



BLOCK 2

**DEVELOPMENT, SUSTAINABILITY AND
CLIMATE CHANGE**

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UNIT 5 CONCEPTS OF GLOBAL COMMONS AND CLIMATE CHANGE*

Structure

- 5.0 Objectives
- 5.1 Introduction
- 5.2 Concept of Global Commons
- 5.3 Climate Change: A Global Problem of Commons
- 5.4 Tragedy of Commons and Common Heritage of Mankind
- 5.5 Global Governance of Climate Change
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5.0 OBJECTIVES

After reading this Unit, you should be able to:

- Explain the concept of global commons;
- Examine the concept of climate change as a global problem of commons; and
- Describe the issues with regard to global governance of climate change.

5.1 INTRODUCTION

Rapid economic growth all over the world has led to massive extraction of the natural resources found in the global commons. In many cases, the extraction has been higher than their natural capacity to replenish, leading to its fast depletion. Therefore, there is an urgent need to conserve global commons. International community has felt the urgency of conserving those resources for the well-being of not only the present generations but also for the sustainability of future generations.

Historically, access to most of the resources found within the domains of global commons was difficult. Moreover, those resources were not scarce. Therefore, global commons were safe from human encroachment. However, in the recent past, on one hand there has been tremendous advancement of science and technology; and on the other, demand for resources has also increased manifold. This has led to increase in various activities such as fisheries, scientific research, laying of submarine cables etc. (UN, 2013).

Increased *anthropogenic activities* and excessive emission of *Greenhouse Gases* have resulted in climate change, which is considered to be one of the most serious threats to the world at present. Climate change is often said to be the most

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prominent problem of global commons. *Two* of the most relevant questions related to climate change are: a) who will take the major responsibility to control the situation, and b) how to manage this global problem.

Due to the special characteristic features of global commons, one or few nations cannot govern or ensure its sustainable use. Worldwide cooperation is needed for this purpose. Therefore, presently, global commons are the focus of international interest, particularly from the perspective of global governance. This Unit discusses some of these issues. It goes into the issues of climate change in detail. It explains the concept of global commons and elaborates why climate change is a global problem of commons and deals with global governance of commons. The Unit explains these two concepts that dominate the relevant legal discourse, and examines the debates around them, from the perspective of developed vis-à-vis developing countries. It concludes with a discussion on the design principles for sustainable governance of commons. Since the future of the world is dependent on the joint use of the global commons, its governance is becoming increasingly relevant for achieving sustainable development.

5.1 CONCEPT OF GLOBAL COMMONS

‘Global Commons’ is an aspect of a more generic concept of ‘Commons’ in the particular context of resources. Therefore, to understand the concept of global commons, it is first necessary to understand the concept of commons. Let us now see what the term ‘Commons’ means:

i) Commons

Susan J. Buck (1998) in her book “The Global Commons: An Introduction” has explained commons in the context of resources, through *two* different approaches:

- a) Two attributes of resources: exclusion and subtractability; and
- b) Concepts of resources, resource domains, and property rights.

Two Attributes of Resources: Exclusion and Subtractability

Exclusion is the possibility of excluding others from using any resource. For example, it is quite easy to exclude people from using a personal swimming pool, but it is difficult to exclude people from the common pond in the village or a lake in the city. Subtractability is the extent to which use of the resource by one diminishes the amount left for the others. For example, the food in your lunch-box on a particular day is highly subtractable. It means if someone else grabs that, you will not be able to eat it.

Common pool resources are those which are high in subtractability, but low in exclusion. For example, resources found in the village forest are common pool resources. Every villager is entitled to collect fruits (or even other resources) to a limited amount, therefore exclusion is low. But once some fruits are collected by one villager, those fruits are no longer available for other villagers, i.e., those are highly subtractable. Therefore, in this case, village forest is the ‘Commons’.

Resources, Resource Domains, Property Rights

Resource is something which is used to meet the needs of any living being. Natural resources are those directly extracted from the nature for use, e.g., air, water, wood, natural gas and oil, iron, coal and others. Resources are located in fixed spatial dimensions, which is known as resource domains, e.g., fish is found in the ocean resource domain. 'Commons' are simply the resource domains where common pool resources are found. 'Commons' can be small, e.g., the village pond for fishing, or substantially large like the oceans or the solar system.

ii) Global Commons

Common pool resources are also known as common property resources. The term property, in case of resources, is a bundle of rights, such as rights of access, exclusion, extraction, or sale of the captured resource.

Property rights may be held by individuals, groups of individuals such as communities, or even nations. The very large commons that do not fall within the jurisdiction of any one country are known as international commons or global commons. However, there is a slight difference between international commons and global commons. International commons are resource domains shared by more than one nation, such as the Mediterranean Sea (shared by different countries such as Spain, France, Italy, Greece, Turkey, Syria, Israel, Egypt, Malta and many others). Global commons, on the other hand, are resource domains to which all nations have legal access, such as the outer space. Therefore, according to Buck (*Op.cit.*), the distinction between the two is important, especially because international commons are exclusionary (for some countries), while global commons are not. Traditionally, global commons have been defined as parts of the planet, which fall outside the national jurisdiction of any country and to which all nations have access.

Historically, common pool resources have been extracted by governments and individuals as rapidly as possible. Only *four* global commons have remained exceptions to this trend, mainly because of difficulty in accessing them. Moreover, value of the resources they contain has not been enough to justify the effort of acquiring them. These are the following:

- i) High seas/ the oceans
- ii) Antarctica
- iii) The atmosphere
- iv) The space

However, in the recent years, there has been a tremendous advancement of science and technology, and demand for resources have increased manifold. In this changing context, concern for restoring these global commons is becoming increasingly important. Mercator Research Institute on Global Commons and Climate Change, Berlin, defines global commons as 'natural resources, which require global cooperation for their sustainable use, such as the atmosphere, land and forests'. In fact, some scholars define global commons much more broadly, including education, science, information, and peace. However, international law identifies only the above mentioned *four* types of commons as global commons (UN, 2013).

5.2 CLIMATE CHANGE: A GLOBAL PROBLEM OF COMMONS

Climate change is one of the most serious environmental risks to the world at present. The main reason behind this threat is the excessive emission of Greenhouse Gases by different countries. According to technical definition of United Nations Framework Convention on Climate Change (UNFCCC, 1992), ‘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’. In simple words, climate change refers to a long-term (more than 30 years) trend of weather pattern.

Climate change is often claimed to be a global problem of commons for the following reasons:

- Atmospheric sink for Greenhouse Gases can be understood as a common pool resource just like a fishery. Although, fisheries can be easily understood as commons (which provide fish as the resource), the atmosphere is a global common in as lightly different manner. The resource which, is found in the atmosphere is clean air. Although it is not extracted, it does become contaminated as pollutants are added.
- It is difficult or almost impossible to exclude anyone or any nation from the access to the atmospheric or clean air absorptive capacity.
- The atmosphere, as a sink service, is subtractable, because one unit used by one user is not available to others. If carbon emissions are viewed as using up of the carbon absorption capacity of the air, then one country’s emissions reduce the absorptive capacity available to other countries.

Presently, there are excessive emissions of Greenhouse Gases in the atmosphere by different countries. It has gone beyond the natural sink capacity of the atmosphere, which is causing climate change. International community acknowledges the urgent need of conserving global commons, e.g., the atmosphere. But there are differences regarding the regulation. We will discuss these aspects in the next Section.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1. Explain the meaning of ‘global commons’.

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2. Why is climate change a problem of global commons?

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5.3 TRAGEDY OF COMMONS AND COMMON HERITAGE OF MANKIND

‘The tragedy of the commons’ and ‘the common heritage of mankind’ are the two popular concepts that dominate the legal discourse on governing global commons (Ranganathan, 2016). Although both the concepts point out towards sharing and preservation of common resources, there are some differences. Let us explain the *two* concepts, and discuss the debates around them:

Tragedy of the Commons (ToC)

According to biologist Garrett Hardin (1968), human beings are descendants of thieves, which is the reason for over-exploitation of commons. According to him, uncontrolled shared resource is often overexploited because of the interest of individual users to maximize their short-term use. Hardin has explained the case of destruction of common pastures, as herdsmen have increased the cattle grazed on those. He also provided the example of pollution, where the rational man finds that his share of the cost of emissions into the commons is much less than the cost of purifying it. The incentive behind this act is free riding problem or shifting costs to others. But as a result, this behaviour adds to a larger cost of pollution.

To overcome this tragedy, Hardin (*Ibid.*) has suggested that commons should be enclosed and entry should be restricted. He suggested to either privatize the resource so that it is in the best interest of the owner to take account of long-term effects, or to have top-down government rules that limit resource use. According to him, access could be based on a first-come first basis, auctioning, lottery or wealth. Acknowledging the fact that all these choices have their own limitations, Hardin advocated that even then a decision has to be made to restrict access to the commons.

