
UNIT 9 INTRODUCTION TO SUSTAINABLE DEVELOPMENT

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9.0 INTRODUCTION

Few important questions that must be coming in your mind before you start to read this unit. Why we are talking so much about sustainable development? Is sustainable development possible to happen? So, let's try to look for answers to these questions.

The expansion of human civilisation is through development and development is the key to survival also. Industrialisation has become the indicator of development and finally divided the world into three major categories of countries viz. Developed, Developing and Underdeveloped based on the degree of industrialisation. The reckless development processes created avoidable issues and problems around the world. Human exploited the resources around us more than our own need and requirements. The people of developed countries follow highly unsustainable lifestyle, and unsustainable population growth rate in developing and underdeveloped countries throws more pressure to the limited resources of the earth. Today we have cross 7 billion in the beginning of this century. Demanding more than what we need, our consumptive lifestyle

never bothers about the other living being, which is the key integral parts of the life we live. This brought the questions of not only the survivability of plant and animals but also for our own survivability and the population to be added generation by generation. Fortunately, after Second World War, the world comes together for the survival of planet. We realised the need to take a united effort. The United Nation constituted World commission on Environment and Development (WCED) in the year 1983. It is also known as Brundtland Commission and the broad political concept of Sustainable Development was brought. Since then, many individuals and organisations expanded the concept and value of sustainable development. Models and indicators were developed during the last three decades. We are discussing the details in this unit.

9.1 OBJECTIVES

After reading this unit, you will be able to

- Explain the concept of sustainable development;
- Explain the inter-linkages among the different pillars of sustainable development
- Describe the major indicators of sustainable development

9.2 DEVELOPMENT AND SUSTAINABILITY

The concept of development and sustainability is not new and it is as old as the human civilisation. Development is basically a process to build a base where human tries to make its own comfort. Sustainability, in a simple language, is to manage the availability of the stock. The growth of different civilisation shows how the process of development was passes through ages. The existence of every civilisation and its collapse was depending on the way how it was developed and managed its surrounding environment. The best evidence we have seen was the Indus and Harappan civilisations. By learning lessons from the collapse of old civilisations, we need to strengthen our responsibility for managing our surrounding. We have already crossed 7.6 billion in July 2018 on this limited space of the planet. Increasing numbers are directly related to increasing demand for human needs. Different studies on population –resources linkages (Malthus, 1798; Mill 1848; Hardin 1968; Odum, 1971; Meadows et. al, 1972; Club of Rome, 1972) argued about the limit to available resources in the future. It is the UN Stockholm conference on Human and Environment (1972) that open the door for a global common effort to sustainability of our very planet. The year 1983 marks a new beginning by constituting ‘World Commission on Environment and Development (WCED)’ under United Nations. The Commission submitted its report ‘Our Common Future’ in 1987 and give the definition as

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

After publication of its report, number of critics raise the limitation of the definition of sustainable development. Basic terms i.e. ‘development’ and

'needs' were not clearly defined in the report. Most of the critics are of the opinion that 'development and needs' may be different between rich and poor, among developed, developing and underdeveloped world. The real fact is, it opens the eyes of the world and brings all the countries together for a sustainable planet.

It is after Earth Summit, 1992, more than 178 countries adopted Agenda-21 and it was followed by Millennium Summit (2000) in New York that adopted Millennium Development Goals to reduce extreme poverty by 2015. Again in 2002, at World Summit on Sustainable Development reaffirmed the global communities commitment to poverty eradication and the environment, and built on Agenda 21 and MDGs by including more emphasis on multilateral partnership. The Sustainable Development Goals was built upon MDGs, with 17 goal and 169 targets was adopted by all Nations in the year 2015 to achieve by 2030.

9.3 DIMENSIONS OF SUSTAINABLE DEVELOPMENT

In view of the progressively increasing degradation of the environment quality and mainly the diminution and exhaustion of essential natural resources without which no development is feasible, the succeeding generations will not be able to meet their own needs for their development or even survival. The succeeding generations progressively will have lesser and lesser resources leading to gross inter-generational inequity. Not just the terrestrial resources but the marine and aquatic resources also are being degraded, polluted and/or unsustainably exploited. Every major oil spill leaves large number of marine organisms and seabirds dead, morbid or otherwise incapacitated in some manner. Significant loss of coastal livelihoods leads to accentuation of food insecurity and hunger. What this means is that we are now consuming our life support systems of land, water, biodiversity and forests in an unsustainable manner. In fact, the basic tenet of sustainability approach is to bequeath to posterity not any particular thing, rather to endow them with whatever it takes to achieve a standard of living at least as good as our own and to look after their next generation similarly.

