

# **Planning for Sustainable Development**

## **UNIT –I**

### **1.1 SUSTAINABLE DEVELOPMENT:**

Nothing can be achieved by blind criticism of development agendas. By 2050 the population of our planet, which crossed 7 billion in 2011, is expected to be 10 billion (United Nations Population Fund). This increased population will demand more natural resources and energy resources for their survival and development activities. The challenges for the state-providing food, cloth and shelter for the masses-will increase in magnitude. In order to provide the facilities, the governments may go ahead with urgent development plans without considering the impact of such activities on the environment, society and culture. The former approach was to plan developmental activities first and to deal with environmental issues later on. But this would not help in improving the quality of life. Since the increase in population demands more economic growth, developments cannot be stopped. Competent authorities can accept, reject or modify a project by considering whether the environment is protected, resources are consumed with the future in perspective, biodiversity is preserved and also by evaluating the effect on human health and safety.

The handing over of the socio-economic development done so far along with the natural resources and other benefits from the environment, without losing the quality of living to future generations can be considered sustainable development. The World Commission of Environment (initiated by the United Nations in 1982) popularly known as Brundtland

Commission has put forward the definition of sustainable development in its report in 1987

'Our Common Future'-The report of the World Commission of Environment) as

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs". According to Allen Prescott "sustainability is just another way of saying "the good life" as a combination of a high level human well-being and the high level of ecosystem well-being that supports it". Thus sustainable development involves the satisfaction of present human needs, thought about the future, sustainable consumption of the resources, well-being of the environment and keeping the quality of life.

## **1.2 THINK CRITICALLY ABOUT DEVELOPMENT:**

Up to the end of the Second World War there were imperial and colonial powers who controlled the world by regulating the utilization of its resources. The resources consumed were both natural and human, often at very low expense. So the benefits were distributed unevenly among the nations. Ever after this period the world considered development only from the economic viewpoint. Consume or export available natural resources, start new industries and improve the standard of living-this was the concept of people as well as the governments. Whenever a new development project was initiated the only thought was about economic profit and the impact on the environment or on the society was often neglected. The income inequalities result from the said development models are persisting or increasing year by year.

Up to the twentieth century, most development plans did not take environmental factors into consideration. All projects during those days were economy based and not socially or environmentally relevant. Rapid industrialization caused high levels of air pollution, water pollution and ground contamination. Also unplanned developments raised issues like inadequate transportation, unavailability of water and other resources required for well being. Only years after establishing an industry or development project did people become aware of its impact. By that time the people might have had to quit the land, abandon their farms and lose their life span due to unhealthy environment. Traditional ways of life and wisdom might have been endangered and particular species of flora and fauna might have vanished. Deforestation, biodiversity loss and adverse climate change are also some of the consequences of unbridled profit motive and economy oriented development. It is the right time to act for a change from unsustainable development to sustainable development.

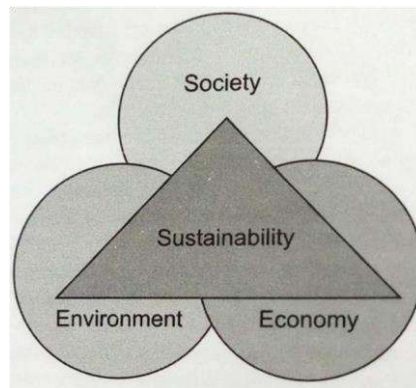
## **1.3 CONCEPT OF SUSTAINABLE DEVELOPMENT:**

The 'sustainable' part of the term argues for the 'carrying capacity' of the planet and the 'development' stands for economic growth. 'Sustainability' deals with the action oriented part such as planning for a long duration, assessing the impact on environment, influence on culture and society, protecting nature, embracing innovation, understanding the constraints, creating and fostering awareness about the system and following the best practices. Only such development which is aligned and adapted to the environment will be sustainable. Sustainable development should be the optimization of three E's-Economy, Ecology and Equality. Proper planning which co-ordinates these three E's pave the way for sustainable development.

The following models will help to understand the concept of sustainable development:

### 1.3.1 Three Pillar Basic Model (Three Circles Model)

This model consists of three interconnected circles superimposed by a triangle. The circles represent the three dimensions of the model-Society, Environment and Economy. The triangle stands for sustainable development which aims equity in society, conservation of environment and growth1 economy. Figure 1.1 represents this model.

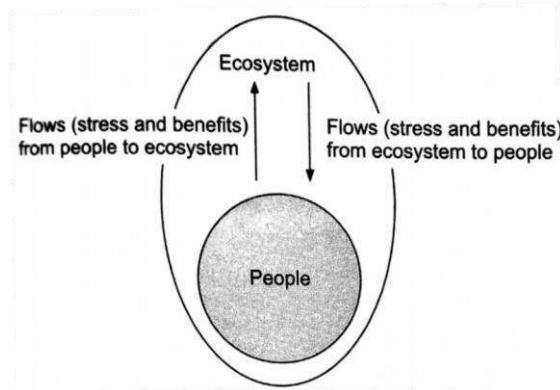


*Figure 1.1 Pillar model of sustainability.*

If we consider only the social and environmental dimensions, development will only be bearable. If the social and economic dimensions are considered, there will be equitable development. When the environmental and economic perspectives are satisfied, the development is viable. When all the three dimensions are considered and optimised properly, the development is sustainable.

### 1.3.2 The Egg of Sustainability' Model

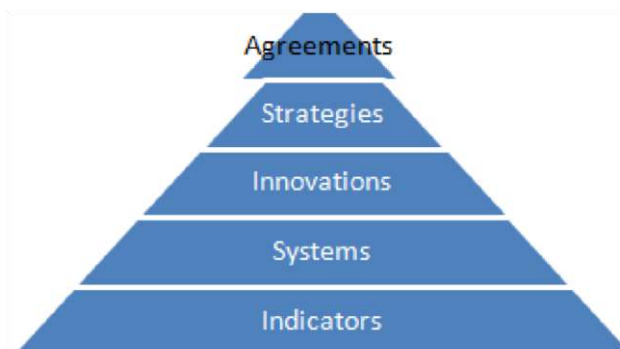
This is a simple model that resembles an egg. The outside ellipse stands for the ecosystem. The circular yolk within the egg represents people, who are also part of ecosystem. Any stress or benefits flow from the ecosystem to the people and vice versa, i.e. they are mutually affected. For an egg to be good both the yolk and the white should be good. This model was designed in 1994 by the International Union for the Conservation of Nature (IUCN) Thus, from Figure 1.2, it is very clear that sustainable development is the sum total of well being of the people and the ecosystem.



*Figure 1.2 Egg model of sustainability.*

### **1.3.3 Atkisson's Pyramid Model**

In Atkisson's pyramid model, there are five steps involved. At the bottom of the pyramid there will be indicators decided by brainstorming and discussions about the common vision for the project. For example, if the common objective is 'to create a pollution free environment at a particular village. There will discussions on pollutants expelled treatment, reduction in water resources, etc. The second level of the pyramid is the identification of systems involved in the discussed indicators. In the example discussed, these may be related to the profit motive of managements or failure to enforce rules and regulations. Innovations which put forth new ideas as the solution for the above problems can be considered as the third level of the pyramid. The solutions for the problem under discussion may include framing new laws, regular monitoring of adherence to these, adoption of improved technology, etc. These innovations or ideas must be framed as strategies in the fourth level of the pyramid. At the final stage, the systems involved in the development activity should make an agreement for action. The pyramid model is given in Figure 1.3.

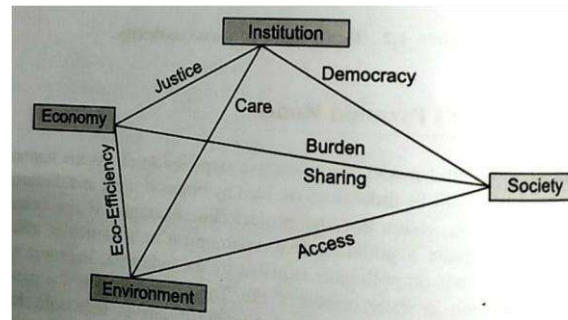


*Figure 1.3 Atkisson's Pyramid Model*

### **1.3.4 Prism Model**

In the prism model, the four sides of the prism are formed by justice, democracy, ecoefficiency and access. The diagonals of the prism are care and burden sharing. These six elements relate

the four components economy, environment, institution and society. It is shown in Figure 1.4. There are criticisms and arguments about this model.



*Figure 1.4 Prism model.*

#### **1.4 ENVIRONMENTAL DEGRADATION AND POVERTY SUSTAINABLE DEVELOPMENT**

Environmentally, it is clear that much of our industrial, agricultural and other uses of renewable and non-renewable natural resources are unsustainable. It has been widely acknowledged, both during UNCED and subsequently by bodies such as the World Bank and the OECD Development Assistance Committee, that the current trends in environmental degradation are a major threat to the achievement of sustainable development. The on-going loss of biodiversity; decline of forest, freshwater, marine and soil resources; changing climate; loss of stratospheric ozone; and accumulation of toxic substances in soil, water, and living organisms, are all threats to the environmental goods and services upon which all human life depends for food, fodder, crop production, and innumerable other goods and services. It is usually the rural poor who are the first to suffer when these systems fail, but not even the most insulated of city dwellers in the industrialized countries are immune from these effects.

Poverty is often associated with degraded rural environments. Environmental degradation has many consequences, because a healthy natural environment sustains nonmonetary economies and can be viewed as the "social security" of the rural populations. When the productive functions of healthy rural environments degrade or when people lose access to those productive environments, movement to cities in search of alternative livelihoods can exacerbate urban poverty. Environmental degradation therefore undermines sustainable livelihoods and affects the rural poor by disproportionately affecting their health, livelihoods and security, and can aggravate poverty in already stressed urban environments.

A sound environment alone will not alleviate poverty, but attempts at poverty alleviation in isolation of the environment will sooner or later be undermined. It is evident today that the costs of past environmental mistakes are being borne by the current economy. Recent

data have shown that natural disasters, exacerbated by the mismanagement of natural systems, have the greatest human impact on the poorest countries.

## **1.5 PRINCIPLES OF SUSTAINABLE DEVELOPMENT**

### **a) Integration of environmental and economic decisions**

All decisions taken for economic development as well as environmental protection should go hand in hand. Along with the improvement of standard of living as defined by economic indicators the holistic well being of life is also important.

### **b) Stewardship**

Resources are not only for the present generation, but also for the future generations. A man of the present generation is a 'steward' who is duty-bound to consume sustainably and hand over the rest to the coming generations. This is an important aspect in the present scenario, since the natural resources available are quite limited considering the huge population expected to come in near future. Forecasting of impacts of today's decisions on economy, environment and society are to be done.