Common Heritage of Mankind (CHM)

The ‘common heritage of mankind’, articulated by diplomat Arvid Padro (1967) reflects the idea that natural resources belong to all of us, not only for the present generation, but even our future generations. Therefore, we can neither be denied rights nor the responsibilities in using natural resources. Padro adopted a different view of the tragedy, particularly in the context of international commons. He was concerned about the enclosure of the seabed (Mediterranean Sea particularly) by technologically advanced States. His fear was that rich countries, who have resources to spend on oceanographic research, can exploit oil, gas and minerals from the common seabed. Poor countries which also have right to this common seabed will suffer as a result.

To avoid these outcomes, Padro (*Ibid.*) has suggested the establishment of a 'treaty regime' by the United Nations General Assembly. Such a regime could ensure peaceful and orderly exploitation of the seabed, on the principle that it is the common heritage of mankind and, thus, should be used in the interests of all, especially the developing States.

Debates around ToC and CHM

Although both the concepts share the concern about preservation of common resources, there are noticeable differences, particularly with respect to the role of developed vis-à-vis developing countries in conserving global commons.

- ToC is alleged to be taking a discriminatory and prejudiced stance in favour of the developed countries. Citing the example of English commons, Hardin (*Op.cit.*) has suggested that those should be enclosed and entry should be restricted. However, according to Ranganathan (2016), the illustration was false and English commons had been successfully managed by their commoners over long periods. In fact, many empirical researchers have given ample examples of successful common management across the world. Even in India, similar argument is provided for tribal people efficiently managing their common forests.
- Another criticism of Hardin's suggestion of restricted entry and access emerged in the background of existing inequality in the world. Gupta (2019) has argued that rich countries and rich people will invest in and manipulate the access to commons. The poor will suffer. The actual tragedy will be inequality in the access to, and utility from the commons.
- Apart from inequality of access, impact of degradation of global commons is also linked to social justice. Historically, developed countries have followed energy-intensive growth path leading to more emissions of Greenhouse Gases and climate change. At the same time, developed countries possess the capability to avoid negative impacts of climate change. But on the other hand, developing countries, particularly the least developed countries, who have contributed very little to climate change, are highly vulnerable to the adverse impact (Paavola, 2012).

In the light of this criticism, developing nations have supported the Common-Heritage Approach to global and international commons. In 1992, the 'common concern of mankind' has been adopted as an alternative to, but not substitute for 'common heritage', in the preamble of the UNFCCC (Taylor, 2017). Global governance regime under the umbrella of the UN has also been advocated to ensure preservation of global commons for future generations in order to achieve sustainable development goals. The question remains, what will be an ideal global governance of climate change? Let us discuss this in our next Section.

5.4 GLOBAL GOVERNANCE OF CLIMATE CHANGE

Regarding global governance of climate change, although the atmosphere meets the two criteria of global common-pool resource in its function as a sink for carbon dioxide or CO₂ and other Greenhouse Gases, it was not governed as 'Commons' in the beginning of the twenty first century (Gupta, 2019). It was an

unregulated 'no man's land', which was freely accessible and appropriated by everyone in most regions of the world, with the exception of the European Union (EU) and few other countries that have started to price carbon emissions.

Later on, it was realised that efficient governance of the atmosphere requires global cooperation and coordination of climate policies of different nations. But nations face a strong *collective action problem*. This is because everybody can benefit from the abatement of one party without contributing to the associated cost of abatement, while the cost is borne by the abating State alone. There are *two* aspects, which make governance of climate change difficult:

- i) Global commons (the atmosphere in the particular context) are outside national jurisdiction of any country.
- ii) Sometimes conservation of global commons and sustainable use of resources (found within), conflict with national sovereignty and regulation. For example, in some countries, there might be plenty of fossil fuel in the ground, but the disposal space for the CO₂ arising out of its use, is limited global common namely atmosphere.

Thus, we find governance of climate change is a complex issue, which requires global cooperation for a sustainable future. In this context, the contribution of Nobel Laureate Elinor Ostrom is extremely significant. Let us discuss this in some detail.

Institutional Analysis and Development Framework for Governance of Commons

The term 'global governance' is defined by Finkelstein (1995) as 'governing, without sovereign authority, relationships that transcend national boundaries... doing internationally what governments do at home.' This definition of global governance makes it clear that it is closely linked with the study of public administration.

In her book 'Governing the Commons' (1990), Elinor Ostrom has addressed the questions regarding whether and how the common-pool resources should be managed so that both excessive consumption and administrative problems could be avoided. She presented number of success stories of managing common pool resources (each located within a single country) to understand how they were governed in reality.

The success stories revealed that both public and private players played an instrumental role in successful management of commons. Interventions of external political regimes were helpful in a few cases only. Moreover, in many cases it even impacted negatively. Ostrom thus challenged the convictions of many policy analysts that the problems of commons can only be solved by external authorities by imposing private property rights or centralised regulation.

Consequently, Elinor Ostrom has developed a framework called Institutional Analysis and Development (IAD) to summarise the lessons of successful and unsuccessful efforts in managing small-scale common pool resources. The framework has identified ***eight*** design principles for sustainable small-scale common pool resource regimes:

- i) There must be clearly defined boundaries for the user pool (appropriators) and the resource domain.
- ii) Appropriation rules must be compatible with local conditions and with provision rules (which regulate user inputs for resource maintenance). Appropriation rules and provision rules together are called operational rules.
- iii) Collective choice arrangements ensure that the resource users participate in setting appropriation and provision rules.
- iv) Monitoring is done by the appropriators or by their agents.
- v) Graduated sanctions are applied to appropriators who violate operational rules.
- vi) Conflict resolution mechanisms are readily available, low cost, and legitimate.
- vii) Rights to organise regimes are recognised by external authorities.
- viii) For common pool regimes that are part of larger systems, nested enterprises aggregate institutions within local, regional, and national jurisdictions.

According to Buck (*Op.cit.*), IAD framework has become a key to the analysis of management or governance of global commons. Although all eight of the design principles are applicable to the analysis of global commons, five of them are particularly relevant: i) clearly defined boundaries, ii) compatibility of operational rules and local conditions, iii) monitoring, iv) graduated sanctions; and v) nested enterprises.

However, while Elinor Ostrom (*Op.cit.*) made great progress towards understanding the management of local common pool resources, she herself suggested that there was a need for more research into the governance of global commons in order to face the global challenge of climate change. Ostrom (2009) has outlined several principles for designing such a policy:

- All reductions in Greenhouse Gas emissions are beneficial, and there is no single solution;
- Seemingly small actions can have significant consequences;
- Programmes must be sensitive to context;
- Trust is a critical resource;
- All policies have multiple effects; and
- Real policies work at more than one level, and we learn by doing.

Since the future of the world is dependent on the joint use of the global commons, its governance is becoming increasingly relevant for achieving sustainable development.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1. Explain the two popular concepts that dominate the legal discourse on governing global commons.

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2. Why is governance of climate change difficult?

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3. List the eight design principles of IAD framework given by Elinor Ostrom.

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5.6 CONCLUSION

Historically, lack of access to global commons kept them safe from human encroachment. However, technological development and rapid economic growth across the world, led to unsustainable use of natural resources found in the global commons. This resulted in an urgent need to conserve the same. Climate change is often said to be the most prominent consequence of misuse of the global commons. However, one or few nations cannot restore the situation; rather worldwide cooperation is required. Therefore, global governance of commons is of major international interest. This Unit has thrown light on that.

This Unit has explained the relevant concepts and elaborated why climate change is often cited as a global problem of commons. It has examined the debates over the two popular notions that dominate the relevant legal discourse, from the perspective of developed vis-à-vis developing countries. It also highlighted the relevant contributions of Nobel Laureate Elinor Ostrom in providing the design principles for sustainable governance of commons in general, and climate change in particular.

This Unit has helped us to understand the fact as to why the third dimension of sustainable development, namely environmental sustainability, is characterised by weak global governance regime. Although, the UN Conference on Sustainable Development, held in Rio de Janeiro in June 2012, did conceive a coherent global governance framework; however, its success would require a partnership at the global level between all countries, multilateral organisations, civil society and

other stakeholders. This Unit has tried to weave many knowledge frameworks into the broader debate on sustainable development.

5.7 GLOSSARY

Anthropogenic: The term anthropogenic designates impacts resulting from human activity. Some human activities cause damage to the environment either directly or indirectly, e.g., pollution, overconsumption, overexploitation, deforestation etc.

Atmospheric Sink: In the evolution of atmospheric processes, the atmosphere is called a sink. The sink is the dominant pathway by which gases are removed from the present atmosphere. The biological processes that tend to remove gases from atmosphere are called sinks.

Collective Action Problem: It is basically a social dilemma or a situation, where all individuals would be better off cooperating but fail to do so because of conflicting interests between individuals, which discourage joint action.

Greenhouse Gases: Gases that absorb and emit radiant energy within the thermal infrared range. These gases are carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons, perfluorocarbons etc.