The simple logic of human- environment interdependence is the flow of energy and materials. This is what we have seen as economy. Thus, if we look this flow of energy from either the lenses of eco-centric or anthropocentric approaches, there exist three main pillars i.e. human, environment and economy. Let's see how these three pillars are inter-related.

Human (or society) through ages depends on the environment for its survival. The environment gives us the resources we need, i.e. the food, the air, the water etc. Human with its growing knowledge, adding more and more need, to increase the level of its comfort thereby affecting the quality and quantity of the available resources. The increasing numbers of human population added more demands to the environment. The level of comfort is again measure through the lenses of economic value i.e. wealth. Wealth has become one of the indicators to show power. Every individual or nation wants to gather more wealth to show their power and strength to the society. This is how affecting the

flow of human-environment relation. Thus, the major objective of sustainable development should be to strengthen the linkages of the basic three pillars or dimensions of Sustainable development i.e. environmental, economic and social. Again, Sustainable Development, by definition, all Nations of the world would be able to enjoy economic prosperity, achieve social inclusion, and ensure environmental sustainability. Thus, the three major pillars of sustainable development i.e. Environment, social and economic needs to be looked through the lenses of SDGs dimensions of Sustainable Development. They are environmental sustainability, social inclusion, prosperity and good governance, and each of the 17 SDGs contributes to these four dimensions (the world in 2050).

9.3.1 Environmental Sustainability

Environment is the source of everything we need. It composes of living and non-living components. If we look from anthropocentric approach, human is in the centre of Environment that maintains everything. If we look from eco-centric point of view, in the present era, we are the destructor of environment. When the value of environment was a medium to survive, we are a good manager. The need is to understand how to maintain the quality of our environment. Again, in the growth of civilisation, the value started to calculate in terms of economic value as wealth. Thus, these changes happen through the process, the cultural dynamism. The environmental dimension covers a wide variety of critical environmental factors and threats: soil, water and marine resources essential to increase, or at least to maintain food production, widespread, health-damaging pollution, stratospheric ozone depletion; goal climate change and loss of biodiversity. The fundamental challenge is to satisfy the present needs while reducing the impact of human activity. An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems or environmental sink functions and depleting non-renewable resources only to the extent that investment is made in adequate substitutes. Thus, environmental sustainability basically means protection and conservation of the environment, maintain the health of ecosystems and specially in this era of climate change, resilient to climate shocks. We will be able to maintain environmental Sustainability when we are able to end hunger and poverty across the globe. That is why SDGs have different goals like SDG 6 (freshwater supply), SDG 11 (sustainable cities), SDG 12 (sustainable production and consumption), SDG 13 (climate safety), SDG 14 (conserving marine ecosystems), and SDG 15 (conserving terrestrial ecosystems), SDG 1 (No poverty) and SDG 2 (Zero Hunger).

9.3.2 Social Inclusion

The dimension social inclusion means all humans of planet Earth must obtain their **basic** needs and derive a feeling that they have a fair share of wealth, safety and influence. Individual gain is not the objective, but the provision for and involvement in equitable growth for all in the society. In other words, the social inclusion aims at good life for all humans, within the present and future generations (i.e. ensuring intra-and inter-generational equity). Gender and social equities are also integral components of sustainable development.

The dimension of social inclusion therefore includes necessary policy support and institutional mechanisms to fight against poverty through creation of livelihoods, support to sustainable livelihoods, eradication of discrimination and social security for all. A social system which is free from hunger and poverty can be achieved when we have fairness in distribution and opportunity, adequate provision for social services including health and education, gender equity and political accountability and participation. Thus, SDG 3 (Good health and well-being), SDG 4 (quality education), SDG 5 (gender equality), SDG 10 (reducing inequality), and SDG 16 (freedom from violence) are some of the SDGs to achieve social inclusion.

9.3.3 Economic Prosperity

The dictionary meaning of **prosperity** is ‘the state of being prosperous’. A general conception is that you are prosperous when you are earning enough money and makes you more successful. So, prosperity looks from economic dimension. Traditionally, economic development has been seen as the target or the objective and the environment as the tool through use of natural resources. Economic development should be inclusive in approach and harmony with nature. In fact, sustainability is about an obligation to future generations (towards meeting their needs) and it is necessarily about **intergenerational allocation**. This implies that our economic systems should be carefully managed in such a way that we live off the dividend of our resources, maintaining and improving the asset base so that the generations that succeed will be able to manage as well as the present generation.