### **c) Shared responsibility and understanding**

Sustainable development can be implemented as a collective effort. This is not just the responsibility of environmentalists, government, industrialists or social workers, but that of the entire community. Sustainable development models discussed in Section 1.3 clearly specifies the involvement of the entire cross section of the population. The importance of sustainable development as well as their specific role in ushering it must be clearly communicated to each and every member of the society through education, discussion and other means.

### **d) Prevention**

Whenever a new developmental activity is planned, potential problems such as industrial pollution, unscientific waste disposal, unhealthy ambience, hasty decisions related to new developmental projects and unsustainable consumption of natural resources must be extensively studied and be prevented both by law and by creating awareness. Such activities need not be perceived as resistance to development, but as thinking of better alternatives to prevent or offset its negative effects. Also there should be continuous assessment of all the existing projects and the various parameters adjusted to prevent any issues which may arise in operation.

#### **e) Conservation and enhancement**

The conservation of biodiversity, forests and natural resources are a big question for the future generations due to the projected population increase and change in demographic patterns. One of the major issues is the increased demand for fast diminishing fossil fuels which also have significant environmental impact. So the conservation of resources for the future and enhancement of the use of renewable resources in the present stage are well defined efforts for sustainable development. Also the ecological processes and life support systems should be conserved in order to maintain environmental harmony.

#### **f) Rehabilitation and reclamation**

A key requirement for future developmental projects should be that there should not be any detrimental impact on the environment the society. All living beings are inter-linked in way or the other The restoration of environment along with the development is expected for sustainability, If any modifications are to be made to existing systems, it must be done after consultation with the relevant authorities and providing awareness to the public.

#### **g) Global responsibility**

It is the responsibility of all the nations to collectively make efforts on sustainable development. Also nations must independently prepare laws and manifestos for implementation through the local self governments, NGOS or institutions. Public opinion should be taken seriously as feedback both for new and existing projects. So 'think globally and act locally' must be the policy of all who are involved in such activities for comprehensive and equitable solutions for the problems.

### **1.5 THE EVOLUTION OF IDEAS ABOUT SUSTAINABILITY**

Throughout the evolution of the concept of “sustainable development” there was consensus on the fact that it does not focus solely on environmental issues. The three interdependent and mutually reinforcing pillars are: economic development, social development, and environmental protection. Indigenous peoples have argued that the fourth pillar of sustainable development is also cultural diversity.

The idea of sustainability dates back to the early 20th century in the era of industrial revolution when two opposing factions had emerged within the environmental movement: the conservationists and the preservationists. The conservationists focused on the proper use of nature, whereas the preservationists sought the protection of nature from use.<sup>1</sup> Put another way,

conservation sought to regulate human use while preservation sought to eliminate human impact altogether.

As the first evidences of an environmental crisis began to appear, several reactions took place. The International Union for Conservation of Nature (IUCN) was founded in October 1948 following an international conference in Fontainebleau, France. Its promoter's sought to ensure that any use of natural resources is equitable and ecologically sustainable. The Club of Rome, a think tank composed of a small international group of people from the fields of academia, civil society, diplomacy, and industry, raised considerable public attention in 1972 with its report *The Limits to Growth* that predicted that economic growth could not continue indefinitely because of the limited availability of natural resources, particularly oil. Sustainable development was a key theme of the United Nations Conference on the Human Environment in Stockholm in 1972. The concept was coined explicitly to suggest that it was possible to achieve economic growth and industrialization without environmental damage.

In the ensuing decades, mainstream sustainable development thinking was progressively developed through the World Conservation Strategy (1980)<sup>3</sup>, the Brundtland Report (1987)<sup>4</sup>, and the United Nations Conference on Environment and Development in Rio (1992) , as well as in national government planning and wider engagement from business leaders and non-governmental organisations of all kinds.

Over these decades, the definition of sustainable development evolved. The Brundtland Report defined sustainable as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This definition was vague<sup>5</sup>, but it cleverly captured two fundamental issues, the problem of the environmental degradation that so commonly accompanies economic growth and yet the need for such growth to alleviate poverty.

The core of mainstream sustainability thinking has become the idea of three dimensions, environmental, social and economic sustainability. These have been drawn in a variety of ways, as 'pillars' (Figure A), as concentric circles (Figure B), or as interlocking circles (Figure C). The IUCN uses the interlocking circles model to demonstrate that the three objectives need to be better integrated, with action to redress the balance between dimensions of sustainability.

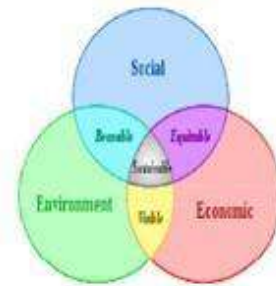




*Fig. A: The Three Pillars of Sustainability*



*Fig. B: Concentric circles*



*Fig. C: Overlapping circles*

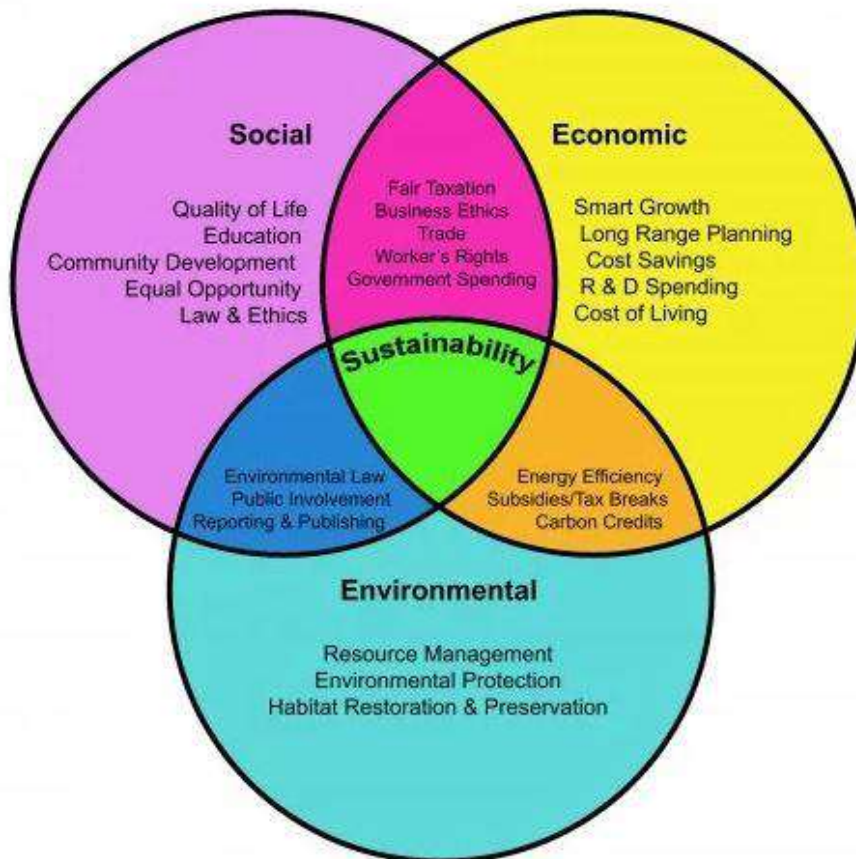
# **Planning for Sustainable Development**

## **Unit-II**

### **Key Components in Sustainable Development**

#### **Key Components in Sustainable Development:**

It seems like every other day we hear someone talk about sustainability. Sustainability can be broadly defined as *“meeting the needs of the present generation without compromising the ability of future generations to meet their own needs”*. When it comes to describing sustainability in our world, we need to be concerned about three main areas of influence. There are three interconnected spheres of sustainability that describe the relationships between the environmental, economic, and social aspects of our world. These spheres are a related set of concepts that, when taken together, can form a solid ground from which major decisions and actions can be made. Examples of such decisions could include land use planning, surface water management, building design and construction, and even law making. When the concepts contained in the three spheres of sustainability are applied to real world situations, everybody wins. Natural resources are preserved, the environment is protected, the economy isn't harmed, and the quality of life for our people is improved or maintained. Below is a diagram showing the three spheres and how they are related.



Basically what this is saying is that nearly everything we do or plan to do, has an effect on the sustainability of the human race.

### **1. Environmental Sustainability:**

In a truly sustainable environment, an ecosystem would maintain populations, biodiversity, and overall functionality over an extended period of time. Ideally, decisions that are made should promote equilibrium within our natural systems and seek to encourage positive growth. Unnecessary disturbances to the environment should be avoided whenever possible. If there is a disturbance, it should be mitigated to the maximum practicable extent. When decisions are made, one part of the discussion should always be the environmental impacts of the proposed outcome or result.

There are several items that are directly related to environmental sustainability. One of the concepts that is of the utmost importance is the proper management of our natural resources. Using the Z-squared approach to sustainability, we can minimize our impacts to the environment. In some

cases we can even promote habitat restoration and preservation as means to negotiate a successful solution to a problem.

## **2. Economic Sustainability:**

Similar to environmental sustainability, economic sustainability involves creating economic value out of whatever project or decision you are undertaking. Economic sustainability means that decisions are made in the most equitable and fiscally sound way possible while considering the other aspects of sustainability. In most cases, projects and decisions must be made with the long term benefits in mind (rather than just the short term benefits). Keep in mind that when only the economic aspects of something are considered, it may not necessarily promote true sustainability.

For many people in the business world, economic sustainability or growth their main focal point. On the large scale (globally or even locally), this narrow-minded approach to management of a business can ultimately lead to unsatisfactory results. However, when good business practices are combined with the social and environmental aspects of sustainability, you can still have a positive result that is for the greater good of humanity.

There are several key ideas that make up economic sustainability. For example, governments should look to promoting "smart growth" through no-nonsense land use planning and subsidies or tax breaks for green development. Strong financial support for universities, education programs, and research & development is an important part of economic sustainability as well. In addition to this, an emphasis should also be placed on other areas such as reducing unnecessary spending and cutting red tape.

## **3. Social Sustainability:**

Social sustainability is based on the concept that a decision or project promotes the betterment of society. In general, future generations should have the same or greater quality of life benefits as the current generation do. This concept also encompasses many things such as human rights, environmental law, and public involvement & participation. Failing to put emphasis on the

social part of decision or action can result in the slow collapse of the spheres of sustainability (and society as well).

