce and consume (Waste Management & research 2016).

The Global Waste Management Outlook, a collective effort of the United Nations Environment Programme and the International Waste Management Association, is a pioneering scientific global assessment on the state of waste management and a call for action to the international community. Prepared as a follow up to the Rio+20 Summit and as a response to UNEP Governing Council decision GC 27/12, the document establishes the rationale and the tools for taking a holistic approach towards waste management and recognizing waste and resource management as a significant contributor to sustainable development and climate change mitigation (UNEP, 2015)

**Protection for Endangered species:** An endangered species is a species which has been categorized as likely to become extinct. Endangered (EN), as categorized by the International Union for Conservation of Nature (IUCN) Red List, is the second most severe conservation status for wild populations in the IUCN's schema after Critically Endangered. The conservation status of a species indicates the likelihood that it will become extinct. Many factors are considered when assessing the conservation status of a species; e.g., such statistics as the number remaining, the

overall increase or decrease in the population over time, breeding success rates, or known threats ('Nature Serve Conservation Status Report, 2007). The IUCN Red List of Threatened Species is the best-known worldwide conservation status listing and ranking system.

The Environmental Protection Agency (EPA) has established the Endangered Species Protection Program (ESPP) in 1988. The goal of Endangered Species Protection Program (ESPP) is to carry out EPA's responsibilities under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in compliance with the Endangered Species Act (ESA), without placing unnecessary burden on agriculture and other pesticide users. EPA determines if listed species or their designated critical habitat may be affected by use of the product. All pesticide products that EPA determines may affect a listed species or its designated critical habitat may be subject to the ESPP (United States Environmental Protection Agency).

**2.5.4 Environmental Organization:** An Environmental Organization is an Organization coming out of the conservation or environmental movements that seek to protect, analyze or monitor the environment against misuse or degradation from human forces.

In this sense the environment may refer to the biophysical environment, the natural environment or the built environment. The organization may be a charity, a trust, a non-governmental organization or a government organization. Environmental organizations can be Global, National, Regional or Local.

Some of the environmental issues that are of interest to environmental organizations are pollution, waste, resource depletion, human overpopulation and climate change. Some Environmental Organizations are discussed below which address the various Environmental Issues.

**Earth System Governance Project:**

The Earth System Governance Project aims to contribute to science on the large, complex challenges of governance in an era of rapid and large-scale environmental change. The project seeks to create a better understanding of the role of institutions, organizations and governance mechanisms by which humans regulate their relationship with the natural environment (Biermann, Betsill. et al, 2009).

The Earth System Governance Project aims to integrate governance research at all levels. The project aims to examine problems of the global commons, but also local problems from air pollution to the preservation of water sources, waste treatment or desertification and soil degradation. However, due to natural interdependencies local environmental pollution can be transformed into changes of the global system that affect other localities. Therefore, the Earth System Governance Project looks at institutions and governance processes both local and globally (Biermann, Betsill. e.tal. 2009).

In 2001, the four then active global change Research Programmes DIVERSITAS<sup>25</sup>, International Geosphere-Biosphere Programme, World Climate Research Programme, and International Human Dimensions Programme on Global Environmental Change agreed to intensify co-operation through setting up an overarching Earth System Science Partnership. The research communities represented in this Partnership contend in the 2001 Amsterdam Declaration<sup>26</sup> on Global Change that the earth system now operates well and that human activity is generating change that extends well beyond natural variability in some cases, alarmingly so and at rates that continue to accelerate (The Amsterdam Declaration 2001).

To cope with this challenge, the four global change research programmes have called for Earth System management. In March 2007, in response to the 2001 Amsterdam Declaration, the Scientific Committee of the International Human Dimensions Programme on Global Environmental Change (IHDP), the overarching social science programme in the field, mandated the drafting of the Science Plan of the Earth System Governance Project by a newly appointed Scientific Planning Committee. The Earth System Governance Project builds on the results of an earlier long-term research programme, the IHDP core project Institutional Dimensions of Global Environmental Change (Shi, Jaeger et al, 2012).

In 2008, the Earth System Governance Project was officially launched. In 2009, the Science and Implementation Plan of the Earth System Governance Project were published. The project has evolved into a broader research alliance that builds on an

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<sup>25</sup>Diversitas was an international research programme aiming at integrating biodiversity science for human well-being.

<sup>26</sup> In 2001, International Geosphere-Biosphere Programme and other international global change programmes held a major conference in Amsterdam. The conference produced the historic Amsterdam Declaration on Earth system science.

international network of research centers, lead faculty and research fellows. After the termination of the IHDP in 2014, the activities of the Earth System Governance research alliance are supported by an international steering group of representatives of the main Earth System Governance Research Centres and the global group of lead faculty and research fellows (Earth System Governance Project, 2015).

**Global Environment Facility:** The Global Environment Facility (GEF) unites 183 countries in partnership with International Institutions, Civil Society Organizations (CSOs), and the private sector to address Global Environmental Issues while supporting national sustainable development initiatives. Today the GEF is the largest among public funded projects aims to improve the global environment. As independently operating financial organization, the GEF provides grants for projects related to Biodiversity, Climate Change, International Water, Land Degradation, the Ozone Layer Depletion, and Persistent Organic Pollutants.

Since 1991, the GEF has achieved a strong track record with developing countries. The GEF work focuses on seven main areas, including Biodiversity, Climate Change (Mitigation and Adaptation), Chemicals, International Waters, Land degradation, Sustainable Forest Management, and Ozone Layer Depletion<sup>27</sup>.

**Intergovernmental Panel on Climate Change (IPCC):** The Intergovernmental Panel on Climate Change (IPCC) is a scientific and intergovernmental body under the auspices of the United Nations,. It set up at the request of member governments, dedicated to the task of providing the world with an objective, scientific view of climate change and its political and economic impacts (Weart, Spencer, 2011).

It was first established in 1988 by two United Nations organizations, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), and later endorsed by the United Nations General Assembly through a Resolution. Membership of the IPCC is open to all members of the WMO and UNEP (IPCC, 2005).

The IPCC produces reports that support the United Nations Framework Convention on Climate Change (UNFCCC), which is the main international treaty on climate

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<sup>27</sup>Ozone depletion describes two distinct but related phenomena observed since the late 1970s: a steady decline of about four percent in the total amount of ozone in Earth's stratosphere and a much larger springtime decrease in stratospheric ozone around Earth's polar region.

change (UNFCCC, 2014). The ultimate objective of the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. IPCC reports cover the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The aims of the IPCC are to assess scientific information relevant to: 1. Human-induced climate change, 2. the impacts of Human-induced climate change, 3. Options for adaptation and mitigation (IPCC, 2006).

**International Union for Conservation of Nature :** The International Union for Conservation of Nature and Natural Resources (IUCN) is an international organization working in the field of nature conservation and sustainable use of natural resources. It is involved in data gathering and analysis, research, field projects, advocacy, lobbying and education. IUCN's mission is to influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

Over the past decades, IUCN has widened its focus beyond conservation ecology and now incorporates issues related to gender equality, poverty alleviation and sustainable business in its projects. Unlike other international NGOs, IUCN does not itself aim to mobilize the public in support of nature conservation. It tries to influence the actions of governments, business and other stakeholders by providing information and advice, and through lobbying and partnerships. The organization is best known to the wider public for compiling and publishing the IUCN Red List, which assesses the conservation status of species worldwide (IUCN, 2014).

**United Nation Environment Programme:** United Nations Environment Programme (UNEP) is an agency of United Nations. It coordinates the environmental activities of UN and assisting developing countries in implementing environmentally sound policies and practices. UNEP was founded by Maurice Strong<sup>28</sup> as a result of the United Nations Conference on the Human Environment in June 1972 and has its headquarters in the Gigiri neighborhood of Nairobi, Kenya. UNEP also has six regional offices and various country offices.

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<sup>28</sup> First director of UNEP

Its activities cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance and green economy. It has played a significant role in developing international environmental conventions. UNEP has a long history of contributing toward the development and implementation of environmental law. At a global level, Division of environment law and convention (DELC) has been pivotal in the facilitation of intergovernmental platforms for the promotion and implementation of multilateral environmental agreements (MEAs) and defining international environmental norms.

At the regional and national scales, DELC has supported many fora as well as the utilization of resources aimed at strengthening legal principles, policies and guidelines that seek to address environmental issues, especially trans-boundary legal challenges. These fundamental activities, along with specific sectorial work such as enhancing freshwater and marine law, together form the central aspects of DELC's work in building and strengthening global environmental laws.

During the recent year the high level meeting took place on the first day of the United Nations Sustainable Development Summit 2015 in New York, during which more than 150 world leaders will formally adopt an ambitious new development agenda that will serve as the launch pad for global action to promote shared prosperity and well-being (United Nations Sustainable Development Summit 2015).

The panel analyzed key policies and investment decisions needed for countries to move towards more sustainable economic growth that respects planetary boundaries and ensures equitable outcomes. It identified how to strengthen bilateral and multilateral advisory mechanisms, networks and partnerships to support countries. The event saw a call for expressions of interest from countries willing to receive support from PAGE to advance their transition to a green economy for achieving the sustainable development goals and 2030 Agenda (UNEP, 2015).

### **World Nature Organization:**

The World Nature Organization (WNO) is an intergovernmental organization which promotes global environmental protection. The organization is focused on promoting activities, technologies, economies, and renewable energies which are regarded to be

environment friendly; and reducing the impact of climate change (World Nature Organization).

The establishment of the World Nature Organization is one of the key outcomes of multilateral environmental protection negotiations (World Nature Organisation, 2012). The role of the Organization is to turn declarations into implementable actions and to support the protection of the environment and climate at the international level. The organization was established by the intergovernmental WNO-Treaty, which enters into force on May 1, 2014 (World Nature organization, 2014).

Most of the signatory states are yet to ratify the treaty on their respective legislative bodies. The organization is governed by the WNO Secretariat and the assembly of the members. The purpose of the WNO is to preserve nature and to prevent detriment and destruction of the natural conditions for existence of human beings, animals and plants, in the water, on land and in the air; guided by the wish that all human beings have secure access to natural resources, especially clean water and air (World Nature Organization Report 2014).

#### **Partnerships in Environmental Management for the Seas of East Asia:**

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is a regional partnership programme implemented by the United Nations Development Programme (UNDP) and executed by the United Nations Office for Project Services (UNOPS). The project, started in 1994, was originally known as Prevention and Management of Marine Pollution in the East Asian Seas (SDS-SEA). Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is an intergovernmental organization operating in East Asia to foster and sustain healthy and resilient oceans, coasts, communities and economies across the region.<sup>29</sup>

Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) commits to assisting its partners achieve the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) goals. As the pioneer of Integrated Coastal Management (ICM) in East Asia, Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) provides integrated solutions for effective management

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<sup>29</sup> <http://www.internationalwatersgovernance.com/partnerships-in-environmental-management-for-the-seas-of-east-asia-pemsea.html>

of coastal and marine areas, supporting sustainable economic growth and blue economy, ecosystem rehabilitation and protection and adaptive and resilient communities.

The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) had also put the recent initiatives for the sustainable development which lies on the PNLG Forum 2016. The PNLG Forum 2016 was hosted by the City Government of Ansan, Republic Of Korea, from September 5-7, 2016 at the Ansan Culture and Art Center. Carrying the theme of “Sustainable Future Cities in the Coastal Area through UN SDGs”, the PNLG Forum 2016 assembled over 100 representatives from 30 local governments in 8 countries (Cambodia, China, Indonesia, Philippines, RO Korea, Thailand and Vietnam), as well as representatives from the PNLG associate members(PNLG Forum 2016 report).

**International Council for Local Environmental Initiative:** The organization is now officially called 'ICLEI-Local Governments for Sustainability'. In 2003, ICLEI's Members voted to revise the organization's mission, charter and name to better reflect the current challenges local governments are facing. The International Council for Local Environmental Initiatives became 'ICLEI—Local Governments for Sustainability' with a broader mandate to address sustainability issues, not only environmental issues.

The organization promotes the following programs for local-level adoption and implementation as described below;

The Rio Conventions: The UN Framework Convention on Climate Change, The UN Convention on Biological Diversity, The UN Convention to Combat Desertification.

Agenda 21: The Habitat Agenda, the Millennium Development Goal, the Johannesburg Plan of Implementation. ICLEI also provides oversight for the Compact of Mayors, a global coalition of city leaders founded to address climate change at the local level.<sup>30</sup>

**1.5.5 Environmental Non-Governmental Organization:** The ENGOs provide for popular participation and influence in global environmental politics. This influence

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<sup>30</sup>New alliance on city finance unveiled at UN Summit on climate change Cities Today - Connecting the world's urban leaders". *cities-today.com*

can be noted by the following three important examples: The world wild fund for nature, Green peace and friends of earth are the largest nongovernmental organizations.

**World Wide Fund:** The World Wide Fund for Nature (WWF) is an international non-governmental organization founded in 1961, working in the field of the wilderness preservation, and the reduction of humanity's footprint on the environment. It was formerly named the World Wildlife Fund, which remains its official name in Canada and the United States.