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5.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Your answer should include the following points:

- Commons are simply the resource domains, where common pool resources are found.
- Common pool resources are those which are high in subtractability, but low in exclusion.
- Subtractability is the extent to which use of the resource by one diminishes the amount left for others.
- Exclusion is the possibility of excluding others from using any resource.
- Commons can be small, e.g., the village pond for fishing, or significantly large like the high seas or the solar system.

2. Your answer should include the following points:

- Property in case of resources is a bundle of rights, such as rights of access, exclusion, extraction, or sale of the captured resource.
- Property rights may be held by individuals, groups of individuals such as communities, or even by nations. The very large commons that do not fall within the jurisdiction of any one country are termed international commons or global commons.
- International commons are resource domains shared by more than one nation, but global commons, on the other hand, are resource domains to which all nations have legal access.

3. Your answer should include the following points:

- Atmospheric sink for Greenhouse Gases can be understood as a common pool resource, which is high in subtractability but low in exclusion.
- It is difficult or almost impossible to exclude anyone or any nation from access to the atmospheric absorptive/sink capacity.
- The resource which is found in the atmosphere is clean air. Although it is not extracted, it does become scarce as pollutants are added.

Check Your Progress 2

1. Your answer should include the following points:

- The Tragedy of the Commons (ToC) and the Common Heritage of Mankind (CHM).

- According to ToC, the rational man finds that his share of the cost of his emissions into the commons is much less than the cost of purifying it. But, this behaviour, as an outcome, adds to a larger cost of pollution.
- To overcome this problem, ToC suggests that commons should be enclosed and entry should be restricted.
- According to CHM, natural resources belong to all of us, not only for this present generation, but even our future generations.
- Rich countries that have resources can exploit commons, which might cause suffering of the poor countries, which also have right to those commons.
- To avoid this problem, CHM suggests establishment of a 'treaty regime' to protect interests of all.

2. Your answer should include the following points:

- ToC is alleged for taking a discriminatory and prejudiced stance in favour of the developed countries. Restricting access to English commons as suggested by ToC has been criticised.
- Hardin's suggestion of restricted entry and access was challenged in the background of existing inequality in the world.
- Impact of degradation of global commons is also linked to social justice.
- Developing countries are pushing for CHM under the umbrella of UN.
- Global commons (atmosphere in this particular context) are outside national jurisdiction of any country.
- Sometimes conservation of global commons and sustainable use of resources (found within), conflict with national sovereignty and regulation. For example, in some countries there might be plenty of fossil fuel in the ground, but the disposal space for the CO₂ arising out of its use is a limited global common namely atmosphere.

3. Your answer should include the following points:

- There must be clearly defined boundaries for the user pool (appropriators) and the resource domain.
- Appropriation rules must be compatible with local conditions and with provision rules (which regulate user inputs for resource maintenance). Appropriation rules and provision rules together are called operational rules.
- Collective choice arrangements ensure that the resource users participate in setting appropriation and provision rules.
- Monitoring is done by the appropriators or by their agents.
- Graduated sanctions are applied to appropriators who violate operational rules.
- Conflict resolution mechanisms are readily available, low cost, and legitimate.

- Rights to organise regimes are recognised by external authorities.
- For common pool regimes that are part of larger systems, nested enterprises aggregate institutions within local, regional, and national jurisdictions.
- All reductions in Greenhouse Gas emissions are beneficial, and there is no single solution.
- Seemingly small actions can have significant consequences.
- Programmes must be sensitive to context.
- Trust is a critical resource.
- All policies have multiple effects.
- Real policies work at more than one level, and we learn by doing.



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UNIT 6 INTERNATIONAL CONVENTIONS ON SUSTAINABLE DEVELOPMENT*

Structure

- 6.0 Objectives
- 6.1 Introduction
- 6.2 Journey of Two Decades prior to the Earth Summit
- 6.3 Earth Summit 1992
- 6.4 Two Decades after the Earth Summit
- 6.5 A Critical Appraisal of International Conventions
- 6.6 Conclusion
- 6.7 Glossary
- 6.8 References
- 6.9 Answers to Check Your Progress Exercises

6.0 OBJECTIVES

After reading this Unit, you should be able to:

- Discuss the events or situations that paved the way for various international conventions on sustainable development;
- Explain the features and outcomes of different international conventions on sustainable development; and
- Examine the role of international conventions.

6.1 INTRODUCTION

We all know by now that concept of sustainable development implies meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. It can also be viewed as maintaining a pace of economic development that protects the long-term value of the environment (Emas, 2015). Unfortunately, the rapid growth rate of countries has resulted in critical damage to the environment, which is a global common. It is difficult for one or few nations to ensure the sustainable use of this global common. A worldwide cooperation is needed for that.

At the same time, one should not forget that historically, it is the developed countries, which followed energy-intensive growth path leading to more damage to global commons. Developing countries and particularly the less developed countries have contributed the least to this environmental damage. Thus, it is crucial to have international conventions, which could explore the effective solutions of economic growth, environmental protection, and social equality.

By the term International Convention, we mean an agreement or treaty between different countries, which generally takes place under the umbrella of United

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Nations (UN). Till date, many international conventions have taken place on various issues or themes, such as human rights, tariffs and trade, high seas, sustainable development and others. In the context of sustainable development, there have been *three* major Conventions up till now:

- i) United Nations Conference on Environment and Development (UNCED) of 1992, held in Rio de Janeiro, Brazil (popularly known as Rio Summit or Earth Summit 1992).
- ii) World Summit on Sustainable Development (WSSD) of 2002, held in Johannesburg, South Africa (popularly known as Rio+10 or Earth Summit 2002).
- iii) United Nations Conference on Sustainable Development (UNCSD) of 2012, held in Rio de Janeiro, Brazil (popularly known as Rio+20 or Earth Summit 2012).

This Unit examines the relevance, features, and outcomes of these three major International Conventions on sustainable development. The Unit is broadly divided into four Sections. The first Section explains the journey of two decades prior to the Rio Summit or Earth Summit, 1992. The second Section discusses the key components of the Summit. The third Section traces the journey of two decades after the Rio Summit i.e., Rio+10 and Rio+20. The Unit concludes by touching upon the reasons behind the slow progress in the area of sustainable development even after so many conventions.

6.2 JOURNEY OF TWO DECADES PRIOR TO THE EARTH SUMMIT

Identifying the need of global governance in protecting global commons, the world started organising under the umbrella of UN in early 1970s. The first historical conference about environmental concerns was the United Nations Conference on Human Environment, which was held in Stockholm in 1972. The Conference called upon governments and people to apply common efforts for the preservation of environment for the benefit of all human beings across the globe. The major outcome of Stockholm Conference (1972) was the establishment of United Nations Environment Programme (UNEP). It became the leading global environmental authority for setting the global environmental agenda and advocating a global environment, as well as the creation of a number of multilateral environmental agreements.

After a decade of UN Stockholm Conference, it was realised that neither the high-income countries in the North, nor the low-income countries in the South were willing to give up on the resource based economic growth that they were focused on. This form of economic growth was unsustainable, as it was leading to serious issues like pollution, acid rain, deforestation and desertification, and the destruction of the ozone layer among others. Thus, an urgent need was felt for a developmental concept that would allow for reconciliation of economic development with environmental protection. Therefore, in 1983 Secretary-General of the UN asked the former Prime Minister of Norway, Gro Harlem Brundtland, to create an organisation independent of the UN, to focus on environmental and developmental problems as well as solutions.

This new organisation was called the Brundtland Commission, or more formally, the World Commission on Environment and Development (WCED). The Brundtland Commission was officially dissolved in 1987 after releasing the Report titled ‘Our Common Future’. The major relevance of this Report lies in its definition of the term ‘Sustainable Development’ and also making it popular thereafter, which we have read in almost all the earlier Units of this Course i.e., development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This definition captures the importance of intergenerational equity, which distinguished sustainable development policy from traditional environmental policy (Emas,*op.cit.*).

The Brundtland Report was first of its kind report in addressing the need for economic development without harming the environment. The Report suggested long-term environmental strategies for achieving sustainable development by the year 2000 and beyond, through cooperation between countries at different stages of economic and social development, by taking into account inter-relationships between people, resources, environment and development.

After releasing their Report, the Brundtland Commission called for an international meeting, where more concrete initiatives and goals could be mapped out. Therefore, UN General Assembly called for United Nations Conference on Environment Development (UNCED) with primary goals of socio-economic development, while preventing environmental deterioration. UNCED finally took place in 1992 in Rio de Janeiro, Brazil.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1. Explain the relevance of international conventions on sustainable development.

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2. Write a note on the three International Conventions on sustainable development till now.

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3. Describe the important aspects of the Report on “Our Common Future”.

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6.3 EARTH SUMMIT 1992

In 1992, the UNCED took place in Rio de Janeiro, Brazil. It is also known as the Rio Summit or the Rio Conference, and most popularly the Earth Summit. Various outcomes in the form of treaties, political declarations, and action plans, have been of great significance (Cruickshank *et al.*, 2012). These are the following:

- Rio Declaration on Environment and Development: A political declaration of principles on environment and development.
- Agenda 21: A blueprint for implementing sustainable development.
- Statement of Forest Principles: A non-binding authoritative statement of principles.
- UN Framework Convention on Climate Change (UNFCCC): A Multilateral Treaty.
- Convention on Biological Diversity (CBD): A Multilateral Treaty.