One great example of social sustainability is the passing of the Clean Water Act in 1972 (and amendments in 1977) and the Safe Drinking Water Act in 1974. Overall, these sets of laws were great pieces of legislation that set minimum water quality standards for both surface and drinking water. This had the effect of positively promoting the health and well-being of everyone in America. The clean water act also served to protect our nation's water supply by making it essentially illegal to discharge pollutants in adjacent rivers, lakes, and streams. This period of time in our nation also saw many other improvements in our environmental laws. All of these laws (and other factors as well) lead to the overall betterment of society for Americans. The graph below illustrates the correlation between the passing of this kind of legislation and the average life expectancy for citizens of the United States.

### **Environmental Ethics:**

Human beings are social animals with lot of unique qualities. Primarily, we are able to distinguish between right and wrong. Also we can understand pain and joy, good and harmful deeds from others and plan and act according to the situation. Though man can think wisely sometimes he becomes greedy and forgets the distinction between right and wrong. This why certain countries dispose their hazardous waste near another without even giving proper awareness about the consequences. Medicines banned in one nation may be made freely available in others by the same company which is highly unethical. There was a development consciousness in early 1960s which led to the formation of several social movements. These movements propagated the importance of ethical values for protecting the environment.

According to ISO 14000 the environment is defined as the surroundings, comprising air, water, land, natural resources and their interactions. The environment is a combination of biosphere, atmosphere, hydrosphere and lithosphere. When the equilibrium between the biosphere and the other three components is disturbed, the environment becomes polluted. The large

excessive consumption of paper, soap, toothpaste, plywood, etc demands a large quantity of resources. Such resources are consumed more by the rich- while a vast majority of the population is too poor to afford them. Thus utilization of resources by a small number causes imbalances in development. Deforestation, loss of biodiversity etc. can be wisely stopped by timely and effective intervention.

Thus environment ethics demands:

1. Equitable utilisation of the natural resources and energy resources.
2. Caring for the human beings regardless of economic status, nationality or gender. All have the right to life and equal responsibility to other lives.
3. Protect the surroundings without disturbing the equilibrium between the components of the environment.
4. Reduce pollution. Air, water and land must be clean for the wellbeing of human life.
5. Wild life and other natural resources are to be protected in order to preserve the biodiversity.
6. Accept that the earth is the habitat of other living beings as well. Human beings are only one link in the chain of living organisms which should never be broken.
7. The resources of this planet are not only for the present generation, but for the future generations too.

### **Environment Education:**

India has a strong tradition of environmental education. Rabindranath Tagore in *Santhinikethan* taught profound philosophical truths by taking young people close to nature. The father of our nation, Mahatma Gandhi taught about the need for simplicity in life. He also dreamed of a rural India based on agriculture rather than on industry. The Honourable supreme court of India recommends the provision of environmental education in school as well as university for giving proper awareness to the citizens.

Why is environment education important? If the citizens of a nation are aware of the environmental problems they may face, they can be proactive in

establishing a sustainable life style. The awareness through the environment education is not merely for knowledge, but for active participation in protection of the environment. Consciousness about the environmental conditions is very important. Climate change, global warming, ozone depletion, deforestation, lose of biodiversity-all these are caused or augmented by human activities. In such a situation, citizens should actively participate in taking decisions and actions for the protection of environment. If the environment itself is seen as a vital resource which needs to be zealously protected, the rest will take care of itself. Everything we use comes from air, water, land and the surroundings. Developing this vision about the environment will ensure its protection. This enlightenment can be provided by proper environmental education.

Environmental education cannot be confined to any particular discipline. It deals with living and non-living things. Life sciences, social sciences, meteorology, physics, chemistry, psychology, different engineering disciplines and more are related to environmental engineering. No one on the earth can detach himself from the environment and be independent. So it is a sensible proposition that everyone should be educated about the environment at some level, and that everyone must participate actively in such activities with a clear vision of sustainable life and development.

## **Strategies for promoting the sustainable development:**

### **Important Strategies to Achieve Sustainable Development!**

The Rio Summit established sustainable development as the guiding vision for the development efforts of all countries. The strategies for sustainable development to ensure socially responsible economic development while protecting the resource base and the environment for the benefit of future generations. To agree how the international community can best assist developing countries in meeting good of sustainability.

Commitment to provide support for sound nationally-owned sustainable development strategies where conditions for effective partnership are in place. In simple terms, sustainable development means integrating the economic, social and environmental objectives of society, in order to maximize human

well- being in the present without compromising the ability of future generations to meet their needs.

***Strategy Formulation:***

a. Country ownership and participation, leadership and initiative in developing their strategies.

b. Broad consultation, including particularly with the poor and with civil society, to open up debate on new ideas and information, expose issues to be addressed, and build consensus and political support on action.

c. Ensuring sustained beneficial impacts on disadvantaged and marginalized groups and on future generations.

d. Building on existing strategies and processes, rather than adding additional ones, to enable convergence and coherence.

e. A solid analytical basis, taking account also of relevant regional issues, including a comprehensive review of the present situation and forecasts of trends and risks.

f. Integration of economic, social and environmental objectives

g. Through mutually supportive policies and practices and the management of tradeoffs.



# **Planning for Sustainable Development**

## **Unit-III**

### **INNOVATION FOR SUSTAINABLE DEVELOPMENT**

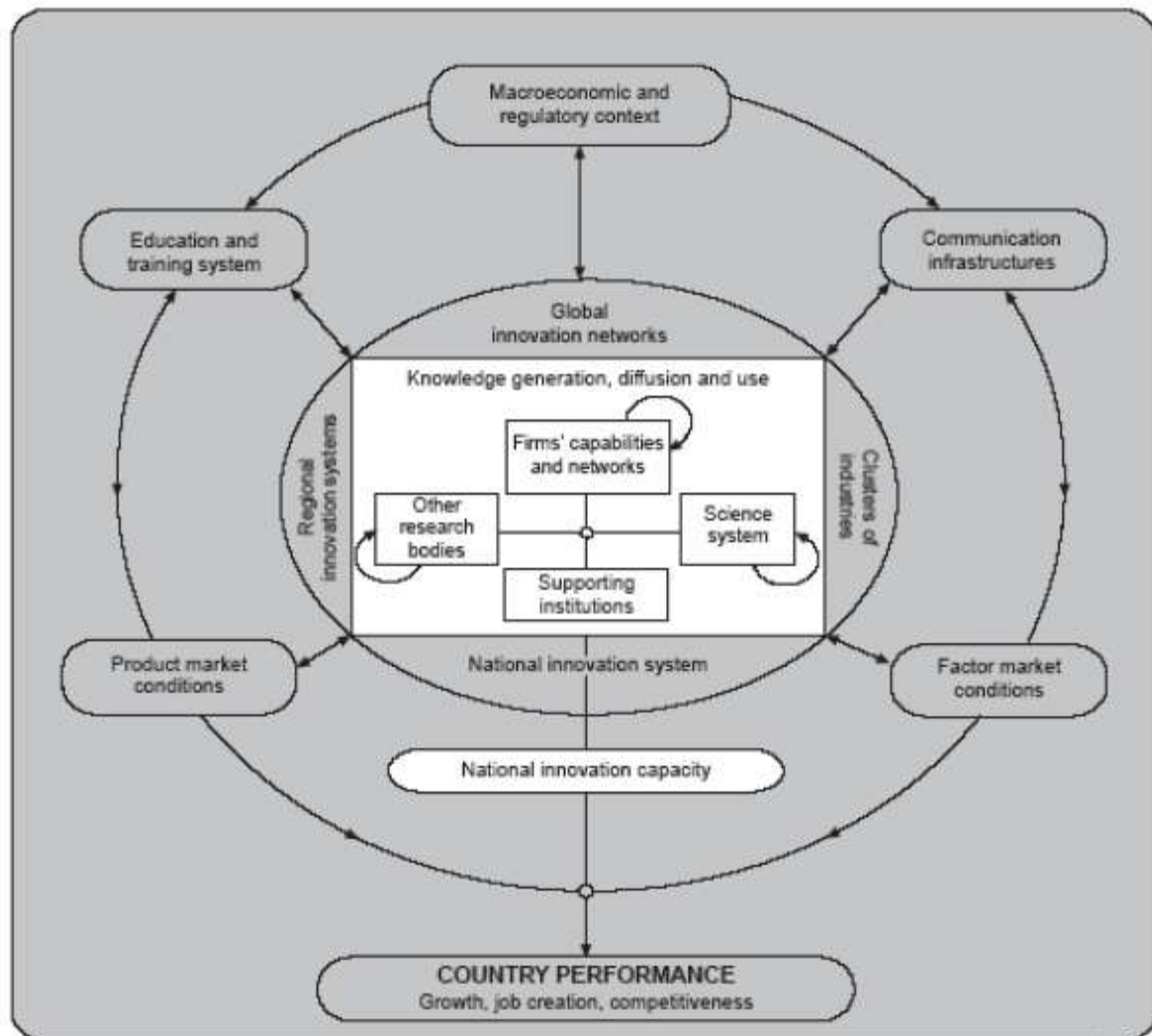
Innovation is the introduction of novelty in the economic realm. The novelty can be many things. According to the Oslo Manual (OECD 2005), innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practice. The innovation that is being developed or adopted may be new to the world or new to the company. The adoption of a new process or business practice developed elsewhere counts as innovation.

Innovation should be distinguished from invention. While the concept of invention refers to discovery, discovery may not be needed for innovation. The overwhelming majority of innovations are not based on discovery but are the outcome of applied research and development informed by theoretical knowledge, engineering experience and knowledge about user wants. Sometimes users are actively involved in the creation of an innovation. An example is the mountain bike, which was 'invented' by users.

Innovation is ongoing—and this creates a big problem for innovation measurement. Advances in technology and feedback from users help product innovation vendors to improve their products, while economies of scale and competition help to bring down prices for the innovation. New uses and users may be found during diffusion. Innovation continues in the diffusion stage. The characteristics of the innovation and the way in which it is used thus change. Given the uncertainty about outcome and need for alignment of various activities, the innovation process is best viewed as a search, development and learning process, where knowledge is gathered and used in new ways in the development of process technologies, products or services. Consequently, R&D is only part of the story of innovation. It is important for high-tech products but less important for other types of products that still may be knowledge-intensive.

The products from IKEA are an example, since they are knowledge-intensive but require little R&D. Innovation occurs within a wider context that shapes innovation processes, innovation output and economic and environmental outcomes. This wider context encompasses the values, beliefs, knowledge and networks of actors, the technologies in place, economic growth, the product market conditions, factor market conditions, the education and training system, physical infrastructure and the macroeconomic and regulatory context. Impacts are coproduced, both at the micro and macro level. The macro performance of an innovation is hard to assess because it depends on income effects and spill overs in knowledge and taste formation. It is possible, however, to compare the performance of an innovation to the performance of a relevant alternative in a first round analysis, which looks at material consumption, emissions and waste.

