

Block

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BLOCK 4 NATURAL RESOURCE MANAGEMENT AND SUSTAINABLE DEVELOPMENT

Introduction

The current century is one where the issues of clean air, potable water and pollution are foremost in any discourse on politics, economics and culture and human life in general. Uncontrolled exploitation of natural resources and co modification of every element of nature's bounty has reduced the earth to a gaseous hot house of poison that is slowly killing almost everything living.

In this Block we direct our attention to many of the issues such as sustainable use of earth's resources, these plans and policies to save the remaining wealth of nature and also the examination of the best ways to deal with environmental problems. It is increasingly clear that technology is only a minimal aspect of environmental issues. Most of our problems have a social origin rooted in human inequalities including that between man and woman.

The course of human civilization has taken a historical direction towards values of domination, colonization and exploitation in which values cherished by the feminine side of human nature such as nurturance, care and cooperation have taken a back seat along with the marginalization of nature, women and also of non-western people and those without the industrial-capitalistic modes of life. Thus the time has come for us to reexamine the role played by the marginal's, such as the indigenous and the women in a more sustainable approach to life and living.

The units in this block dwell upon some vital issues such as How to incorporate nature within human societies? How to regulate the relationship between humans and other living beings? How to visualize nature, as a commodity or as web of which humans are but one part? Do the humans have a right to dominate over other beings on this earth? Or are we but one of the many other species and all have equal rights over the earth's resources? How to regulate our use of resources, through community or by individual property?

It is increasingly apparent that what was accepted as the best ways of life even a few decades back are all falling short of fulfilling the goal of human survival and the earth itself. Fast disappearing forests, biodiversities, cultures and languages are all symptomatic of a philosophy based on consumerism and materialism that has gone all wrong.

The units bring us philosophical approaches, case studies, debates and overview of policies and practices that are being evolved to deal with the environmental issues of the present.

There are many vital dimensions of life that need to be critiqued and given thought to and alternative models of developments to be explored of which, technologies and values are an imperative. There is need to think about reconstituting of society in a manner where there is greater cooperation and equality, where women get their due places in the management and decision making with respect to natural resource management and the marginalized get the respect they deserve as many of them have greater ecological wisdom than the so called elite. The units in this section are thought provoking and vital to the understanding of human place in Nature.

UNIT 1 COMMON PROPERTY RESOURCES AND SUSTAINABLE DEVELOPMENT

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Learning Objectives



At the end of this unit, you will be able to:

- describe the concept common property resources and sustainable development from the perspective of anthropology;
- elucidate on the types of resources, and theory developed in management of Common property resources;
- distinguish the linkage between livelihood, poverty and CPR as it plays important and critical role in rural and tribal economic system; and
- explain its linkage with sustainable development and role of CPR management in it. ?

1.1 INTRODUCTION

Areas like rivers, forests, village ponds, water bodies, parking lots and train compartments are referred to as Common Property Resources (CPR) or Common Pool Resources in academic and governance domain.

How are they situated in our social domain? How are they defined, governed and what are problems arising around them? This was the concern of many social and environmental scientists including anthropologists in the 60's and 70's decade. Do you feel the necessity to know about them through an anthropological lens? Yes we should know about them from lens of anthropology as common resources are

an integral part of social and cultural resources of communities and have been so since historical times. In ancient India and medieval European communities evolved ways and means to use land, water and forest on collective basis and in the process evolved procedures for management and use of these resources (Dasgupta, 1982). Quite a substantive part of land area, water system and grass land, and space above us are classified as commons and we should understand these resources from both a micro and a macro level.

1.2 COMMON PROPERTY RESOURCES AND SUSTAINABLE DEVELOPMENT

1.2.1 Typology of Resource Ownership

Resources are classified by their physical nature, ownership and use pattern. A property right is a claim of benefit that is legally and socially recognized and respected by the communities and state. There are four forms of properties prevalent in society, they are private, public or state, common property and open access.

A distinction is made between property rights and tenure. Property right brings some kind of management status to the ownership of property, but tenure refers to acts of pure ownership with no references to management (Singh, 1994).

The most commonly found form of property is private, here the individual, households, even groups (corporate bodies and firms) own the resources with exclusive right to use them, to exclude others from using them and right to trade with them. We all own properties like our clothes, cars, houses etc. and they are best examples for private property. A family based company like The Tatas (owning Tata group of industries) is an example of corporate private ownership.

The public good or property resources are not owned by any individual or firm, and people in general are not excluded from using or enjoying them. They allow collective use and consumption, often indivisible. Examples of public property is natural and environmental resources, national parks, rivers, waterways, oceans, marine fisheries in exclusive economic zones (EEZ) etc. Other examples are state owned minerals units, municipal corporations, and national highway authority owning public roads. Therefore, public goods are also considered as state property, as it is the exclusive owner of the resources or properties.

Activity 1

Try to identify different types of properties around and list them according to their ownership pattern, use pattern and access norms.

1.2.2 Common Property Resources

The most commonly talked commons are grazing lands, village ponds, Non Timber Forest produces and forests, etc. Common represents all natural resources used for human welfare, which are not necessarily owned by an individual or a group of individuals. A definition of Common Property Resources quite acceptable to thinkers of Economics is: 'A property on which well defined collective claims by an exclusive group are established, the use of the resources is subtractive, having the characteristic of a public good such as indivisibility, shall be termed as Common Property Resources (Kadekodi, 2004).

Does this definition explain to you the status of village open areas, rivers and other such resources which are not clearly owned by a defined group? Such confusion was further clarified and Ostrom (1992) explained that such resources are owned by state and state extends the 'use right' to the defined communities to

use it to meet their needs. Therefore, in Common pool Resources the group may or may not have a collective claim, ownership or custodianship but may have access or 'use rights' to the resource. Two important examples of CPRs in India are Panchayat lands in villages and water or canal irrigation owned by the village communities.

Open access resources are considered to be a variation of CPR, but it is better to view them as a situation where there are no enforceable property rules. Stevenson (1991) defined open access resource as a dilatable fugitive resource characterized by rivalry in extraction, it is subject to use by any person who has the capability and desire to enter and harvest or extract of it; and its extraction results in symmetric or asymmetric negative impact on the resources. The question of their appropriate use and prevention of misuse remains open.

1.2.3 CPR and Sustainable Development

However, we observe that a large section of human population depends on CPR for various tangible or non tangible services giving rise to the question of sustainable utilization of these CPR's. In recent times, the earlier thinking about abundance of resources has changed and limitation of resources became accepted, secondly the increase of biotic pressures like population, livestock and human induced problems also impact the carrying capacity and sustainability of the natural resources. The other factors of development like industrialization, nationalization of resources has also led to degradation of natural resources.

This brings us to the definition of sustainable development. When the World Commission on Environment and Development presented its 1987 report, Our Common Future, they sought to address the problem of conflicts between environment and development goals by formulating a definition of sustainable development: 'Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. Therefore in the present era it is utmost important that we sustainably manage CPR so that our generation as well as future generations can avail of them.

CPR as stocks can provide either flows or other types of resources. Their relevance to the communities has significant importance for advocating their sustainable use. In India they mostly constitute of wastelands, biodiversity hot spots, forests, fisheries, Non-timber forest produce (NTFP) and water systems. Since they are a part of natural resources systems, there is a need for sustainable maintenance of CPRs.

The first issue is with respect to efficiency and feasibility of resource management under alternative property regimes as there is a strong link between CPRs and livelihood as observed among the communities owning and living around them (Kadekodi 2004). We can see two distinctive types of CPR-livelihood linkages, first is the level of the present generation needs and quality of life, and second is with the sustenance of livelihood with resilience, equitable distribution of benefits, regeneration and growth.

Jodha (1986) in his famous study of seven states and 20 districts of India found that about 84 to 100 percent of the rural poor depended on common property resources for fuel, fodder and food; the corresponding proportion of rich farmers did not exceed 20 percent (except in very dry villages of Rajasthan); and an intermediate categories of farm households depended on these resources more than the rich. The heavy dependence of the rural poor links these resources to the poverty and failure of development interventions centered on the poor. Therefore, any change in the status and productivity of common property resources directly influences the economy of the rural poor. This basically means change of CPR

ownership, reduction in extent of area and quality of produce directly influenced the income of the poor households who derived significant benefit from commons like collection NTFP, fodder, fuel wood which supplemented its household income, with privatization and decline of common, such tangible and intangible benefit was an added cost to household economy and poor were mostly effected by it. For example, mostly potters used to get mud for making pots from the CPR, but after privatization they either became dependent on the owner of area or had to pay the cost of mud.

The immediate consequence of increased pressure due to market oriented government policies relating to land, water and forest of privatization of CPR resulted in their overexploitation and degradation. Their physical degradation is strongly felt and observed, but its quantification is difficult owing to a lack of benchmark data. Nevertheless, case histories and close monitoring do provide the basic details. Declines in the number of products available and their yields are the main indicators of physical depletion. The decline of products was due to weakening of the traditional management institutions like village council control over the resources and lack of effective management of CPR under panchayati system which took control of CPR in and around villages in the new government set up. For instance, the number of different common property products collected by villagers ranged from 27% to 46% before 1952. At present, this statistic only ranges from 8% to 22%. The decline in the number of products also suggests reduced biodiversity in common property resources (Jodha, 1992).

One of the important causes of degradation is a slackening of traditional management. As the traditional institutions which had hereditary pattern of leadership, were sometime not as per democratic principles, therefore government replaced them with roaster system of PRI institution or administrative system like Joint forest Management, or irrigation committee. But these government institutions did not have the local peoples consent and support, because they were mostly constituted by government official to protect their interest with weak leadership or else traditional leaders did not participate in the new process and new leader lacked skills to manage the resources collectively and effectively which resulted in their degradation and decline. Therefore State interventions have been ineffective in substituting formal institution for the previous informal institutions which provided social sanctions and customary arrangements for protecting, upgrading and regulating the use of common property. As a result, many have become open access resources, with everyone using them without any reciprocal obligation to maintain them. Nearly 90 percent of villages fail to enforce historical regulations, in both formal and informal institutions.

Until 1990, due to government intervention, changes in CPR ownership and management took place and further decline in participation of local people resulted in decline of monitoring and protection of resources. Secondly, as the new system had the sanction and conflict resolution framework, these also allowed free-riders to escape: leading to CPRs becoming open access. The reduction in areas of land CPR, water CPR, poor maintenance and the decline in their carrying capacity led to reduction of supplies of products for those who depended on those common property resources. Seen in relation to earlier evidence of the rural poor's heavy dependence on these resources, their decline represents a definite step towards further pauperization of the poor. Therefore at the advent of 1990, stage was set for participatory management approach of development, because of the earlier few decades of development, and Jodha's work (1986) of their impact on CPR provided classic case of the vicious circle of poverty and resource degradation reinforcing each other and therefore providing opportunities for sustainable management of CPR to address poverty issues which are at the core of development planning process.

1.3 COMMON PROPERTY RESOURCES SCHOOL OF THOUGHT

The discussion on Commons started way back in years of 1950s after seeing the rapidly degrading and depleting condition of Common all around. Basically most of countries had adopted capitalistic model of development, which emphasized privatization and rapid exploitation of natural resources. But initially it did not get much attention, many thinker were looking at it as problem of economics and technology. But a seminal paper in 1968, by G Hardin in Science journal brought the Common to centre stage of discussion in welfare economic and other social science disciplines.