We can achieve prosperity when the quality of the environment is good, society is free from hunger and poverty with secure livelihood for all. SDG 1 (end of poverty), SDG 2 (end of hunger), SDG 3 (health for all), SDG 4 (education for all), SDG 6 (water and sanitation for all), SDG 7 (modern energy for all), SDG 8 (decent jobs for all), and SDG 9 (modern infrastructure for all).

9.3.4 Good Governance

Ensuring environmental sustainability, bringing economic prosperity and achieving social inclusion are inter-connected and interdependent to each other. The proper inter-connection and interdependence must be properly and effectively managed through a system. Achieving all these dimensions needs participation of all the stakeholders at different scales- from local to global, political will, and collaboration and cooperation among the nations across the world. And thus, **Good governance** has become the fourth pillar of sustainable development. In Good governance, the interactions of state and non-state actors are put in the centre of policy making. It also implies that governments are following the rule of law, are accountable to their citizens and administer justice in a fair manner, non-state organizations are proactively involved and part of the governance system. Consequently, they cooperate with other countries. Good Governance is at the core of SDG 16 (rule of law, absence of corruption) and SDG 17 (global cooperation and partnerships for the SDGs). It is also explicitly addressed in other SDGs such as 10 on social and political equality or 5 on gender equality. SDG 16 is not only a goal in itself but also an enabler for other SDGs. Good and inclusive governance is thus seen as a precondition for

combining and aligning visions of local, national, and global common welfare.

Check your progressive Exercise 1

- Note:** a) Use the space given below for your answer
b) Compare your answers with those given at the end of the unit

1. Explain the concept of sustainable Development in your own language.
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2. What are the major dimensions of Sustainable Development?
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9.4 SUSTAINABLE DEVELOPMENT MODELS

The simplified representation of a real situation is termed as model. Models can be useful in helping to conceptualise a system, build a common understanding of problems, issues and interlinkages among different components in a system or of different systems. Most of academics argue that sustainable development and being sustainable are two different characteristics of the complex heterogeneous systems representing society and the environment. In fact, sustainable development is a process and sustainability is the goal of sustainable development. It is here we need models or modeling. Let us, in this section, try to understand basic models based on the concept of sustainable development.

9.4.1 Three pillar model

The new paradigm of development as we called, *Sustainable Development* has three main aspects namely *Economic*, *Social* and *Environmental*. These three main aspects are also called ‘three pillar’ or ‘dimensions of sustainability’ or ‘three circles model’. It is shown in the **figure 1**.

1.It is based on basic aspects of human society, but does not explicitly take into account ‘human quality of life’.

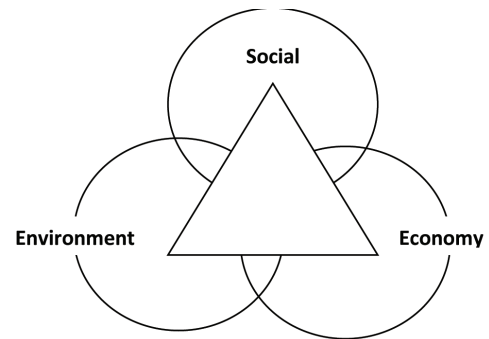


Figure 1. The three pillar (triangle) basic model of sustainability

(Serageldin, 1995)

9.4.2 The Capital Stock Model

The ‘capital stock model’ (World Bank, 1994) expresses that “if we live only off the interest and not the capital, the basis of prosperity is maintained – however, if we consume the substance, our means of existence is endangered in the long term”. It talks about *ecological capital* (the planning process includes bio-diversity, landscape, mineral resources, clean air and healthy water) and *Human and social capital* (equates to health, social security, social cohesion, freedom, justice, equality of opportunity and peace). The model proposed the following equation:

Capital stock of sustainable development (CSD) = \sum Capital stock of the environment (CE_n) +Capital stock of the economy (CE_c) +Capital stock of the society (CS)

9.4.3 The egg model

The International Development Research Center (IDRC, 1997) proposes the ‘egg of sustainability’ (Figure 4) which originally designed in 1994 by the International Union for the Conservation of Nature (IUCN).

The *egg of sustainability* illustrates the relationship between people and ecosystem as one circle inside another, like the yolk of an egg. This implies that people are within the ecosystem, and that ultimately one is entirely dependent upon the other.

Hypothesis of IUCN:

Sustainable development = human well being + ecosystem well being

Social and economical development can only take place if the environment offers the necessary resources: raw materials, space for new production sites and jobs, constitutional qualities (recreation, health, etc.). Ecosystem is therefore to be regarded as a super-ordinated system to the other dimensions of the triangle or prism models: social, economical, and institutional. These latter can only prosper if they adapt themselves to the limits of environmental carrying capacity.