## A systemic view of innovation



## Eco-innovation

There are different definitions of eco-innovation and environmental innovation. We have definitions based on motivation and based on performance. We had a long discussion about whether an environmental aim should be a distinguishing feature of eco-innovation. On reflection, we decided to base the definition of eco-innovation on environmental performance instead of on environmental aim because it is not the aim that is of interest but whether there are positive environmental effects related to its use. Past studies of eco-innovation have focussed on environmentally motivated innovation, overlooking the environmental gains from “normal” innovations. The environmental gains from normal innovations have never been the object of systematic study. It has been estimated, however, that 60% of the innovations of the Dynamo Database in the Netherlands offer environmental benefits. It was also found that 55% of the innovations supported by a general innovation scheme for research cooperation (IS) offered “sustainability benefits”.

## **Eco-industry**

The broad definition of eco-innovation might have implications for our understanding of eco-industry. One could argue that the definition of “eco-industry” should be widened to include also companies whose innovations qualify as eco-innovations by being less environmentally harmful than relevant alternatives. This would create problems from a data collection view point, as the term “eco-industry” is already used for data collection activities by Eurostat and OECD; they define eco-industries as “activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to

waste, noise and eco-systems. This includes technologies, products and services that reduce environmental risk and minimize pollution and resources” (European Commission, 2006).

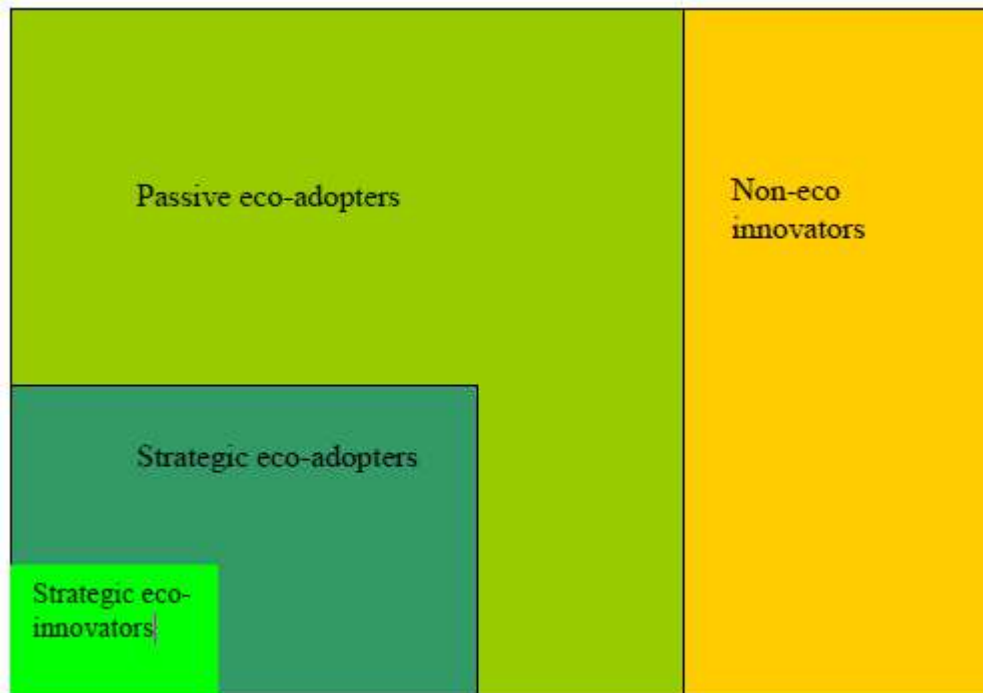
The eco-industry (or environmental goods and services sectors as it is also called) may be measured on the basis of environmental protection measures or on the basis of sales, or a combination thereof. Whatever method is used, it is important to note that eco-innovation occurs in the whole economy: any company adopting a good, service, production process management or business method with environmental benefit is an eco-innovator. In this respect, it appears useful to distinguish between different types of eco-innovators.

### **Different types of eco-innovators.**

Here we could follow the suggestion of Bruce Tether in the UK and Anthony Arundel and Hugo Hollanders at UNU-MERIT to assign all innovative firms to one of four mutually exclusive categories, depending on how each firm innovates (by developing innovations for other firms, adopting innovations developed elsewhere in a strategic or passive way). Following this logic, eco-innovators could be classified in one and only one category on the basis of how they introduce environmental innovations. For instance:

- Strategic eco-innovators: active in eco equipment & services sectors, develop eco-innovations for sale to other firms.
- Strategic eco-adopters: intentionally implement eco-innovations, either developed in-house, acquired from other firms, or both.
- Passive eco-innovators: process, organisational, product innovations etc. That result in environmental benefits, but where there is no specific strategy to ecoinnovate.
- Non eco innovators: No activities for either intentional or unintended innovations with environmental benefits.

Possible distribution of firms according to eco-activities



### Typology of eco-innovation

Keeping in with the view that any innovation that offers environmental benefits compared to relevant alternatives is to be viewed an eco-innovation we developed the following classification for eco-innovation.

#### A. Environmental technologies

- Pollution control technologies including waste water treatment technologies. Cleaning technologies that treat pollution released into the environment;
- Cleaner process technologies: new manufacturing processes that are less polluting and/or more resource efficient than relevant alternatives;
- Waste management equipment;
- Environmental monitoring and instrumentation;
- Green energy technologies;
- Water supply;
- Noise and vibration control.

B. Organisational innovation for the environment: the introduction of organisational methods and management systems for dealing with environmental issues in production and products. A finer classification is:

- Pollution prevention schemes: aimed at prevention of pollution through input substitution, more efficient operation of processes and small changes to production plants (avoiding or stopping leakages and the like);
- Environmental management and auditing systems: formal systems of environmental management involving measurement, reporting and responsibilities for dealing with issues of material use, energy, water and waste (EMAS and ISO 14001 are examples);
- Chain management: cooperation between companies so as to close material loops and to avoid environmental damage across the value chain (from cradle to grave).

C. Product and service innovation offering environmental benefits: new or environmentally improved products and environmentally beneficial services

- New or environmentally improved material products (goods) including ecohouses and buildings;
- Green financial products (such as eco-leases or climate mortgages);
- Environmental services: solid and hazardous waste management, water and waste water management, environmental consulting, testing and engineering, other testing and analytical services;
- Services that are less pollution and resource intensive (car sharing is an example).

D. Green system innovations

- Alternative systems of production and consumption that are more environmentally benign than existing systems: biological agriculture and a renewables-based energy system are examples.

New materials such as lightweight composite materials could be an additional category. They could also be subsumed under product innovations.

### **Methods for measuring eco-innovation**

MEI investigated the usefulness of 3 methods for measuring eco-innovation

- Survey analysis
- Patent analysis
- Digital and documentary source analysis

### **Survey analysis**

Survey analysis is an important method for monitoring and understanding innovation. The results of the Community Innovation Survey (CIS) have provided us with a much better idea of innovation activities in Europe. While the CIS has provided researchers with extremely valuable information, unfortunately it provides little information about eco-innovation. At the moment environmental issues are not specifically and separately addressed by the CIS. In CIS6 they are addressed together with health and safety issues in question 7.1. CIS also has a question about whether the innovation helped to meet regulation and also asks about process-related effects in terms of reduction in the use of material and energy for new innovations (adopted in the last 3

years). There are, however, no questions on waste and pollution. In MEI we examined the possibilities of studying eco-innovation through survey analysis, with special attention to the CIS. We will report here the main findings (as relayed in the report of Horbach and Rennings and the workshop on survey analysis). Questions and additional information for the respondent firms in surveys, have to be simple and short. Therefore, a not overly detailed classification of eco-innovation has to be applied. It seems useful here to consider the distinction between technical, presentational and organisational innovations of the OECD Guidelines for Collecting and Interpreting Technological Innovation Data (OECD, 2005). Technical innovations are divided into product and process innovations:

- Process innovations occur when a given amount of output (goods, services) can be produced with less input;
- Product innovations require improvements to existing goods (or services) or the development of new goods. Product innovations in machinery in one firm are often process innovations in another firm;
- Presentational innovations refer to the implementation of new design and marketing methods in order to increase firms' sales;
- Organisational innovations include new forms of management, e.g. total quality management.

According to MEI researchers Jens Horbach and Klaus Rennings, the analysis of eco innovation within surveys cannot be restricted to a simple identification of the different innovation activities of the questioned firms. In particular the development of political measures to promote eco-innovation requires a profound knowledge of the drivers and barriers and also, if possible, of the economic and ecological impacts of eco-innovation. One major problem of surveys in general is that there are normally only few possibilities to link survey data with official statistics or other survey data. Therefore, the survey itself has to provide information on the relevant control variables such as the influence of different policy instruments. Combining theoretical assumptions with evidence from past surveys, an optimal set of survey questions was identified, both for the determinants and for the control variables for eco-innovations.

#### Determinants (drivers and barriers) of eco-innovation

- Inputs: financial and human resources, R&D expenditure supporting the technological capabilities of a firm;
- Environmental policy framework (e.g. regulatory stringency, different environmental policy instruments such as technology-based standards, emission taxes or liability for environmental damages);
- Existence of environmental management systems, practices and tools;
- Demand pull hypothesis: expected market demand, profit situation in the past;
- Appropriation problem: competition situation (e.g. number of competitors, concentration of the market), innovation cooperation;
- Influence of stakeholders and motivations for environmental innovation (e.g. public authorities, pressure groups such as industry or trade associations);
- Availability of risk capital;
- Availability of high-skilled labour force.

#### Control variables and impacts

- Firm-level attributes (sector, size, stock market listing, employment, value of shipments);
- Commercial conditions (scope of the firms' markets, competition, sales, profitability);

- Environmental impacts of the facilities' products and production processes by different environmental fields (importance of each impact and change in impacts during the last three years).

## **Patent analysis**

A patent is an exclusive right to exploit (make, use, sell, or import) an invention over a limited period of time (20 years from filing) within the country where the application is made. Patents are granted for *inventions* which are *novel*, *inventive* (non-obvious) and have an *industrial application* (useful). The right embedded in the patent can be assigned by the inventor to somebody else, usually to his/her employer, a corporation, and/or sold to or licensed for use by somebody else; this right can be enforced only by the potential threat of or an actual suit in the courts for infringement damages (OECD, 2004). The standard of novelty and utility imposed on the granting of such a right is not very high. In Europe, the European Patent Office (EPO) grants about 70% of the patent applications. In the US, more than 80% of the patents applications are granted.