Rio Declaration on Environment and Development

It was a political declaration, which recognised the integral and interdependent nature of our largest home, which is the Planet Earth. In order to establish equitable global partnership and co-operation among States, key sectors and people, it came up with 27 principles. Some of the important highlights of these 27 principles are as following:

- Human beings are at the centre of concern for sustainable development, and they are entitled to healthy and productive life in harmony with nature;
- In order to achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption;
- The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority.
- Environmental Impact Assessment (EIA) should be undertaken for any proposed activities, which are likely to have a significant adverse impact on the environment;
- Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development; and

- Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognise and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

Agenda 21

It was basically a non-binding Action Plan of the United Nations or UN regarding sustainable development, where 21 referred to the 21st Century i.e., preparing for the 21st Century. This Action Agenda was planned to be executed at local, national, and global levels by multilateral organisations and individual governments around the world. Successful implementation was primarily made the responsibility of the governments, and national strategies, plans, policies and processes were crucial to achieving this. International cooperation was expected to support and supplement such national efforts. All the goals and issues were clubbed under *four* Sections:

Section I captured the social and economic dimensions like combating poverty (especially in developing countries), changing consumption patterns, promoting health, achieving a more sustainable population, and sustainable settlement in decision making.

Section II covered the conservation and management of resources for development like atmospheric protection, combating deforestation, protecting fragile environments, conservation of biological diversity (biodiversity), control of pollution and the management of biotechnology, and radioactive wastes.

Section III covered the strengthening of the role of major groups e.g., children and youth, women, non-governmental organisations (NGOs), local authorities, business and industry, and workers; and strengthening the role of indigenous people, their communities, and farmers.

Section IV captured the means of implementation like scientific know-how, technology transfer, education, international institutions, and financial mechanisms.

Statement of Forest Principles

This was a non-legally-binding authoritative Statement of Principles for a global consensus on the management, conservation and sustainable development of all types of forests. Some of the important highlights of the Statement of Forest Principles are:

- Forests are essential to economic development and the maintenance of all forms of life;
- Forest Principles should apply to all types of forests, both natural and planted, in all geographical regions and climatic zones of the world;
- Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of the present and future generations;
- Appropriate measures should be taken to protect forests against harmful effects of air-borne pollution, fires, pests and diseases etc, to maintain their multiple values;

- National forest policies should recognise and duly support the identity, culture and the rights of indigenous people and forest dwellers;
- The full participation of women in all the aspects of management, conservation and sustainable development of forests should be actively promoted; and
- Forest conservation and sustainable development policies should be integrated with economic trade and other relevant policies.

United Nations Framework Convention on Climate Change (UNFCCC)

It was an Intergovernmental Treaty to address the problem of climate change, and it opened for signature at the Earth Summit (1992). It acknowledged that human activities have caused substantial increase in the atmospheric concentrations of Greenhouse Gases resulting in climate change. It also noted that the largest share of historical and current global emissions of Greenhouse Gases has originated in developed countries. The per capita emissions in developing countries are relatively low presently, but the share of global emissions will grow to meet their social and development needs. Therefore, the global nature of climate change requires a possible cooperation by all countries according to their common, but differentiated responsibilities, respective capabilities, and their social and economic conditions.

The objective of UNFCCC was to achieve stabilisation of Greenhouse Gas concentrations in the atmosphere in a given time-frame, so that ecosystems can naturally adapt to climate change. This is essential to ensure adequate agricultural food production and sustainable economic development. It was stated that the stakeholders in developed countries should take the lead in combating climate change and the resulting adverse effects. Moreover, the specific needs of developing country, especially those that are particularly vulnerable to the adverse effects of climate change should be given full consideration. Countries have been segregated as *four* Classifications of Parties to UNFCCC:

- 1) Annexure (Annex-I): 43 nations + European Union (EU): Industrialised Nations and Economies in Transition (EITs);
- 2) Annex-II is a subset of Annex-I: 24 Nations + EU members of Organisation for Economic Co-operation and Development (OECD), which will provide support to the developing nations;
- 3) Non-Annex-I: Low income developing countries; and
- 4) Least Developed Countries (LDCs): 49 Nations, which have been given special status.

The major outcome of UNFCCC was the Kyoto Protocol. In December 1997, delegates in Kyoto, Japan, agreed to a Protocol to the UNFCCC that commits developed countries and countries in transition to a market economy in order to achieve quantified emission reduction targets. Under Kyoto Protocol, Annex-I parties, agreed to reduce their overall emissions of six Greenhouse Gases (carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, fluorocarbons, and sulphur hexafluoride) by an average of 5 per cent below 1990 levels between 2008-2012 (the first commitment period), with specific targets varying from country to country. The Protocol also established *three* flexible mechanisms to assist Annex I parties in meeting their national targets cost-effectively:

- Emissions Trading System, where Annex-I countries can purchase credit from other Annex-I countries.
- Clean Development Mechanism, where Annex-I countries can participate in the green development of the non-Annex-I countries.
- Joint Implementation, where Annex-I can take up projects in other Annex-I countries.

Convention on Biological Diversity (CBD)

The importance of biological resources in economic and social development of present and future generations was realised by world community. At the same time, it was felt that increasing human activities were resulting in the extinction of species and eco-systems at an alarming rate. Against this background, International Convention on Biological Diversity was planned as a legally-binding treaty. Inspired by the world community’s growing commitment to sustainable development, the Convention on Biological Diversity (CBD) had *three* main objectives:

- i) The conservation of biological diversity;
- ii) The sustainable use of the components of biological diversity; and
- iii) The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

CBD was opened for signature at the Earth Summit 1992, and entered into force a year later. The major outputs of CBD were: 1) Cartagena BioSafety Protocol, 2) Aichi Targets; and 3) Nagoya Genetic Resource Protocol. Let us discuss these briefly:

The Cartagena Protocol on BioSafety was an international agreement, which aims to ensure the safe handling, transport and use of Living Modified Organisms (LMOs), resulting from modern biotechnology that may have adverse effects on biological diversity and human health. It was adopted in 2000. The basic idea of Aichi Targets was to address causes of biodiversity loss, promote sustainable use, and safeguard ecosystems, species and genetic diversity etc., through some short-term and long-term plans (2011 through 2020) by 2050. Nagoya Genetic Resource Protocol was an international agreement, which aims at sharing the benefits arising from the utilisation of genetic resources in a fair and equitable way. It came into force in 2014.

Check Your Progress 2

- Note:** i) Use the space given below for your answer.
ii) Check your answer with that given at the end of the Unit.

1. Discuss the various outcomes of Earth Summit held in 1992.

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6.4 TWO DECADES AFTER THE EARTH SUMMIT

A number of multilateral environmental agreements have taken place since 1992. However, despite of that, the global environment has continued to suffer. Loss of biodiversity has continued, and fish stocks have got depleted. Desertification has claimed more and more fertile land, the adverse effects of climate change are already evident, occurrence of natural disasters is also more frequent and devastating. Besides the air, water and marine pollution has continued to take millions of lives. One of the reasons has been rapid globalisation. Apart from worsening global environment, globalisation also led to other crucial problems like inter- and intra-country income inequality, posing major threat to global prosperity, security and stability.

In the background of these global disparities, an urgent need was felt to act in a manner that will fundamentally change the lives of the poor in the world. The World Summit on Sustainable Development, also known as Rio +10 was organised after 10 years of the first Earth Summit at Johannesburg. It highlighted the importance of poverty eradication, changing consumption and production patterns and protecting and managing the natural resource base for economic and social development, all as essential part of sustainable development.

The major focus of the Johannesburg Summit was human dignity through increased access to basic requirements such as clean water, sanitation, shelter, energy, health care, food security and the protection of biodiversity. At the same time, it was planned that developed countries will help the developing countries regarding financial resources, technology transfer, human resource development, education and training to arrest the condition of underdevelopment.

The major outcome of Rio+10 was Johannesburg Declaration, which was only in the form of a political statement to be agreed by world leaders, reaffirming their commitment to work towards sustainable development. It also planned to serve as a platform for the launch of new partnership initiatives by and between governments, NGOs and businesses, to tackle specific problems and achieve measurable results.

However, despite the growing number of institutions and planning regarding sustainable development, environmental problems kept on intensifying globally. The findings of the 2005 Millennium Ecosystem Assessment showed that ‘over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history’, and that this has resulted in ‘a substantial and largely irreversible loss in the diversity of life on Earth’. The Intergovernmental Panel on Climate Change (IPCC) has found that global CO₂ emissions grew by 70 per cent between 1970 and 2004 (Cruickshank *et al., op.cit.*).