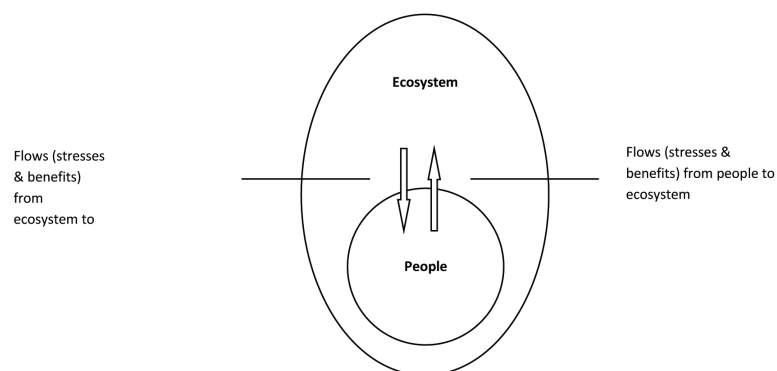


Figure 4. IUCN’s (1994) egg of sustainability (Source: IDRC, 1997)

As with any equation, the above hypothesis of IUCN appears to be too simple. It implies that the environment is not the super ordinate system, because it allows that sustainable development can occur if human well-being goes up more than ecosystem well-being falls. Thus, the equation does not show that humanity's wellbeing depend on ecosystem well-being and sustainable development as a whole.

As we learnt that the issue of sustainable development is highly complex in nature, the degree of complexity is also increasing more and more with the growing human knowledge. And we need to find a way i.e. a tool to conceptualize, model and measure the progress that humanity is making towards becoming more sustainable. So, it is in this context, there is a need to see the issues of sustainable development as an integration of the socio-economic and biophysical processes in a dynamic spatial and temporal resolution at different scale (for example, local, regional or global etc.) where different processes can best be represented. Being complexity in nature of the issues, the sustainable development may be suitable to the new concept called 'co-evolution'. 'Co-evolution' is a new methodological basis for knowledge generation in a wide array of areas. The three basic components of sustainable development that is social, economic and environment are simultaneously developed in its own trajectory at different speed which needs to be maintained at mutual interaction i.e. co-evolution. Todorov and Marinova (2009), famous scientist in the field of environmental modeling explained as the changes that are happening within the economy affect society and the environment; similarly environmental changes affect human society and the economy and most importantly changes in human behavior can affect the economy and the planet's natural environment. So, any proposed model of sustainable development should have this co-evolution as characteristics. It is also fact that nature provides human societies and economies with a complex life support system, comprising air, water, food and a suitable climate for our survival, and the physical resources that are the foundation of our economy. Thus, you cannot sustain your social or economy system if you do not sustain the natural system first i.e. ecological sustainability. So, any proposed model should be ecology centric.

Check your progressive Exercise 2

Note: a) use the space given below for your answer

b) Compare your answers with those given at the end of the unit

1. Briefly explain the conceptual model of three pillars in your own language

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2. Elaborate the capital stock model taking a pond ecosystem as a system

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9.5 INDICATORS

The dictionary meaning of ‘indicator’ is something that shows or indicate what a situation is like or level of something. Setting goals and identify indicators will help in promoting sustainable development at different scale. Indicators perform many functions viz. act as a tool to communicate ideas, thought and values; early warning to prevent further setbacks; measure and calibrate the progress and moreover, better decisions and effective implementation strategies by policy makers.

During the post Brundtland period, the concept of *sustainability* became one of the key political principles for most of the Nations around the world and *sustainability indicators* as a basic approach to provide the progress towards a broad range of social, environmental and economic goals. Thus, the United Nations was mandated by the Rio summit to establish a set of ‘indicators of sustainable development’ in order to put the Agenda 21 into practice and to monitor the progress. Chapter 40 of the Agenda 21 introduced the development of *sustainability indicators*. In 1995, the UN Committee on Sustainable Development (CSD) became the first to work on the development of *sustainability indicators* in global level and set 134 indicators which was reduced to 58 indicators in 2001 based on feedback of participating countries. Consequently, within the European Union (EU) “sustainable development” was introduced in 1997 (Article 2 of the Amsterdam Treaty) and the European Environment Agency (EEA) and UROSTAT, the statistical office of the European Union gave efforts to establish ways to measure progress through indicators. Thus, EU Sustainable Development Indicator Task Force (2001) was founded to support further development of the indicators. Specific sectoral indicators have also been developed by a range of sector administrations at international, European and national levels. As experiences gained by many countries in applying and adapting the new indicator, the UN MDG has 48 major indicators of 8 goals with 21 targets and SDG has 17 goals with 169 targets and 243 indicators.