The measurement of technological innovation has long preoccupied economists. R&D and patent data have emerged as relevant indicators of the innovativeness of an economy. R&D expenditures provide an *input* measure of innovative activity, while patent data are considered an *output* indicator. For innovation research, the main advantage of patents is that they are publicly available for rather long time series and provide detailed technological information. The long time series make patents unique among innovation indicators. Using patent data, it is possible for researchers to collect data in highly disaggregated forms and to subject this to statistical analysis. The cost of processing patent data is also lower than the cost of survey-based data. As a measure of invention patents have a close (if not perfect) link to technical invention. Over the last two centuries, there are very few examples of major technical inventions that were not patented. Patents cover a broad range of techniques, extending now to biotechnology and software, with first extensions towards service related inventions (so-called "business methods"). Invention is, of course, not the same as innovation. The use of patent data enables researchers to study and to assess different features of innovative processes. On the basis of the huge literature on patents, we can emphasize five attributes of innovative activities that can be evaluated through patent data.

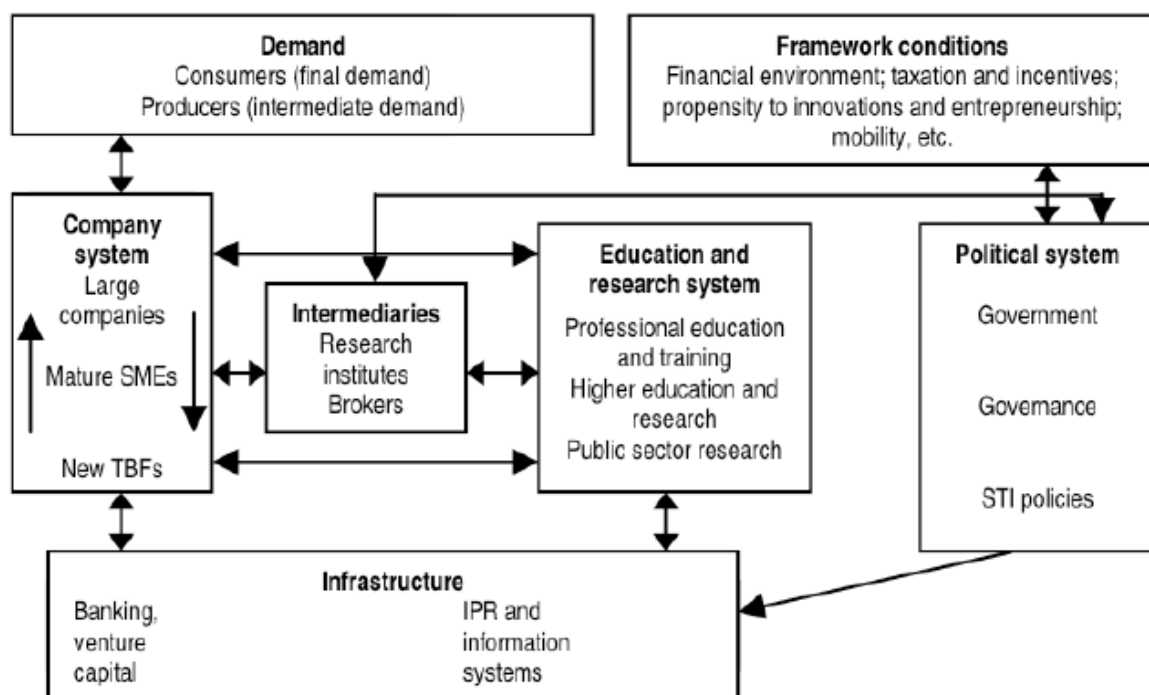
## **National Innovation System**

The concept of "National Innovation Systems" (NIS) was developed during the 1990s and is an attempt to expand the ideas of innovation models from typically linear structures to a more integrated and interactive innovation systems conceptual framework. Work towards this more strategic concept of innovation was carried out by the OECD under the National Innovation Systems project and was concluded with the paper 'Dynamising National Innovation Systems' (Remøe et al. 2002). A subsequent project entitled "MONIT" (monitoring and implementing national innovation policies) attempts to guide implementation of this previous work into national government policy (Remøe et al. 2005).

## Scope of NIS

The NIS approach is, similar to the previous strand, focused on the firm or enterprise level and its interactions throughout the system. The approach is primarily focussed on technological innovation, which should be viewed as analogous to TPP innovation referred to in the previous chapter. However, brief consideration is given to the increasing evidence of the importance of organisational and marketing (referred to as “branding”) innovations. The transformation of the telecommunications firm Nokia is cited as an example of organisational and branding innovation.

A generic model of national innovation systems is presented in Arnold & Kuhlman (Arnold, Kuhlman 2001) and presented here in Figure



This generic conceptual model of innovation can be summarised as:

- Clusters of innovative entities;
- The interactions between these innovative entities; and
- The framework conditions within which these entities operate.

The idea of the conditions creating successful clusters is also visited within the NIS literature and this can be seen as being part of the framework conditions itemised within the generic model in Figure 7 and as common to many of the innovation conceptualisations covered in this review. The concept of clusters of innovative entities involves an inherent dependence on interactions and these interactions are central to the goals of NIS (i.e. to generate a non-linear model of innovation). The interactions considered here are summarised as including three basic ideas:

- **Competition**, creating incentives for innovation through rivalry between innovating firms;



- **Transaction**, representing traded knowledge between actors including tacit and technology embodied knowledge;
- **Networking**, or knowledge transfer through collaboration, co-operation and long term networking arrangements.

### **The Innovative Capacity Index**

This index is the sum of the four sub-indices detailed above and is intended as the definitive measure for comparison of innovative capacity across countries. By comparing the overall standing in this index with the various sub-indices it is possible to see areas where a sub-index for a country outperforms the final innovation capacity index, possibly suggesting inefficiency within that sub-index. Conversely, it may be possible to observe a sub-index that underperforms against the final index rank, possibly suggesting an area for improvement or an area of high efficiency.

### **The Technological Innovation System (TIS) approach**

This approach has been developed by several researchers in Sweden and the Netherlands (Bergek, Jacobsson and Hekkert), with the aim of improving on “systems” style analysis of the innovation process. Innovation theories focusing on the structure of innovation systems have, it is claimed, proved insufficient in informing the study of the innovation process (Hekkert et al. 2007). As such, this approach attempts to analyse innovation systems by assessing what are termed “functions of the innovation system”, a term given to certain processes deemed important to the success of an innovation system. It is mentioned that this approach can be considered a form of history event analysis.

### **Scope of TIS**

The scope of this approach is focused on technological innovations and using these innovations as a reference point rather than the firm or enterprise, as is common in other innovation systems approaches. The approach is also defined with reference to the scope of other system scopes, overlapping sectoral and national system scopes. This approach also expresses an explicit interest in environment specific innovations policy, as in Hekkert *et al* (2007) and their consideration of ‘market formation’ as a function of the innovation system. This is not expressed explicitly in any definition of the approach or its intentions within this document but is clear in the details of the paper. Hekkert *et al* (2007) created a list of seven functions which they propose as suitable for the purposes of describing and analysing technological innovation systems. The proposed functions are as follows:

- **Entrepreneurial activities.** This is noted as a primary indicator of the performance of an innovation system. As such, it is in part a function of the other six functions. It is also highlighted that active entrepreneurs have a significant influence in shaping the innovation system. The following indicators are suggested in order to measure this function:
  - The number of new entrants
  - The number of diversification activities of incumbent actors
  - The number of experiments with the new technology

• **Knowledge Development.** This function includes “learning by searching” and “learning by doing” and represents the heart of the innovation process (the knowledge economy). Three indicators for this function are suggested:

- Number of R&D projects over time
- Number of patents over time
- Investment in R&D over time

• **Knowledge Diffusion.** This function is a common concept throughout various innovation system theories. The speed and proliferation of knowledge transfer is of significant importance to the health of an innovation system. The following two indicators are suggested:

- Number of workshops and conferences devoted to a specific technology topic
- Size and intensity of network related to specific technology over time

• **Guidance of the Search.** The force guiding investment in certain aspects of the development of new technology. This is of importance due to the limited resources often associated with the development of new technologies. Any actor within the system can create this guiding force, although most commonly it is exerted through market forces and legislative/economic influence. Suggested indicators are:

- Success achieving government or industry designed targets for use of a specific new technology
- Number of articles on the future development of a new technology
- Ratio of positive to negative articles regarding expectation of future technology development

• **Market Formation.** Through the observation that most new technologies are poorly prepared to compete within their relevant markets, it is noted that the formation of niche markets or manipulation of market conditions through economic instruments is important for the successful development of a new technology. Certain examples of this process in practice are given, including the tax incentives for renewable energy technology in Holland or the tax exemption on biofuels implemented in Germany. Suggested indicators are:

- Number of niche markets introduced
- Number of specific tax regimes for new technologies
- Number of new environmental standards that improve chances for new technology

# **Planning for Sustainable Development**

## **Unit-IV**

### **Theories of Sustainable Development**

#### **Introduction on Theories of Sustainable Development:**

Four major theories are identified, i.e. Corporate Social Responsibility, Stakeholder Theory, Corporate Sustainability, and Green Economics. Currently various innovative approaches and new theories emerged, such as Co-evolution Theory and Multi-level Perspective, reflecting three directions of theory development, namely 1) shifting from “what” to “how”, 2) growing use of interdisciplinary approach, and 3) towards broader systems. Renewable energy studies associated with firms and future research opportunities in this area are also critically analysed. The comprehensive review provides a useful reference for policy makers, corporate managers and researchers interested in corporate sustainability and renewable energy related studies.

#### **The present practice of corporate social responsibility (CSR) has been depicted and informed by three CSR theories:**

The stakeholder theory of CSR.

The business ethics theory of CSR.

And the shareholder value theory of CSR.

#### **Environmental Management System (EMS):**

All the organizations have some form of hierarchical structure comprising different departments like finances, personal management, sales and marketing, etc. The organization structure forms the framework for the efficient functioning of these departments. If the structure and functions are clearly defined, these departments will function in the systematic manner envisaged for them. Environmental management system help in integrating environmental consciousness in to the structure and function of an organization. The organization may be connected to the environment by its land, location, function, emissions, products, consumption of the natural resources and utilisation of the available energy sources. Proper planning

right from the inception of a venture can go a long way in preventing many environmental problems. Several standardised assessments are available which will help in doing this in the best possible way. EMS also helps in evaluating the functions and products of existing units and allows proper guidance to be given for modification of unhealthy procedures, products and processes at any level of operation. An efficient environmental management system also facilitates the easy implementation of voluntary standards such as ISO 14000 which are becoming mandatory in several countries. Thus EMS is of great importance to organizations which give prime importance to environment and sustainability.