Thus, it was felt that there was a need to re-direct and re-energise political commitment to the three dimensions of sustainable development: economic growth, social improvement and environmental protection. In this background, the United Nations Conference on Sustainable Development (Rio+20) was held in Rio de Janeiro, Brazil in 2012. It was basically like a ‘review’ Conference, which would assess the progress made since 1992. Therefore, its objectives were

much limited than the earlier two Conferences. However, with growing concerns of environmental degradation and income inequality, the importance of sustainable development kept increasing. It got reflected in the participation in Rio+20. With around 100 Heads of States, many ministers, and more than 40,000 other representatives of governments, NGOs, private sector, and civil society, it was the largest ever UN gathering.

The two themes got the primary focus in Rio+20: a) green economy in the context of sustainable development and poverty eradication, and b) institutional framework for sustainable development. The primary outcome of the Conference was the non-binding Document 'The Future We Want'. This 49 page Document largely reaffirmed the goals of the previous action plan that is the Agenda 21. The major focus areas of this Document revolved on:

- Using the green economy as a tool to achieve sustainable development by focusing on clean energy, food security, decent jobs, and water conservation among others;
- Strengthening of the United Nations Environment Programme (UNEP);
- Taking steps to go beyond Gross Domestic Product (GDP) to assess the well-being of a country;
- Improving gender equity;
- Recognising the important role that indigenous knowledge plays in sustainable development;
- Prevention of land degradation;
- Planning sustainable cities and urban settlements;
- Developing tools to reduce the risk of disasters; and
- Restoring oceans and marine ecosystems, and maintaining their biodiversity.

Another important issue is that at Rio+20, member States decided to launch a process to develop a set of Sustainable Development Goals (SDGs), to build upon the Millennium Development Goals post-2015, and to establish a high-level political forum on sustainable development.

6.5 A CRITICAL APPRAISAL OF INTERNATIONAL CONVENTIONS

Since 1992, the number of multilateral environmental agreements has grown significantly, and there are now many hundreds of binding and non-binding global agreements on environmental issues, as well as a wide range of other agreements that address social and economic aspects of development. Despite this, environmental problems have intensified globally. The question arises, why much progress could not be achieved even after so many international conventions. The following can be cited as few reasons behind that:

- Most environmental problems are global in nature and most national governments often give financial priority to solve national problems rather than global problems.
- Rapid globalisation has had negative impact on global environment, as well as inter and intra-country income inequalities, posing a major challenge to the full realisation of global sustainable development.

- The international decision-making process is quite slow, as it requires many national governments to agree before taking any action. Moreover, there is little democratic accountability at the global decision-making level. As a result, it is difficult to generate effective public pressure for action.
- There have been institutional problems. For example, United Nations Environment Programme or UNEP was conceived to be the ‘environmental conscience’ of the United Nations. UNEP is not a specialised agency, but is attached to the UN General Assembly as a subsidiary programme. Critics of UNEP often suggest that being a subsidiary programme, it restricts the influence and effectiveness of its work and that not having the same stature as other UN organisations makes it more difficult for it to achieve its aims.
- There are many different international organisations, programmes and bodies that govern sustainable development at the global level. Each of these bodies has its own objectives and mandates, and as such can act somewhat autonomously, which often results in fragmented and fractured processes and agreements that govern international environmental issues.
- Last but not the least, historically it was the developed countries, which contributed more to the damage of global commons, compared to developing and least developed countries. Thus, unless and until international conventions ensure more commitment from developed countries like the USA, chances of success in sustainable development area could be bleak.

Check Your Progress 3

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1. Explain the journey of two decades after Earth Summit of 1992.

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2. Examine the reasons behind the lack of progress in the area of sustainable development despite so many international conventions.

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6.6 CONCLUSION

Environment being a global common, it is difficult or rather impossible for one or a few nations to ensure its sustainable use. A worldwide cooperation is needed for this. At the same time, since it is the developed countries, which have contributed more to the damage of global commons compared to the developing and least developed countries, it is crucial to have international conventions to explore the win-win solutions of economic growth, environmental protection, and social equality on one hand, and assigning some common and differentiated responsibilities between developed and developing countries on the other.

This Unit has discussed the impact of the major international conventions on sustainable development. It has also explained the background and relevance of each convention, and its outcome. Apart from the institutional problems, the Unit has described those conventions, which could not ensure strong commitments from the developed countries despite sincere efforts.

Outcomes of these conventions were not always in favour of developing countries, which is a major concern from the perspective of these countries. For example, Rio+20 World Trade Organisation (WTO) promoted free flow of goods and services between nations by stating that international trade was important for sustainable development and poverty removal. But USA gives heavy subsidies to its cotton and corn farmers. So if there is a totally free system, USA can export those products in other developing countries like India at a price where Indian farmers cannot compete.

Therefore, India prefers protection, and demands for a fair and equitable global trade regime to achieve development. Regarding green economy, most of the green/environment-friendly technologies are with the developed countries. Therefore, developing countries like India want these international forums to facilitate the transfer of these technologies from the developed countries to developing countries at a reasonable price so that the goal of green economy is achieved. In short, there should be adequate flow of resources and technologies from the developed countries to the developing countries to achieve the concept of some common and some differentiated responsibilities between the two. This Unit discussed these issues against the backdrop of pertinent environment summits and international conventions.

6.7 GLOSSARY

Acid Rains: It is also known as acid deposition. It includes any form of precipitation with acidic components such as sulfuric or nitric acid. When the compounds of sulfur dioxide and nitrogen oxide are released into air, they rise high enough and get mixed with water vapour and other chemicals to form acidic pollutants that then fall on earth in the form of rain, fog, snow, hail, dust etc.

Intergenerational Equity: It refers to relationships and transactions between generations. Thus, intergenerational equity implies fairness or justice between generations. In the context of sustainable development, it refers to justice of availability of natural resources for the use across generations.

Green Economy: The concept of green economy combines economics and ecology. The focus of an economy should not only be to become internationally

competitive, but also be environmentally friendly and socially acceptable. A green economy is one that enhances social welfare, combats poverty, and strives for social justice.

United Nations Conference on Environment and Development: It is also known as the Rio de Janeiro Earth Summit, the Rio Summit, the Rio Conference and the Earth Summit. It was held in June 1992.

United Nations Environment Programme: It is a programme responsible for coordinating responses to environmental issues within the United Nations system. It came up in 1972.

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6.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Your answer should include the following points:

- The rapid growth rate of countries resulted in critical damage to the environment.
- Environment being a global common, it is difficult or rather impossible for one or a few nations to ensure its sustainable use. A worldwide cooperation is needed for this.
- Historically, developed countries followed energy-intensive growth path leading to more damage to global commons, compared to developing and the least developed countries.
- Thus, it is crucial to have international conventions and explore the win-win solutions of economic growth, environmental protection and social equality.

2. Your answer should include the following points:

- Till date, three international conventions on sustainable development have taken place.
- United Nations Conference on Environment Development (UNCED) of 1992, held in Rio de Janeiro, Brazil (popularly known as Rio Summit or Earth Summit 1992).
- World Summit on Sustainable Development (WSSD) of 2002, held in Johannesburg, South Africa (popularly known as Rio+10 or Earth Summit 2002).
- United Nations Conference on Sustainable Development (UNCSD) of 2012, held in Rio de Janeiro, Brazil (popularly known as Rio+20 or Earth Summit 2012).

3. Your answer should include the following points:

- The title of the Brundtland Commission Report is 'Our Common Future'.
- The Report was first of its kind in addressing the need for economic development without harming the environment.
- The Report defined and popularised the term "Sustainable Development", i.e., development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This definition captured the importance of intergenerational equity, which distinguished sustainable development policy from traditional environmental policy.
- The Report suggested long-term environmental strategies for achieving sustainable development by the year 2000 and beyond, through cooperation between countries at different stages of economic and social development, by taking into account interrelationships between people, resources, environment, and development.

Check Your Progress 2

1. Your answer should include the following points:

- Rio Declaration on Environment and Development was a political declaration of 27 principles on environment and development. It highlighted the special needs of women, indigenous people, and environmentally vulnerable countries. It emphasised on reducing unsustainable patterns of production and consumption, and also on undertaking of Environmental Impact Assessment for any proposed activities, which are likely to have a significant adverse impact on the environment.
- Agenda 21, is a non-binding action plan of the UN regarding sustainable development, where 21 referred to the 21st Century. Various goals and issues were clubbed under four Sections - Social and Economic Dimensions, Conservation and Management of Resources for Development, Strengthening the Role of Major Groups, and Means of Implementation.
- Statement of Forest Principles. This was a non-legally-binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests.
- UN Framework Convention on Climate Change (UNFCCC) was an intergovernmental treaty to address the problem of climate change. The objective of UNFCCC was to achieve stabilisation of Greenhouse Gas concentrations in the atmosphere in a given time-frame, so that ecosystems can naturally adapt to climate change. The major outcome of UNFCCC was the Kyoto Protocol (1997).
- Convention on Biological Diversity (CBD) was planned as a legally-binding treaty. The three main objectives were conservation of biological diversity, sustainable use of the components of biological diversity, and equitable sharing of the benefits arising out of the utilisation of genetic resources. The major outputs of CBD were: 1) Cartagena Bio Safety Protocol, 2) Aichi Targets; and 3) Nagoya Genetic Resource Protocol.