It is the world's largest conservation organization with over 5 million supporters worldwide, working in more than 100 countries, supporting around 1,300 conservation and environmental projects<sup>31</sup>. The group's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature<sup>32</sup>. Currently, much of its work focuses on the conservation of three biomes that contain most of the world's biodiversity: oceans and coasts, forests, and freshwater ecosystems. Among other issues, it is also concerned with endangered species, sustainable production of commodities and climate change<sup>33</sup>.

WWF is a Project Agency for the Global Environment Facility (GEF), which is the largest source of public funding to protect the environment worldwide. In this role, WWF can assist governments and other non-governmental agencies in the development, implementation, and management of GEF-funded projects, many of which are large-scale conservation initiatives. Previous GEF-funded projects have addressed issues related to biodiversity, climate change, international waters, and land degradation.

WWF is currently one of only two non-governmental organizations that have received GEF Project Agency status. Other GEF agencies include the World Bank, regional development banks, and United Nations agencies such as the United Nations Environment Program and the Food and Agriculture Organization. WWF became a project agency in November 2013<sup>34</sup>

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<sup>31</sup>[http://www.panda.org/about\\_wwf/where\\_we\\_work/project/](http://www.panda.org/about_wwf/where_we_work/project/)

<sup>32</sup> [www.worldwildlife.org](http://www.worldwildlife.org)

<sup>33</sup> [www.worldwildlife.org](http://www.worldwildlife.org)

<sup>34</sup> [www.worldwildlife.org](http://www.worldwildlife.org)

**Greenpeace:** Greenpeace is a non-governmental environmental organization (United Nation Report 2010). Greenpeace states its goal as to ensure the ability of the Earth to nurture life in all its diversity and focuses its campaigning on worldwide issues such as climatechange, deforestation, overfishing, commercialwhaling, geneticengineering, and anti-nuclear issues (Greenpeace International,2009).

Greenpeace is known for its direct actions and has been described as the most visible environmental organization in the world. Greenpeace has raised environmental issues to public knowledge, and influenced both the private and the public sector. Greenpeace has also been a source of controversy; its motives and methods have received criticism, including an open letter from more than 100 Nobel laureates urging Greenpeace to end its campaign against genetically modified organisms.

NGOs have become key players in environmental politics at all levels from local to global. As an example, FoE can play an important role from local planning disputes to global environmental conferences (Pricen & Finger, 1994; 4–6).

**Friends of the Earth International (FoEI):** Friends of the Earth International (FoEI) is an international network of environmental organizations in 74 countries. Friends of the Earth were founded in 1969 as an anti-nuclear group by Robert O Anderson.<sup>35</sup> Friends of the Earth International (FoEI) area country federation of national environmental groups, each of which has equal power within the organization. It differs from the two other large transnational environmental NGOs - WWF and Greenpeace in several ways: it has strong membership in Southern countries that have had a significant influence on its recent strategic development; it is decentralized and its key decisions are made by national groups in annual meetings rather than by an appointed board.

#### **2.5.6 Major Acts Related to Global Environmental Initiatives:**

The following are the major Environmental Acts which are responses to the Global Environmental Issues.

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<sup>35</sup>Robert Orville Anderson (April 13, 1917 – December 2, 2007) was an American businessman and philanthropist who founded Atlantic Richfield Oil Co. since 2000 part of BP through the 1966 merger of the Atlantic and Richfield oil companies and was Arco's chairman for two decades. Anderson used his clout to support an array of major cultural organizations, from the Los Angeles County Museum of Art to Harper's Magazine

**Watershed Protection and Flood Prevention Act:** The Watershed and Flood Prevention Operations (WFPO) Program includes the Flood Prevention Operations Program authorized by the Flood Control Act of 1944 (P.L. 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 (P.L. 83-566).

It provides cooperation between the Federal government and the States and their political subdivisions in a program to prevent erosion, floodwater, and sediment damage; to further the conservation, development, utilization, and disposal of water; and also for conservation and proper utilization of land in authorized watersheds.

**Clean Air Act:** The Clean Air Act 1956 was an Act of the Parliament of the United Kingdom passed in response to London's Great Smog of 1952. It was in effect until 1964, and sponsored by the Ministry of Housing and Local Government in England and the Department of Health for Scotland. The Clean Air Act has achieved dramatic reductions in air pollution, preventing many cases of serious health effects each year. The Act calls for states and Environment protection agency to solve multiple air pollution problems through programs based on the latest science and technology information (Clean Air Act, 1956).

The Act establishes standards for sources of air pollution, for sources of hazardous air pollutants, and for the emissions that cause acid rain. It establishes a comprehensive permit system for all major sources of air pollution. It also addresses the prevention of pollution in areas with clean air and protection of the stratospheric ozone layer.

**Endangered Species Act:** The Endangered Species Act of 1973 is one of the few dozens of US environmental laws passed in the 1970s, and serves as the enacting legislation to carry out the provisions outlined in The (CITES) Convention on International Trade in Endangered Species of Wild Fauna and Flora. The Endangered Species Act (ESA) provides common sense and balanced solutions for government agencies, landowners, and concerned citizens to protect and restore endangered species and their habitat. It is based on three key elements listing species as threatened or endangered, designating habitat essential for their survival and recovery, and ultimately restoring healthy populations of the species so they can be removed from the list (Species Act, 1973).

## **2.6 Conclusion:**

The Global environment is constantly changing. As the environment changes, so the need to become increasingly aware of the problems that surround it. The environmental imbalance gives rise to various environmental problems. Some of the environmental problems are pollution, soil erosion, desertification, landslides, and depletion of natural resources, waste accumulation, deforestation, thinning ozone layer and global warming. The environmental problems are visualized in terms of pollution, growth of population, development, industrialization, unplanned urbanization etc.

In order to bring remedy to the problems, various environmental initiatives are initiated in Global level like Idea of Common Green Ecology, Sustainable Tourism Development, and Conservation of biodiversity, global waste management programme and protection of endangered species.

There are many environmental organizations in the world with most countries having at least one government ministry or agency with a dedicated role to monitor and protect the environment. There are a large number of Private Organizations, sometimes known as Non-Government Organizations (NGOs) which also are playing an active role in conservation of Biodiversity. These environmental organizations provide a financial assistance to countries for development of environmental initiative programs.

Many countries have initiated various global environmental conferences and acts which discusses on the conservation of global natural resources. The recent idea of Sustainable Development Goals and the Paris Climate Treaty, adopted by the UN created a framework for strengthening global initiatives to tackle environmental challenges. The 2016 Environmental Performance Index (EPI) ranks 180 countries according to their performance in safeguarding ecosystems and protecting human health from environmental harm (Government of Sikkim, 2016).

## CHAPTER III

### Environmental Initiatives of Sikkim: An Overview

#### 3.1 Introduction

Sikkim is a state in northeast India, bordered by Bhutan, Tibet and Nepal. Part of the Himalayas, the area has a dramatic landscape that includes India's highest mountain, 8,586m Kanchenjunga. Sikkim is also home to glaciers, alpine meadows and thousands of varieties of wildflowers. Sikkim is situated in an ecological hotspot of the lower Himalayas, one of only three among the eco regions of India.

The forested regions of the state exhibit a diverse range of fauna and flora. Owing to its altitudinal gradation, the state has a wide variety of plants, from tropical species to temperate, alpine and tundra ones, and is perhaps one of the few regions to exhibit such diversity within such a small area. Nearly 81 per cent of the area of Sikkim comes under the administration of its forest department.

Natural elements of the State have been revered and celebrated by different communities and forms a part of their folklore, songs, dance and rituals. In the last few years, the State Government has taken several steps towards conserving the environment. Sikkim has been in the forefront in conservation of natural resources and environmental initiatives.

This chapter deals with various local level responses in Sikkim to global environmental initiatives. It also examines the various policies and programs initiated to address the environmental issues of Sikkim.

#### 3.2 Major Environmental Initiatives of Sikkim:

Following are the various policies and initiatives taken by Sikkim in response to Environmental Issues.

**3.2.1 Forest and Forestry:** Forest is one of the richest natural resources of Sikkim. With luxuriant forest abounding in all part of state, Forestry has been the major land

use in the State and 82.31% of the total geographical area of the State is under the administrative control of the State Forest Department. The total forest and tree cover of the State is 3392 sq. km, 47.80% of the total geographical area of the state (Government of Sikkim 2015).

### **3.2.1. a Ban on Grazing**

Two decades ago, Sikkim forests had witnessed rampant and large scale grazing in the mountainous region. The whole phenomena started from the mid twentieth century, when transborder Bhutia yak herders from eastern Nepal started migrating and settled in the border villages of West Sikkim adjacent to Khangchendzonga National Park. With the merger of Sikkim into India in 1975, rapid development created new opportunities and markets. In order to meet the growing demand for dairy products, the herd size of the recently introduced pastoral systems like the yak and the cow yak crossbreeds started increasing. The increase in the cattle population resulted in the increased pressure on the fragile mountain eco-system.

History is thus proof to the rampant traditional grazing practice and the consequential deterioration to the endemic eco-system in Sikkim. The cattle herders who used to reside in cattle sheds in the deep forests used to lop and fell trees and poles for their day to day use and for construction of their cattle sheds. This kind of indiscriminate lopping of trees around cattle shed led to the creation of blanks in forest areas.

Free ranging of cattle in forest areas resulted in soil compaction and the inability of trees to regenerate as new plants were often trampled upon and compaction of soil led to poor conditions for new saplings to sprout. Forest pathways leading in and out of cattle sheds also formed potential channels for rain water to run off the steep slopes causing soil erosion and reduced supply of water to the villages. New plantations raised in forests also do not survive due to over grazing.

In 1998 Government of Sikkim imposed ban on Grazing in reserved forest areas, plantation areas and water sources areas (Forest, Environment and wildlife Management Department, 2011). This age old system of grazing was thrown over

thus set the tone for umpteen numbers of follow-up policy and legal inroads that led to the forest floor becoming clear of this nuisance and menace.

The effects of which reflects its visibility in the recent years. Forests regenerating with natural succession, water-regime in the catchment areas improved, sick and dying lakes brimming with water, more water flowing down the streams and streamlets than before. Wildlife, avian-fauna and wilderness areas being better adapted leading to increase in population on account of creating an ideal habitat for their living, breeding and propagating. All of these project a positive natural scenario that speaks of sustainability and viability of life support systems in the hills and valleys of Sikkim (Government of Sikkim, 2011).

### **3.2.1. b Joint forest management**

The Joint Forest management model follows the same approach where the forest is managed through a partnership between the forest department and village people. It is based on mutual trust and cost sharing. The state has entrusted the Joint forest management committee with the task of afforestation and protection of the natural resources of their area and they will be implementing the national afforestation programme through the four FDAs in the 10<sup>th</sup> plan period. More than 1000 hectares of land will be developed over the plan period through this scheme (Government of Sikkim, 2016).

Sikkim is at the forefront of local self governance in the country. This emphasis on decentralized village level governance has touched forest and wildlife management as well. Forestry in India has undergone a transformation from extraction-based practices mainly to meet commercial interests to people-oriented action such as social forestry, in the last century. The National Forest Policy of 1988 also states that the first claim to a forest shall be the people dependent on it (Environmental Initiatives of Sikkim State Government 1994-2016, 2016).

In line with this ideology, the State Government first brought out a notification for constitution of Joint Forest Management Committees (JFMCs) in 1998 with specific

rules for sharing of usufruct and defining the role of these village-based committees in the management of their forests(ibid).Joint forest management were conceived as democratic local level institutions' which would, through a democratic process, take decisions on how forest produce is to be harvested and the benefits shared, how and where plantations and allied activities should be done and assist the forest department in forest protection measures.

The action taken in 1998 was further consolidated in 2001 and 2002 when more detailed guidelines on constitution and operationalization of Joint Forest management committees were notified and Joint Forest Management committees constituted all over the State to implement the policy of participatory forest management.

Joint forest management committee played a key role in protection and development of forest resources and development of degraded lands in and close to their villages. They were trained to undertake micro-planning at the village level using the participatory rural appraisal method. Based on these micro plans forestry activities were planned and executed forests(ibid).The Joint forest management committees have contributes immensely to forest protection by way of assisting the FEWMD in forest fire management and prevention, taking up expeditions for controlling illegal activities in forest areas and in checking encroachments.

The department takes the help of these committees to identify needy villagers for various beneficiary oriented schemes and they decide what activities of village development are to be implemented as entry point activities of forestry schemes. Decentralization of the state forestry sector gained momentum since 2007 with the formation of Joint Management committee (JMC) and economic development committee and forest development Agencies in the state (ibid).

### **3.2.1. c State Green Mission**

Sikkim is blessed with vast forest resources. Due to the increase in human population and developmental activities coupled with increase in cattle population, the pressure on the environment, forest and land is increasing at a very fast pace here. Similarly,

there has been increase in the air pollution in the urban areas due to the increase in the number of vehicles over the years.

To overcome this situation and to increase the participation of the local people in the conservation and management of forest resources of the state and to maintain the ecology of the state without hampering developmental activities, the government has introduced the Green Mission Plan (Government of Sikkim, 2006). This plan reviews the forest situation and, adopts strategies for the future, development of environment.