### **Environmental Impact Assessment (EIA):**

A considerable number of resources development projects like dams, nuclear power plants, highways were commissioned during post second world war period. Till 1970s all these developments were made based solely on profit motive and feasibility. But in early 1970s, worldwide discussion on the environmental consequences of such development policies. So there was often a lot of perplexity about proposed development activities. In order to give clear answers about the environmental impact of each project, a systematic approach was required. For the health and well-being of the society, the unwelcome consequences of development proposals were rigorously discussed at all levels. Environmental impact analysis is actually a tool for doing this. The block diagram will give an idea of evolution of EIA.

As the name suggests, EIA assesses the impact of a project on the environment and helps in decision making for finding alternatives. So EIA can be considered as a tool for sustainability. Though there is no idea definition for EIA accepted universally, the different definitions coined during the early stages.

In order to conduct an EIA, there are many different models, guidelines and methods. In an EIA, process the key objective is to evaluate the impact of any project, extension or proposal on the environment. The procedure includes preparing handbooks, guidelines and manuals for the assessment process and system, questionnaire to the public, quantifying effects by setting

indicators, etc. Though the standard methods and procedures are well-defined, the lack of proper conclusions and comments result in incomplete implementation of the proposals in certain countries. In countries like Indonesia and srilanka, where EIA is a part of legislation or a compulsory for the major projects like mining, thermal power plants, hydro-power plants, ports and harbours, greenfield air ports, etc. for all these cases, there will be assessment by experts and a public hearing.

### **EIA in India:**

Since we Indians have a culture of living in harmony with nature, we have, as a society, been conscious about environmental problems. The EIA process has found a place in legislation since the 1980s. the stemmed from the protest against a proposed project of the kerala state electricity board (KSEB)- a 130 m high dam across kuntippuzha river in palakkad district. The project would severely affected the biodiversity in silent valley, an adjoining area which was later declared a national park. The conditions and need for conducting EIA were clearly notified by ministry of environment and forest (MoEF) in 1994. By referring schedule-I of EIA notification we can find 29 items for which EIA and environmental clearance (EC) is mandatory. Later in 2004 three more items are also added and total number became 32.

### **EIA Process in India:**

For EIA in india, we have three frameworks- statutory, administrative and procedural.

#### **(a) Statutory framework:**

There are many government bodies and agencies for controlling pollution and protecting the environment. In addition, there is also the ministry of environment and forest, central pollution control board and state pollution control boards. All these bodies are responsible for the implementation of relevant legislation in india. The structure of the statutory bodies are firm and effective.

### **(b) Administrative framework:**

The MoEF and CPCB (Central Pollution Control Board) conduct impact assessments at the national level. And state pollution control board (SPCB) and state departments of Environment (DoE) works for the assessment at the province level.

### **(c) Procedural framework:**

Before starting a project or industry, No objection certificates (NOCs) must be obtained from concerned agencies like departments of environment (DoEs) and state pollution board. The NOCs may vary depending on the site of the project, nearness to airport, nearness to forests and so on. Certificates from competent authorities are to be collected and submitted along with application to the MoEF.

Under these three frameworks, there are three basic steps-

- (i) Preparation of the EIA report till documentation and public hearing
- (ii) review and decision-making and
- (iii) post project monitoring.

### **Societal Theories in sustainable development:**

Transformative **social development** must also support the transition to **sustainable** production and consumption, and be accompanied by change in economic structures and relations—to enhance productivity in an environmentally sound manner, and ensure equitable distribution of its benefits.

Section-1 introduces the discursive and policy changes or innovations that characterize the contemporary “social turn”, a shift in ideas and policies that has reasserted social dimensions in development agendas since the World Summit for Social Development in Copenhagen in 1995, but often failed to support more transformative social change that addresses root causes of poverty, inequality and unsustainable practices

Section-2 presents the conceptual framework used in the report and identifies types of innovations that are potential drivers of change processes, and potential pitfalls in these processes.

Section-3 sets the scene for the analysis in the subsequent chapters by shedding light on the contextual factors that will shape policy space for the implementation of the Sustainable Development Goals (SDGs) in the coming years.

Section-4 The last section presents the policy areas discussed in the report: those with cross-cutting impacts and multiplier effects for the achievement of all SDGs.

### **Section-1 Introduction:**

In September 2015, the international community agreed on the 2030 Agenda for Sustainable Development that will guide development policy and practice at national, regional and global levels for the coming 15 years. The Sustainable Development Goals (SDGs) follow the Millennium Development Goals (MDGs), which successfully mobilized efforts around poverty reduction and social development, but also had shortcomings. Overcoming these by forging a universal agenda that will “leave no one behind” is the ambition of the 2015 agreement and the SDGs. The more inclusive process of formulating and negotiating the goals not only resulted in a more comprehensive development vision, but also laid the foundation for more inclusive implementation and monitoring processes.

“Transforming our world”, as the 2030 Agenda is titled, is a far more challenging task than business as usual and goes well beyond the narrower focus of the MDGs. Transformation requires attacking the root causes that generate and reproduce economic, social, political and environmental problems and inequities, not merely their symptoms.

### **How UNRISD defines social development:**

Social development is a process of change that leads to improvements in human well-being and social relations that are equitable and compatible with principles of democratic governance and justice. It includes material achievements, such as good health and education; sustainable access to the resources, goods and services necessary for decent living in a viable environment; social and cultural attributes, such as a sense of dignity,

security and the ability to be recognized as part of a community; and political achievements related to agency, participation and representation.

Transformative social development must involve changes in social structures, institutions and relations, including patterns of stratification related to class, gender, ethnicity, religion or location that may lock people (whether current or future generations) into positions of disadvantage or constrain their choices and agency. Transformative social development must also support the transition to sustainable production and consumption, and be accompanied by change in economic structures and relations—to enhance productivity in an environmentally sound manner, and ensure equitable distribution of its benefits.

The achievement of desirable development outcomes through just and participatory processes is ultimately a political project at the core of which lie power configurations at the household, local, national, regional and global levels. Social change inevitably involves contestation of ideas and interests between different groups, and requires the redistribution of resources and entitlements, and improvements in the institutions of governance that manage collective concerns at different levels.

## **Section-2 The Social Turn, Innovations and Transformative Change:**

Underpinning this “social turn”—a combination of shifts in ideas and policies that has reasserted social issues in development agendas in the postCopenhagen era (since the World Summit for Social Development in Copenhagen in 1995)—is a critique of the trickle-down assumptions that link liberalization to a virtuous circle of growth, employment generation and poverty reduction, and of the notion that the key social function of governments should be restricted to the provision of safety nets. Since the turn of the millennium in particular, there is growing recognition of the need for a more proactive approach to eradicate poverty, reduce inequality and protect people against the vagaries of market economies, and social risks associated with the lifecycle from childhood to old age, including sickness and disability.



In practice, bringing the social more prominently into development in the last two decades has, however, frequently meant continuing with variations of residual approaches, while the integration of social perspectives into mainstream development strategies has often been an after-thought. Palliative, patchwork and ad hoc interventions to mitigate social costs of economic policy have done little against the drivers of social exclusion and economic stagnation: far from being transformative, they have reproduced the problems they were meant to address. Early manifestations of this approach that would not openly question orthodox economic recipes and unequal power relations were the Poverty Reduction Strategy Papers (PRSP) promoted by the World Bank, and the implementation in numerous developing countries of conditional cash transfer programmes (CCTs) or public works programmes and public-private partnerships in the social sectors.

### **Sustainable Development Goals:**

GOAL 1. End poverty in all its forms everywhere

GOAL 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

GOAL 3. Ensure healthy lives and promote well-being for all at all ages

GOAL 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

GOAL 5. Achieve gender equality and empower all women and girls

GOAL 6. Ensure availability and sustainable management of water and sanitation for all

GOAL 7. Ensure access to affordable, reliable, sustainable and modern energy for all

GOAL 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

GOAL 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

GOAL 10. Reduce inequality within and among countries

GOAL 11. Make cities and human settlements inclusive, safe, resilient and sustainable

GOAL 12. Ensure sustainable consumption and production patterns

GOAL 13. Take urgent action to combat climate change and its impacts

GOAL 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

GOAL 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

GOAL 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

GOAL 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

### **Transformative change encounters obstacles**

The transformative potential of reforms and innovations is, however, often not realized. The sooner obstacles are identified and addressed, the more likely are transformative processes and outcomes. Transformative change can be undermined or hindered when:

- ✓ innovations in one sphere, for example, introduction or expansion of social protection programmes, is realized without the corresponding changes in power relations and without expanding economic opportunities in harmony with environmental sustainability;
- ✓ changes in policy rhetoric or intentions are not applied in practice, or are translated into cosmetic reform;
- ✓ policy “incoherence” prevails—that is, policy initiatives in one field are contradicted by those in another (for example, the social or environmental effects of macroeconomic or other policies, or lack of progressive funding structures underpinning a new social contract);
- ✓ progressive ideas and institutional reforms are captured by special interests or bolted on to business as usual;

- ✓ calls for new partnerships forgo opportunities to be truly synergistic and transformative and instead reproduce and reinforce asymmetric power;
- ✓ conservative gender norms are pervasive, preventing the positive effects of innovations associated with women's well-being and gender equity; and
- ✓ social or governance innovations are not sustained.

### **Section-3 Crises and Opportunities: The Context for Implementation:**

The multiple objectives to be fulfilled through the 2030 Agenda speak directly to the global challenges of our time: poverty and hunger; climate change; unsustainable growth and economic crises; migration, flight and displacement; health epidemics; inequality; social exclusion; lack of decent work and social protection; as well as political instability, insecurity and violent conflicts.

There are also opportunities emerging in the current context that could impact positively on transformative change. One is to seize the momentum of the 2030 Agenda to raise awareness and forge the alliances that will be needed to drive implementation at the national, regional and global levels. Others arise from the wider range of global initiatives and partnerships that aim to support Changes in policy rhetoric or intentions may not be applied in practice or may translate into cosmetic reform 41 progressive change at the national level, from the recommendation on National Social Protection Floors to the Paris Agreement on climate change. And finally, there are the manifold opportunities arising at the local and grassroots levels, which have the potential to support a change in the direction of the global development model toward promoting more cohesive and sustainable societies.