1.3.1 Tragedy of Commons' Hardin

Tragedy of Commons' paper by Hardin (1968) in Science journal about the management of CPRs, predicted overexploitation and ultimate degrading of common resources due to the users' rational incentive to maximize utility. He suggested that either privatization or state can provide solution to this so-called 'commons dilemma'. However, privatisation and state regulation have not in all cases lived up to the expectations; sometimes even causing or accelerating degradation of the CPR. The externalities and transaction costs in CPR is very high therefore it becomes costly for both private organization and government to efficiently and effectively manage them. Secondly he also emphasizes that demographic changes, technological developments, changes in life style patterns and changing markets are but some of the factors causing increasing pressures on commons. His concern was that technology cannot solve the human problems and social system should respond to it through state. See the box: 1for understanding the prisoner dilemma problem of grazing.

Box 1: Hardin Prisoners' Dilemma in Grazing Case

Hardin used an example of grazing pasture to explain his view point. He said if a pasture is open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Historically, such an arrangement would have worked reasonably satisfactorily for centuries because tribal wars, poaching, and disease kept the numbers of both man and beast well below the carrying capacity of the land. But in present period, that is, when social stability has becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy. As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

- 1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly + 1.
- 2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision making herdsman is only a fraction of - 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit - in a world that is limited. Ruin is the destination towards which all men rush, each pursuing

his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all (excerpt taken from original document to explain the concept).

However, Hardin's views were challenged that he had a conceptual misunderstanding about the nature of such resources, as he used the term 'the commons' to describe an 'open access' regime. Resources used in general are referred as 'open accesses', 'common-pool', 'common property' and 'public property'. However, Hardin's 'common', was a pasture open to all, and was essentially an 'open access' resource, where decision-making arrangements governing access to, allocation of and control over the resource are absent (Bromley, 1992; Ostrom, 1990; Wade, 1988).

Activity 2

Does the waste management of your municipal place not suffer from prisoner's dilemma? Try to observe a pond lake or graining ground around your place and observe that are we not facing similar dilemma of exploitation. What are the way the problems are solved?

1.3.2 Theory of Collective Action

Collective action is considered to be the solution to manage private, public, or common property resources for effective decision making and implementation. The basic social philosophy of collective action is participatory development as against individual development (Chopra et al, 1990). This approach has led to development of participatory management of natural resources in India in early 1990's, which we see in form of Joint forest management (JFM) in forests, Participatory irrigation management (PIM) in irrigation and self help group (SHG) in micro finance management in various development programmes.

Various disciplines explain the collective action from their perspective, like economic theory takes the course of minimizing transactions costs, externalities as a parameter management of CPR. Two approaches are followed in economics; first is to opt for a strategy to minimize economic costs i.e. minimize transactions or information costs in efficient management of resources. The second argument is reducing the cost of economics of scale in CPR management.

Historians look into evolutionary processes of learning and adaptation (Axelrod, 1990). It is believed that collective action is adapted through experimentation and socialization processes. Another issue for collective action is the optimum size of groups needed to effectively manage the resources. Olson (1965) said that a small size and homogenous group is ideal of collective action. This was developed on the basis of observation of actor's behavior and action, which is possible only in small size of the group to observe and take actions for deviant behaviour. Also, Olson believed that if group size is large coercion is needed to check the opportunistic behavior of self-interested members. But this theory does not explain collective action taken in case of Chipko movement in Uttarakhand under the leadership of famous environmentalist Sunderlal Bhauguna. Russel Hardin (in Haword, 2002) explained this by saying that when the group has super-ordinate goal, group size does not matter.

Political scientist's view collective action through various game theory approaches, interplay of powers between different stakeholders, arriving at cooperation or non-cooperation. Seeing the aspects of selfish motives of different actors, political science discipline saw the emergence of participatory institutions, which followed two routes a) game theoretic approach and b) evolutionary approach (Kadekodi, 2004). Game theory is a branch of mathematics, which offers to model a behavioural situation and predicts the outcome (in both static and dynamic situations) based

on several strategies that are open to different societal agents. They are generally cooperative, non-cooperative, assurance game etc. The evolutionary approach derived its principles from the theory of natural selection and inheritance of survival mechanisms and acceptance of successful strategies in social behaviour. It focused on two aspects namely; social norms and evolution of participatory institutions. Social norms depend upon understanding about the outcome of collective action, obligations required, responsibilities to be delegated, and restrictions on individual behavior. They are more stable and evolve internally than imposed from outside (Ostrom, 2000).

The institutional management of resources was seen as a viable solution to CPR. There are many reasons for people to choose or not to choose community actions. First, smallness and inability in getting involved individually in scale oriented resource management makes it necessary to collectivize, for example irrigation management (Sengutpa, 1991). Sacred groves found all over India, is an example of evolutionary approach of social norms. The study of Villages republics in Andhra Pradesh by Robert Wade (1988) is another example of social norms evolution. Second, there are various level of information about the commons and their usability among the communities, because of such asymmetry of information and inequalities between individuals, people trust the community rather than individual motivation and actions (Murthy, 1994).

Another problem of CPR theory was to identify a suitable 'design principles' for institution management. Nobel Laureate of 2009, Elinor Ostrom in 1990, gave designed principles to CPR theory and introduced a list of variables "associated with the establishment of coordinated or organized strategies for managing common-pool resources". She argued that successful common-pool resource management systems of all kinds (i.e. irrigation, fisheries, forests) are characterized by eight traits: (1) well-defined boundaries, (2) proportional equivalence between benefits and costs, (3) collective-choice arrangements, (4) monitoring, (5) graduated sanctions, (6) conflict-resolution mechanisms, (7) minimal recognition by governments of the rights of local people to organize, (8) nested enterprises (i.e. common-pool resource management units arranged in a nested hierarchy).

Although Ostrom (1995) stressed that "there is no blueprint that can be used to create effective local institutions", she recommends that "[design] principles can be taught as part of extension programs ... to learn more from one another about how successes have been achieved or how to avoid some kinds of failures", thereby granting them a prescriptive status.

These theories will be useful tools for understanding and examining CPR and its internal mechanism and their linkages. Besides this political scientists show the issues of governance of common at all level i.e., micro, meso and macro level. The governance of international and global commons is also the issues discussed by them. The examples of International commons are climate change debate going around the world; other examples are ocean and Antarctica, whereas the examples of global commons are the way of outer space and geo-space.

1.3.3 Anthropology and CPR

Anthropologists study humans, their culture and social institutions, practices, behaviours, technologies, skills, knowledge, beliefs and values. Anthropological studies have considerably influenced the discourse centering around common property resources. Through various anthropological studies it is found that people cooperate to manage resources in many historical societies and regions. Human societies use kinship, ethnicity, and status to distinguish people who are likely to cooperate and from others who are not (Henrich and Henrich (2007).

Several Anthropologists all over world have described a variety of common property resources systems that have been managed by local communities or groups of private citizens (McCay and Acheson 1987; Berkes 1989; Baland and Plateau 1996). Pinkerton and Weinstein (1995) tried to look at another possibility of control through co-management. The co-management discusses rules to manage and enforce resource-management rules which are shared between government agencies and local-level groups. Robert Wade's (1988) "village republic" is an exemplary anthropological study on management of common property resources in India. It showed empirically that norms of cooperation and trust could emerge and be sustained in local communities with a history of repeated and interlocking interactions. Along with ethnography studies, extensively used experimental games have been used in studies of collective action.

Second issue in better management of CPR was ensuring proper property right. Most of the Anthropology textbooks have chapters on property rights. The relationship between property and power has been a mainstay of Political Anthropology. Economic anthropologists have written extensively on land tenure and exchange of goods and services. Social Anthropologists like Davis (1949) and Mair (1965) have for long recognized that property consists of a bundle of rights to land, goods or services, which can be combined in many ways to make a wide variety of property arrangements.

Third aspect related to CPR was concern for development of norms. The generation of rules, norms, and institutions has never been the primary focus of attention for social-science discipline. In the 1960s and 1970s, anthropologists were making key contributions to this field with the works of Barth (1959), Bailey (1969), Heath (1976), Kapferer (1976), and Netting (1976), (in Acheson 2011). Anthropologists have long shared an interest in rules or norms. Norms are basic concepts connected to social structure, including status, roles, and institution. Norms are expectations and social structure is a structure of expectations. Mainstream cultural anthropology also looked into the problem of generating norms and related fields of institutional economics and institutional analysis and development (Cook and Levi, 1990).

The early decade of 1990, saw the era of initiation of participatory management of commons. The common-pool resource literature during this period provided opportunities for theorizing on collective action and participation. The enthusiasm over "participation" united right based groups for political right, who believed that market failures can be overcome by rational individuals acting together under enabling incentive structures, and who have grown disenchanted with the centralized state as the primary provider of development needs. New work in Anthropology has critically re examined the case for local control of the commons, or of participatory development for that matter, and has revealed the political limits and dangers of "localism" (Gadgil and Guha 1993; Li 1996; Mohan and Stokke 2000).

When other social disciplines were studying factors of achieving collectivism by treating human as individuals or rational men anthropologists believed that individuals have agency and they are situated, embedded beings rather than autonomous beings who view life as a series of constrained optimization problems. The operationalization of embeddedness has a rich tradition in Anthropology. Polanyi (1954) argued that individuals are characterized by relationships of reciprocity rather than utility-maximizing motives and that this was particularly the case for pre-capitalist economies. Even ostensibly market interactions were embedded in, and inseparable from, larger social and political commitments. Geertz (1963) and Scott (1976) framed peasant societies in Southeast Asia as moral economies rather than utilitarian economies. In a moral economy, individuals act not to advance their own well-being but to make sure that resources and risks are pooled so that everyone has a part in the system. This can be understood by observing the traditional village economy of India.

Activity 3

Try to study the jajmani system operating in villages, how the resources and labour are exchanged? How changes are coming in this system due to market intervention? Was earlier pattern equitable or present pattern is equitable?

Anthropological theories, drawing on social theories as well as empirical field observations have brought a much richer understanding of power to the literature on common pool resources (Bardan and Ray, 2006). David Mosse (1997) showed how collective action over tank irrigation in Tamil Nadu, India, is as much an issue of allocating water as it is of maintaining or resisting social power. The study compared two villages; both had shortage of water, where one had very cooperative social organization, the other had no collective action practices. This study led him to believe that water needed to be treated as an institutional whole, that the separation of economic-political and religious-cultural were not meaningful. Secondly, an understanding of power is incomplete without an understanding of the resistance that oppression can generate, and the history of common resource struggles is replete with such resistance. From struggles to retain the right to protect and use common forest resources Chipko movement in middle Himalayas to the protests to stop the displacement of tribal people from their traditional lands along the Narmada River (Baviskar, 1996), to the exercise of power, has generated collective actions of protest that can be understood only as dynamic movements and processes not as predictable outcomes, not as rules of management, and certainly not as equilibrium.

Finally, concerns are expressed about local common resources being eroded everywhere due to the processes of urbanization, privatization, and globalization. The solutions suggested in the form of community management as at best a romanticization of “communities” and at worst a cover for within-group exploitation. But these narratives of decline and degradation of traditional common-pool resources conceal the emergence of new common resources and new avenues for local collective action. In India, community-based drinking water sources, such as harvested rainwater, and common sanitation facilities (Sulabh Sauchlaya) in crowded peri-urban areas are spreading. Social forestry, Agro-forestry, Joint forestry experiments and researches aimed at sustainable village-based livelihoods are seriously examining the interaction between ecology and community.

Activity 4

Try to study who claims these resources, how are they appropriated, how are they maintained, and how are they seen by different groups or users within the community? These questions are very much alive in Economics as well as in Anthropology, and so the commons are very much with us.

Another area of study in commons was use of logic of social capital as building blocks distinct from man-made capital in a socially fragmented society. Social capital as building block includes harmony; mutual understanding, sympathy, and institutions of inter dependency (Putnam, 1993).