Sikkim has implemented the State Green Mission in the year 2006. The plan envisages long-term strategy for forestry development which reflects on three major objectives: (i) to reduce soil erosion and flooding; (ii) to supply the growing needs of the domestic wood products industries; and (iii) to supply the needs of the rural population for fuel wood, fodder, small timber, and miscellaneous forest produce. Such socially responsible forestry was encouraged by the state government (ibid).

This plan emphasizes more of trees in order to check denuded communal cattle-grazing grounds and make villages self-sufficient in fuel wood, supply timber needed for the construction of village houses, and provide the wood needed for the repair of farm implements. Both individual farmers and tribal communities at household level are encouraged to grow trees for profit. Land use planning and land management is very important for optimal utilization of land resources in this state. It has thus become necessary to formulate a State Policy of Environment, Forests and Land Use and the outcome here is the implementation of State Green Mission in the year 2006-2007.

The Government of Sikkim launched a unique and innovative programme called State Green Mission with a view to raise avenue plantations along the roads and beautification of all vacant and waste lands to further reinforce wide spread recognition of Sikkim being a Green State (Government of Sikkim, 2016). The State Government has taken initiative to generate avenue plantation in massive scale by using all the manpower in various departments in the Government, and other nature lovers from the Government and Non Governmental Organizations including different Eco clubs and Self Help groups (ibid).

In order to realize the above objectives of the Plan certain implementation measures has been laid down which are as follows: Firstly the sites are identified and prepared by clearing and removing stones, debris, unwanted weed growths etc. for laying out the specification of planting the different species as per their geographical condition. While selecting the sites importance is given to existing sacred groves Natural falls, rocky outcrops, caves, and flank areas in order to check soil erosion. View Points adjoining the roads, the religious, cultural, recreational centres are also within this scheme as it helps in beautification of such sites that induces the tourists. Surplus water is drained out in wet areas in order to save the plants from flood and excessive moisture.

In steep slopes both in the uphill and downhill sides of the roads simple contour terraces along the contours are dug out so as to reduce the run off discharge and soil erosion and conserve moisture in dry areas. Treatments of soil with organic manure, insecticides, bio-fertilizer etc are also encouraged. While selecting the tree species attention is given to the geographical conditions necessary for planting such species hence trees are selected as per there in order to get the optimum results (ibid).

#### **3.2.1.d Ten Minutes to Earth**

The concept Ten Minutes to Earth was first implemented in 2009. It is a unique and innovative programme initiated in Sikkim. A total of 6, 10,694 saplings in the stipulated 10 minutes time were planted to beat the world record. The 25<sup>th</sup> day of June every year is observed by every citizen of the State as an annual ritual by dedicating ten minutes of their time in plantation, protection and conservation of Earth. As the clock ticked 10:30, thousands of people stopped all other activities to pledge themselves to Earth for 10 minutes (Government of Sikkim, 2016).

They appeared from all the corners of Sikkim to participate in the historic moments of planting of saplings, more than the population of State. The stipulated time was from 10.30 am to 10.40 am. The idea was to plant trees equivalent to the population of Sikkim in Ten Minutes: one tree for one person. This was also a record that within 10 minutes the plants numbering population of the State were planted anywhere. This ten minutes activity would also help in sequestration of 1400 tons of carbon dioxide

annually. So Sikkim has shown its unique way of Climate Change Mitigation technique which contributes annually (Government of Sikkim, 2015).

Ten Minutes to Earth is an exceptional programme and it is a people's programme where every person of Sikkim participates in planting on the same day and at the same time. Sikkim has successfully completed the 8th successive year of Ten Minutes to Earth programme with more than 15 lakh saplings planted through active participation of the nature loving people of the State. Through this programme, Sikkim has definitely ignited a lamp for restoration of ecology which would guide other States of India and the world towards the protection of the earth.

### **3.2.2 Environmental conservation Awareness and education**

#### **3.2.2. a Paryavaran Mahotsav**

Paryavaran Mahotsav or the Environmental Festival is a people's programme celebrated throughout the State from 15th to 30th June every year. Paryavaran Mahotsav has added dynamism to the Green Sikkim Campaign. It has set up a holistic platform duly integrating the state's flagship programmes such as State Green Mission and Ten Minutes to Earth which have now become the integral part of Paryavaran Mahotsav celebrated every year by Sikkim.

During this festival, various activities are carried out throughout the State. They will have the Flag off programme on 15th June every year; setting up of free seedling distribution booths, information booths. They will organize Mass plantation and sensitization drives as a part of State Green Mission. The other activities Ten Minutes to Earth plantation drive on 25th of June from 10.30 am onwards every year and Greenathon (Green Run and Green Walk) for a clean and green Sikkim. There will be a Signature campaign, awareness programmes, lectures, talk shows through media, rally, and banner campaign, street plays etc and also includes Mass cleanliness of major towns and villages. Eco-paintings/ Essay Writing/ Debate/Quiz competition at all school eco clubs will be organized (Sikkim Forest, Environment and wildlife Management Report 2015).

### **3.2.2. b Ban on Plastic Carry Bags**

There has been an ongoing debate on the use of plastic bags across the world and many cities have banned or considered banning the use of this product. Plastic bags have today become the most visible indicator of environmental degradation as citizens associate plastic to environmental pollution on account of its prominence in the municipal waste stream. Use of non-biodegradable materials like plastic carry bags has been banned in the State of Sikkim since 1997 (ECOSS, 2014).

Plastic as a material is highly versatile, economical and convenient hence more acceptable to consumers resulting in increased consumption patterns over many years. While the consumption patterns have continued to grow the bags are also seen as one of the major sources of littering in cities and even rural areas. Most civic agencies in India have struggled hard to set up systems for collection and disposal of these bags but have found it extremely difficult to come up with any substantive solution towards managing this waste hence the conversation and debate on the use of polythene bags.

Sikkim, generates around 20-30 MT of solid waste per day with the figure going up to 50 MT during the tourist season. The composition of solid waste generated in the state is provided in the table below. It illustrates that plastic comprises 17.18 per cent of the waste in Sikkim (ECOSS, 2014). Presently solid waste treatment is confined to collection and transportation to landfills near rivers or dumping into streams and the countryside or being subjected to burning. Only a small quantity of waste is recycled.

Apart from the issue that the waste is being burned openly, another factor that adds to the urgency of the problem is that very little land is available for landfills. The issue of climate change has added a further dimension to the problem as it affects mountain regions more seriously than other regions. Given this scenario, the state government has no option but to make serious efforts to tackle the solid waste management issue, deliberations for which have already started.

Sikkim was one of the first states in India to issue a plastic bags ban order. At present, the plastic bag ban notification states that 'You shall not deliver any goods or materials purchased or otherwise to any person, firm, shop, company or any other

agency or organization in plastic wrappers or plastic bags'.<sup>1</sup>It was issued at a time when plastic bags were found to be choking drains and streams and thereby blocking and diverting the flow of rainwater, resulting in a spate of landslides in the state capital. However, since this notification is directed only at licensed traders and shopkeepers, it does not make customers liable.

The plastic bags ban in Sikkim was a significant development during a time when there was a spate of landslides in and around Gangtok. Discarded plastic bags were suspected to be the prime reason for choking the drainage system and the streams, resulting in water flows being diverted and causing these landslides<sup>2</sup>.

It has been 15 years since the plastic ban was notified under the Trade License & Miscellaneous Provisions(Amendment Rules 1998), Sikkim, and it is about time that the notification and its effectiveness was assessed so that necessary changes and improvements can be brought about. The notification is framed loosely and imposes responsibilities only on manufacturers and shopkeepers selling plastic carry bags and using plastic for wrapping items of sale.

The state Municipal Corporation, in coordination with other government officials, is in the process of formulating a Plastic Ban Act that will be part of a larger and comprehensive State Level Solid Waste Management Policy (Sikkim ECOSS report 2014).

### **3.2.2. c Ban on Firecrackers**

The use of firecrackers during the festivals and other occasion has led to several implications in the ecological fragile Himalayan State that harbors more than 25%of country's biodiversity. As Sikkim falls in one of the only two biodiversity hotspots of the country, the possible measure has been taken by the State Government to conserve this biodiversity. Besides all possible health and other hazardous impacts, the noise

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<sup>1</sup> The notification is dated 4 June 1998, NO. GOS/UD & HD/97-98/6(84) issued by the Government of Sikkim, Urban Development & Housing Department under the Sikkim Trade License & Miscellaneous Provisions (Amendment Rules, 1998).

<sup>2</sup> 'No plastic bags ,no landslides', Down to Earth 1999

and air pollutants from firecrackers are irksome for both human and animals especially avifauna.

Thus the Sikkim government imposed prohibition on the manufacture, sale and use or bursting of all types of firecracker including any sound emitting or illuminating type of firecrackers within the State of Sikkim(Government of Sikkim, 2014).

### **3.2.2. d Ban on burning of Agricultural waste**

Burning of agricultural wastes, dry leaves, paper effects the environment. It produces gases such as carbon dioxide which escape into the atmosphere. Such gases remain above the earth's surface for a long time and trap the heat of the sun making the earth hot. Heating of the earth leads to less rainfall and drying of crops affecting agricultural production.

If dry leaves, papers are not burn then these gases are not trapped in the upper part of the atmosphere and the sun rays are reflected back and so does not lead to heating of the earth. When dry leaves, paper, agriculture wastes etc. are burning open areas then the smoke produced contains many gases which cause pollution of the air.

In order to address this, Sikkim has imposed prohibition on the burning of agricultural waste, leaves, litter, paper wastes and garbage within the State of Sikkim. The advantage of ban on burning of leaves, agriculture wastes is that these will remain in the soil and add organic manure to it if it is left there to decay. This means that the soil will become more fertile and give good harvest in the future (Government of Sikkim2015).

### **3.2.2. e Ban on Styrofoam Products**

Sikkim has imposed a ban on sale and use of disposable items such as cups, plates, spoons, containers etc made from Styrofoam throughout the State with immediate effect(Government of Sikkim, 2016).Disposable Styrofoam or Thermocol products

like plates, cups and food containers are non-biodegradable and non-recyclable<sup>3</sup>. They are environmentally hazardous and also not healthy.

Polystyrene has been linked to cancer. A report of the Union Ministry of Environment, Forests and Climate Change noted polystyrene's ill-effects and warned that it was unsafe for food and beverage packaging as polystyrene breaks down to styrene at low temperatures. Many reports globally have classified styrene as a possible human carcinogen. Styrene also enters human bodies through the food chain. Once in the oceans, the polystyrene degrades in the presence of sunlight and breaks down into smaller pieces that marine animals mistake for food, ingest and die (Report by Indian Union Ministry of Environment, Forests and Climate Change, 2010).

### **3.2.2. f Prohibition of packaged drinking water bottles in government function and meetings**

For effective waste management in an eco-friendly manner, the Sikkim has restricted the use of mineral water bottles in government programmes and banned the use of foam food containers all over the state. Sikkim becomes the first Indian state to ban mineral water bottles in government programme. The use of filtered water or large reliable water dispersers or reusable water bottles during government functions was encouraged. Discard packaged water bottles, clog waterways and fast fill up landfills out of which toxin leach, contaminating water in and around the area posing a health hazard for people and a serious challenge (Government of Sikkim, 2016).

### **3.2.3. Sikkim Wildlife and Other Biodiversity Conservation**

The term wildlife encompasses all uncultivated flora and undomesticated fauna. Every species has the right to live and every threatened species must be protected to prevent extinction. Water, wilderness and wildlife are irrevocably interlinked. With mounting industrial and demographic pressures, wilderness areas, which are the richest repositories of wildlife and biodiversity, have either shrunk or disappeared

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<sup>3</sup> Styrofoam and Thermocol are trade names of a type of plastic called polystyrene, a white, lightweight material, which takes hundreds of years to break down.

their continued existence is crucial for the long term survival of the biodiversity and the ecosystems supporting them.

Effective ecosystem conservation is the foundation of long-term ecological and economic stability. Conservation of biodiversity is directly linked with conservation of ecosystems and thus with water and food security. Habitat loss caused by developmental infrastructural developmental projects for short term economic gains undermining ecological security. These below are the various initiatives taken by Sikkim for the wildlife protection and conservation of biodiversity.

### **3.2.3. a Wildlife Management**

Sikkim State has progressed a great deal with the establishment of Khangchendzonga National Park, one Biosphere Reserve known as Khangchendzonga Biosphere Reserve and eight Wildlife Sanctuaries including one Faireanum Orchid Conservation Reserve, all occupying as much as of State's total geographical area under the wildlife protected area network including Biosphere Reserve. It is one of the highest coverage when compared with other States in the country. The State has been able to set aside 51.68 % of the State's forest land area under the wildlife protected area network including Biosphere Reserve for the protection and conservation of State's rich wildlife and biodiversity resources (Forestry and environment mission Sikkim 2015).