### **Section-4 Transformative Change and the 2030 Agenda in a Shifting Global Context: From Innovation to Implementation:**

To realize the transformative promise of the 2030 Agenda and the SDGs in a challenging global context, it is not enough to integrate the 169 development indicators into national strategies and periodically report on progress, as daunting as this task itself might appear. Addressing the root causes of

poverty, hunger, inequality, climate change and unsustainable practices will require different types of innovations in conceptual approaches, policies, institutions and social relations, overcoming policy silos by working at the intersections between the three pillars of the agenda by integrating the economic, the social and the environmental objectives in a rebalanced way. It will also require moving from declarations of intent toward implementation by designing appropriate policies and institutions, leveraging the political will and consensus as well as the financial and administrative means to implement them. It will require multiple actions from the top down and the bottom up, involving all members of society. At each step, from innovating to integrating and implementing, the nature of the political process in terms of inclusiveness, transparency and accountability will be crucial. As much as the outcomes, the processes related to the implementation of the SDGs will be the litmus test of the very principles of universalism and human rights inherent in the 2030 Agenda. In this sense, the agenda cannot reach its full potential without transformative change as defined in this report.

### **Institutional Theory:**

The study field of institutions and institutionalism is quite complex, encompassing theories, concepts, and tools that can be applied in various ways related to sustainable development. At the same time, sustainable development is not uniquely defined and can imply a range of policy, normative, or resource use issues at various scales. Therefore, institutions and their change over time can be analyzed with regard to specific topics on sustainable development such as institutional reforms, learning, institutional interplay, and appropriate designs. Often, institutional designs and institutional change are useful approaches for investigating unsustainability in economic development (Opschoor 1996). This happens when institutions are understood as a structuring element of human–nature relationships, and institutional change is used to redirect institutional failures during the development process. Here, the institutional failures and rigidity explain why one-sided development processes can cause environmental degradation and unsustainable outcomes. However, the terms and metaphors to explain

sustainability failures or successes depend largely on the type of institutional theory used for the analysis. Depending on the branch of institutionalism and the understanding of institutions used, different theories offer different drivers, categorizations, and consequences of institutional change and what this means for sustainable development. According to Wegerich (2001), one can differentiate the theories of new institutional economics by determining whether they see change as demand- or supply-induced. Demand-induced institutional change represents a bottom-up approach which can be related to changes in prices, technologies, environmental issues, or demographics. For example, sustainable development patterns can be seen as driven by ecological innovations or technological change resulting in new economic reality. In contrast, supply-induced changes occur in a top-down approach, or as a result of a change in the environment of an institution. Such a change can happen because of certain opportunities or important events or in relation to pressures from elites. In this regard, political parties, protest movements (e.g., Green movements), or a major environmental disaster can result in a shift toward sustainability. Thelen (2009) explained institutional change in advanced political economies. She highlighted the fact that the debate between “agency” and “structure” as drivers of change is a recurrent and unsolved theme in institutional change theories. The two drivers coexist and result in different types of changes that can affect institutional governing issues such as those related to sustainable development. She highlighted four types of institutional change depending on the characterization of the change process as incremental or abrupt, and the result of change as continuity or discontinuity. These four types are reproduction by adaptation (incremental continuity), survival and return (abrupt continuity), gradual transformation (incremental discontinuity), and breakdown and replacement (abrupt discontinuity). This conceptualization can be used to characterize the specific trajectory of sustainable development in a certain country and region. Overall, the understanding of the concept of institutions as applied in any institutional theory is instrumental for empirical analysis of the institutions’ influence, and for postulating the causality in institutional change and its effects on

sustainable development. This chapter illustrates this by introducing understandings of institutional change, theories, and common applications to sustainable development issues. In this context, related concepts such as institutional or organizational learning are briefly explained and related to sustainable development. Some examples of the impacts of sustainable development on institutional change in different fields are presented with a focus on the higher education sector.

# **Planning for Sustainable Development**

## **Unit-V**

### **Governance and Policy Response**

#### **Introduction on Governance and Policy Response:**

**Governance:** It has been defined as the rules of the political system to solve conflicts between actors and adopt decision (legality). It has also been used to describe the "proper functioning of institutions and their acceptance by the public" (legitimacy).

**Example of governance:** It is defined as the decisions and actions of the people who run a school, nation, city or business. An example of governance is the mayor's decision to increase the police force in response to burglaries.

**Purpose of governance:** It is the action of governing an organisation by using and regulating influence to direct and control the actions and affairs of management and others. It is the exclusive responsibility of the 'governing body', the person, or group accountable for the performance and conformance of the organisation.

#### **Benefits of good corporate governance and examples**

- ✓ Encouraging positive behaviour. ...
- ✓ Reducing the cost of capital. ...
- ✓ Improving top-level decision-making. ...
- ✓ Assuring internal controls. ...
- ✓ Enabling better strategic planning. ...
- ✓ Attracting talented directors.

**Policy Response:** A Critical Engagement. ... We adopt a "critical postmodern perspective" (Nudzor, 2009) on the implementation of policy, viewing policy as both an attempt to solve problems and an attempt to persuade social actors to subscribe to particular beliefs that delineate action.

**Public Policy:** It can be best defined as that these are the actions that the government takes to respond to a public problem. It is a project which is designed by a state through public administration and government in order to satisfy the basic or specific needs of the people of the society.

**Sustainable development policy:** Sustainable Development is a globally accepted approach to sustaining economic growth without harming our planet or exhausting its resources while improving the quality of life for its current and future inhabitants.

**Sustainability policy:** Sustainability is the capability to equitably meet the vital human needs of the present without compromising the ability of future generations to meet their own needs by preserving and protecting the area's ecosystems and natural resources.

**Challenges of sustainable development:** The main challenges to sustainable development which are global in character include poverty and exclusion, unemployment, climate change, conflict and humanitarian aid, building peaceful and inclusive societies, building strong institutions of governance, and supporting the rule of law.

### **Sustainable Cities:**

From 2007 onwards 50 percent of the world population is living in urban areas. The extrapolated population living in cities may reach 70 percent by 2050. The concentration of a large number of people is expected produce economic growth and social development as the accessibility to all amenities will be more compared to rural areas. Also necessities like electricity, water supply, educational institution and other services are more available in cities. But the most difficult part is the expansion of these facilities in tune with the population increase. Also, pollution rates and waste disposal issues are more of 'city' varies from country to country depending on the population has maximum consumption of fuels, utilisation of natural resources and more degradation of the resources.

The concept of sustainable city is necessary for the future, since urbanisation is a fast growing trend in the world. There are four pillars of sustainability:



1. Social development
2. Economic development
3. Environmental Management
4. Urban governance

In the first pillar. i.e., social development supports the major concerns of education and health for all. Food and nutrition with good recreation facilities and community support is necessary for a sustainable city.

Economic development, which is a main factor, is the second pillar. It deals with green productive growth, creation of decent employment, production and distribution of renewable energy and research and development.

Environmental management is an important pillar which forms the basis of sustainability. Waste management, forest and soil conservation, energy efficiency systems, air and water quality management.

High density of population necessitates efficient urban governance. Planning and decentralisation is imperative to the establishment and maintenance of a sustainable city.

### **Sustainable Transport:**

According to black, the definition of sustainable transport is “transport that meets current transport and mobility needs without compromising the ability of future generations to meet these needs”. Where the capital includes human capital, monetary capital and natural capital.

Transportation systems give rise to the following issues:

1. The combustion of fossil fuels cause air pollution and GHG emissions which exacerbates environmental ills like climate change and global warming.
2. If the fuels and energy sources used are non-renewable, there is the possibility that they will get exhausted.
3. Unsustainable transportation methodologies cause traffic bottle necks due to the unforeseen increase in motorised vehicles plying the roads.
4. Safety of pedestrians, physically challenged and users of non-motorised vehicles cannot be ensured.

5. The development of roads is not at par with huge increase in vehicle population.

In order to address the above issues, the following solutions must be taken into consideration:

1. Need of good planning for sustainability. On the roads, priority must be given to pedestrians, cyclists, public transport usage.
2. The street also must be provided with car free zones giving priority to pedestrians and non – motorised vehicles. Cars must be used only when there is sufficient number of travellers.
3. The vehicles which use alternative energy sources are to be promoted for the sake of environment.
4. The public transport system must be efficient. There should be well-designed vehicles which use hybrid energy principles. The public transport vehicles should be maintained properly.
5. Taxes and charges must be imposed on private motor vehicles in order to promote public transport system.
6. Offices and other institutions must be located as close to each other as possible and thus movements of people can be optimised.

### **Sustainable Pavements:**

In modern cities, drainage is becoming a problem since the old pipe line methods are insufficient. Due to blockage, they might not function properly. If permeable pavement systems are used, water management can be done effectively. Also pavements help people to walk or park vehicles. Sustainable pavements allows water to penetrate to the soil in a natural way. The common applications of pavement systems are as follows:

1. Vehicular access: Residential driveways, service and access driveways, road shoulders, crossovers, fire lanes and utility access.
2. Slope stabilisation and erosion control.
3. Golf courses
4. Parking (Church, employee, overflow and event)

5. Pedestrian access

6. Bicycle

7. Land irrigation

Permeable pavements and porous pavements are the two types of pavements in this class. The storm water retention and infiltration of the runoff water happens very effectively without any separate system. Thus there is energy conservation and also increase in the ground water. A sort of water treatment also takes place, while storm water passes through the pavement.

#### *Advantages of the system*

1. The pavement units can be made of waste materials.

2. Less time requirement for the pavement.

3. Less energy is only required in manufacturing

4. The quantity of water replenishing the ground water will increase.

5. Self-cleaning of water will take place.

6. Can be easily recycled or reused.

### **Governance for Sustainable development:**

The full realization of the Sustainable Development Goals and other internationally agreed development objectives strongly depends on a common understanding of the basic principles of effective governance for sustainable development. On 2 July 2018, the UN Economic and Social Committee endorsed a set of 11 principles prepared by the UN Committee of Experts on Public Administration (CEPA) and UN DESA. This is an important starting point: without such guiding principles, implementation of the SDGs risks being inconsistent and ineffective.

The 11 basic principles should clarify the governance agenda, taking into account different governance structures, national realities, capacities and levels of development and respecting national policies and priorities. They have been developed to help interested countries, on a voluntary basis, build effective, accountable and inclusive institutions at all levels, with a view to achieving the shared vision for the people and the planet embodied in the

2030 Agenda for Sustainable Development. As basic principles, they apply to all public institutions, including the administration of executive and legislative organs, the security and justice sectors, independent constitutional bodies and State corporations. The principles are given depth and made operational through a selection of commonly used strategies and related practices, which are an integral and evolving part of this work.