1.4 CHALLENGES TO GOVERNANCE OF COMMON PROPERTY RESOURCES

Hardin in 2001 wrote in Science, on the issue tragedy of common revisited, where in again proclaimed about the weakness in CPR management still existing and still suffering from tragedy of management. This is evident from the presence of a multitude of management regimes to co-ordinate multiple uses which has, however,

not prevented externalities, such as environmental impacts and conflicts amongst different user groups, from occurring. For example, increasing pressure on coastal fisheries, tourism and industries in combination with impacts from land-based uses, is posing a threat to coastal habitats. This has become a growing concern not only for conservationists, but also for user groups, scientists and governments. Another criticism is that, can CPR be managed with rapidly increasing population dependency? The expansion of market, technologies and expansion of urbanization are creating new demand and pressures on commons. Some challenges are on using CPR as an instrument of governance because bringing collectivism is a difficult paradigm and preference of individual control or state control is seen as an easy solution.

1.5 CRITICISMS OF COMMON PROPERTY RESOURCES

The CPR theory and approach was seen as a tool to manage the natural resources, the major focus was on collective action of the group. First criticism which this theory faces is the rational approach of resources management, wherein the individuals are seen as self seeking and interested persons were as in social setting this does not apply to the role of culture, and norms play an important role in management of social system. Secondly it sees the common from single point of view and tries to address its solution on linear basis. On the contrary the commons are a part and parcel of larger social system. Another missing aspect of CPR approach is linking it with external factors of macro governance and political development. For example with coming of Forest Right Act, 2006, the ownership of state forest will see major changes but CPR does not provide solution to such policy issues. The theory of collective action find difficulty in dealing with heterogeneity and large group size ending up with solution of use of force, but fails to explain large collective action taken place like Anna Hazare movement where people participated in large number.

1.6 SUMMARY

In the end we see that CPR is an important component in Human system and it plays very important role in its livelihood and socio-cultural domain. We found that CPR debated started way back in 1950, and gradually it developed into subject leading to research studies. CPR as an instrument helps in rural development planning as we have seen that majority of poor population still as its survival embedded in CPR. Present day rural development work like NREGA is around CPR development. Therefore it can be concluded that knowledge of CPR is very important for students of anthropology.

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Sample Questions

- 1) What are common property resources? And what are its different dimensions?
- 2) Discuss the property rights issues and how it plays a significant role in the management of CPR?
- 3) What are different theoretical views regarding CPR?
- 4) Discuss the CPR from anthropological perspective and how Anthropology can support other disciplines in development of CPR theory.
- 5) Discuss social capital and its relevance in participatory development?
- 6) Try to identify the CPR space in different aspects of rural development?

UNIT 2 ECOLOGY, DEGRADATION AND DEVELOPMENTS IN ARID AND SEMI-ARID AREAS

Contents

- 2.1 Introduction: Human-environment Linkages
 - 2.1.1 Man Against Nature
- 2.2 Arid and Semi-arid Regions
 - 2.2.1 Dry Land Ecology
 - 2.2.2 Environmental Degradation in Drylands
 - 2.2.3 Drought and Desertification
 - 2.2.4 Overgrazing, Deforestation and Unsuitable Cropping Patterns
- 2.3 Development of Arid and Semi-arid Areas: Social Perspective
 - 2.3.1 The Maasai of East Africa
 - 2.3.2 The Thar Desert
- 2.4 Summary
- 2.5 References
 - Suggested Reading
 - Sample Questions

Learning Objectives



After going through this unit, you would be able to:

- Comprehend the inter-linkages between ecology, society and development, especially in the case of arid and semi-arid regions;
- Understand the key phenomena responsible for environmental degradation in arid and semi-arid regions; and
- Understand the ecological and social impact of unsustainable development initiatives on environment and communities living in arid and semi-arid regions.

2.1 INTRODUCTION

In the previous units you have studied about the intricate linkages that human society has with its local environment, and how culture acts as an adaptive strategy, helping societies to cope up with their physical environments. The local ecology not only influences material culture and subsistence patterns of society, but also social institutions and ideologies. However, the extent of this influence varies in different societies. In simple societies living in harsh environments, such as high altitudes or deserts, subsistence patterns, institutions and ideology of people seem to be more directly influenced by the environment. On the other hand, in complex societies, the social environment has a significant impact on cultures. Steward (1955) says that in the case of complex societies, cultures create their own environment. There is emergence of local sub-cultures and due to the development of technology, the sub-cultures become more and more dependent upon the larger society, thereby reducing the direct adaptation to the local environment¹. However,

1. With the changes that have taken place in the world over the past two-three centuries, we find that now even the communities living in harsh environmental conditions have become well-connected with the outside world, and their dependence on local environment has considerably decreased.

we must remember that human actions are not merely a reflex to the environment, as suggested by 'adaptation' theories (Sutton & Anderson, 2004:27). Humans do not merely adapt to the local environments, but the interactions between people and the environments are dual in nature, wherein human beings are not passive players, but also creators and shapers of their environments.

2.1.1 Man Against Nature

Contemporary ecological studies in Anthropology focuses a lot on the issues of ecological crisis, such as degradation of natural resources, climate change and its impacts, intensive agriculture, etc. We now understand that human activity plays a central role in this ecological crisis. But have human activities always been highly detrimental to the environment, or is it only a recent phenomenon? Let us try to understand this in detail from the perspective of Historical Ecology.

Historical ecologists are interested in the history of resource use. They argue that, "people construct (or transform) their environments over time, rather than simply, meekly, adapting to it" (Srivastava, 2000:19). Natural resources have been exploited even by societies of the prehistoric ages. Small-scale societies, previously dismissed as 'primitives' or 'savages' which had minimal impact on their environments, are now understood to have had significant impact on their environments. Balee (1998) emphasizes on the role of individual human action and argues that "(1) human activity has affected virtually all environments, (2) human activity does not necessarily degrade or improve environments, (3) different cultural systems have different impacts on their environments, and (4) human interaction with the environment can be understood as a total phenomenon" (Sutton and Anderson, 2004:27). Thus, Historical Ecology basically criticizes the "dichotomy that many environmentalists created between 'nature' and 'culture', assuming that the former is in a state of virginity, a pristine condition, untouched" (Srivastava, 2000: 19).

When we try to understand the nature of resource-exploitation over historical phases, it becomes clear that human activities that transform the environment have gradually intensified over the past two centuries, since the time of industrial revolution. "The ideological underpinning of industrial society involves the total rejection of the worldview of traditional societies where man was a part of a community of beings and a steward of nature. Instead, it is emphatically asserted that man is separate from nature, with every right to exploit natural resources to further his own well-being" (Gadgil and Guha, 1992:45). According to Anderson (1973:201-2), the western conception of "man against nature" has been one of the most powerful ideas, which has had far-reaching influence. In this view man is placed above and separate from the realm of nature. Man's manipulation of nature inevitably gives rise to unlimited progress.

However, this man-nature dichotomy is not found in the worldview of traditional societies, and is probably the reason behind sustainable resource use in traditional societies. We shall discuss this with the help of two cases in the last section.

2.2 ARID AND SEMI-ARID REGIONS

In this section, we are going to discuss the case of arid and semi-arid regions, to understand the environmental and developmental challenges faced by these regions. Let us begin by understanding the ecology of these regions.

2.2.1 Dryland Ecology

Hot, dry regions cover more than one-third of the earth's land surface. The ecology of arid and semi-arid areas is not uniform throughout. They encompass a variety of ecological zones, ranging from lifeless seas of sand dunes to lush irrigated

oases. Most lands that might be considered arid or semi-arid, however, are between those two extremes. They range from the thinly vegetated desert fringes that sustain only nomadic populations and their grazing animals, to larger areas comprising much of central Africa, Asia, and Latin America that support a settled population, crops, and livestock. The single defining factor linking all these zones is low, often unreliable rainfall that limits the level and kinds of animal life and vegetation they can support (Eckholm, 1975:138).

Ecologically, an arid region, also known as desert, is an area having an annual rainfall of 10 inches (25 cm) or less. It is usually partly covered by sand, and is almost devoid of vegetation. Cold deserts are caused by extreme cold. They are often covered with perpetual snow or ice and are quite distinct from the deserts of warm regions. It is estimated that cold deserts cover about one sixth of the world's surface and hot deserts form about one fifth of the land surface of the world².

The main deserts of the world include the Gobi, Kara Kum and Kyzyl Kum in Central Asia, the Thar and the Arabian in South Asia, the Sahara (world's largest desert) in North Africa and the Kalahari in South Africa. South America has deserts on the coast and interior of Chile and East of the Andes in Argentina and Patagonia. Large parts of central and west Australia consists of deserts. In North America, deserts are found from North Mexico northwards through parts of the South West and West United States³.

The semi-arid regions of the world are defined as transition zones between arid and sub humid belts, where annual rainfall is between 30 to 60 cms. The vegetative cover is characterized mainly by shrubs, scrubs and grass⁴. In both arid and semi-arid areas, rainfall patterns are unpredictable and are subject to great fluctuations. The occurrence of drought is more frequent in the arid areas than in the semi-arid zones⁵.

2.2.2 Environmental Degradation in Drylands

The arid and semi-arid regions face a lot of challenges. There is growing environmental degradation, which is closely linked to poverty and increasing food insecurity in these areas, population rise, globalization and climate change. Semi-arid areas, especially within the tropics, cover most parts of the developing nations of the world including Latin America, most parts of sub-Saharan Africa, large portions of Eastern and Southern Africa and parts of India and South East Asia⁶. With the high population growth rate in these regions, stress on the existing natural resource base is magnifying at a fast pace.

The main environmental concerns of these regions are drought and desertification. Both these phenomenon's have now been studied and researched extensively, not only in an effort to understand them, but also to find possible ways of addressing these and enhancing the coping mechanisms of the affected people. Over the past four decades or so, our perceptions and understanding of these phenomena have also undergone a change. However, we are still struggling to find a way of addressing these. Let us take a closer look at these two phenomenon's.

2.2.3 Drought and Desertification

Contrary to the general understanding, desertification is not synonymous with desert advancement (Tucker et al, 1991 and Hellden 1991). Desertification, or dry land

2. <http://encyclopedia2.thefreedictionary.com/Arid+region>(accessed on 11 November 2011)

3. Ibid.

4. <http://www.syngentafoundation.org/index.cfm?pageID=46>(accessed on 11 November 2011)

5. http://www.ifad.org/lrkm/theme/range/arid/arid_2.htm (accessed on 10 November 2011)

6. <http://www.syngentafoundation.org/index.cfm?pageID=46>(accessed on 11 November 2011)

degradation, primarily refers to persistent decrease in the productivity of vegetation and soil, as a result of long periods of drought, and also unsustainable methods of land use (such as deforestation and injudicious farming practices), especially in delicate environmental conditions like arid and semi-arid regions (Toulmin, 1993). Within the context of Agenda 21 at the Earth Summit (1992), desertification, has been defined as “land degradation in arid, semi-arid and dry sub-humid areas resulting from climatic variations and human activities⁷.”

In the decades prior to the Earth Summit, human intervention was viewed as the central driving force in desertification; however now it is clearly understood that both human and climatic influences cause desertification (Toulmin, 1993). The nature of desertification processes still is subject to much controversy and there is no consensus about what desertification amounts to. Nonetheless it is widely accepted that millions of people in arid and semi-arid regions are affected by it and with the high fertility rates of developing countries in these regions, the populations affected are only going to increase in the future (Myers, 1997:170).

The debates and discussions on desertification intensified in the 1970s, when incidence of drought increased dramatically in the Sahelian⁸ countries (Senegal, Mauritania, Mali, Niger, Nigeria, Chad, and Sudan) between 1968 and 1973, and in the Horn of Africa (Ethiopia, Eritrea, Somalia, Djibouti, and northern Kenya) during the years 1960-61, 1968-69, 1974-76, 1979-81, 1991-93, and in 1996. Famines occurred mainly in Ethiopia and Sudan during their civil wars of the 1980s, and in Somalia in the 1990s. Whereas drought is a climatic event, famine refers to widespread starvation and usually is brought about by political dislocations, including civil war (Fratkin, 2001:8).