Barsey Rhododendron Sanctuary, West Sikkim covering an area of 104 Sq.kms was commissioned and declared for the purpose of protection of flora & fauna especially the flora (Rhododendron species) and other bio-diversity resources of the area during the year 1996. (Government of Sikkim, 1996). Himalayan Zoological Park, Bulbulay established in an area of 230 Ha was formally opened to the tourists during May, 1997 (Government of Sikkim, 1997).

Protection, preservation and conservation is achieved through the people's participation represented by Eco-development Committees (EDCs) formed around the protected areas. There are altogether 57 EDCs already formed around the protected areas who are implementing Wildlife Forest Development Agency schemes since the year 2004. There is a ban on killing of wild animals (Government of Sikkim, 2004).

In the year 2010, the International Rhododendron festival was celebrated for the first among the entire Himalayas. This event was initiated with the aim to increase tourism in these natural resources and generate awareness and promote the conservation of Sikkim rich heritage of Rhododendrons at the global level. During the recent years 2016 International Day of Biodiversity (IDB) was celebrated on the theme called Mainstreaming Biodiversity: sustainable people and their livelihoods (Government of Sikkim 2016).

### **3.2.3. b Biodiversity and threatened species:**

State is rich in Butterflies<sup>4</sup> and numerical abundance of bird<sup>5</sup> lives of highest interest and rarity. There are abounded endangered wildlife species such as Tibetan Wild Ass, Great Tibetan Sheep, Tibetan Wolf, Blue Sheep, Snow Leopard, Himalayan Marmot, Snow Cocks and migratory aquatic birds in the Tibetan plateau in North Sikkim.<sup>6</sup>

Snow Leopard and Red Panda<sup>7</sup> found in the Sikkim Himalayas are among the globally threatened animal species given highest protection under the wildlife laws. In order to initiate long term in -situ protection<sup>8</sup> and conservation of these rare and endangered species, Project Snow Leopard and Project Red Panda are proposed for launching (Government of Sikkim 2010).

Zonation of the National Park and Wildlife Sanctuaries is carried out in order to identify the Critical Wildlife Habitat Areas and to keep these inviolate and the rest for zonation into Buffer and Tourism Zones for manipulation of wildlife and tourism related developmental works for us tenance of these wildlife protected areas. Wildlife Protected Areas (WLPAs) of Sikkim including India's highest altitude National Park i.e. Khangchendzonga National Park, recognized as a World Heritage Site by UNESCO (United Nations Educational, Scientific and Cultural Organization) on 17

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<sup>4</sup> Sanctuaries at Legship, West Sikkim, Sankalang in North Sikkim and Middle Camp in East

<sup>5</sup> Rabdentse in West Sikkim, and GoruZurey in East Sikkim will be proposed for declaration of Bird Sanctuaries/Parks

<sup>6</sup> It is a trans-Himalaya zone and will be proposed for State's Cold Desert Sanctuary

<sup>7</sup> Red panda is Sikkim's state animal.

<sup>8</sup> In-situ conservation is the on-site conservation or the conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations of tree species. It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself, or by defending the species from predator

July 2016, a Biosphere Reserve known as Khangchendzonga Sanctuaries all occupying as much as 42.54% of State's total geographical area under the WLPA network including Biosphere Reserve Report by Forestry and environment mission Sikkim 2015). This has given Sikkim the unique distinction of the highest coverage under WLPA network in the country (Government of Sikkim, 2015).

The existing Himalayan Zoological Park, Bulbulay will be developed into a Modern Zoo with the new concept of Immersion Exhibits<sup>9</sup> of the Sikkim Himalayan animal species. In addition to this, Project Himalayan Tahr Safari Park in an area of 24 Ha. and Project Bird Safari Park (Walkthrough Aviary) in an area of 4.45 Ha. are also to be developed within the Zoological Park campus. The Zoological Park will also be proposed for re-naming as Sikkim Himalayan Zoological Park with an autonomous status under the Society (ibid).

Bulbulay<sup>10</sup> will also propose to initiate endangered species conservation breeding projects of target animal species such as Red Panda, Blood Pheasant<sup>11</sup>, Himalayan Tahr, Blue Sheep and Snow Leopard. In-situ conservation breeding for research and education would be done and the surplus species will be released in their natural habitats to replenish the depleting wild stocks and some will be exchanged with other zoos for conservation breeding programs.

Sikkim's Red Jungle Fowl<sup>12</sup> are presumed to be pure wild fowls separated from hybrid individuals. Pure Red Jungle Fowl has become increasingly rare both in captivity and in the wild. In order to protect, preserve and propagate these rare species, Project Red Jungle Fowl for captive conservation program will be proposed for launching at Manipur forest, South Sikkim.

The Wildlife Sector is already going ahead for establishment of iconic projects such a Sidkyong Tulku Bird Park at Rabdentse, West Sikkim and Butterfly Park at Rang,

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<sup>9</sup>An immersion exhibit is a naturalistic zoo environment that gives visitors the sense of being in the animals' habitats. Buildings and barriers are hidden. By recreating sights and sounds from natural environments, immersion exhibits provide an indication about how animals live in the wild

<sup>10</sup>Sikkim Himalayan zoological park

<sup>11</sup>Sikkim's State Bird

<sup>12</sup> Red jungle fowl is a bird locally known as *Luinchey* found in the lower forests belts

North Sikkim. The Projects are mainly aimed at ex-situ conservation of birds and butterflies of interest and boosting of tourism in the State for its sustenance plants.

### **3.2.3. c Prohibition of commercial extraction of minor forest produces from the wild**

Non timber forest produce or minor forest produce mainly consisting of medicinal plants were being collected on a large scale from the reserve forests. This had led to alarming depletion of stocks of some medicinal plants especially the varieties used for making incense which are found only in the high altitude alpine areas of the State. Other species of plants used in alternative medicine and Tibetan medicine found in different parts of the State are also highly valued in the national and international markets.

To preserve the mother stock of these plants and to ensure that the gene pool of valuable plants is preserved, the Government imposed a ban on the commercial collection of medicinal plants in 2001. The ban was initially imposed for a period of five years but the same has been extended and is in force even now (Government of Sikkim, 2016). However, this does not affect collection by villagers of wild medicinal plants for local consumption or commercialization of cultivated medicinal and other wild plant varieties. A quality control research laboratory is being set up in the forest, Environment & Wildlife Management Department to test the active principle content of the medicinal plants found in the State (Government of Sikkim, 2016). Future efforts will focus on commercial cultivation of high value medicinal plants.

### **3.2.3. d Sustainable Eco Tourism**

Since the last decades Sikkim has become one of the most sought after tourist's destination. Having realized Tourism as a major engine of economic growth, employment generator and poverty alleviator, and the state government has endorsed the sector as the main civil industry of the state (Tourism Department 2010). The process of drafting a ecotourism policy is being held in a participatory manner with inclusion of all stakeholders Minister, expert members at local and national level.

The increase in tourist activities poses the risk of substantial damage being caused to the natural resources of the territory. Therefore emphasis is laid down on promotion of sustainable ecotourism. In order to adhere to sustainable ecotourism the state is attempting to implement to same through ecotourism policy. Ecotourism is promoted in Sikkim with two principle objectives as per global sustainable tourism criteria (GSTC): 1. Providing income generation opportunities to local communities living in forest fringe area, 2. Ensuring that the impacts of developing ecotourism do not damaging the Environment (Government of Sikkim, 2011).

In 2002, the South Asian Regional Conference on Ecotourism was organized in Sikkim by The International Ecotourism Society (TIES) and Ecotourism and Conservation Society of Sikkim (ECOSS) with support from UNDP and the Ministry of Tourism. This was a milestone in introducing the concept of Ecotourism to Sikkim and the North East Region and in defining community-based tourism in the state. Several ecotourism sites in different parts of the state Kewzing, Yuksam, Dzonguand Pastanga were some of the first community-based tourism (CBT) sites that evolved as a result, and established them(Government of Sikkim, 2016a).

The core component of these CBT initiatives was the village homestay, a new tourism product that ensured spread of tourism benefits to local communities. Since then the Government has taken several initiatives to support village tourism and ecotourism including the notification of the Sikkim Ecotourism Policy in 2012 and the Sikkim Registration of Home stay Establishment Rules 2013 and more recently, the construction of over 700 home stays in different villages all over Sikkim (ibid).

In 2010, a Sikkim Tourism Mission- 2015 was released by the State Government, which emphasized the need for both, ecological and economic sustainability in tourism, through promotion of quality tourism and enhanced participation of local stakeholders. As with other green policies of the State, this Tourism Mission Statement elucidated strong political will to guide Sikkim's tourism towards a sustainable future. The Sikkim Ecotourism Policy 2011 was also developed by the State Government. It set guidelines and strategies for development of tourism around protected areas and forest areas of the State, which highlights the issues of zoning and carrying capacities in fragile areas (ibid).

The Human Development Report (HDR) 2014 has identified certain potential sectors for growth and livelihood creation, of which tourism ranks the highest. The Human Development Report recognizes that Sikkim as a prime tourist destination because of its peaceful environment, political stability, high literacy rate, its green policies such as organic farming and easy accessibility. Sikkim's Tourism Mission 2015 aspires to make tourism the main livelihood of the people of Sikkim, and each and every household and individual, a skilled force for the tourism industry. At the same time the Government of India's increased focus on the development of the North East Region has earmarked tourism as a priority area (Government of India, 2015).

In lieu of increasing inflow of domestic and international tourists the state is establishing an eco tourism marketing cell (EMC) under the Sikkim biodiversity conservation and forest management project in order to formulate a five year ecotourism marketing strategy and will be involved in implementing the state. The government of Sikkim along with the numerous NGOs such as ECOSS has also been promoting home stays<sup>13</sup> as a convenient and affordable mode of accommodation. Innovative initiative has made the state a major ecotourism destination in this region.

An ecotourism policy has been framed on international standards that are in consonance with the local conditions of Sikkim. This policy was drafted after intensive local consultation so that the local community's view points and interests are well represented.

#### **3.2.4. Climate Change Initiatives**

Sikkim has been engaged in a number of climate related initiatives since 2008. Sikkim's climate plan drafted as an extension of its green drive was initiated in 2010. The immediate impetus for an action plan; Sikkim was likely an ideational one. The state's prior engagement with climate change was part of an overarching strategy to appear progressive in addressing environmental issues.

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<sup>13</sup> Sikkim home stays programme is unique programme supported by UNESCO and implemented locally by ecotourism and conservation society of Sikkim (ECOSS).It seeks to combine the strengths of rural communities with the experience of national and international groups who are leaders in the field of ecotourism thereby contribute to the livelihood of community. The promotion campaign is backed up by providing the inhabitants with adequate training in hospitality cutlery.

The Science and Technology Department was renamed Department of Science and Technology and Climate Change (DST&CC) in 2009 (Government of Sikkim, 2009). Notable climate initiatives also included the formation of a Glacier and Climate Change Commission in early 2008 to monitor glaciers and their influence on the hydrology of the region.

In addition, in 2009; researchers were hired under a Senior Scientific Officer to manage a Climate Cell within the Department of Science and Technology and Climate Change (DST&CC) with focus on climate research (Tambe, and Arrawatia, 2012). Early that year the Sikkim State Council on Climate Change was also constituted an advisory council as to provide policy direction and institutional mechanism to implement various climate adaptation programmes in the state.

The SAPCC was actively supported by two senior bureaucrats; one was at the helm of Department of Science and Technology and Climate Change (DST&CC) when the draft was prepared, and the other heads the Rural Management and Development Department (RMDD) in the state. They used the State Action plan on climate change (SAPCC) platform to scale up pilot programmes in the water sector using existing funds. Sikkim were involved in the SAPCC process through their representation in the five working groups. Apart from state officials, the working groups also included Non-governmental organizations (NGOs), educational institutions and the private sector.

#### **3.2.4. a Spring recharge and enhancing ground water recharge in forest areas**

The aim of this strategy is to make Sikkim a water secure state. This can be through climate proofing of the existing programmes of Integrated Watershed Management Programme (IWMP), Centre for advance training (CAT) and Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) through appropriate management of water sheds. For climate proofing these programmes the steps that can be undertaken are:

- 1. IWMP (Intergrated Watershed Management Programme):** Focus on drainage line treatment has to be shifted to a watershed development and management of the

entire catchment using rainwater harvesting techniques which will help in recharging the ground water. In drought prone areas of South and West districts and small areas in East and North districts, rainwater harvesting component needs to be explored having activities like staggered contour trenches, percolation pits and spring-shed development. This will help in recharging the ground water and ensuring perennial spring flow and reviving the entire ecosystem in general. Survival of the vegetative measures and horticulture plants will also increase. Reduced surface run off will reduce instances of floods as well (Government of Sikkim, 2001).

**2 CAT (Centre for advance Training):** CAT plans need to be area specific to be able to cater to the diverse needs of water surplus regions and drought prone regions as well and shift from flood control approach to rainwater harvesting using soil and moisture conservation works like contour trenches, percolation pits, drainage lines etc. and spring shed development of springs originating from forest areas in drought prone areas and in subtropical and middle hill areas which are not very steep. Though the flood control and protective works is essential for heavy rainfall areas, however, CAT programs. Capacity to identify, plan and execute these rainwater harvesting measures needs to be developed (ibid).