Operationalizing the principles and undertaking related strategic actions that are known to be effective in particular contexts is essential to taking the work on principles to the next level. To be helpful, associated practices will need to be clearly relevant, feasible to implement, and based on sufficient empirical evidence of their impact on the achievement of the targets of the Sustainable Development Goals. To that end, it would be important to define criteria and mechanisms for evaluating the strength of the evidence of impact, together with other experts, and ensure that practices are well defined and actionable in different contexts, while allowing space for experimentation. This will be a key priority of CEPA while preparing its 18th session to be held in April 2019. Meanwhile we hope that the 11 principles, presented below, will already now be used to guide SDG implementation. Each principle is followed by examples of commonly used strategies.

The first three principles focus on **effectiveness**.

### 1. **Competence**

To perform their functions effectively, institutions are to have sufficient expertise, resources and tools to deal adequately with the mandates under their authority. Commonly used strategies include promotion of a professional public sector workforce, strategic human resources management, leadership development and training of civil servants, performance management, results-based management, financial management and control, efficient and fair revenue administration, and investment in e-government.

### 2. **Sound policymaking**

To achieve their intended results, public policies are to be coherent with one another and founded on true or well-established grounds, in full accordance with fact, reason and good sense. This regards strategic planning and foresight, regulatory impact analysis, promotion of coherent policymaking, strengthening national statistical systems, monitoring and evaluation systems, science-policy interface, risk management frameworks, and data sharing.

### 3. **Collaboration**

To address problems of common interest, institutions at all levels of government and in all sectors should work together and jointly with non-State actors towards the same end, purpose and effect. This includes centre of government coordination under the Head of State or Government, and collaboration, coordination, integration and dialogue across levels of government and functional areas.

Three more principles address **accountability**:

### 4. **Integrity**

To serve in the public interest, civil servants are to discharge their official duties honestly, fairly and in a manner consistent with soundness of moral principle. This is about promotion of anti-corruption policies, practices and bodies, codes of conduct for public officials, competitive public procurement, elimination of bribery and trading in influence, conflict of interest policies, whistle-blower protection, and provision of adequate remuneration and equitable pay scales for public servants

### 5. **Transparency**

To ensure accountability and enable public scrutiny, institutions are to be open and candid in the execution of their functions and promote access to information, subject only to the specific and limited exceptions as are provided by law. Examples are proactive disclosure of information, budget

transparency, open government data, registries of beneficial ownership, and lobby registries.

## 6. **Independent oversight**

To retain trust in government, oversight agencies are to act according to strictly professional considerations and apart from and unaffected by others. This covers promotion of the independence of regulatory agencies, arrangements for review of administrative decisions by courts or other bodies, independent audit, and respect for legality.

Five principles focus on **inclusiveness**:

## 7. **Leaving no one behind**

To ensure that all human beings can fulfil their potential in dignity and equality, public policies are to take into account the needs and aspirations of all segments of society, including the poorest and most vulnerable and those subject to discrimination. This includes promotion of equitable fiscal and monetary policy, promotion of social equity, data disaggregation, and systematic follow-up and review.

## 8. **Non-discrimination**

To respect, protect and promote human rights and fundamental freedoms for all, access to public service is to be provided on general terms of equality, without distinction of any kind as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, disability or other status. Strategies include promotion of public sector workforce diversity, prohibition of discrimination in public service delivery, multilingual service delivery, accessibility standards, cultural audit of institutions, universal birth registration, and gender-responsive budgeting.

## 9. **Participation**

To have an effective State, all significant political groups should be actively involved in matters that directly affect them and have a chance to influence policy. Examples are free and fair election, regulatory process of public consultation, multi-stakeholder forums, participatory budgeting, and community-driven development.

#### 10. **Subsidiarity**

To promote government that is responsive to the needs and aspirations of all people, central authorities should perform only those tasks which cannot be performed effectively at a more intermediate or local level. Examples include fiscal federalism, strengthening urban governance, strengthening municipal finance and local finance systems, enhancement of local capacity for prevention, adaptation and mitigation of external shocks, and multilevel governance.

#### 11. **Intergenerational equity**

To promote prosperity and quality of life for all, institutions should construct administrative acts that balance the short-term needs of today's generation with the longer-term needs of future generations. This includes sustainable development impact assessment, long-term public debt management, long-term territorial planning and spatial development, and ecosystem management.

#### **Policy Responses to Environmental Degradation:**

Environmental degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife. It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable.

Policy responses to environmental degradation have taken three major forms: conservationism, —primary environmental care and monetary cost-benefit approaches. ... In developing countries, however, the effectiveness of conservationism has been limited, while its human costs have not always been adequately recognized.





# **Planning for Sustainable Development**

## **Unit-VI**

### **Research in Sustainable Development**

#### **Introduction on Research in Sustainable Development :**

We research development methods that consider available resources and the environment, along with policies needed to achieve long-term sustainability.

Issues we examine include:

- The role of a finite capacity for the environment in economic and political development
- The intersection between political processes such as democracy, autocracy, and wars and natural resources
- The effects of global warming
- The effects of economic globalization on the environment
- Human behavior and resource use
- Mitigation of and adaptation policy approaches to environmental problems
- Market-based versus political institution-centered approaches sustaining long-run social welfare

#### ***Research in education:***

Sustainability requires permanent deepening of knowledge on processes and their effects. This is only possible if education and training of people themselves is understood as a continuous and sustainable process. On the one hand, the implementation of new technologies, e.g. regarding the protection of climate and resources, requires the rapid diffusion of the demands on and the changes in professional qualifications and skills.

In order to better meet these constant challenges for business education, the BMBF intends to provide funding to develop suitable intercompany training centers (ÜBS) into competence centers (KomZet). These are able to process new technologies and innovative products in an application-

oriented way and to integrate them directly into vocational training and further education. As a kind of link between development and implementation, the resultant competence centers shall have an exemplary effect and shall support the efficient transfer of knowledge to operational practice.

Moreover, a broad research and development programme for lifelong learning is to be launched. Its results will help provide the basis for devising and implementing innovative ideas in those areas where measures cannot currently be implemented due to gaps in research and knowledge. Moreover, basic research in the field of lifelong learning shall be expanded to include the following issues:

- Effects of demographic change on the participation in lifelong learning,
- Effects of educational guidance on the participation in lifelong learning,
- Connection between learning behaviour and didactics,
- Intercultural and intergenerational learning,
- Continuing education in SME,
- Continuing education in the field of high-technology and in key industries.

### **Capacity Development for Innovation:**

To achieve goals including ending poverty, promoting economic growth, creating decent jobs, enhancing health, agricultural development, as well as sustainable urbanization, renewable energy and fighting climate change, innovation and technology are of crucial importance.

(1) Although technology holds much promise in terms of sustainable development, we should not be credulous believers in the power of technology. Technological innovation is essential for sustainable development, but - like digital technology - its transformational potential can be exploited for the benefit or the detriment of ecosystems and societies.

(2) The articles highlight that innovation for sustainable development is not only about making changes to technologies, and that innovation in technologies cannot be separated from socio-economic developments. Innovating for sustainable development must be understood and carried out within this broader context.

(3) Alternative solutions are not necessarily more sustainable than conventional models. In any case, the alternatives do not develop by substitution and the different models are interconnected, they co-evolve and lead to a myriad of unprecedented socio-technical configurations. Alternative models challenge the established models, and lead actors to significantly revise their business models, to rethink the governance of infrastructure, territories and resources.

(4) Clearly, we do not have an eco-innovation machine that can be started at will. Sustainable innovation cannot be imposed arbitrarily, and efforts to drive change face multiple obstacles of a technical, political, financial and economic nature.

(5) While we may be witnessing the collapse of the myth that Northern countries innovate and Southern ones copy, the reality of the geography of innovation is always that of highly concentrated clusters that are mainly located in the North. In developing countries, governments should have a much broader and integrated vision that extends beyond the massive promotion of R&D, or the attraction of FDI. International organizations, governments, and corporates must recognize that innovation is not developed within confined spaces, but instead arises in the field, and should promote the establishment of collaborative open innovation models that fully involve society. The challenge of innovation for sustainable development is immense: it is nothing less than setting entire societies in motion.

## **Research Methods:**

The human dimensions aspects, or ways that people contribute to and are impacted by global environmental change, are becoming an increasingly important element of major research efforts. Here are some links to research methodology and philosophy in this area, as well as links to journals and discussion lists.

Systems thinking Consistent with systems philosophy, systems thinking concerns an understanding of a system by examining the linkages and interactions between the elements that comprise the whole of the system. This helps us to see the big picture, to see the connectivity between elements in the situation, so as to support joined-up actions.

Managing participation Over the past few years a number of reviewers have pointed to the need for us to get more accurate about our use of the word participation.

Action research Action research is becoming an increasingly important way of gaining increased understanding about ways that groups and organisations can contribute to constructive change.

Using narrative Narrative and stories are increasingly being used to support pluralistic understanding, and to better understand the complexities of different social realities.

## **Sustainable Urbanization:**

Environmental Effects of **Urbanization**. Urban populations interact with their environment. Urban people change their environment through their consumption of food, energy, water, and land. ... For example, urban populations consume much more food, energy, and durable goods than rural populations.

The Sustainable Urbanization Strategy outlines UNDP's response to the rapid urbanization of the developing world and its consequences for sustainable development. It is written for internal and external purposes. Externally, the strategy is targeted at local and national government and development partners who are responsible for urban development. It stands as UNDP's

global offering, outlining the organization's intent, niche and particular areas of focus on this issue. Internally, the strategy is intended to frame discussions, to help assess urban issues through a multidimensional lens and to develop context-specific solutions to urban development challenges for country programming. This Strategy Note is divided into four sections, including the introduction. The second section provides an overview of the key development issues generated by urbanization in the developing world and their relevance to UNDP. The third and fourth sections take up UNDP's role in addressing them and outline the policy and programme support UNDP will offer.

This Strategy Note will be updated as the New Urban Agenda to be agreed at Habitat-III is operationalized and as UNDP's 'offer' to cities and urban partners is enriched by further engagement with urban stakeholders. As the New Urban Agenda takes shape, specific and targeted programming tools, evidence and resources will be developed and made available online to further elaborate UNDP's approach and offering.

Building on this strategy, UNDP will develop and offer integrated solutions combining its expertise across core thematic areas, build and work through a broad coalition of partners and deepen cross-country and regional networks of learning and exchange. The objective is to ensure the policy vision expressed in this document is translated into clear programmatic direction that is tangible and implementable to achieve results.

<https://teams.microsoft.com/l/team/19%3a2a0c1385054147588f5a3997ff52ffec%40thread.tacv2/conversations?groupId=fafdcc8c-a953-4a00-a5ee-45d141c0e6eb&tenantId=df7217c9-cec8-4cc2-8e6a-a1cfbfadb321>