During this period, the awareness of the misery and dislocation facing millions of Africans grew. Social and natural scientists also began to highlight that ecological calamity had roots in human social and economic patterns, which were incompatible with the region's environmental limitations (Eckholm, 1975:140). We will discuss this point in greater detail in the next section.

The Sahelian prolonged drought has since been reported to have continued for over 25 years (Agnew, 2002:257) and several questions have been raised about the veracity of reports that suggest this. Many scientists have also questioned the extent of the role of climatic factors and human induced changes. However, the fact is that disasters in the desert are not new. Droughts and crop failures have always plagued arid lands. But both the scale of suffering and the scale of destructive human pressures on delicate arid-zone ecosystems, have been unprecedented in Sahel (Eckholm, 1975:140). Furthermore, desertification in Africa is by no means limited to the Saharan fringes. It is a major problem in parts of southern Africa, particularly Botswana and Namibia. Vast semi-arid grasslands in East Africa (Kenya and Tanzania) are also facing serious land degradation (ibid:141). Desertification trends are in operation in many other parts of the world too. Scientists have made valuable estimates of desertification in various regions and these support the conclusion that desertification is a major world problem and is growing in magnitude (ibid).

While the influence of climatic changes in the spread of desertification is undeniable, human factors like overgrazing, deforestation and unsuitable cropping patterns have been identified as the chief contributors in all the arid and semi-arid regions. Let us now discuss and analyze how and to what extent these human factors contribute to dry land degradation. We will also try to understand how these are closely linked to the other social and economic factors.

7. <http://www.iisd.org/casl/asalprojectdetails/asal.htm> (accessed on 11 November 2011)

8. The semi-arid transition region between the Sahara desert and the equatorial belt of Africa is commonly known as the Sahel.

2.2.4 Overgrazing, Deforestation and Unsuitable Cropping Patterns

Over-grazing is widely believed to be one of the main causes for land degradation in arid and semi-arid areas. "Devastated forest and woodlands in the early Middle East seem to have resulted from herding activities" (Sutton & Anderson, 2004:231). In North America, much of both the Sonoran Desert in Arizona and the Chihuahuan Desert in New Mexico has been created by overgrazing in the few hundred years since the European invasion (Eckholm, 1975:141).

However, many of the assumptions that we make about grazing and the impact of pastoral communities in environmental degradation can be questioned. "Grazing has been studied by many cultural ecologists, and the general conclusion is that light grazing with frequent moving of stock does little damage" (Sutton & Anderson, 2004:231). Grazing is, after all, a natural thing. Since humans cannot use grass or woody vegetation for food, to get any food benefit from grasslands and bushlands (the semi-arid environment), humans have to cycle some of its productivity through herbivorous animals. It seems that creating and maintaining stable, sustainable grazing systems are not beyond human ability. Indeed, some seemingly technologically simple societies manage it very well. Present serious problems with overgrazing are due not to any innate evil of grazing but to corrupted or badly conceived management" (Sutton & Anderson, 2004:232).

Like grazing, the depletion of the vegetation resource (both perennials and annuals) in the Sahel has been widely contended as a central process leading to desertification in the region (Hulme, 1989:42). Soil degradation caused by deforestation is a serious threat in this region. Deforestation exposes the soil to high temperatures which break down the organic matter, increase evaporation and make the soils vulnerable to erosion. Thirty-seven million hectares of forest and wood lands in Africa are said to be disappearing each year. More serious still is the gradual removal of trees in farms and pastures, which are crucial for protecting productive land from erosion⁹.

In Africa, trees play an important role in protecting the environment. They are the principal source of rural energy, and provide countless medicinal and industrial products used in both the home and in small-scale industry. They often supply food and feed, are the main source of building materials in the countryside and, directly and indirectly, are a source of employment and income for many rural Africans. Management of the scarce forests and plant cover was previously done through cultural practices and never led to serious consequences. The pace of deforestation has increased due to uncontrolled logging by commercial loggers and also due to large populations of poor communities being pushed to marginal lands¹⁰.

Unsuitable farming practices, have also contributed a great deal to land degradation. For instance, in semi-arid East Africa, agricultural development projects have been launched in the fertile and most well-watered areas, without taking into consideration the needs of communities with different modes of resource use, like the nomadic pastoralists. Agriculture development projects usually deny access to nomadic pastoralists, whose livelihoods depend upon the well-watered fertile areas during the dry season and during frequent droughts. This has eventually led to over exploitation of their grazing lands, and also made pastoral communities more vulnerable (Unruh, 1990). Intensive cultivation of fertile lands and insufficient length of fallow between cultivation periods have left led to the impoverishment of land, forcing farmers to cultivate the rocky hillsides and upper pediments (Darkoh, 1982).

9. <http://www.fao.org/docrep/X5318E/x5318e02.htm> (Accessed on 11 November 2011)

10. *ibid*

Unsuitable farming practices also include the transition from subsistence cropping to cash cropping, which in many cases was brought about by the colonial regimes. In Tanzania (East Africa), much of the desertification in the north-west region (Sukumaland) is also due to over-cultivation and poor land management. This area supports about 80 per cent of the cotton (cash crop) grown in Tanzania, and production is based on rain-fed cultivation without proper soil and water management systems. Soil exhaustion and sheet erosion have seriously affected crop yields. Moreover, in the 1920s, the colonial administration's anti-tsetse campaigns¹¹ also led to the wholesale repetitive clearing of vegetation in the area. In central Tanzania (Shinyanga and parts of Singida), wind erosion occurs where mechanised large-scale arable farming has been introduced without the protection of windbreaks or strip cropping (Darkoh, 1982:327).

The trend of growing cash crops (which are generally water and nutrient intensive) in arid and semi arid regions is increasing globally. Tea, coffee, cocoa, grapes, oil palm, cashew, rubber, cotton, groundnuts, pineapple, rice, wheat and tobacco are some of the cash crops grown in Africa. In north-west India, cotton, tobacco, oilseeds, groundnuts and chilies are the main cash crops.

Now let us take a closer look at the human social and economic patterns in arid and semi-arid regions.

2.3 DEVELOPMENT OF ARID AND SEMI-ARID AREAS: SOCIAL PERSPECTIVE

The process of desertification is not merely ecologically hazardous, but also a major cause of underdevelopment in the areas affected by it. This is because the large majority of people in developing countries have livelihoods based on land and the long-term decline of the biological productivity of land undermines livelihood and results in economic underdevelopment (Bandyopadhyay & Shiva, 1986: 1448). On the other hand, there are other socio-economic and political factors also that influence people's vulnerability to drought and intensify environmental degradation. Poverty can be seen as the main cause of vulnerability to desertification. And poverty is the result of different factors which combine life in a harsh environment and its historical, political and social dynamics (Fara, 2001).

In Namibia (Southern Africa), past colonial rule was responsible for a systematic process of impoverishment through discriminatory policies such as homeland systems¹², the contract labour system¹³, and influx control¹⁴. Since pre-colonial time, extensive stock-farming¹⁵ has been the dominant land use here, and contributing to land degradation. The situation has become further complicated because of the highly skewed and unequal distribution of land. Even after independence, there has not been much change in settlement patterns in Namibia. Pre-colonial nomadic practices of pastoral communities are no longer possible. The resultant sedentarisation of the livestock and overstocking of animals (due to limited land available to communal farmers, cultural factors, and a shortage of alternative income sources among farmers), has had a negative impact on the semi-arid environment (Fara, 2001:54).

11. Tsetse fly is a vector that transmits parasites causing sleeping sickness. Large parts of sub-Saharan Africa are infested by Tsetse fly.

12. Creating homelands for the different ethnic groups in Namibia

13. The contract labour was a system adopted by the white regime (during the German colonisation in 1912 and later the South African apartheid regime, 1945) that ensured employment of black people under white supremacy.

14. Measures used to regulate the inflow of black Africans into South Africa's urban areas during the pre-Apartheid and Apartheid eras.

15. A farm for raising livestock

Population growth and food security issues, along with development plans intended for these regions are some of the other social factors that make arid and semi-arid regions extremely vulnerable. We will now discuss two cases in detail, to highlight the significance and role of all these factors in desertification.

2.3.1 The Maasai of East Africa

The Maasai are semi-nomadic pastoralists, who have been traditionally living in southern Kenya and northern Tanzania. Their traditional territory contains extensive grasslands in the semi-arid plains on the east and the better-watered mountain areas towards the west. Cattle form the basis of life for the Maasai. Cattle are not only used as food and materials, but also as currency and to legitimize marriages and solidify social relationships. For centuries the Maasai have been living sustainably in the region because of their socio-cultural adaptation and resource management practices (Sutton & Anderson, 2004:234).

The Maasai have three major resources to manage - their animals, their pastures, and water. "The animals are very intensively managed, with selective breeding and castration being important techniques. Poor quality animals are culled, and the proper mixture of sex and age is managed in the herds. The animals are also closely monitored to prevent or limit diseases. The pastures are the second critical resource. Their condition is constantly monitored for sufficient information to make decisions about where to go, when to move, and what to use. The Maasai strive to prevent overgrazing with a complex system of pasture assignment" (Sutton & Anderson, 2004:239). Animals are moved fairly often. They have around fifteen primary territorial groups, whose members have priority rights to use the pastures under their control and local leaders decide who can have how many animals in which pasture. The use of one group's pasture by any of the other groups must be negotiated with the owners (ibid:234). Movement of herds has traditionally been to the well-watered highlands during the dry season, and to the lowlands during the wet season. This system is designed to reduce the risk for any one group by ensuring that livestock are dispersed so as not to overgraze regions. The size of a herd is dependent on the available pasture and water, but the constant goal is to have as large a herd as possible¹⁶ (ibid:237). "Water is the third important resource, as cattle require a considerable amount of it. Water holes are important places and are owned by individuals, who modify and maintain them. Access to the water is open to all (ibid:239).

Changes in the System

During the colonial rule and even post-independence, the Maasai have witnessed a massive change in their livelihoods. There has been complete disregard of traditional rights of the Maasai over their natural resources. The ruling states have been guided by the perception that pastoralism is a less efficient mode of resource use, in comparison to agriculture, and also environmentally detrimental.

During the colonial period (1900-1963), pastoralists in Kenya were bounded in administrative districts that restricted their movements. Colonial intrusion cut Maasai land in half with an international boundary between British Kenya and German Tanganyika¹⁷ in 1885 (Fratkin, 2001:11). In the early twentieth century, the Maasai were pushed off of 60 percent of their lands by British and German settlers (ibid:6). Towards the end of the twentieth century, the Massai had lost

16. The Maasai seek to expand their herds, not out of an irrational love of cattle, but because herders typically lose over half their animals during periodic drought, a situation that has occurred every five to six years in the past three decades in East Africa (Fratkin 2001:7). The size of the herd and grazing rights also determine a man's social status, thus this survival strategy is culturally reinforced as well.

17. Present day Tanzania

some 75 per cent of their traditional lands. Some of this land has been taken by farmers while large tracts have been set aside as wildlife preserves and game parks. The Maasai cattle have been excluded from such preserves so that the wild animals would return and boost the tourist trade¹⁸ (Sutton & Anderson, 2004:241). Loss of grazing land and displaced local authority over pastures has had significant impact on their semi-nomadic lifestyle.