**3 MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act):** To climate proof the water availability through MGNREGA, about 1,000 springs need to be recharged 1,000 in drought prone areas While the program has helped in developing human capacity for this important sector and also carried out pilots to facilitate hands on training, there is a need for earmarked funds for spring shed development to upscale this initiative on a bigger scale (ibid).

### **3.2.4. b Enhancing quality of moderately dense forest open forests, and degraded forests**

The aim of this strategy is to improve the health of these types of forest, improve the ecosystem services and enhance the carbon sequestration<sup>14</sup> potential. Actions for enhancing quality of forests would include- regulation and monitoring of invasive species<sup>15</sup> and identification of non-native species that can survive climate change and be beneficial to the ecosystem, management of insects and other pathogens, adoption of short rotation species, preventing forest fragmentation by conserving contiguous forest patches, eco restoration of degraded open forests, and restoration of grass land (ibid).

Sustainable management of these forests would lead to increase in soil moisture content of the forests, increase in biomass density, along with increase in the flow of forest goods like Non-timber forest products (NTFPs), fuel wood, hydrological services, improvement in biodiversity and enhancement in C sequestration.

Additionally trees in notified forest patches which are threatened by expanding urban and industrial development, green spaces like parks lots set up on municipal land, Diffused planting such as on avenues and in households and Institutional lands, especially lands belonging to industrial houses and educational institutions can be explored for enhancing Carbon sequestration, as well as for improving the quality of soil, water and air of the immediate environment.

**3.2.4. c Linking protected areas:** Aim of this strategy is the creation of secure corridors to facilitate species migration of both flora and fauna and adapt to climate change, especially for species with limited dispersal ability. It can be done through connecting fragmented forests with ‘Canopy Corridors’ and ‘Flyways’ to assist species migration. Corridors will be prioritized and maintained by local stakeholders. As for people living in these corridor areas, rapid agency responses to crop-raiding,

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<sup>14</sup>Carbon sequestration is the process involved in carbon capture and the long-term storage of atmospheric carbon dioxide. Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change.

<sup>15</sup> intentionally introduced flora, fauna, domesticated, wild, ornamental, medicinal, hybrids, spawn, fungi, herbs/shrubs/trees, bulbs, tubers, microbes (Bird/Swine Flu, Nipah, Distemper, etc), through Meat-on-Hoof, Invertebrates, Molluscs, Aquatic Plants, Exotic Fish, Weeds, etc.

man-animal conflict, crop-insurance and hassle-free compensation would be some of the key interventions.

**3.2.4.d Disaster Risk Reduction and Management:** In Sikkim, disasters which are likely to be more frequent with projected increase in intensity of extreme events such as extreme heat, droughts, and extreme precipitation include incidences of forest fires, landslides, increase Glacial Lake Outbursts and Flows (GLOFs), land erosion, and threat to hydropower dams. Therefore climate proof strategies for preventing the exacerbated impacts of climate change for these can be as follows: (State Disaster Management Authority, Government of Sikkim).

**3.2.4. e Effective Fire Prevention and Fire Management:** Fires are frequent in the subtropical Sal forests in Sikkim and occur in the months. Winter precipitation used to douse the fires. However, with the change in the climate pattern, winters are cold and dry; fires are on for longer periods of time and also occurring at higher altitudes. The extent of the damage depends upon the frequency and intensity of fires and the type of forest, availability of fuel and local climatic factors. Fires in Sal forests, though damage the forest, but regeneration of the ground flora occurs in the next rainfall season. However, the total oak trees catches fire in oak forests, as its calorific value is higher than Sal, and the forest remains degraded for long time.

**3.2.4 f Safeguarding hydropower in critical areas:** Sikkim has a high potential of hydropower- both large and small hydropower projects are in the pipeline. In this region, Global warming and changes in precipitation patterns is likely to increase the risk of GLOFs and also the timing and magnitude of river flows. With increase in GLOFs, there may be increase in water discharge and consequent power generation in the short term. Hydropower generation is then vulnerable to landslides, increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermontane valleys (Government of Sikkim: 2011).

Enhanced snow melt and fluctuating stream flows may also produce seasonal floods and droughts. As a result of these, Faunal and floral species migration may take place. Additionally, Earthquakes, increase in landslides and other geophysical hazards may also occur in these environments. Disaster management in the context of climate

change entails, establishment of appropriate institutional mechanisms at state, district, block and gram panchayat level for managing the risks associated with the projected enhanced intensity of the disasters, such as landslides due to high intensity of rains, bursting of hydropower dams, due to both extreme rain fall and GLOFS.

Further, it is essential to install early warning systems and associated hardware; undertake remote real time monitoring with automatic data transmission; undertaken hazard mapping of key watershed Areas; Implementation of Hazard Zonation Plan; preparation of a state database on landslide prone areas and intensity of landslides to assess the risk of landslides; Reforestation of catchment areas and slope stabilization of landslide and Flash flood prone areas, doing River bank protection and Re-location/ resettlement of villages and people in risk prone areas. Further awareness generation amongst general public on impacts of climate change on GLOFS, Land Slides, dam burst etc. required for disaster preparedness (ibid).

**3.2.4.g Conservation of High Altitude Wetlands (HAWs):** The aim of this strategy is to secure the services provided by the Wetland Ecosystem even in the context of the likely adverse impacts of climate change. This actions within strategy need to include Identification of critical wetlands for undertaking long term scientific studies flora and fauna, hydrology, limnology etc.; Identification and inclusion of more wetlands and marshes for effective management; .Strengthening capacities of the stakeholders to manage the wetlands; Acceleration of the efforts to include more wetland sites under Ramsar convention and Conservation and security of these HAWs through active involvement of the border protection agencies which depend on them for survival (ibid).

### **3.2.5 Legislative Amendments**

Policy making and initiation of environment oriented Schemes is the first step towards efficient and sustainable forest management. It ought to be followed by effective implementation, in compliance with the objective laid down. The increase in the forest cover of Sikkim over the past decade has been a consequence of such effective governance, local participation, and ensuring strict compliance to the law which was ensured through imposing strict penalty for those violating the law.

The Sikkim Forests Rules 1998 has been notified in time. This rule notified by the government is to make strict rules for offender who commits any forest offence, thereby keep a check on the offenders for violating the rules. The state government thereafter has brought about vital amendment in the present Sikkim forest water courses and road reserve (preservation and Protection) Act 1998.(Amendment 2000) to make the specified clause more stringent and harsh in enforcement offences such as illegal felling of trees , encroachment and grazing in the reserve forest have been made non bailable (Government of Sikkim2011). Other important initiatives, measures and actions taken are intensification of management and protection.

The overall management of forest land and forestry resources have been intensified by better patrolling, effective forest check post, check on illegal extraction and transit of forest produce, reporting and recording of all forests offences and other information in head quarter control room and division control room, registration of forest cases check on leakage of forest revenue and better communication (ibid).

There is also one of the very unique Act Sikkim Ecology Fund and Environment Cess Act, 2005 providing for levy of Cess on industries, traders and consumers for using non-biodegradable materials. The Government has taken up several measures both through developmental action and legislation to promote sustainable tourism. While several peaks, lakes and rocks have been notified by the Government as sacred, the Regulation of Trekking Rules notified in 2006 lays down a code of conduct that tourists should follow when they are trekking in wilderness areas especially in wild life areas. They contain specific dos and don'ts that tourists should follow while trekking in the State (Government of Sikkim 2011).

### **3.3 Role of Non -State Actors for environmental Initiative in Sikkim**

**3.3.1 The Ecotourism and Conservation Society of Sikkim (ECOSS):** The Ecotourism and Conservation Society of Sikkim (ECOSS) is a registered NGO and operate out of Gangtok, Sikkim. This NGO was Founded in 2001.It has dedicated members who believe in the concept of self reliance and have a mandate towards achieving the goals of sustainable development. ECOSS seeks to combine the

strengths of rural communities with the experiences of national and international experts for process driven innovation and advocacy.

The Ecotourism and Conservation Society of Sikkim believe in the conservation of biodiversity, local culture, promotion of sustainable livelihoods through community mobilization and empowerment. It conceptualized and hosted the South Asian Regional Conference on Ecotourism (SARCE 2002) at Gangtok with the International Ecotourism Society (TIES) and the Ministry of Tourism which essentially brought ecotourism into the development profile of the North Eastern States and put Sikkim on the ecotourism map of India.

ECOSS has successfully executed the Sikkim Himalayan Home stay Project funded by UNESCO <sup>16</sup> under their Cultural & Ecotourism in Mountain Regions of Central and South Asia programme from 2004-2007 for promotion of community home stays in Yuksom<sup>17</sup>, Dzongu<sup>18</sup>, Kewzing<sup>19</sup> and Pastanga<sup>20</sup> through capacity building of ecotourism service providers.

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<sup>16</sup>The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a specialized agency of the United Nations (UN) based in Paris. The purpose is to contribute to peace and security by promoting international collaboration through educational, scientific, and cultural reforms in order to increase universal respect for justice, the rule of law, and human rights along with fundamental freedom proclaimed in the United Nations Charter. It is the heir of the League of Nations' International Committee on Intellectual Cooperation.

<sup>17</sup>Yuksom is a historical town in Geyzing subdivision of West Sikkim district in the Northeast Indian state of Sikkim. It was the first capital of Sikkim established in 1642 AD by Phuntsog Namgyal who was the first Chogyal of Sikkim. The coronation site of the first monarch of Sikkim is known as the Throne of Norbugang. Yuksom is where there is the Norbugang Chorten near the Norbugang throne, the place Namgyal was crowned and several monasteries and a lake.

<sup>18</sup>Dzongu is a triangular region in North Sikkim. It is bounded by the Teesta River in the south-east, Tholung Chu River in the north-east and by mighty mountains in the west. It borders the Kanchenjunga Biosphere Reserve. Dzongu has been established as an official reserve for the Lepcha people, the aboriginal inhabitants of Sikkim. The Lepchas have strong ties with the nature and have lived here for centuries. An understanding of their culture, customs and language helps to foster an appreciation of the beautiful mountains, deep forests, and the emerald-colored Teesta River..

<sup>19</sup>Kewzing Village is located 10 km south west of Ravangla along the main road between Rabong town and Legship. It's easily accessible from Gangtok in the east, Namchi in the south and Pelling in the west. Kewzing is a typical Bhutia village rich in cardamom forest cover.

<sup>20</sup>Pastanga a small village, situated in the East District of Sikkim state, at an altitude of 1423 meter. In olden times the village was known as Pa-Sing-Tel in Kulung Language Rai which means forefather's wood collecting place and on the other hand Pasing Tengkha in Bhutia language meaning below bamboo forest. Gradually with the passage of time the name changed into Pastanga.

ECOSS has been a key player in The Sikkim Water Supply and Sanitation Scheme Project funded by the Australian Government International Development Assistance (AUSAID) Programme under their Community Small Grants Scheme. It has been actively involved in the improvement of water supply, sanitation and solid waste management in Greater Gangtok area covering 55 various schemes and benefiting over 26,000 people.

The Ecotourism and Conservation Society of Sikkim ECOSS has executed the Rural Tourism Cluster Project funded by National Bank for Agriculture & Rural Development (NABARD) for the promotion of community based home stays and ecotourism activities in the villages of Rey Mindu in East Sikkim and Lingee Payong in South Sikkim. ECOSS continues to conduct numerous awareness and capacity building trainings in the ecotourism sector both within Sikkim and in the North Eastern states.

ECOSS has conducted a pilot project for the revival of the ancient weaving practice of giant nettle fiber cloth amongst the Lepcha community of Dzongu. It has also provided consultancy services on ecotourism for the Asian Development Bank (ADB) funded South Asia Sub regional Economic Cooperation (SASEC) Tourism Infrastructure Project in Sikkim.

In 2011 ECOSS had created the Vision Document for Quality Elementary Education for the Human Resource Development Department, GoS. ECOSS is also currently engaged in the JICA funded Sikkim Biodiversity and Forest Management Project covering the North District. ECOSS has also partnered with GIZ in the Uttarakhand Reducing emissions from deforestation and forest degradation (REDD) programme in the sector of Tourism (ECOSS).

In the recent year 2016 The Ecotourism and Conservation Society of Sikkim (ECOSS) was awarded by UNESCO for community based tourism (CBT) project in Sikkim (Uttarakhand Tourism Draft Policy 2016). In Interview with the Rajendra P Gurung, chief Executive Officer (ECOSS) shows that the Ngos of Sikkim Eco- tourism and conservation society of Sikkim conservation (ECOSS) is playing an important role in response environmental initiatives. Eco- tourism and conservation society of Sikkim

conservation (ECOSS) also have done lots of programmes in response to global environmental initiatives. They have focused on sustainable tourism, Zero Waste Management, Idea of organic farming Green mission plan, Climate change initiative plans and programmes etc. (A report through Interview with NGO ECOSS, 2016)

**3.3.2 Nature conservation and social organization:** Nature conservation & social organization (NCSO) is another important non-governmental organization founded in the year 2008 in the State of Sikkim. This organization is established to address the needs of community. Nature conservation and social organization is engage in protection on human rights, humanitarian issues, management & protection of natural resources, environmental developments. Ngo is aimed to tackle the humanitarian crisis including disaster prevention and also develops community basic social services needs. It also provides training, researches and capacity buildings to local authorities and civil society. This Ngos is also working for the environment development (Nature conservation and social organization, 2008).This Ngo is still supporting for the conservation and management of natural resources in Sikkim and focusing on environmental sustainability.