Check Your Progress 3

1. Your answer should include the following points:

- Rio +10 was organised at Johannesburg in 2002. It highlighted the importance of poverty eradication, changing consumption and production patterns and protecting and managing the natural resource base for economic and social development.
- The major focus of the Johannesburg Summit was human dignity through increased access to basic requirements as clean water, sanitation, adequate shelter, energy, health care, food security and the protection of biodiversity.
- The major outcome of Rio+10 was Johannesburg Declaration, which was only in the form of a political statement to be agreed by world leaders, reaffirming their commitment to work towards sustainable development.

- United Nations Conference on Sustainable Development (Rio+20) was held in Rio de Janeiro, Brazil in 2012. It was basically like a ‘review’ Conference, which would assess the progress made since 1992. Therefore, its objectives were much limited than the earlier two Conferences.
- The two themes got primary focus at Rio+20: green economy in the context of sustainable development and poverty eradication, and the institutional framework for sustainable development. The primary outcome of the Conference was the non-binding document “The Future We Want”.
- The major focus of “The Future We Want” was on how the green economy can be used as a tool to achieve sustainable development; strengthening UNEP; assessing the well-being of a country beyond GDP; improving gender equity; providing importance to indigenous knowledge; prevention of land degradation; planning sustainable cities and urban settlements; developing tools to reduce the risk of disasters; restoring oceans and marine ecosystems and maintain their biodiversity.
- In Rio+20, member States decided to launch a process to develop a set of SDGs, to build upon the MDGs post-2015.

2. Your answer should include the following points:

- Most environmental problems are global in nature and most national governments often give financial priority to solve national problems rather than global problems.
- Rapid globalisation has/had a negative impact on global environment as well as inter-and intra-country income inequalities, posing a major challenge to the full realisation of global sustainable development.
- The international decision-making process is quite slow, as it requires many national governments to agree before taking any action. Moreover, there is little democratic accountability at the global decision-making level. As a result, it is difficult to generate effective public pressure for action.
- There are institutional problems.
- There are many different international organisations, programmes and bodies that govern sustainable development at the global level, which often results in fragmented and fractured processes instead of a holistic solution.
- Historically, it is the developed countries that have contributed more to the damage of global commons compared to the developing and the least developed countries. Thus, unless and until international conventions ensure more commitment from developed countries like USA, chances of success will be bleak.

UNIT 7 INTERRELATIONSHIP AMONG DEVELOPMENT, SUSTAINABILITY AND CLIMATE CHANGE: CASE FOR DIFFERENTIATED RESPONSIBILITIES*

Structure

- 7.0 Objectives
- 7.1 Introduction
- 7.2 Concepts of Development and Sustainability
- 7.3 Climate Change: Meaning and Impact
- 7.4 The Principle of Common but Differentiated Responsibilities
- 7.5 Interrelationship among Development, Sustainability and Climate Change
- 7.6 Conclusion
- 7.7 Glossary
- 7.8 References
- 7.9 Answers to Check Your Progress Exercises

7.0 OBJECTIVES

After reading this Unit, you should be able to:

- Discuss the concepts of development, sustainability and climate change;
- Explain the principle of common but differentiated responsibilities; and
- Examine the interrelationship among development, sustainability and climate change.

7.1 INTRODUCTION

Development is a multidimensional process, which enables the people to meet their basic needs and improve their standards of living by reducing poverty, inequality and unemployment. Advancement of science and technology, massive industrialisation and over-exploitation of natural resources have helped the governments to achieve their developmental goals. These achievements are uneven and largely concentrated in industrialised countries. Although developed States have proven relatively successful in promoting economic growth and social welfare, much of the progress over the past half-century has been achieved at the expense of sustainability of the environment.

As a result, the world is currently facing multiple economic, social and environmental threats, which could interact catastrophically. The pressures

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wielded by the dynamic forces of socio-economic development and technological advancement have radically transformed the ecological balance of Earth as never before. Although human beings have overused natural resources throughout history, ecological problems such as climate change are manifesting themselves more poignantly now because of population explosion.

Today, the threat of global climate change poses unprecedented challenges to humanity. Climate change represents a grave development problem, which is now largely accepted as real, pressing and truly global problem. There are many uncertainties in the predictions of climate change, particularly with regard to the timing, magnitude and regional patterns. The threat of human-induced climate change, popularly known as global warming, presents a huge challenge to society. Over the last few decades, the rate of Greenhouse Gases (GHGs) emissions have accelerated enormously as a result of human activity, mainly due to the burning of fossil fuels such as coal, oil, and natural gas. It is expected to lead to a generalised warming of the Earth's surface.

Today no country is immune to climate change. But developing economies are more affected by it, in part because of their greater exposure to climate shocks and in part because of their low adaptive capacity. While the energy- and resource-intensive modes of production and consumption pattern in the industrialised countries are among the main causes of climate change, it is the poor in the southern parts of the globe, which are hit the hardest by its effects. These regions have the lowest coping capacities and have contributed the least to climate change.

With the global economy set to quadruple by mid-century, energy-related carbon dioxide (CO₂) emissions would, on current trends, more than double, putting the world onto a potentially catastrophic trajectory that could lead to temperatures more than 5°C warmer than in pre-industrial times. The complex nature of global climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities. As per this principle, all States are responsible in the face of global environmental destruction, yet not equally responsible. This principle remains at the core of all the global efforts to address environmental problems including climate change.

7.2 CONCEPTS OF DEVELOPMENT AND SUSTAINABILITY

Concept of Development

Development has many elements and is difficult to define. It can be viewed in terms of goals and processes, in terms of economic and human development, and in terms of sustainability. Development means meeting basic needs, reducing poverty, inequality and unemployment, raising living standards, improving access to education, increasing life expectancy; and expanding economic and social choices. Development implies radical transformation of society involving a complex of economic, social, political, and cultural changes. Development is concerned with sustained and irreversible economic growth, which will be characterised in quantitative terms by an increase in real income per capita and accompanied by certain structural and social transformation of a given country.

Development is not synonymous with economic growth. Growth is related to increasing national income and is unidirectional in nature. Development is about increasing the quality of life of human beings, and not necessarily increasing Gross National Product or GNP. Development must be conceived as a multidimensional process involving the reorganisation of the entire economic and social systems. In addition to improvements in national incomes, it typically involves radical changes in institutional, social, and administrative structures, as well as in popular attitudes and even customs and beliefs. Significantly, economic growth is one of the important means to development.

Important objectives of development include increasing and widening the availability and distribution of basic life sustaining goods- food, shelter, health, protection, etc., raising 'levels of living,' including higher incomes, more jobs, better education, etc.; and expanding the range of economic and social choices available to individuals and nations. Sustenance, self-esteem and freedom are some of the core values of development, which should serve as the conceptual basis and practical guideline for understanding the inner meaning of development. These represent the common goals sought by all individuals and societies. They relate to fundamental human needs that find their expression in almost all societies and cultures at all times.

These core values reflect in the indicators that are used in measuring development. In the pre -1970s, development was measured in terms of the capacity of the national economy to show an annual increase in its national income or the ability of the nation to expand its output at a rate faster than the growth rate of its population. It is simply related to the physical expansion of national economy.

These simplified, narrowly defined indicators of development were criticised since they did not reflect the distribution of income amongst the entire population. Also, it failed to take into account certain factors which are important for development. To address these concerns, new indicators were used to measure development. These are Human Development Index (HDI), Human Poverty Index (HPI), Gender-related Development Index (GDI) and Gender Empowerment Measure (GEM).

HDI measures the average achievements in a country in three basic dimensions of human development: a long and healthy life (life expectancy), knowledge (adult literacy) and a decent standard of living with (Purchasing Power Parity - PPP). While the concept of human development is much broader than any composite index can measure, these composite human development indices offer powerful alternatives to income as a summary measure of human well-being.

HPI is in an attempt to bring together in a composite index the different features of deprivation in the quality of life in order to arrive at an aggregate judgment on the extent of poverty in a community. Human poverty is primarily a deprivation of choices and opportunities for living a life, rather than only earning income. Lack of income is therefore far too narrow to serve as a holistic poverty indicator.

GDI measures achievement in the same basic capabilities as the HDI does, but takes note of inequality in achievement between men and women. GDI evaluates progress in advancing women's standing in political and economic forums. It examines the extent to which women and men are able to actively participate in economic and political life and take part in decision-making.

Over the past two centuries, the direct benefits of carbon-intensive development have been concentrated largely in developed countries. On the other hand, development experiences of developing countries failed to achieve critical goals. The low levels of per capita income and poverty in developing countries is due to low levels of productivity in various fields of production including agriculture. Also, low levels of capital formation, both physical and human, lack of technological progress and rapid population growth are some of the other common characteristics of the developing countries.