Furthermore, the colonial and east African governments have encouraged *settled cultivation*. “In recent times, the governments of Kenya and Tanzania have been putting pressure on the Maasai to become settled farmers. In 1973, the government of Tanzania, where most of the Maasai live, required all people to move into ‘development villages’ to get them out of the landscape and force them into farming. Due to pressure from herders, the policy was changed in 1974 to include “livestock development villages,” thus allowing pastoral groups to continue their economies. Nevertheless, the trend away from pastoralism to settled farming is increasing” (Sutton & Anderson 2004:240). Another measure to encourage pastoral sedentarization has been the mechanization and private ownership of bore holes, which has led to the degradation of aquifers. Privatization of common resources like grazing land and boreholes has facilitated manipulation by the wealthy and influential (Fratkin, 2001:6).

Political instability and civil war have also contributed to aggravating the grim situation of the Maasai. Following independence from colonial rule, both ecological conditions and political relations deteriorated in East Africa, particularly following extensive droughts between 1968 and 1973 (ibid). *Population growth* and recurrent *drought and famine* have also played a significant role. Kenya and Tanzania have among the world’s highest population growth rates and that naturally puts pressure on natural resources. The well-watered highlands are attracting sedentarizing populations and thus, are increasingly getting over-populated. Environmental degradation is pushing farmers to move onto less productive lands, suitable mainly for grazing. Population growth in both herds and humans has brought about increased competition between settled farmers and their pastoral neighbors for pasture and water (ibid:7). Although droughts and famines are not uncommon to the region, the traditional responses of mobility and temporary migration to hunting and gathering or farming societies are no longer possible. Today the Maasai are increasingly migrating to towns for wage labour, and even to famine relief centres, taking up farming is also a response to these stresses.

Western aid and International development agencies have played a key role as well. During the 1960s and 1970s, a large number of developmental organizations launched pastoral development initiatives among the Maasai. The intent was to improve livestock production and market integration of the Maasai. Local governments were encouraged to curtail pastoral livestock production on communally held lands and promote private ranching of beef and dairy resources, as private landowners were assumed to better conserve their resources. Organizations like the World Bank and the USAID encouraged “ranching associations” and “group ranches” during this period. By the 1980s, privatization of the pastures into individual holdings was promoted as a solution to poverty and environmental degradation by local governments (ibid:6).

Thus we can see that desertification of this region of East Africa has been brought about not because of any one factor, but a combination of climatic, social, political, economic and historic factors. Now let us discuss the causes of desertification in the arid region of north-west India.

18. Interestingly, without the cattle and land management by the Maasai, the brush began to take over the land, and the game that had lived there began to leave-just the opposite of what the governments wanted (Sutton & Anderson 2004:241).

2.3.2 Thar Desert

The Indian Thar desert is spread over 250,000 square kilometers. It comprises parts of Punjab, western Rajasthan, and Kutch in Gujarat. It is a unique landmass of sprawling undulating sand dunes, lowly rock hills bereft of vegetation, saline marshes and hardy grasslands. Despite the extreme environment, the Thar has supported a large population of people and animals, in moderate comfort for centuries, through recurring droughts and famines. In fact, the Thar is the world's most densely populated desert¹⁹.

Today, the Thar is mostly talked in terms of progressive desertification, although there is no uniform opinion about desert advance. "Notwithstanding the controversy over the expanding area of the Rajasthan desert, it is clear that desert-like conditions within the arid zone of western Rajasthan are becoming more accentuated" (Jodha, 1980:1351). Desertification is indicated by a number of factors such as growth of waste lands due to loss of top soil, conversion of fertile lands into patches of saline wastelands in low lying areas, drying of dug wells or increased salinity, reduced productivity of crops, increased out-migration, etc. (ibid).

But what have been the factors contributing to desertification in Thar? Just as in the case of East Africa, it has been a combination of factors, which we will discuss a little later. Let us first try and understand how this region has supported a dense population and a rich culture over centuries.

The Thar is inhabited by a number of castes and tribes, the chief being Rebari / Raikas (camel herders) and Bharwards (sheep and goat herders) who are semi-nomadic and the Rajputs, Jats, Malis, Minas and Bishnois who are mainly cultivators. As the bulk of the natural resource base of the arid region is grazing land; and only a few pockets are good for sustained cropping, this has led to the evolution of a plural society where different tribes and castes occupy different ecological niches, and the economic interdependence among them leads to sustainable resource use. The pastoralists (nomadic and semi-nomadic) form the majority of the population of this region, and they live in a symbiotic relationship with settled cultivators. The settled cultivators have also evolved a system of mixed farming- including crop and animal husbandry – which matches the potential and the limitations of the natural resource base. Livestock rearing ensures the stability of earnings (through seasonal migration), against spatial variability of weather. This helps efficient utilization of lands unsuited to crop farming, and ensures complementarity between crop and livestock farming at the regional level. Livestock accounts for a substantially larger share of the total asset value, as well as gross farm income, in drier areas like Jaisalmer. Its importance declines as the rainfall situation improves. The traditional system initially had a number of institutional arrangements which prevented over-exploitation of resources (Jodha, 1980:1351).

Common property resources like water and grazing land are shared and governed according to strict social and cultural norms of each community. People have also evolved unique water management practices, including rain water harvesting, storing and recharge of ground water so as to supply water in smaller wells (spread across the settlement areas) during the dry season. Lakes have been constructed in natural depressions. Traditionally these were maintained by kings and strict norms were followed for the use and maintenance of these lakes²⁰. Among the settled cultivators, practices like crop rotation, which included a long fallow (bush fallow), and cultivating on pond beds during dry seasons further contributed to sustainable resource use.

19. Thar-Secrets of the Desert (Documentary CSE)

20. Thar-Secrets of the Desert (Documentary CSE)

Changes in the system

The traditional system of niche specialization and resource management has been fast changing. It has been seen that the pastoral communities are now undertaking crop farming in addition to livestock rearing. And more and more of the traditional cultivators are incorporating sheep raising and dairying as subsidiary occupations. Broadly, there seems to be trend towards mixed farming. Though an efficient and beneficial system from the viewpoint of private individuals, the increase in mixed farming (in the arid region as a whole) has led to the extension of cultivation to sub-marginal lands (suited only to natural grasses) and to overgrazing of fast-shrinking pastures (Jodha, 1980:1351). This is very similar to what we have seen in the case of East Africa.

“At the micro-level, the two forces which induce farmers to over-exploit the land resources base are: (1) increased subsistence requirements and (2) apparent increases in the profitability of exploiting arid lands. These forces in turn are a product of certain public interventions which, at least in the short run, have accentuated the over-exploitation of land resources, part of which would have taken place because of secular growth in pressure on land” (ibid:1352).

The main changes that have taken place since India's independence have been—reduced isolation and increased market integration of arid areas with other regions, the government's land-reforms policies (ibid), and development initiatives like the Indira Gandhi Canal to bring about green revolution in Rajasthan and to check desertification. With reduced isolation, droughts ceased to be levelers of pressure on the land. Relief and resource transfer led to increase in both human and animal population. Integration with the market, and improved market infrastructure contributed to higher prices for farm products, particularly for the livestock products and pulses (ibid).

“Land reforms helped in the distribution of sub-marginal lands for crop farming. During the peak period of land distribution, the cropped area increased from 6.6 million hectares in 1951 to around 10 million hectares in 1961. Most of these lands were suitable only for natural pastures.” (Jodha1980:1353). The breakdown of the tenurial arrangements under feudal system, although led to the disappearance of exploitative features of feudal system, it also led to weakening of informal institutional arrangements for resource conservation and regulated use. Furthermore, there was drastic reduction in the cost of land use for both cropping and grazing. The lower cost, complemented with improved marketability and profitability of animal products and cash crops, further strengthened the tendency to over-exploit the resources. And without proper measures for improvement of production base, this contributed to environmental degradation (ibid).

Along with this, the Indira Gandhi Canal, which brought irrigation facilities to the interiors of the desert, supporting crops such as mustard, cotton, rice and wheat, did bring prosperity to the region in the initial years, but excessive irrigation and intensive agriculture have caused severe environmental degradation and created new wastelands. Problems of water-logging (due to excessive irrigation, seepage from canals and poor drainage), have led to a rise in water table, increased salinity and submergence of once fertile lands (Rao, 1992)²¹.

Thus, it becomes clear that even in the Thar, environmental degradation is the result of the combined effect of social, political, and economic factors, which along with factors like climate change are making the ecosystem even more fragile.

2.4 SUMMARY

In this unit we have seen that humans engage very closely with their environments. Human cultural, social and economic systems have always had an impact on the environment; however human activities have been instrumental in transforming the environment more intensely over the past two centuries. Arid and semi-arid regions of the world, being highly vulnerable ecosystems, have witnessed severe environmental degradation, with increasing frequency of droughts and famines, and growing pace of desertification. These regions have been struggling with challenges of population growth, food security, and in many regions, conflict. Along with climatic changes, human activities like overgrazing, deforestation and unsuitable cropping patterns have been seen as the prime movers of environmental degradation. However, these activities are closely linked to other factors like colonial and national government policies, international and national development programmes, global economy and trade, and politics.

The pastoralist societies in East Africa face more demands on their way of life today than at any previous time. Population growth, loss of herding lands to farmers, ranchers, game parks, and urban growth, increased commoditization of the livestock economy, out-migration by poor pastoralists, and dislocations brought about by drought, famine, and civil war are increasing throughout the region. These problems are aggravated by development initiatives that encourage privatization and individuation of formerly communally held resources (Fratkin, 2001:1). The pastoral communities in north-west India are also losing their grazing lands to cultivation. Land reform policies favour individual ownership over management of common property resources. All development initiatives by the government also encourage settled cultivation, despite the fact that livelihoods of the majority of the people (nomads and semi-nomads) are still linked primarily to animal husbandry.

As in the case of East Africa and Rajasthan, communities of the arid and semi-arid regions worldwide are responding to the social, political, and economic challenges with increased economic diversification including agro-pastoralism, agriculture, wage labour, and increased market integration.

In the process of economic growth and development of arid and semi-arid regions, the traditional knowledge, customary laws and practices of the communities, which contributed to sustainable resource use, have been completely neglected. The challenges faced by these regions need to be tackled by bringing about a fundamental shift from a system that looks at short term goals to a system which aims at long term sustainable solutions to the current environmental and social problems. This calls for a suitable mixture of technological, economic and political measures to deal with specific situations. For instance, cash crops, which are the principal source of foreign exchange for many arid countries, can bring about economic prosperity uniformly only if their spread is accompanied by careful land use planning, supporting social policies and good governance. There is an urgent need for natural resource development through private and public investment. Future development initiatives should be such that they do not disregard the limitations of the land-resource base in these regions, but that incorporate natural resource management practices of traditional societies and western scientific knowledge. These, along with good governance and management, can provide some hope for the future of arid and semi-arid areas.

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Suggested Reading

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Sample Questions

- 1) What is the nature of environmental degradation in arid and semi-arid regions? Explain how over-grazing and unsuitable cropping patterns contribute to environmental degradation.
- 2) “Socio-economic, political and historic factors influence people’s vulnerability to drought in arid and semi-arid areas.” Explain with the help of an example.



UNIT 3 GENDER AND ENVIRONMENT

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- 3.1 Introduction
- 3.2 Gender and Environment Concept
 - 3.2.1 Defining Gender
 - 3.2.2 Development of Gender Roles
 - 3.2.3 Society, Gender and Environment
- 3.3 Major Theories and Approaches in Gender and Environment
 - 3.3.1 Eco-feminism and Environment
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 - 3.3.3 Anthropological Approach of Gender and Environment
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 - 3.4.1 Gender and Water for Domestic Use
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- 3.5 Gender and Forest
- 3.6 Gender and Bio-energy
- 3.7 Gender and Land Resource
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- 3.9 Summary
- 3.10 References
 - Suggested Reading
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Learning Objectives



After going through this unit, you will be able to:

- delineate the approach gender and environment from the perspective of anthropology;
- explain major theories and approaches how gender is conceptualized in the knowledge system of society and environment;
- describe the diversification of gender roles globally in relationship with the environment; and
- comprehend the relationship of society, gender and environment.