Sustainable development, which is multidimensional and integrated in nature, the sustainable development indicators attempted to measure sustainable development in its entirety. The simplest way for the conceptions of defining and measuring sustainable development, can broadly be placed in two major categories: *weak and strong sustainability*.

9.5.1 Weak Indicators

The *concept of weak sustainability* is based on neo-classical economic theory and assumes that manufactured and natural capitals are close substitutes. This means that costs of environmental deterioration (e.g., forest damage) can be compensated by benefits from manufactured capital (e.g., income). Thus, environmental damages are valued in monetary units. Examples of *weak sustainability indicators* are damage cost calculations which can be found

in several studies of social costs, concepts of integrated environmental and economic accounting ('green GDP') or multidimensional socio-economic indices like the "Index of Sustainable Economic Welfare" (ISEW). Damage cost calculations try to quantify the external effects of environmental pollution. The methodology is based on welfare theory and cost benefit analysis.

9.5.2 Strong Indicators

The concept of *strong sustainability* denies the degree of substitution that weak sustainability assumes, at least for some critical elements of natural capital. In *Strong sustainability* concepts, the scale has to be measured in absolute physical limits. *Ecocapacity, Material intensity per unit service, Pressure-State Response indicators, AMOEBA indicators.*

Up to now, several concepts and sets of indicators are being proposed that can broadly be divided into two viz. *the economic strategy* and *the ecological strategy*. *The economic strategy* focuses on getting prices right and income derived from the economic strategy which are measured in monetary units like, e.g. the 'sustainable income' or 'green GDP'. These indicators are taken as weak sustainability since they assumed that manufactured and natural capitals are close substitutes that costs of environmental deterioration (e.g., forest damage) can be compensated by benefits from manufactured capital (e.g., income). *The ecological strategy analyses* the impacts of economic activities on ecological systems by keeping ecosystems intact through the protection of natural abilities like ecological stability or ecological resilience. They are measured in physical units and they quantify the thresholds of critical ecological functions. Examples of such indicators are critical loads quantifying depositions which may have significant negative impacts on ecosystems in the long run. They are characterized as indicators of strong sustainability because they deny the degree of substitution that weak sustainability assumes.

The two approaches are complementary though it always presents a gap to link the two. But there is still a necessity to develop an integrated approach since ecological and economic approaches have different purposes which cannot be assessed by the same criteria.

Check your progressive Exercise 3

Note: a) use the space given below for your answer

b) Compare your answers with those given at the end of the unit

1. Define the concept of indicators

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9.6 LET US SUM UP

The pressure of increasing human population on the limited resources of the earth calls for a developmental pathway that cares the survivability of planet and we called it as sustainable development. The major dimensions of sustainable development are environmental sustainability, economic prosperity to all, social inclusion and good governance. Based on the basic concept of sustainable development, three pillar model, the capital stock model and the egg model are the basics models that explains the relationship among the different pillars of sustainable development. The progress of sustainable development can be measured through two basic indicators i.e. weak sustainability indicators and strong sustainability indicators. Both have limitations and need indicators that are integrated in nature.

9.7 KEY WORDS

<u>Agenda 21</u>	: a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.
Sustainability	: the ability to maintain at a certain level or rate
Governance	: the manner in which the power is exercised in the management of a system or a country

9.8 REFERENCES AND SUGGESTED FURTHER READINGS

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- TWI2050 - e World in 2050 (2018). Transformations to Achieve the Sustainable Development Goals. Report prepared by the World in 2050 initiative. International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. www.twi2050.org
- Bell and Morse. 2008. Sustainability Indicators: measuring the immeasurable. Earthscan Publication

9.9 ANSWERS TO CHECK YOUR PROGRESS

Check your Progress 1

1. Your answer must include the following points
 - The development that balance environment-economy- society interlink
 - Development that looks towards achieving long term benefits

2. Your answer must include the following points

- Environmental Sustainability
- Social Inclusion
- Economic prosperity
- Good Governance

Check your Progress 2

1. Your answer must include the following points

- Environment: source of resources
- Social: managing the environment
- Economy: that link the social and environment

2. Your answer must include the following points

- Capital stock of the environment in a pond: biodiversity, water etc.
- Capital stock of economy in a pond: ecological production
- Capital stock of the society: health of the species

Check your Progress 3

1. Your answer must include the following points

- A way to measure progress
- Can be look into two major categories: weak and strong