Let us review the situation with examples. Close to half the population in developing countries (48 per cent) are still in poverty, living on less than \$2 a day. Nearly a quarter—1.6 billion—lack access to electricity, and one in every six lack humans access to clean water. Around 10 million children under five still die each year from preventable and treatable diseases such as respiratory infections, measles, and diarrhoea. Larger populations in developing countries put more pressure on ecosystems and natural resources, intensify the competition for land and water, and increase the demand for energy. This affects the sustainability of the environment and compromises the development process.

Concept of Sustainability

Sustainability refers to the long-term viability of a system, a community, set of social institutions, or societal practices. The idea rose to prominence with the modern environmental movement, which rebuked the unsustainable character of contemporary societies, where nature of resource use, direction of growth, and patterns of consumption threaten the integrity of ecosystems and the well-being of future generations.

The concept of sustainability is a condition or quality of something that can sustain, defend, maintain or conserve something else. In the context of this Unit, sustainability refers to the quality of human environmental system. Sustainability requires a quantitative evaluation, which means, to quantify or measure the level or quality of a system. This measurement can be made through indicators and indices, among other modalities.

In contemporary debate, sustainability often serves as a synonym for sustainable development. Sustainability is concerned with the quality of a system that concerns itself with constant integration of environmental and human aspects. Ability of the environment system (sustainability) will be affected if the output (development) is not based on the principles of sustainable development. Therefore, sustainable development is the key to achieve sustainability, which is considered the final long-term goal. In other words, sustainable development means that sustaining an activity or process ensures that a system works in the long-term.

Thus, sustainability encompasses systems and sustainable development looks towards human needs and their present and future well-being. Sustainability can be achieved through proper integration of human and environmental system. This system's protection of environmental, social and economic issues must integrate the sustainable development process.

The ecological footprint is a measure of sustainability. It is a measure of the physical area required to provide the resources consumed by an individual, city or nation. It is a measure of sustainability based on the recognition that when

resources are consumed faster than they are produced, they are eventually depleted.

Parallel references can also be found such as:

Environmental sustainability: The ability of environmental resources to support an activity or set of activities.

Economic sustainability: The ability of an activity or set of activities to yield economic benefits greater than economic costs.

Social sustainability: The ability of social structures and/or behaviour to support an activity without being undermined by it.

7.3 CLIMATE CHANGE: MEANING AND IMPACT

Changes in the Earth's climate and its adverse effects are a common concern of humankind. Climate change is a major global challenge. The sharp upward trend of global annual mean temperature since the 1970s–80s has led to the emergence of climate change as a global issue. Human activities have significantly contributed to climate change, but that the change is far more rapid and dangerous than thought about earlier. Climate change is defined as a local, regional or large-scale change in the long-term average regime of temperature, precipitation, circulation and related variables characterising the climate. It is considered an issue of global importance because the rise in temperature and the environmental consequences this might engender are transboundary; they do not respect the boundaries demarcated by the Nation-States.

Economic development has been accompanied by large-scale growth in the consumption of fossil fuels, with more and more coal, oil, and natural gas being burned by factories and electric power plants, motor vehicles, and households. This has resulted in huge carbon dioxide (CO₂) emissions. This is the largest source of Greenhouse Gases, which can trap the infrared radiation from the earth within its atmosphere and create global warming.

There are a total of six different Greenhouse Gases, with significant differences among them in terms of global warming potential. They absorb certain wavelengths of infrared radiation (heat) that is leaving the Earth and thus raise the temperature of the atmosphere. Since 'glass' has the same effect on the loss of heat from a Greenhouse, these gases are known as 'Greenhouse' Gases. The sources of Greenhouse Gases are varied.

Climate change imposes an unprecedented scale of burden on development. Its impacts are already visible, and the most recent scientific evidence shows the problem is worsening fast, considering its current rate of Greenhouse Gas emissions. Climate change affects numerous sectors and productive environments, including agriculture, forestry, energy, and coastal zones. The implications of such climate change for poverty and Gross Domestic Product or GDP could be enormous given the projected population growth in developing countries. For example, evidence from Sub-Saharan Africa indicates that rainfall variability, projected to increase substantially, also reduces GDP and increases poverty.

The main impacts of climate change include:

- Increase in local average temperature and extremes; both land and water;
- Change in rainfall pattern- its onset, seasonal distribution and extremes;
- Increase in frequency and intensity of large storms and tropical cyclones;
- Increase in evaporation losses from plants and water surfaces; and
- Increased melting of glaciers and other ice bodies, which lead to sea level rise and ocean acidification;
- Frequent severe droughts and floods;
- More damage from high winds in storms;
- Disrupted crop calendars, with different pests, diseases and water requirements;
- Heat waves and spread of disease to new areas (e.g., malaria); and
- Increased water demand and reduced water availability.

The 1970s and 1980s witnessed increased attention to global atmospheric pollutants and their global consequences namely climate change. The United Nations Conference on the Human Environment (1972) raised the issue of climate change. Similarly, in 1974 and 1976, the United Nations World Food Conferences discussed climate change as a pressing matter. The United Nations Environment Programme and the World Meteorological Organisation led to the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1988. This Panel tries to predict the effect of the Greenhouse Gases according to existing climate models and literature.

In 1992, at the Rio Earth Summit, the United Nations Framework Convention on Climate Change (UNFCCC) was signed by 154 States. The UNFCCC aimed to stabilise GHGs at a level that would prevent further interference in the climate system. Parties to this Convention also adopted Kyoto Protocol in 1997. The countries that ratify it commit to reducing GHGs or to engage in emission trading if they maintain or increase the emissions of these gases. Most of the provisions of the Kyoto Protocol apply to the developed countries. The Kyoto Protocol adopts the principle of common but differentiated responsibilities.

This principle entails that developed countries, given their high levels of contribution to global environmental problems and their higher economic wealth and advanced technical capabilities, which has enabled large-scale exploitation of natural resources, should take the prime responsibility of implementing measures to protect the environment. Under the Protocol, industrialised nations are required to reduce their emissions of GHGs. It also reaffirms the principle that developed countries have to pay for and supply technology to other countries for climate-related studies and projects.

Check Your Progress 1

- Note:** i) Use the space given below for your answers.
ii) Check your answers with those given at the end of the Unit.

1. Discuss the concepts of development and sustainability.

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2. Explain the meaning and impact of climate change.

7.4 THE PRINCIPLE OF COMMON BUT DIFFERENTIATED RESPONSIBILITIES

No crisis in world history has so clearly demonstrated the need for closer cooperation among States and increasing interdependence of governments as the contemporary global environmental crisis, including climate change. They are global in scope, transcending national boundaries and affecting all, or substantial portions of the world's population and natural resources. The complex nature of environmental problems is characterised by considerable degree of scientific uncertainties concerning their causes, impacts, feedback, and the interrelationships among complex natural and social parameters.

Today, all the global efforts to address environmental problems are governed by the principle of common but differentiated responsibilities. It advocates the need for all States to take adequate responsibility in the face of global environmental problems. It recognises the historic correlation between higher levels of development and a greater contribution to the degradation of global environmental resources, such as water and air, and enables the sharing of responsibility accordingly. It establishes that developed countries that have been able to develop for so long, without being impeded by environmental restrictions, now need to take a greater share of responsibility.

The emergence of principle of common, but differentiated responsibilities can be traced to Stockholm Conference (1972). This United Nations or UN Conference was the first tangible global effort to protect the environment. It produced a seminal paper- known as the Founex Report on the problems of environment and poverty. The Founex Report attempted to bridge the gap between developing and industrialised countries in their attitudes towards environment and development. This pioneering Document advocated the differentiated responsibility principle among nations towards environmental protection. It stressed the need to balance environmental demands and the need for economic development of the poor nations. It was formalised into International Law at the 1992 United Nations Environment and Development Conference (UNEDC) in Rio de Janeiro.

In legal terms, the principle of common but differentiated responsibilities describes the shared obligation of two or more States towards the protection of a particular environmental resource. On the other hand, the need to establish variegated levels at which different States can effectively enter into a collective response, according to both their capacities and their levels of contribution to the problem. Accordingly, it mandates the developed countries to provide assistance in the form of transfer of technologies and financial resources to the developing countries to meet their global sustainable development targets. This principle is more appropriate to apply in the context of climate change.

While climate change results from activities all over the globe, it may lead to very different impacts in different countries. The worst impact of climate change would fall on developing countries, in part because of their geographical location, and in part because of weak coping capacities due to their vulnerable social, institutional, and physical infrastructures. Developed countries are responsible for about two-thirds of the cumulative energy related GHGs now in the atmosphere. They also consume five times more energy per capita, on an average, than the developing countries. Developed countries must take the lead in combating climate change. For example, the United States is the largest contributor to global warming. Although it contains just 4 per cent of the world's population, it produces almost 25 per cent of global carbon dioxide emissions.