3.1 INTRODUCTION

Vital contribution of women to the management of biological resources, and to economic production generally, has been misunderstood, ignored, or underestimated. The importance of biodiversity to individuals varies according to gender. Based upon the social roles between men and women, gender is shaped by culture, social relations, and natural environments. For this reason, we need to incorporate gender dimensions into our understanding of biodiversity and its conservation, sustainable use and the sharing of benefits. Gender has long been recognised as important within environmental issues, but exactly how and in what contexts it is relevant has been hotly debated. In this unit we are going to have a basic overview of

dynamic interrelationship of gender, society, culture and environment. In this unit introduce the basic concepts and fundamental issues in environmental and gender studies which are needed to understand current debates on gender and environment. Unit also acquaint learners with different frameworks used in gender and environmental studies;

3.3 GENDER AND ENVIRONMENT CONCEPT

3.2.1 Defining Gender

Gender is equated with the women or women's studies in most popular perception of what constitutes gender studies. However, gender is social interpretation and construction of biological difference among humans. Gender is a much wider concept than women and involves a holistic perspective on society and culture that inform and constrain the relationships of women with men and every aspect of human life can be viewed with a gendered lens. But in reality most studies based on gender take up a critical stand prioritizing women as it was realized that women have occupied a marginal position in society both in social terms and intellectually.

3.2.2 Development of Gender Roles

In the world view of the scientific Renaissance period in Europe, women were equated with the nature and men with the culture that means women could be dominated as men could dominate nature. Enlightenment thought, which was a crucial intellectual foundation for industrialisation, believed that it was both possible and desirable not only to distance society from nature, but to use this distance to control nature

3.2.3 Society, Gender and Environment

Natural resources are integral part of rural household. Women, particularly those living in rural area, play a major role of managing natural resources which include soil, water, forests and sources of energy. Their task in agriculture and animal husbandry, as well as their central role in the household make them daily managers of living environment.

As the women work ahead in the environment, they are the one who suffer more from the adverse effect of environmental degradation.

Yet, women are no longer viewed as mere victims, it is increasingly recognized that women can play important role in natural resource management as they have the knowledge and experience gained from working closely with their environment. In order to have a sustainable development approach on environment study, we need to incorporate the knowledge system of women in the mainstream understanding.

3.3 MAJOR THEORIES AND APPROACHES IN GENDER AND ENVIRONMENT

The gender environment relations have significant symbolic and material dimensions and significant implications for ecological relations. The questions that arise are; how environmental resources and responsibilities are managed and distributed? What role gendered power dynamics play in the day to day lives of people around the world? To answer these questions we need to understand the gendered environment; how we signify, symbolize, materialize, transform it. Secondly how gender informs power in distribution, access, and governance of natural resources.

There are various theories and approaches to study the interrelationship of gender and environment. This will include brief discussion on ecofeminism; gender, environment and sustainable development and concluded with anthropological approach to study the gender and environment.

3.3.1 Ecofeminism and Environment

Eco-feminism was coined as a term in 1974 when Frenchwoman Françoise d'Eubonne called for an ecological revolution to be led by women in order to save planet Earth. Eco-feminism has evolved both as an analysis of society-nature relations and as a prescription for how these relations can be transformed. There are many different perspectives of ecofeminism approaches. From the box 14.1, we can have glimpse of diverse world-wide different perspective of ecofeminism.

Broadly, these analyses fall within two areas: cultural eco-feminism and social eco-feminism. Cultural ecofeminism identifies a powerful and positive link between women and nature, particularly through such female reproductive functions as childbirth and menstruation. This connection between women and nature is used to argue that women are better placed than men as advocates of nature. Social eco-feminism argues that because women and nature have both been subjugated by a society dominated by men, women, through the roles they play, are in a better position than men to speak for nature, because of this shared experience of domination. Social eco-feminists contest that there is anything more natural in a woman's body than in a man's and disagree with cultural eco-feminists' belief that there is something which constitutes a woman's 'essence'.

However, if we look for combined perspective of both cultural ecofeminism and social feminism then we do not find many differences. In fact they both carry us on the same direction. This will leads us to the affirmation that all women have a special relationship with nature. The "woman" is considered as a unitary concept and reality, centred on the role of women as mothers and nurturers of life. Again, it is maintained that the experiences of women, be they biological, as determined by the female body and its functions (pregnancy, childbirth, lactation, menstruation), or cultural (the care and bringing up of children), give them a different "natural mind-set". In turn, the closeness of women to nature supposedly gives them a "special" knowledge that will enable them to save the planet (Shiva, 1989), and their "natural" propensity to protect the environment is an extension of their role as carers in the family group and the community.

Box 3.1

Eco-feminism as a broad, diverse, world-wide movement Unique eco-feminist approaches

- Liberal eco-feminists who seek reform from within existing political and economic structures.
- Radical eco-feminists who wish to dismantle those very structures through direct action.
- Cultural eco-feminists who focus on the cultural manifestations of the women-nature connection, earth-based spirituality, goddess religions, and witchcraft.
- Social eco-feminists who build on the social ecology movement of the American anarchist philosopher Murray Bookchin in an attempt to restructure hierarchical society into egalitarian, decentralized, bioregional communities.

- Socialist eco-feminists who draw on neo-Marxist philosophies to focus on the relationship between production and reproduction and on women's work in the continued biological and social reproduction of life on Earth.
- Ecological eco-feminists who strive to show the respects in which eco-feminism and the science of ecology (specifically eco-system ecology) share vital similarities.
- Deep ecological eco-feminists who draw on the work of the Norwegian philosopher, Arne Naess, and strive to dismantle both anthropocentrism (human-centeredness) and androcentrism (male-centeredness).
- Critical or transformative eco-feminists who wish to transform the very categories of masculine and feminine and the divisive nature of dualistic rationality.
- Aboriginal or native eco-feminists who live close to nature, nurturing sacred lands and reconsecrating degraded spaces.
- Eco-feminists of the Third World who criticize mal-development in the First World and show us how women of colour may be in a privileged position because their minds are not yet colonized and because they do not profit from the oppression of others.

Source: Hallen (1994:207).

3.3.2 Gender, Environment and Sustainable Development

The movement known as “women and the environment” forms part of the strand of thought and action called “women in development”. In literature, this position is found to be greatly influenced by ecofeminism; particularly in the way it is based on the assumption that women have a special affinity with nature. This approach is followed by most of the NGOs (Non-government Organizations) with the diverse objectives that involves use and management of environmental resources; the power relationships that exist; and above all the gender relationships that differentiate men and women in the processes of production and reproduction.

The “women and the environment” approach stresses the potential of women’s role as “day-to-day administrators” of natural resources (Dankelman and Davidson, 1989), with analysis being carried out mainly at the micro-social level. It is maintained that women are the most affected by the energy crisis; therefore they should be considered as being the best placed to tackle and resolve this crisis. So in this approach, the focus is on the special characteristics of women as “custodians of the environment”. While at the same time they are regarded as the “most valuable resource, and the most neglected one”.

As of now, most of the development policies ignore two gendered realities:

- i) The poor women in developing countries are heavily exploited and overworked. This creates the negative impact on their health, the amount of time available to them and their powers of self-determination and ability to express them full.
- ii) The subordinate position that women occupy in our society, because of the system of power that regulates gender relationships. In other words the obstacles that they face in seeking to participate actively in decision-making processes that relate to the handling and management of environmental resources.

This approach enables us to identify the differences that exist between women by emphasizing the social, historical and cultural nature of the processes of

subordination and negotiation in which they are involved. The relationship of women to men, the division of labour, and decision-making patterns that obtain within their households, all of which to a large degree determine the way in which access to and use, ownership and control of resources are managed. The role of women is a key factor in the processes that are recognized as being agents of intermediary in the relationship between sustainable development and the environment. This includes population growth, migration, family organization of labour, patterns of production and consumption and unequal distribution of economic, political and technological power. Seen from this viewpoint, women and their participation are characterized not only by their status as “victims” of environmental changes. But it is also include their understanding, use and consumption of natural resources. In this regard their experience and creativity that they bring to community work, which enable them to suggest mechanisms to achieve sustainability.

Among the researchers who subscribe to this viewpoint, the main areas of interest and study are as follows:

- 1) The way in which male-female interaction affects and is affected by environmental change.
- 2) The structure of gender identities in different groups of women and men, in terms of the roles, subjectivities and socially constructed and culturally validated perceptions.
- 3) The ideology that sustains and defines the subordinate position of women as against men and the obstacles that women face in obtaining access to and control of environmental resources, and in exercising power in decision-making processes dealing with the direction of sustainable development

It is accepted that the globalization of economies brings changes in the employment structure of countries. This in turn influences the way work is divided by gender; the way employment is generated and the way natural resources are used and managed. For example, international tariff and trade policies have a large impact on regional agriculture, and thence on the structure of agricultural employment and labour, as well as on the gender relationships that arise in this area of production.

3.3.3 Anthropological Approach of Gender and Environment

Quite early in the study of band societies by anthropologists it had been clarified that at the earliest phase of human adaptation it were the women who were responsible for basic subsistence of the bands, rather than the men. The food gathering activities of women provided that bulk of subsistence food and men's hunting activity provided only supplementary proteins. Thus women's relationship to the environment is life giving rather than life taking.

But anthropologists have related women's activities not to their natural affinity to nature but to culture. Thus both women's activities and their knowledge is specific to some women in some communities and also in some time periods. Thus some women especially of upper classes may engage in activities that are exploitative of nature. The wearing of animal fur as fashion is a case in point. But among most communities who are in the pre-industrial or peasant mode of existence women's role as reproducers and producers of subsistence goods does keep them in close touch with nature.

Activity: Try to collect and understand basic approaches on gender and environment section. You can take help of the reading list given at the end of this unit.

3.4 GENDER, WATER AND ENVIRONMENT

In 2000, at the United Nations Millennium Summit, world leaders committed to a collaborative program of sustainable development, greater gender equality and increased access to health and education through the Millennium Development Goals (MDGs). Greater access for people to water and sanitation is key to achieving each of the eight goals, but of especial interest to this essay are:

- Promote gender equality and empower women; and
- Ensure environmental sustainability, with a specific target to halve by 2015 the proportion of people without sustainable access to water and sanitation.

The Principle has overwhelmingly been interpreted as calling for the increased participation of women in the planning and implementation of water projects. In the following lines we are going to discuss the key areas which need to be considered while analysing the gender and water relationships. This includes water for domestic purposes (it includes basic household consumption, health, and kitchen garden); for irrigation, and sanitation. We will discuss all these aspects with ideas of access and participation of particular gender perspective.

3.4.1 Gender and Water for Domestic Use

a) Access

The water is needed for the basic living of human being. 'Access' to the minimum quantity of water necessary for domestic use, usually meaning drinking, cooking, washing utensils and basic hygiene, can be defined in many ways. The UNICEF/WHO Joint Monitoring Program (JMP), the main source of national level data on access, defines 'reasonable access' as 20 litres per person per day from an improved source, no more than 1 km distant from the dwelling. 'Improved' sources are household taps, public standpipes, boreholes, protected dug wells, protected springs and collected rainwater. 'Unimproved' sources according to the JMP are unprotected wells, unprotected springs, rivers or ponds, vendor-provided water and bottled water. These data should be used with caution, because there are major disparities in data collection accuracy across regions.

Current JMP estimates are that 85% of the population has access in Latin America and the Caribbean, 81% in Asia and 62% in Africa (Table 14.1). Globally, approximately 65% of the population without access to safe water lives in Asia and 28% in Africa. Though these access numbers do not directly translate to those of access for women, they are reasonable proxies because it is almost always women and children who are responsible for the daily provision of domestic water.