**3.3.3 Sikkim Himalayan Integrated Environment Protection Society:** Sikkim Himalayan Integrated Environmental Protection Society is a registered non-governmental organization (NGO). The NGO was established in 1999. It is working in the field of Dalit Welfare, Disaster Management, Eco tourism, Education & Literacy, Environment and natural resource management, Health & Nutrition, Human Rights, Information & Communication Technology (ICT) , Labour & Employment, Legal Awareness & Aid, Micro Finance (SHGs), Minority Issues, Rural Development & Poverty Alleviation, Tribal Welfare, Vocational Training, Women's Development & Empowerment, Youth Affairs, etc. (Sikkim Himalayan Integrated Environment Protection Society,1999). The NGO still works towards the promotion of sustainable development. The organization is operational in Sikkim, India.

### **3.4 Conclusion**

Sikkim has seen a steady and robust growth on environment development. It is bringing many programs in response to global environmental initiatives. Sikkim has initiated programs like ten minutes to earth, green mission for the conservation of

biodiversity. Sustainable tourism is one of the important means for developing natural resources in Sikkim. They also started joint forest management for conservation of forest.

Sikkim is focusing more on climate change initiatives and bringing up programs relating to climate change mitigation. It has formed a State Action Plan on Climate Change (SAPCC). The Sikkim government as well as many Nongovernmental Organizations are working seriously in relation to environmental initiative program.

Sikkim also started Ban on Grazing of Cattle, Prohibition on Manufacture, Use and Sale of Firecrackers, Prohibition on use of Plastic Carry Bags and Prohibition on Burning of Agricultural Wastes. Sikkim State has the pride of being the first State in the country to launch and implement a prestigious award system. Environment Information System (ENVIS) was set up in the Forest, Environment & Wildlife Management Department during the year 2002 with a mandate of collection, collation, storage in a retrieval system and dissemination of environmental related information to varying users, which include decision-makers, researchers, academicians, policy planners, research scientists, etc. Sikkim, the North Eastern Indian State in the Eastern Himalayas, announced in January 2016 that it had transitioned completely to Organic Agriculture, the first state in the South Asian Nation to do so.

Thus, this above initiatives shows that Sikkim State of India is doing a lot related to Environmental Issues and it is moving more towards the future Sustainable Developments. In recognition of all these steps initiated by Sikkim Region, the State has won several accolades such as Nirmal Rajya Puraskar, two of the districts have been declared cleanest in the North-East. Recently the Khangchendzonga National Park has been declared as a UNESCO World Heritage Site.

## **CHAPTER IV**

### **Local Global linkages in Environmental Initiatives: A Case of Sikkim**

#### **4.1 Introduction:**

Global environment is dynamic and is constantly changing. It became apparent that mankind is having an increased effect on the planet's eco-systems so that our activities are now causing environmental change, which is overriding the natural dynamism of the earth. Despite the environmental problems such as loss of biodiversity, land cover changes as evident from satellite imagery, records of climate change; we still pursue activities which perpetuate the problems (Harris,2012: 3). This chapter deals with the local level responses to global environmental initiatives with focus on Sikkim. It also looks into the national level response to global environmental issues as the local and national level are inherently interrelated.

There are problems of overpopulation, overconsumption, and the under distribution of resources. Increasing population and the rise in per capita consumption of natural resources have escalated the environmental problems. The discussion on environment and to make it a global issue is a difficult task. This is due to three broad reasons. First, the science of environmental problems is complex. Secondly, there are many stakeholders involved in both the causes and solutions to environmental problems. Organizing all of these stakeholders to act in a coordinated manner is difficult. Thirdly, resolving global environmental issues will require changes in our own consumption pattern, which will mean changes in lifestyles (Harris, 2012: 3).

Human-environment interaction involves not only the question of resource use per person, but also our ability to understand the science of the environment, our ability to regulate impact on the environment, our beliefs in the value of the environment and our ability to negotiate solutions at both the local and the global level (Harris,2012: 4).

#### **4.2 Environmental Issues: A Global Interpretation**

Environmental Issues have become global in several senses. First, some environmental problems are inherently global. The cause of the problem may be local. But their effect and solution can be visualized at a global level. Carbon dioxide

emissions contribute to global climate change which indicates the effects are global and it needs cooperation at the global level to tackle the problem. Second, there are some resources which are shared by the whole world(Harris,2012: 4).

Third, many environmental problems cross national boundaries even though they are not purely global. Any environment related hazardous activity in one country would produce changes in neighboring countries.Fourth, there are many environmental issues which are local or national. But they happen in too many localities. Hence they are considered as global problems. This includes unsustainable agricultural practices, soil erosion, and deforestation. Finally, and the most important among all these is the fact that environmental issues are intimately linked to broader political and socio-economic processes which themselves are part of global political economy. It is widely recognized that the pattern of wealth distribution, power, industrialization affect the environment in a significant way(Harris,2012: 4).

Hence globalization and interdependence among nation states give all environmental problems an international dimension. Thus it is very clear that global environmental issues encompass a wide range of problems which are interrelated. However each of these problems needs specific and careful explanation so that effective solutions can be found.

### **4.3 India's response to environmental crisis:**

Several years of development have spurred on unplanned urbanization, extensive industrialization, and the building of a series of big dams. In the process, India has landed bang in the middle of an ecological crisis. India have lost half of forests, poisoned their waters, eroded their lands and rendered millions homeless, resource less and more impoverished. Many Indian cities have now become most-polluted cities in the world. Several plant and animal species are extinct.

#### **4.3.1 Environment and development in India:**

There are many environmental issues in India. Air pollution, water pollution, garbage, and pollution of the natural environment are all challenges for India. The situation was worse between 1947 through 1995. According to data collection and environment assessment studies of World Bank experts, between 1995 through 2010, India has made one of the fastest progress in the world, in addressing its environmental issues and improving its environmental quality(World Bank,2010).

Millions of people today are worse off than they were when our modern development process was started. Tribal's have been alienated from their land and forests, nomadic communities have had their pastures taken away by mega-projects, marginal peasants and the landless have become economically more insecure. Between 20 to 30 million people have been displaced by development projects, rendered refugees in desperate search of shelter and jobs, because they had no say in the development planning of the country. For these people, development or destruction is not a simple but it is a burning question (Rangarajan, 2008)

The process of liberalization and structural adjustments, which India embarked upon in the 1990s, has only served to intensify the environmental and social crisis. There are at least four aspects to it (Bhatia, 2006);

1. The drive towards an export-led model of growth is rapidly depleting natural resources in order to earn foreign exchange, particularly in the fisheries and mining sectors.
2. The move towards liberalization is resulting in a free-for-all atmosphere, with industries increasingly ignoring environmental standards and state governments sacrificing natural habitats, including their own wildlife protected areas, to make way for commercial enterprises.
3. Directives to reduce the government's expenditure are resulting in cuts in social and environmental sectors. This is leading to a stagnation or reduction in programmes for the conservation and regeneration of natural resources.
4. Opening up of the economy is bringing in companies with a notorious track record on the environment, and wasteful consumer goods and toxins, which are adding to the country's garbage and health problems.

The debate on the new economic policies since 1990s has highlighted another vital aspect of the environmental crisis: the role of international organizations. Much as inequities within the country have fuelled the crisis, those between countries have resulted in considerable environmental degradation. Unequal trade regimes are forcing Southern countries to over-exploit their resources to compete in the international market and reduce their financial debt burdens. Foreign aid from

multilateral and bilateral donors namely the World Bank<sup>1</sup> primarily finance environmentally destructive projects, and aid packages notably IMF<sup>2</sup> drive macro-economic policies further towards unsustainable and inequitable resource use.

#### **4.3.2 India's effort towards the solution of environmental issues:**

The United Nations Conference on the Human Environment at Stockholm in 1972<sup>3</sup> had a major impact in the history of Environmental Legislation in India. After the Stockholm Conference, India became more aware of Environmental Issues. One outcome was the creation of the National Committee on Environmental Planning and Co-ordination (NCEPC), established in the Department of Science and Technology. Subsequently, the environmental situation of the country featured as a prominent issue under the Fourth and Fifth Five-Year Plans (World Bank, 2011).

The Department of Environment and Forests was created in the central government, which subsequently became the ministry of environment and forests (MoEF) by the mid-1980s. The MoEF is a nodal agency in the administrative structure for planning, promotion and implementation of environment, conservation and forestry-related programmes. The mandates of the ministry include conservation and survey of flora, fauna, forests and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas and protection of the environment. These tasks are being fulfilled by the ministry through environmental impact assessment, eco-regeneration, assistance to organizations implementing environmental and forestry programmes, promotion of environmental and forestry research, extension, education and training to augment the requisite manpower, dissemination of environmental information, international cooperation and creation of environmental awareness among all sectors of the country's population.<sup>4</sup>

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<sup>1</sup>The World Bank (WB) is an international financial institution that provides loans to developing countries for capital programs. It comprises two institutions: the International Bank for Reconstruction and Development (IBRD), and the International Development Association (IDA). The World Bank is a component of the World Bank Group, which is part of the United Nations system.

<sup>2</sup>The International Monetary Fund (IMF) is an international organization headquartered in Washington, D.C., of 189 countries working to foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.

<sup>3</sup>The United Nations Conference on the Human Environment was held in Stockholm, Sweden from June 5–16 in 1972. The meeting agreed upon a Declaration containing 26 principles concerning the environment and development; an Action Plan with 109 recommendations, and a Resolution

<sup>4</sup> <https://sol.du.ac.in/mod/book/view.php?id=1345&chapterid=1089>

In and after the 1970 a number of old acts were amended and new ones passed. These included the Air Prevention and Control of Pollution Act, 1981, the Water Prevention and Control of Pollution Act, 1974, the Environment Protection Act, 1986 the Public Liability Insurance Act, 1991, the National Environment Tribunal Act, 1995, the National Environment Appellate Authority Act, 1997, the Wildlife Protection Act, 1972 and the Forests Conservation Act, 1980. Besides the legislative measures, a National Conservation Strategy and Policy Statement on Environment and Development, 1992, National Forest Policy, 1988 and a Policy Statement on Abatement of Pollution, 1992 have also been evolved (Chandra, 2015).

The Government of India implemented a new Forest Policy in the year 2002. It made provisions for the access to land for the utilization and development of forest resources, and secure the tenure of forest and trees and to conserve the biodiversity of the forest resources. The policy made provisions to encourage sustainable use and ensure that the benefits are shared equitably.

India formulated the National Action Plan on Climate Change. The Plan encompasses a broad and extensive range of measures, and focuses on eight missions, which will be pursued as key components of the strategy for sustainable development. These include missions on solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan ecosystem, creating a Green India sustainable habitat, conserving water, sustaining the Himalayan ecosystem, creating a Green India sustainable agriculture and finally, establishing a strategic knowledge platform for climate change.

The action Plan will go a long way as far as India's position on climate change is concerned. It clearly demonstrates India's concerns and its strategy to meet the challenges of climate change and other environment related problems. Several autonomous agencies, offices and institutions have also been set up in India to implement environmental programmes and policies(Chandra,2015).

#### **4.3.3 International Negotiations and India:**

Since the 1990s onwards, the focus of the entire world was shifted to protect the ecological systems of the planet. As an emerging leader of the developing countries, India was expected to lead the show. Before the 1990s, the debate between the North

and South was related to material advancement but in the 1990s the nature of debate changed. The focus has been shifted to the degree of carbon emission. The developing countries are now blaming the developed countries for the degradation of the world's ecosystem (Patel and Joshi, 2009).

India as a leader of the South that is developing countries, has taken a tough stand in this regard. It has consistently maintained that developing countries including India should not be forced to reduce carbon emissions. The basic argument that was given was that till today the developed countries most prominently the USA have been responsible for the world's total pollution. If at all any target is going to be fixed, first the developed nations must lead the way. Starting from Kyoto Protocol to the recent negotiations held in Bali, what is evident is that India has been able to form a cartel of developing countries to put pressure on the USA and other Developed Nations to accept their terms and conditions. This is a significant development as far as international politics is concerned. India has demonstrated its ability to lead the developing nations.

It is true that at the international level, India is displaying considerable amount of power. Centre for Science and Environment report states that climate change is changing India more rapidly than any other developing country (Patel and Joshi, 2009). It is absolutely correct to pressurize the developed countries to have mandatory Carbon dioxide emissions. At the same time India must also look at the alternative development models which are morally just, economically viable, and environmentally sustainable (ibid).