An equitable approach to limiting global GHG emissions has to recognise that developing countries have legitimate development needs and priorities, that their development may be affected by climate change, and that they have historically contributed little to the problem. The largest share of historical and current global GHG emissions has originated in developed countries, the per capita emissions in developing countries are still relatively low.

Comprehensive action to address climate change is not feasible without global cooperation, as per the principle of common but differentiated responsibilities. Flows of climate finance from developed to developing countries represent the principal means to reconcile equity with effectiveness and efficiency in addressing climate problem. Equally, financial flows can help developing countries reduce their Greenhouse Gas emissions and adapt to the effects of climate change. In addition, there will be financial needs related to developing and diffusing new technologies.

7.5 INTERRELATIONSHIP AMONG DEVELOPMENT, SUSTAINABILITY AND CLIMATE CHANGE

Manifold linkages exist between the concepts of development, sustainability and climate change. The impact of global warming in many countries is preventing sustainable development or even destroying existing development gains. Today, the real challenge is to dramatically improve environmental performance, while also meeting other social aspirations. If we have to meaningfully address climate change, there is no option but to integrate development concerns and climate change. To meet the competing demands and reduce vulnerability to climate change, societies will need to balance producing more from their natural resources with protecting these resources. The sustainability of the environment is critical.

The steep increase in Greenhouse Gases since the Industrial Revolution has transformed the relationship between the people and environment. In other words, not only does climate affect the process of development, the direction of development equally affects the climate of the earth. If left unmanaged, climate change will reverse development progress achieved by the nations and compromise the well-being of current and future generations. It is certain that the earth will get warmer on an average, at an unprecedented speed.

The world's poorest countries are also those that are hardest hit by climate change. For many countries and regions, not only is economic development at stake, but also social achievements. Sea levels are rising, wet and dry seasons are shifting, rainfall is becoming increasingly variable and unpredictable, crops are withering away or getting inundated and diseases such as malaria are penetrating new areas. Tropical diseases may spread farther to the North, and flooding will likely become a bigger problem in temperate and humid regions. Many developing countries in arid and semi-arid regions may see their access to safe water worsen further. Large numbers of people could be displaced by a rise in the sea level, including tens of millions in Bangladesh alone, as well as entire nations inhabiting low-lying islands such as those in the Caribbean.

The amount of carbon dioxide a country emits into the atmosphere depends mainly on the size of its economy, the level and nature of its industrialisation, and the efficiency of its energy consumption. Even though developing countries contain most of the world's population, their industrial production and energy consumption per capita are relatively low.

As per the principle of common but differentiated responsibilities, developed countries hitherto have been the biggest emitters of GHGs, and now must accept the main responsibility for the impact of their actions on climate change. Significant reductions in the burdens that developed societies place on the global environment requires dramatic changes in the established patterns of production and consumption and a fundamental transformation of key economic sectors including energy, transport, construction, manufacturing and agriculture. Mitigation, adaptation, and the deployment of technologies have to happen in a way that allows the developing countries to continue their growth and reduce poverty. This is why additional financial flows to developing countries are so crucial.

Developed countries also need to promote and finance the transition to low-carbon growth in developing countries. Better application of known practices and fundamental transformations in natural resource management, energy provision, urbanisation, social safety nets, international financial transfers, technological innovation and governance, both international and national, are needed to meet the challenge.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1. Explain the principle of common but differentiated responsibilities.

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2. Examine the interrelationship among development, sustainability and climate change.

7.6 CONCLUSION

Development is a multidimensional process, which enables the people to meet their basic needs and improve their standard of living by reducing poverty, inequality and unemployment. Advancement of science and technology, massive industrialisation and over-exploitation of natural resources have helped the governments to achieve their developmental goals. Although human beings have overused natural resources throughout history, today's ecological problems such as the climate change are relatively a recent phenomenon. While the energy and resource-intensive modes of production and consumption patterns of industrialised countries are among the main causes of climate change, it is the poor in the southern parts of the globe, which are hit the hardest by its effects.

The complex nature of global climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common, but differentiated responsibilities. Sustainable development is the key to achieve sustainability, which is considered the final long-term goal. In other words, sustainable development means that sustaining an activity or process ensures that a system works in the long run. Climate change imposes an unprecedented scale of burden on development. Its impacts are already visible, and the most recent scientific evidence shows the problem is worsening fast, considering its current rate of Greenhouse Gas emissions. The enormous scale of floods in Western Europe in July 2021 is a case in point. Climate change thus affects numerous sectors and productive environments, including agriculture, forestry, energy and coastal zones. This Unit explained some of these concerns.

Principle of common but differentiated responsibilities, on the one hand, describes the shared obligation of two or more States towards the protection of a particular environmental resource. On the other hand, it focusses on the need to establish variegated levels at which different States can effectively enter into a collective response, both according to their capacities and their levels of contribution to the problem. Comprehensive action to address climate change is not feasible without global cooperation, which requires a deal or treaty perceived as equitable by all countries according to the principle of common but differentiated responsibilities.

Manifold linkages exist among development, sustainability and climate change. The impact of global warming in many countries is preventing sustainable development or even destroying existing development gains. Today, the real challenge is to dramatically improve environmental performance, while also meeting other social aspirations. To meet the competing demands and reduce vulnerability to climate change, societies would need to strike a balance between exploitation and development of natural resources. The sustainability of the environment is therefore critical. This Unit examined these pertinent connections among the three concepts of development, sustainable development and climate change.

7.7 GLOSSARY

Carbon Footprints: For an entrepreneur wanting to do the right thing for the environment, it is useful to calculate the company's carbon footprint. That means expressing all business activities in their carbon dioxide (CO₂) equivalent emissions, which gives the company or firm a way to measure its environmental impact and track progress in adopting sustainable business practices.

Climate Change: 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.

Differentiated Responsibility: The World States are being urged to maintain ecological balance through common, but differentiated responsibilities or CBDR. It means though all States are responsible for environmental degradation, they are not equally responsible. The concept of CBDR was formalised in International Laws at the UN Conference on Environment and Development (UNCED) in Rio de Janeiro. It established variegated levels of responsibilities of States towards environmental protection depending on the level of their economic development.

Greenhouse Effect: It is the process by when radiation from a planet's atmosphere warms up its surface. This radiation is caused by Greenhouse gases, which are produced by overexploitation of natural resources.

Greenhouse Gases. Gases that trap the sun's heat within the earth's atmosphere, creating a Greenhouse effect that may dangerously raise temperatures around the globe. Greenhouse Gases include ozone, methane, water vapor, nitrous oxide, carbon dioxide, and ChloroFluoro Carbons (CFCs).

Ocean Acidification: It is the ongoing decrease in the pH levels of the Earth's oceans caused by the uptake of carbon dioxide from the atmosphere. When carbon dioxide is absorbed by sea water, chemical reactions occur that reduce sea water carbonate ions and calcium carbon minerals. These chemical reactions are called Ocean Acidification or OA. It creates conditions that are non-conducive for marine life to survive.

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7.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Your answer should include the following points:

- Development means meeting basic needs, reducing poverty, inequality and unemployment, raising living standards, improving access to education, increasing life expectancy, expanding economic and social choice.
- Development has many elements and is difficult to define. It can be viewed in terms of goals and processes, in terms of economic and human development, and in terms of sustainability.

- Development must be conceived as a multidimensional process involving the reorganisation of the entire economic and social systems.
- Sustainability refers to the long-term viability of a system, a community, set of social institutions, or societal practice.
- The concept of sustainability is a condition or quality of something that can sustain, defend, maintain or conserve something else.
- Sustainable development is the key to achieve sustainability, which is considered the final long-term goal. In other words, sustainable development means sustaining an activity or process that ensures a system works in the long-term.

2. Your answer should include the following points:

- Climate change is defined as a local, regional or large-scale change in the long-term average regime of temperature, precipitation, circulation and related variables characterising the climate.
- Human activities have resulted in huge carbon dioxide emissions. This is the largest source of Greenhouse Gases, which can trap the infrared radiation from the earth within its atmosphere and create the risk of global warming.
- Climate change affects numerous sectors and productive environments, including agriculture, forestry, energy and coastal zones.
- It leads to increase in local average temperature and extremes, both land and water, change in rainfall pattern, its onset, seasonal distribution and extremes.
- It increases the frequency and intensity of large storms and tropical cyclones.

Check Your Progress 2

1. Your answer should include the following points:

- Today all the global efforts to address environmental problems are governed by the principle of common but differentiated responsibilities.
- The principle advocates that all States are responsible in the face of global environmental destruction, yet not equally responsible.
- The need to establish variegated levels at which different States can effectively enter into a collective response, both according to their capacities and their levels of contribution to the environmental problem.

2. Your answer should include the following points:

- Manifold linkages exist among development, sustainability and climate change. The impact of global warming in many countries is preventing sustainable development or even destroying existing development gains.
- Today, the real challenge is to dramatically improve environmental performance, while also meeting other social aspirations.
- To meet the competing demands and reduce vulnerability to climate change, societies will need to balance between the use and preservation of natural resources.
- The sustainability of the environment is critical.