Table 14.1: Access to drinking water by region

Region	Area within region	% of population with access
Latin America & Caribbean	Overall	85
	Urban	93
	Rural	62
Asia	Overall	81
	Urban	93
	Rural	75
Africa	Overall	62
	Urban	85
	Rural	47

Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. 2000. Global Water Supply and Sanitation Assessment 2000 Report.

NGOs working in rural India report that women in many villages find themselves walking 2 km or more to their daily drinking water source. Case studies from South Asia as well as Africa suggest that women place high values on the opportunity cost of the time spent in collecting water; and when access to water improves, more time can be devoted to income-generating activities such as agriculture and micro-enterprises. Researchers argue that easier access to water is desirable not just for economic reasons but for overall quality of life, regardless of how the extra time is spent.

In urban and semi-urban areas in the developing world, women and children would not have to walk long distances, but waiting in line takes time. In densely populated slums such as India waiting times at water kiosks of 1-2 hours have been reported. Same as in rural areas, most of the fetching and waiting in urban areas is the responsibility of women and girl children. The 2006 Human Development Report concludes that there is a “straight trade-off between time spent in school and time spent collecting water”, and that this is much less true for boys than it is for girls. The lack of reliable access to water and sanitation could therefore be a major contributor to continuing gender inequality in education and the opportunities that education can provide.

b) Health

Even households with access to an ‘improved’ source might not actually be getting water that is safe to drink. Sources of surface as well as ground water are increasingly contaminated from human and animal waste, agricultural run-off, chemicals such as fluorine or arsenic, and industrial effluents.

Women and (usually) girl children fetch water in pots, buckets or ideally more modern narrow-necked containers, which are carried on the head or on the hips. A family of five would need 100 litres of water a day to meet its minimum needs; the weight of that water is 100 kg (220 pounds). In these circumstances, women and children may need to walk to the water source two or three times daily, with the first of these trips taking place before dawn. Globally, more than 50% of poor women suffer from malnutrition and iron deficiency. In rural India and Africa, especially during the dry season, 30% or more of a woman's daily energy intake is spent just in fetching water. Carrying heavy loads over long periods of time causes cumulative damage to the spine, the neck muscles and the lower back, thus leading to the early ageing of the vertebral column. The burden of daily carrying is rarely covered in leading public health and epidemiological journals, as it falls outside of the conventional categories of “water-borne, water-washed and water-related diseases”.

c) Women, water and kitchen garden

Women are using water for other purposes such as irrigating vegetables in the farm and kitchen garden. They are prime factor for seasonal and off-seasonal vegetable farming near their households with the optimum utilization of waste water in the kitchen. A group of women can come together, identify a commonplace or land and grow desired vegetables, fruits, cereals etc. The proceeds of these set up can benefit the women and community as a whole. In this role the women are important from starting to the product to selling of product.

d) Gender, water and participation

Many researchers and practitioners have emphasized women's participation in local and community level in water management. The failure of many community-based water resource management projects has been attributed to the exclusion of women and their traditional knowledge.

3.4.2 Gender and Water for Irrigation

a) Access

The literature on small-farm irrigation brings up three gender-specific concerns. First, it suggests that women are often denied direct (that is, not mediated by male relatives) access to irrigation water. Second, new participatory irrigation management policies may not improve women's access to water unless the policies take account of gender-specific roles in agriculture. Unlike drinking water, which is accepted as being in the women's domain, women and men in a community or even household may need and use irrigation water in different ways. Third, the transformation in agriculture that irrigation brings about increases women's well-being through increase in household income, but could also increase in women's workloads without control over the additional income.

These illustrate the structural and household-level constraints to women's access to irrigation, as well as the multiple ways in which access can be mediated. The most common constraint identified is that women typically lack formal or enforceable rights to irrigation water. In a pioneering earlier study of land rights in India, Agarwal (1992) showed that women were denied access to a range of social and economic opportunities because these were available primarily to formal (mostly male) holders of land. Several field-based studies in Anthropology as well as Economics have confirmed that women are efficient irrigators as well and productive farmers. However in most canal irrigation systems water is allocated to the official landowner, usually male. Well ownership is also often a function of land ownership; thus, land ownership patterns directly preclude many women from water rights.

b) Gender, irrigation and participation

It would be naïve to assume, of course, that a changed property rights regime will automatically ensure access and opportunity for hitherto deprived women. Field studies confirm that women without formal rights attempt to get water through social networks or through access to paid labour, or through helpful or influential men.

The decentralized management, devolution of rights and responsibilities to Water Users' Associations in the public irrigation sector has taken hold throughout Asia, Africa and Latin America. This devolution is known as Participatory Irrigation Management (PIM) or Irrigation Management Transfer (IMT). So far, our discussion has suggested that women's participation at all levels is widely considered necessary for productivity, equity and sustainability. However, that women should play prominent (if not equal) roles with men in irrigation management is basic criteria for the PIM success. This is particularly possible if the terms of trade within households are biased against women.

3.4.3 Gender and Water Sanitation

Women are most affected by lack of sanitation and safe water. Apart from fetching water from far away, they also bear the burden of poor health and the security risks that arise when they are forced to go out at night to defecate in private. The design and siting of water supply and sanitation (WSS) facilities will better reflect the needs of both women and men. The technology adopted is likely to better reflect women's needs. For example, pour-flush toilets may not be preferred because they require considerably more work for women in transporting water. Successfully including men and women in WSS project activities requires gender analysis of the project area. Such an analysis will include an understanding of:

- Socio-economic and cultural context of the project area

- The different priorities, demands and needs of men and women

Activity: Try to talk to female counterpart in your family about their perception about water and environment.

3.5 GENDER AND FOREST

For most of the women, especially in rural or semi urban sector, relationship with the forest and their product is very crucial. It is very imperative not only as a source of livelihood of their family but also have other association that are not directly related to livelihood. For instance belief system of the local community that is highly intermingled with the adjacent forest area, like sacred groves, sacred geography. As a result of the gender division of work, it is primarily women who are the major gatherers of a wide range of Non Timber Forest Products (NTFP) for subsistence and as a source of income. The women play important role in forestry in essentially three areas:

- a) Gathering fuel-wood, fodder
- b) Employment and income
- c) Protection and management.
- a) **Gathering fuel-wood, fodder**

Gathering of fuel-wood, fodder and NTFPs is an important subsistence and economic activity for poor women. It has been observed that the relative status of women within the family is higher in well-forested villages/ villages close to natural forests, because their contribution to subsistence and cash incomes of households is greater. Moreover, as their ownership of private resources is negligible, women, particularly those who are poor, depend heavily on common resources for meeting their survival needs.

b) **Employment and income**

The main forest-based activities from which people derive employment and income are:

- Sale of firewood and fodder
- Rearing of livestock (grazing in and/or collecting fodder from forests)
- Collection and processing of NTFP
- Forest-based handicrafts and cottage industries
- Wage labour.

i) **Direct Employment**

The forestry staffs prefer women for forestry operations such as nursery work, transplanting and tendu leaf collection. The work is contracted either on a daily-wage or piece-rate basis, but women often get lower wages than men for similar work are not paid regularly and harassed if they complain.

ii) **Self-Employment**

Self-employment in forestry refers to individual or family units geared towards deriving income from activities such as the sale of firewood, livestock rearing (Where income is derived from the sale of milk) and collection, processing and marketing. As per one study in India about 10 percent of the families derive on an

average 15 percent of their total cash income from NTFP sales, the main collectors being women.

iii) Secondary Employment

Although women's participation rate in some large enterprises such as the match industry may be very high but is less than half in small-scale enterprises.

c) Protection and management and of forests

A study commissioned by UNDP and UNESCO with special reference to non-timber forest products (NTFPs) recommended Gender focus in forest policy, forestry schemes and Government programmes.

Deterioration of forest due to developmental activity has observable impacts on the lives of women. The women have played an important role during the Chipko Movement in the protection of trees from commercial exploitation, because they knew the importance of forests in their lives.

3.6 GENDER AND BIO-ENERGY

Energy is a means of satisfying needs. Both women and men rely on energy for most of their daily activities but they have different needs and roles and the various energy services have different impacts on men and women. In rural region women are responsible both for securing energy for the household and producing crops. Women from rural India rely heavily on traditional biomass systems to obtain the essential energy for their households. It has been observed that in India approximately 625 million people cook with biomass (IUCN).

In the past, women's energy needs and lifestyles have been ignored, and both traditional fuels and modern energy services have certain limitations that can increase women's problems. Simply abolishing traditional fuels is not a solution because the lack of energy can damage women's health, and limit their ability to care for their families, get an education, earn income, and engage in social and political affairs.

The use of bio fuels can solve women's energy needs as long as consideration is taken of women's basic needs. More efficient appliances and cleaner, alternative forms of energy are needed to combat indoor air pollution. This includes the traditional system of energy such as wood energy, dung-cakes, and modern technology of harnessing energy like biogas, solar cooker, etc. Lowering women's workload, might affect or improve their health, and reduce or increase household income. For example, producing biodiesel from *Jatropha* could potentially lead to landscape restoration as *Jatropha* can grow in desert-like conditions.

Recommendations

- A gender perspective must be incorporated into planning and policy-making related to biofuels, to ensure that the concerns and needs of both men and women are taken into account.
- Women should have access to credit and information, to enable them to learn and decide which modern biomass resources and technologies can fulfil their needs.
- Governments should use disaggregated data to identify and quantify the different energy needs of women and men. On this basis, order should be given to design and implement appropriate policies and programmes, and to evaluate the results. Government officials should be trained in bringing a gender perspective into their work.

- Most poor women in developing countries cannot afford to pay for energy services. Poor households spend about 15-28% of their income on energy while 2 billion people do not have access to electricity. Empowering women to provide their own energy is a key policy for sustainable development.
- Women should have access to training programmes relating to the energy service sector. They will then be able to participate in decision-making, scientific development, technical implementation and practical use of biofuels or any other alternative energy source.

3.7 GENDER AND LAND RESOURCE

As land is a material resource and for this there is intense struggle between two half of the community namely men and women. However, these struggles over land are experienced differently by women and men, depending upon the complex interactions of gender, class, age, marital status and life-cycle positioning.

Feminist critiques of development have identified the marginalization of women from the means of production as a critical factor in the subordination of women. (Boserup, 1970)

a) Access

Land is also an important symbolic resource. A focus on women's and men's struggles over land must also consider the symbolic and discursive contestations that constitute those struggles.

As a symbolic resource, land holds important meaning within local culture of India. Access may be limited by the owner or controller of land and environmental resources. This is critical because these resources constitute an essential validation of social and political autonomy. For women, it is a means of moving from reproductive roles to production (Mies, 2003). Women are under-represented in institutions that deal with land and environmental resources, their rights under communal ownerships and ranches are not defined and this allows men to dispose of family land freely. Few women have land registered in their names.

b) Participation through land right

Women's access to, and use of, natural resources is likely to differ from that of men's, as a result of the gender and division of labour. The impact of natural resource development projects and environmental degradation on women and men will also differ. Women often have customary access to agricultural land for food and cash crop production, and to forests for foraging and fuel collection. However, women rarely have legal tenure. So, it became imperative criteria for the gender participation to secure land rights of women.

c) Access to and control over resources

In many countries, rights are linked to women's marital status; widowed or divorced women often lose those rights. Even in countries where the law guarantees women and men equal access to land, women may not be aware of their rights, or customs may exclude women from de facto ownership. In, Burkina Faso, Cameroon and Zimbabwe, for example, women have the legal right to own land and trees but, in practice, men control nearly all of the property.