#### **4.4 Local, National and Global Linkages:**

Sikkim, a province in Indian federation, has also initiated various programs in response to environmental issue. In the global level International Governmental Organizations and international nongovernmental organizations have made initiatives in response to environmental problems. The major initiative that have been taken up for instance Kyoto Protocol, Agenda 21, idea of common green ecology, waste management, conservation of natural resources and biodiversity, protection of threatened species etc.

#### **4.4.1 Relating to Agenda 21:**

Agenda 21 the product of the earth summit and is a global action plan for sustainable development into the 21st century. Agenda 21 is a non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development. It is an action agenda for the UN other multilateral organization and individual government across the world that can be executed at local, national and global levels (UNCED, 1992).

The implementation of Agenda 21 was intended to involve action at international, national, regional and local levels. Some national and state governments have legislated or advised that local authorities take steps to implement the plan locally, as recommended in Chapter 28 of the document. These programs are often known as "Local Agenda 21" or "LA21. At the national level India has also supported the Agenda 21. It also implemented various programmes in support of Agenda 21 (ibid).

At the local level, Sikkim as a particular region has also initiated projects and programs in support of global Agenda 21 for sustainable development. The Sikkim Biodiversity and Ecotourism project seeks to enhance indigenous capacity and generate economic incentives to conserve natural and cultural heritage. The project works with stakeholders to support community based enterprise development approaches for the conservation of Sikkim's unique biological diversity; to improve the capacity of non-government organizations (NGOs), the private sector and local communities to effectively participate in biodiversity conservation; to strengthen community management of ecotourism resources at the project sites; and to develop tourism in a way which would provide widespread economic incentives for participants to conserve the natural resources on which it depends (Mountain Institute, 1996)

The Project implementation began in 1996, and is a joint effort of the G.B. Pant Institute of Himalayan Environment and Development-India and The Mountain Institute, in collaboration with the Travel Agents Association of Sikkim (TAAS), The Green Circle (a Sikkim's non-government organization) and local communities (A report from the Mountain Institute, USA, 1996). As with any project built upon stakeholder participation, the design continues to evolve but

maintains its focus on developing positive linkages between biodiversity conservation and economic development (ibid).

#### **4.4.2 Relating to climate change issue:**

In regard to the climate change issue at the global level Intergovernmental panel on climate change has been organized. The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change.<sup>5</sup> It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

In response to it at the national level India has also released its National Action Plan on Climate Change (NAPCC; 2008) which addresses the urgent and critical concerns of the country through a directional shift in the development pathway. NAPCC envisages, in addition to 07 other missions, a National Mission for Sustaining the Himalayan Ecosystem (NMSHE), the only location specific mission, to evolve management measures for sustaining and safeguarding the Himalayan glaciers and mountain ecosystems (NAPCC, 2008)

This Mission, among others, aims to: (i) understand, whether and extent to which, the Himalayan glaciers are under recession and how the problem could be addressed, (ii) establish an observational and monitoring network for the Himalayan environment including strengthening regional cooperation for data and information sharing with countries that share the same ecology, (iii) promote community based management of the ecosystem through incentives to community organizations and panchayats for the protection of forested lands (ibid).

At the local level mainly in region Sikkim in response to global climate change initiative, there is a state action plan on climate change (SAPCC) as a policy direction and institutional mechanism to implement various climate adaptation programmes in the state. ICSD (Inter-cooperation Social Development India) had facilitated the

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<sup>5</sup>"A guide to facts and fictions about climate change". The Royal Society. March 2005

preparation of the Sikkim SAPCC. ICSD has played a key role in preparing the State Action Plans on Climate Change (SAPCC) for the North Eastern state Sikkim India. Sikkim had set the priority themes and strategies in a view to allow communities to mitigate and adapt to the impacts of climate change and the role was to translate that to a reality. The task was initiated in July 2010 and was completed by end of 2010. The SAPCC of Sikkim has been approved by the Ministry of Environment and Forests and endorsed by the Government of Sikkim (Bawa&Tenzing, 2010)

#### **4.4.3 Relating to the biodiversity conservation:**

In the global initiative has taken up for the conservation of biodiversity. There is the various conventions regarding biodiversity conservation. Seven international conventions focus on biodiversity issues: the Convention on Biological Diversity 1993, the Convention on Conservation of Migratory Species, the Convention on International Trade in Endangered Species of Wild Fauna and Flora 1975, the International Treaty on Plant Genetic Resources for Food and Agriculture 2004, the Ramsar Convention on Wetlands 1971, the World Heritage Convention 1972 and the International Plant protection Convention 1952 (UN, 1992).

Each of the biodiversity-related conventions works to implement actions at the national, regional and international level in order to reach shared goals of conservation and sustainable use. In meeting their objectives, the conventions have developed a number of complementary approaches (site, species, genetic resources and/or ecosystem-based) and operational tools e.g., programmes of work, trade permits and certificates, multilateral system for access and benefit-sharing, regional agreements, site listings, funds (ibid).

In the national level, the Ministry of Environment and Forests implemented an externally-aided project on National Biodiversity Strategy and Action Plan (NBSAP) was prepared. The NBAP draws from the principle in the National Environment Policy that human beings are at the centre of concerns for sustainable development and they are entitled to a healthy and productive life in harmony with nature (Government of India, 2016). This Action Plan identifies threats and constraints in biodiversity conservation taking into cognizance the existing legislations,

implementation mechanisms, strategies, plans and programmes, based on which action points have been designed.

In the local level Sikkim has also put forward various programs in response to biodiversity conservation. To enhance the global, social, and economic value of biodiversity and improve livelihoods in and around protected areas (PAs), buffer zones, and reserve forests, Sikkim established and implemented sound management plans and the dissemination of biodiversity information for promoting public awareness on the significance of biodiversity (Government of Sikkim, 2011).

#### **4.4.4 Relating to protection of Endangered Species:**

In the global level the International Organization International Union for conservation of Nature and Natural Resources - play a vital role in protection of threatened species. The ICUN supports and develops cutting edge conservation science implements this research in field project around the world and then links both research and results to local, national, regional and global policy by convening dialogue between governments, civil society and private sector.

It monitors the state of the world species through IUCN Red list of threatened species. It contributes and supports millennium Ecosystem Assessment. It also gives policy advice to global governments such as UN, International Conventions and other G8 and G77. It provides technical assistance to prepare national biodiversity status and action plans. It gives financial support for protection of globally threatened species (UN, 2015).

In the national level due to the rapid decline in wildlife population, the Government of India during 1952 had constituted an advisory body designated as the Indian Board for Wildlife (IBWL). A comprehensive central legislation was enacted in 1972 called the Wildlife (Protection) Act for providing special legal protection to our wildlife and to the endangered species of fauna in particular. National Board for Wildlife (NBWL) is a statutory Board constituted on 22nd September 2003 under Section 5 of the Wild Life (Protection) Act, 1972.

At the local level, in this regard, Sikkim state has taken many initiatives which have been carried out for the protection of endangered species. Scientific information on the status of the Red Panda in Sikkim is very scant. Though the red panda is the state animal of Sikkim and reported to be found in six protected areas (PAs) within the state (Choudhury 2001), its status in the wild is thought to be steadily declining (Lachhungpa 1997). It also reports that a 1,000 time's increase in tourists in Sikkim between 1980 and 1995 and their subsequent requirement for firewood have accelerated habitat loss. In addition it mentioned that construction of roads; over-grazing, etc. have also had their toll on the red panda habitats in Sikkim.

The ecology of this species has been studied in Singhalila National Park, West Bengal, and also an area that is adjacent to the state of Sikkim and has contiguous patches to this state's largest PA, i.e. the Kanchenjunga National Park (Pradhan et al., 1999). The state of Sikkim is also likely to hold about 20% of the potential red panda habitat in India (Choudhury, 2001).

Therefore, in order to propose a conservation action plan for the species, the foremost activity to be carried out is to estimate the current status and distribution of the red panda in Sikkim. This activity will identify the PAs and other areas of red panda habitat that need immediate attention. India has initiated a project on the Red Panda in Sikkim, for developing an in depth understanding of the species to help develop a long-term conservation plan (Government of Sikkim, 2015).

**4.4.5 Responseto the Idea of Common Green Ecology:** UNEP defines a Green Economy as “One That Results Improved Human Well-Being and Social Equity, while significantly reducing environmental risks and ecological scarcities” (UNEP, 2010). In its simplest expression, a green economy is low-carbon, resource efficient, and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services (ibid).

In 2009, The UN General Assembly held a summit in Rio de Janeiro in 2012 (Rio+20). Two of the agenda items for Rio+20 are, “Green Economy in the Context

of Sustainable Development and Poverty Eradication”, and “International Framework for Sustainable Development” (UN 2009). With the green economy now firmly established on the international policy agenda, it is useful to review and clarify the linkages between a green economy and sustainable development. Most interpretations of sustainability take as their starting point the consensus reached by the World Commission on Environment and Development (WCED) in 1987, which defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). A green economy has become a strategic economic policy agenda for achieving sustainable development.

It is argued that, an Inclusive Green Economy is the alternative to today's dominant economic model, which generates widespread environmental and health risks, encourages wasteful consumption and production, drives ecological and resource scarcities and results in inequality. IGE provides an opportunity to advance both sustainability and social equity as functions of a stable and prosperous financial system within the contours of a finite and fragile planet. It is considered as a pathway towards achieving the 2030 Agenda for Sustainable Development, eradicating poverty while safeguarding the ecological thresholds, which underpin human health, well-being and development.

At national level, India has also started green mission programme. The National Mission for Green India (GIM) is one of the eight Missions outlined under the National Action Plan on Climate Change (NAPCC). It aims at protecting; restoring and enhancing India's diminishing forest cover and responding to climate change by a combination of adaptation and mitigation measures. It envisages a holistic view of greening and focuses on multiple ecosystem services, especially, biodiversity, water, biomass, preserving mangroves, wetlands, critical habitats etc. along with carbon sequestration as a co-benefit. This mission has adopted an integrated cross-sectoral approach as it will be implemented on both public as well as private lands with a key role of the local communities in planning, decision making, implementation and monitoring (Government of India, 2015).

In response to global and national level idea of green ecology, Sikkim has launched a unique and innovative programme called State Green Mission with the view to raising avenue plantation and beautification of all vacant and waste lands. Sikkim has thus implemented the State Green Mission in the year 2006. The plan envisages long-term strategy for forestry development which reflects on three major objectives: (i) to reduce soil erosion and flooding; (ii) to supply the growing needs of the domestic wood products industries; and (iii) to supply the needs of the rural population for fuel wood, fodder, small timber, and miscellaneous forest produce. Such socially responsible forestry was encouraged by the State Government (Government of Sikkim, 2006).

This plan emphasizes more planting of trees in order to check denuded communal cattle-grazing grounds and make villages self-sufficient in fuel wood, supply timber needed for the construction of village houses, and provide the wood needed for the repair of farm implements. Both individual farmers and tribal communities at household level are encouraged to grow trees for profit. Land use planning and land management is very important for optimal utilization of land resources in this state. It has thus become necessary to formulate a State Policy of Environment, Forests and Land Use and the outcome here is the implementation (G. Gautam, 2013).

**4.5 Major Donor Agency:** These are the Major Global Organization providing aid to various institutions at national and local level relating to Environmental Initiative Program:

**4.5.1 World Bank:** The World Bank (WB) is an international financial institution that provides loans to developing countries for capital programs. It comprises two institutions: the International Bank for Reconstruction and Development (IBRD), and the International Development Association (IDA). The World Bank is a component of the World Bank Group, which is part of the United Nations system (World Bank 2008).

The World Bank Group-Global Environment Facility (GEF) Program is one of the institutions largest and longest standing trust-funded programs. The World Bank today approved a US\$1.5 billion loan for the Swachh Bharat Mission (SBM) Support

Operation Project to support the Government of India in its efforts to ensure all citizens in rural areas have access to improved sanitation such as a toilet or latrine with a focus on changing behaviors in ending the practice of open defecation by 2019. This project will support the rural component, known as SBM Gramin (SBM-G), over a five-year period using a new performance-based program which links funds directly to results, ensuring that benefits are delivered to the people in need more than 60 percent of India's rural population(World Bank 2001).

The World Bank is one of the largest international financiers of biodiversity conservation and sustainable use with a portfolio of 241 projects worth over US\$1.25 billion in the 10 years from Fiscal Year 2006 to 2016.Through the application of its safeguards policies, recently updated to strengthen development outcomes, the World Bank also integrates biodiversity concerns into all of its investment projects (World Bank, 2016).

The Bank is the lead agency of the Global Partnership on Wildlife Conservation and Crime Prevention for Sustainable Development, a US\$131 million grant program by the Global Environment Facility (GEF) active in 19 countries. The program focuses on designing and implementing national strategies to help countries secure their wildlife resources, habitats, and the benefits they derive from them while also reducing poaching and illegal wildlife trafficking (ibid).

The World Bank works with countries to put policies in place so that biodiversity is valued as a key driver of sustainable development. World Bank helps countries work across economic sectors and improve their administration of natural resources to better conserve and sustainably use their biodiversity. It invest in those aspects of biodiversity and ecosystem services such as watershed management, integrated coastal zone management and protected areas that help countries achieve their development goals.

Small Grants Program is a key principle of the World Bank's approach to reducing global environmental problems. The Small Grants Program is created in 1983, the Program is one of the few global programs of the World Bank that directly funds civil society organizations. Through the small grants program, World Bank supports the

North East Region like Sikkim for the protection and conservation of biodiversity. The green mission programme initiated in Sikkim during the year 2006 is also funded by World Bank (Government of Sikkim, 2006).

**4.5.2 Japan International Cooperation Agency (JICA):**To conserve the Global natural environment JICA provides cooperation on nature conservation with the aim of facilitating harmony between the conservation of the natural environment and human activities. During the period from 2000 to 2015, JICA pursued natural conservation activities such as collecting forest data, formulating management plans, and improving the livelihoods of local residents on 18.36 million hectares of land in conservation areas. In addition to those activities, JICA carried out afforestation activities for forest restoration on 3 million hectares of land. JICA also contributed to the capacity building of 630,000 administrative officials and residents.

JICA provides various forms of aid in accordance with the development stage of each developing country or region. Within that process, JICA gives priority to preventive measures and is emphasizing the establishment of environmental management systems through a capacity development approach. JICA puts emphasis on enhancing the capacity of the organizations and individuals to conduct environmental management. In fiscal 2016, JICA focus on the following four strategic areas while taking note of important considerations regarding specific environmental issues such as solid waste, water pollution, and air pollution.

Government of Japan through Japan International Cooperation Agency (JICA) is providing financial assistance for Sikkim Biodiversity Conservation and Forest Management Project (SBFP) that is being implemented by the Forest Environment and Wildlife Management Department from year 2010-11. The project aims to strengthen biodiversity conservation activities and forest management capacity and simultaneously improve livelihood of the local people who are dependent on forests and are living in forest fringe areas (Government of Sikkim, 2015). Project objectives are to be achieved by promoting sustainable biodiversity conservation, afforestation and income generation activities including eco-tourism for the community development. The project activities are contributing to environment conservation and harmonized socio-economic development of the state in multifarious ways (Government of Sikkim, 2015).

In New Delhi, Japan International Cooperation Agency (JICA) organized the 7th Forestry Project Director's meeting for JICA assisted Forestry and Natural Resource Management Projects. Sikkim has also introduced this project and it was providing funds from JICA (Government of Sikkim, 2016).

**4.5.3 World Wide Fund:** WWF is one of the world's largest conservation organizations. It was established on the 29th April 1961. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, promoting the reduction of pollution and wasteful consumption (World Bank, 2001).

WWF India renewed their partnership to continue their joint efforts in biodiversity conservation in the north-eastern part of India. This is a result of the earlier three years of successful partnership from organizations in Sikkim. Focusing on community-based conservation initiatives, the second phase of the project primarily focused in Sikkim will capitalize on the achievements made over the last three years and support initiatives in red panda and snow leopard conservation, protection and participatory management of natural freshwater resources and sustainable livelihood opportunities for local communities (WWF 2016).

WWF-India (2013-2016), resulted in scientific assessment of red panda habitat, identification of areas for intensive studies on snow leopards in high altitude areas of Sikkim. The current partnership, building on the study of the estimate of the red panda range and assessment of its threats, conducted in the last phase has now involve local communities in conservation of red panda and support field studies on snow leopards to determine the population status and density of the species in Sikkim, in partnership with the Government of Sikkim. The project also works towards enabling local communities to use forest products for their livelihoods in a sustainable manner, under the existing legal provisions in the state of Sikkim. With approximately 80% of Sikkim's rural population depending on natural freshwater springs to meet their daily water needs, the current partnership assist the state government agencies and local communities for ensuring rural water security in the state (World Wide Fund 2016).

WWF India Exposed to life threatening dangers such as wild animal attacks, forest fires, weapon injuries inflicted by wildlife poachers, the programme aims to provide financial security to the forest staff. Such support will go a long way in ensuring enhanced focus by the frontline protection staff in strengthening protection measures in habitats of iconic and often endangered wildlife. The programmed was also initiated in Sikkim (WWF 2017).

The program will be extended to the frontline staff of Sikkim forests under WWF-India's 10 priorities landscapes, and provide support to the forest guards. WWF-India also extends support to Sikkim State Forest Departments, through a range of interventions, including conducting wildlife research and monitoring, managing human wildlife conflict, building capacity through training programs and providing relevant infrastructure support to improve and strengthen protection measures in important wildlife habitats. (WWF 2017).

WWF –India in partnership with the Department of Forest, Environment and Wildlife Management (DFEWM), Government of Sikkim, the team has enumerated the probable distribution of red panda in the state. Intensive research in selected red panda habitats is underway to ascertain their micro-habitat details and food preference. Threats to the species' populations in its strongholds have been identified, and mitigation measures have been initiated in partnership with DFEWM, Rural Management and Development Department, Government of Sikkim, and local community-based organizations (WWF 2016)

WWF-India, along with these two agencies The Mountain Institute (TMI) and DFEWM formed the Sikkim Lake Conservation Guidelines that were approved by the Government of Sikkim as a gazette notification. Later, using these guidelines, WWF-India worked with TMI, DFEWM, Sindrabong Khangchendzonga Ecofriendly Society and Tsomgo Pokhari Samrakshan Samiti for the conservation of Tsomgo Lake in the east district of Sikkim. Following this, WWF-India also works for conservation management of Gurudongmar Lake in north Sikkim in collaboration with the Lachen Tourism Development Committee and the Lachen Dzumsa. (WWF, 2017).

WWF India is providing technical support to the Rural Management and Development Department of the Government of Sikkim. This programme was initiated for rejuvenating the dying springs of the state on which. Wwf India also provides various training programmes in Support for development of master trainers in the field of groundwater management. It also focuses on the two most important Protected Areas of Sikkim in terms of its transboundary nature the Khangchendzonga Biosphere Reserve and Barsey Rhododendron Sanctuary. WWF- India's key focus and capacity-building programmes for tourism service providers in partnership with the Khangchendzonga Conservation Committee, Kabi Endeavours and other local CBOs were conducted in different parts of Sikkim in order to ensure sustainable and wildlife friendly tourism practices. WWF-India, in partnership with DFEWM, TMI and few other CBOs in Sikkim, is not just documenting the status of human-wildlife conflict in the four districts of this state but also assisting them by demonstrating suitable measures for the management of the problem (WWF, 2016).

**4.6 Conclusion:** Local, Regional, and Global environmental issues are inextricably linked and affect sustainable development. Therefore, there are synergistic opportunities to develop more effective response options to these environmental issues that enhance benefits, reduce costs, and more sustainably meet human needs. The linkages among local, regional, and global environmental issues, and their relationship to meeting human needs, offer opportunities to capture synergies in developing response options and reducing vulnerabilities to environmental issues.

Many initiatives have carried out at global, national and local levels to bring control over environmental issues. Multiple environmental and development goals are introduced by adopting a broad range of technologies, policies, and measures that explicitly recognize the environmental problems. Global Environmental Problems are addressed in a range of individual conventions and agreements, as well as a range of Regional Agreements.

When looking into National Level, India is also started bringing Environment Development programs. Lots of initiatives have taken up such as national biodiversity project, nation endangered species act, forest management programs, national green mission etc. India in response to climate change initiative introduce National Action Plan on Climate Change.

Likewise at the Local Level, Sikkim is carrying lots of initiative in response to National and Global Environment Programs. Sikkim is playing a vital role for the Environmental Protection. It has made lots of achievements with regard to Environmental Conservation Program. Some of the International Organizations as mentioned above such as, World Wide Fund, World Bank and Japan International Cooperation Agency are initiating projects and providing financial assistance for protection of Environmental Resources.

## CHAPTER V

### Conclusion

Environmental issues have become a serious concern in contemporary world. The humanity is living in a dangerous world with the emergence of various environmental issues such as Ozone layer depletion, Global warming, Acid deposition, Over population, Resource depletion, Deforestation, Climate Change, Pollution problems, Endangered species, marine pollution, and trans-boundary movement of hazardous wastes.

When we look into the history of Global environmental movement, it was started first during the 19<sup>th</sup> century. The movement started in countries such as United Kingdom and United States and slowly spread to other countries. The second Global Environmental Movement started after the Second World War which was a response to nuclear weapons. The green party or ecology party was the first national party formed in Britain in 1973. The Chipko movement was an important movement started in India. With the emergence of various movements there started growing awareness of environmental issues all over the world.

There was many initiatives started to address global environmental problems. The most important among this is the Stockholm Conference 1972 which influenced on sustainable use of planet. Another important conference is the Earth summit 1992 which resulted in bringing major agreements such as *The Framework convention on climate change*, *The Convention on Biological Diversity*, *Agenda 21*, *The Rio Declaration on Environment and Development* and *The Forest Principle*. Many international agreements such as *Kyoto Protocol*, *Montreal Protocol* and *Paris Agreement* have been discussed as response to Global Environmental Initiative.

Due to the pressures of over consumption, population and technology, the global environment is being degraded. This has been recognized, and global governments have begun placing restraints on activities that cause global environmental degradation. Since the 1960s, activities of environmental movements have created awareness of the various environmental issues.

The earth's resources are vulnerable. They are affected by human impacts across many countries. Many attempts are made by countries to develop agreements that are signed by multiple governments to remove the damages made by human activity on natural resources. In order to protect the natural environment many new ideas such as *Global Waste Management Programme, Protection for Endangered species, Conservation and Management of Biodiversity Resources, Development and Sustainable Tourism Planning, Idea of Common Green Ecology* are created which resulted in the conservation of natural resources and development of sustainable growth. The important role has also been played by the international governmental and nongovernmental such as the *United Nation Environment Programme, Intergovernmental Panel on Climate Change (IPCC), International Union for Conservation of Nature(ICUN), World Nature Organization, World Wide Fund, Greenpeace, Friends of the Earth.*

Global environment problems are increasing day by day because of climate change, global, natural calamities etc. In order to control these, various major acts have been introduced by different countries, such as *Watershed Protection and Flood Prevention Act, Clean Air Act, Endangered Species Act.* Looking into local region Sikkim, which is a small and biodiversity rich state. This region is very important to study about the environmental initiative programs. As we discussed in the chapters, Sikkim, as geographically rich state, also faces various environmental problems within the region itself such as climatic problems, natural calamities, threatened species and animals, hazardous waste, pollution problem, deforestation.

Sikkim has doing lots of initiative in response to global environmental initiatives. They have started the conservation of forest by imposing ban on grazing in 1998. The region have started Joint forest management for conservation of natural resources and implemented national afforestation programme.

Sikkim has started 'green mission' or 'organic mission' in response to global idea of common green ecology and to maintain the global ecology. The region has started the green mission plan on 2006 and organizing a ten minutes to earth programme for plantation and conservation of trees every year.

Hazardous waste disposal is a global problem and measures have been taken by different countries to address this. The state Sikkim has also introduced the waste

management programme. Under this, the state has banned plastic bags, banned burning of agricultural waste, Styrofoam Products, and put prohibition on packaged drinking water bottles in government functions and meetings. Sikkim has also take initiative regarding global wildlife protection programme. Sikkim has established important national park called Khangchendzonga National Park. The state has also started protecting the threatened species.

The other initiative of Sikkim in relation to global environmental initiative is the introduction of eco-tourism in Sikkim which results in sustainable development. One of the important issues is climate change issue which has become a serious global problem. Sikkim as a small region is taking initiative and putting efforts for the adaptation of climate change issues. They have formed a State Action plan on climate change in response to global climate change initiative.

The Sikkim Government organizations like the forest department, tourism department and one of the important nongovernmental organizations the ECOSS are playing a vital role in bringing the ideas and implementing with global environmental initiative. They have initiated various programs with regard to environmental issues.

Sikkim is interlinked with the global level environmental initiative. As the global environmental issues are not just global but also has local implications. So Sikkim is one region which gives importance to the environmental sector. Some International organizations are providing financial aid to Sikkim for its environmental initiatives. Sikkim state is actively involved in awareness programmes on environmental issues as Environment has become a top priority for the state.

Sikkim began its cleanliness drive over a decade before India launched the Swachh Bharat Mission. The first acknowledgement of the campaign's success came in 2008, when Sikkim was declared a Nirmal Rajya, a national award for sanitation and cleanliness. Besides, in 2016, Sikkim became the first Organic State of India. While the government's efforts in helping Sikkim achieve these remarkable targets is commendable, the commitment and self-imposed discipline of the Sikkim's people also needs to be appreciated.

Sikkim has brought lots of developments within the region itself and has taking up various new ideas and programmes in response to global environmental initiatives.

Resultantly, the region which is already considered as organic state is further moving towards more sustainable developments process.

To conclude, one of the important dimensions of the efforts for environmental protection is raising public awareness and participation. The problems can only be properly addressed through cooperation among public sector along with the private sector, non-governmental organizations and the civil society. The global environmental problems that threaten our living planet require national and local efforts as well as international collaboration on both bilateral and multilateral levels and the active participation of all members of the international community. In this respect, International organization such as the OECD, OSCE and the international financial institutions have been promoting and coordinating the efforts for joint confrontation of global environmental problems on a multilateral level

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