Such insecure land tenure influences use of natural resources by different groups. Women, the poor, and other marginalized groups are less likely to invest time and resources or adopt environmentally sustainable farming practices on land they do not own. In the eastern Democratic Republic of Congo, researchers found that

men usually plant permanent tree crops, such as coffee, on household land where they have secure tenure. Women's food crops are relegated to rented, steeply sloped land with eroding soils. Because tenure is not secure, women have little incentive to invest in soil conservation measures.

These restrictions on women's land rights hinder their ability to access other resources and information. Unable to use land as collateral to obtain loans, women have difficulty in adopting new technology and hiring labour when needed. In addition, women may not be able to access other support services, such as extension and training programmes. Agricultural extension agents have traditionally focused on the male farmers, even where men are working off the farm and women are the primary cultivators (Population Reference Bureau, 2002).

3.8 WOMEN AND ECOLOGICAL MOVEMENTS

Worldwide, women have manifested themselves as agents of change for environment and sustainable development. In the following lines we are going to discuss about some theoretical reflections on the social movement of women for environment.

i) Beginning

The first documented expression of a woman, who gave her life for safeguarding the environment, goes back more than three hundred years ago, and that is from India. The direct concern of Indian women with environment protection can be traced long back to 1731 A.D. It was Amrita Bai of Khejaralli village, of Bishnoi community, of Jodhpur District of Rajasthan sacrificed her life for saving the trees of her village. She is the founder of the modern 'Chipko Movement'. In order to save the trees, she embraced the trees and was cut as per the orders of the then Maharaja. Her three daughters and later her husband came forward and one by one, 363 people were killed and the trees remained untouched because of villager's strong resistance.

ii) Chipko Movement

The Chipko movement is particularly known because of its actions to resist the destruction of their lands and livelihoods since 1974. In that year, the government of Uttar Pradesh (now: Uttarakhand region) in the Himalayan foothills diverted the men of Reni village to a fictional compensation payment site. At the same time labourers disembarked from trucks to start logging activities near the village. Under the leadership of Gaura Devi, (a 50-year old illiterate woman) women rushed from their homes to hug the trees ('Chipko' means hugging) and prevent them from being cut. A four-day standoff ended in victory for the villagers. The actions of the women of Reni were repeated in several other places in the region, as hill women demonstrated their power as non-violent activists. Then question comes why women imitated this kind of resistance for the forest? The threat of deforestation was enough to rally the local women to civil disobedience to protect the eco-system. They knew very well that their well-being, their prosperity, their lives, all were associated with the forest. Some commentators have described Chipko movement as 'Women's Movement' (Bahuguna 1975)

iii) Women movement against industrial pollution in Japan

In Japan, in the 1950s, the Nakabaru Women's Society and Sanroku Women's Society protested loudly against pollution from industries and power plants in the Tobata region. Women started to raise their voices in opposition and organized an increasingly powerful movement. From the authorities and companies, the women claimed the right to live in a safe and healthy environment. This resulted in major pollution prevention measures taken by the local government and corporations.

It is important to recall the names of Indian women who have fought legal battles in the court of law for environment protection, as Mrs. Sarla Tripathi of Indore, Kinkari Devi of Sirmour District, Krishna Devi of Rajasthan etc. Today the torchbearers are Maneka Gandhi, an environmentalist & politician, Medha Patkar, a social worker & environmentalist who are carrying on the crusade of environment protection.

iv) **Green belt movement**

Another movement, which is one of the biggest in women and environmental history, is the Green Belt movement. The Nobel Prize winner Wangari Maathai founded this movement on the World Environment Day in June 1977. The starting ceremony was very simple: a few women planted seven trees in Maathai's backyard. By 2005, thirty million trees had been planted by participants in the Green Belt movement on public and private lands. The Green Belt movement aims to bring environmental restoration along with society's economic growth. This movement led by Maathai focused on restoration of Kenya's rapidly diminishing forests as well as empowering the rural women through environmental preservation, with a special emphasis on planting indigenous trees.

Box 3.2

A fight to save environment

It was a moment of pride for every Indian woman when in 1995 a scheduled caste, illiterate woman of a Below Poverty Line family from a remote village of Himachal Pradesh with fragile frame was given honour to inaugurate the 4th World Conference on women in Beijing, China. In fact the chief guest was Ms Hillary Clinton, the then first lady of the US. But she invited bare foot environmentalist to light the lamp as she felt her to be the most deserving person. This Great women Environmentalist, died in 2007 at the age of 75 years, Kinkari Devi who belongs to Village Sangrah, District Sirmour of Himachal Pradesh. Kinkari Devi belonged to a poor family where education of girls was considered a foolish and money wasting task, and even they did not have enough resources to make their male child literate. So like other girls, she was left uneducated and got married in her teens. She was forced to work as a daily wages worker but unable to manage even two meals a day for herself and her son. Since childhood, Kinkari Devi had an attachment and love for environment. All these difficulties were also not able to break her bond and relation with 'Jal, Jungle and Jameen' (Water, Forest and Land). With courage and determination, she fought a long battle with mining mafia and system to protect the valuable mountains of Himachal Pradesh from getting ruined. Then she decided to make the local people aware and to organize them for the survival of the hills. She held small demonstrations, rallies and speeches with the support of one local NGO. As a result of Kinkari's determination and courage, local people of the village started supporting her and organized themselves into small groups, which created awareness in other villages. These small groups played a crucial role in making people aware of their rights to have clean environment. She took the case to the High Court. The story of Kinkari Devi is a tale of a true Indian Rural Woman who despite facing different odds did not leave the path of truth. Kinkari Devi explained the reason behind her initiative, "Pahar se hi hamara vujud hai. Pahar nahi honge to hum bhi nahi rahenge." (Our existence depends on mountains, without mountains our survival is not possible). She said that in her culture, the environment is considered as mother and serving the mother is everybody's duty. She was honoured by 'Rani Jhansi Stri Shakti' awarded by the then Prime Minister of India, Atal Bihari Vajpayee for her invaluable contribution to protect the environment of the region.

Activity: Based on the daily news update make a report on the movement regarding environment concern and how women related to this.

3.9 SUMMARY

Gender refers to the social roles that men and women play and the power relations between them, which usually have a profound effect on the use and management of natural resources. Nowadays, the relationship between gender and the environment has become more explicit and apparent. The literature on environment and development has particularly stressed that in developing countries like India, women are considered the primary users of natural resources (land, forest and water), because they are the ones who are responsible for gathering food, fuel and fodder. This brings rural women to a close relationship with land and natural resources. Women's perspective towards the importance of environment/natural resources is somewhat different than that of men. Along with increased production and gain in every respect, women give more consideration to protection and improvement of capacity of Nature and Natural Resources

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Sample Questions

- 1) In your opinion briefly describe how gender is related to environmental studies?
- 2) Critically discuss role of women in gender and water management?
- 3) What are basic bioenergy resources and how women are involved in bioenergy project as a whole?
- 4) What is basic personality and modal personality? Discuss
- 5) What are the major ecological movements in which women were in focal perspective? Describe using example of case studies and major personalities involved in this.

UNIT 4 ENVIRONMENT AND SUSTAINABILITY IN THE THIRD WORLD

Contents

- 4.1 Introduction
 - 4.2 People, Culture and Environmental Sustainability
 - 4.3 Sustainable Development and its Importance
 - 4.4 Viewing of Sustainable Development in Different Ways
 - 4.5 Reducing Emissions from Deforestation and Land Degradation (REDD)
 - 4.6 Environment and Sustainable Development Measures in India
 - 4.7 Contentions and Development of Nature-friendly Sustainability
 - 4.8 Summary
 - 4.9 References
- Suggested Reading
- Sample Questions

Learning Objectives



At the end of this unit, you will be able to:

- describe the concept of environmental sustainability in terms of people's cultures;
- comprehend the concept of sustainable development in different ways;
- explain the nature of sustainable development in the third world; and
- depict the state of India in the third world to hold sustainable development approaches.

4.1 INTRODUCTION

Though sustainability in its simplest form is the capacity to endure but for humans, sustainability is the long-term maintenance of well being, which has environmental, economical, and social dimensions. It encompasses the concept of union, an interdependent relationship and a mutual responsibility position amongst all living and non living things on earth. Therefore, environment, though one of the components but the most important dimension of sustainability as both economy and society are constrained by environmental limits. This unit discusses and defines various concepts associated with environment and sustainability in the third world.

4.2 PEOPLE, CULTURE AND ENVIRONMENTAL SUSTAINABILITY

Each society is creative in its own way. It develops its own pattern of socialization, and its own types of responses to its ecological settings and the forces, both animate and inanimate, which surrounds it. In this way each society develops its own culture. Being the end product of a society, it is the sum total of ideas, beliefs, customs,

practices, techniques, institutions, objects and artifacts which make a society distinctive (Chen & Vente, 1980). In other words, the cultural aspect of the environmental sustainability involves the entire way of life that we have transmitted from one generation to another (Keller, 1979).

The history of human evolution revolves around the culture and there exists an intimate relationship between man, environment and their culture. Culture is the attribute which differentiates human from non-humans. Culture gave us the ability to use environmental and natural resources intelligently. Through culture we as humans got the capacity to exploit nature. Since prehistoric time human settlements were found in the topography rich in natural resources like fresh air, water, forests, minerals, etc. In prehistoric time the human society was intimately related, inhabited and was fully dependent on forest and its resources for different purposes and to sustain their livelihood. For example we exploited forest wood for fuel, we gathered fodder for our cattle, we used many herbs and shrubs for medicinal purposes, we hunted wild animals for food and also the forests were abode for our ancestors and deities, which is an integral part of the prehistoric human beings. But at the same time the prehistoric human was equally concerned about their environment and natural resources. They had the feeling of awe and reverence for the mother-nature. There were various forms of taboos and traditional norms through which they were able to protect and conserve the environment and prevent over exploitation of natural resources.

Before the evolution of industrial society there was a cordial relationship between humans and their environment. The subsistence level of economy (i.e. whatever they gathered and hunted was consumed) was the obvious reason for this cordial relation. Though in prehistoric period human explored environment and natural resources but also with a concern to protect it. There was only production and consumption and no concept of distribution. But along with the emergence of agriculture, settled life and surplus production and thereafter emergence of industrial society, the concept of distribution also emerged. Before that the humans who were the protector of the environment became the predator, destructor and exploiter of the environment. Industrial revolution resulted into unprecedented exploitation of environment and natural resources.

The natural environmental system has 'inbuilt self regulatory mechanism' known as HOMEOSTATIC MECHANISM through which any change in the natural ecosystem/ environmental system is counterbalanced by responses of the system to the change and ultimately ecosystem stability or environmental equilibrium is restored. But since the dawn of industrial revolution in 1860 man has emerged with the most powerful environmental process spearheaded by modern technologies capable of modifying the environment to a great extent. In fact, of all the organisms, man is the most intelligent and powerful animal and is capable of not only affecting the environment like other organisms but is also capable of altering the basic composition of the environment at a scale detrimental not only to all biota but also to his own existence. The development of modern technologies, ever increasing population, rapidly growing industries, increasing urbanization and increasing economic functions of man has further accelerated the rate of exploitation of natural resources. All these have modified few of the components of the environment to such an extent that the adverse effects on the environment cannot be set right by the HOMEOSTATIC MECHANISM or self regulatory mechanism of the environment. Consequently, the changed environmental conditions adversely affect the organisms (both plants and animals including man) in the biosphere (Singh, 1991).

Therefore, if we look at historical progression of man-environment relationships, it becomes clear that purely natural relationship between the 'physical primitive man' and the natural environment during prehistoric time has changed to hostile

relationship between the 'technological man' and the environment at present, which has given birth to numerous environmental problems with serious consequences.

With the emergence of market economy and capitalism to the present era of globalization, there is a grim picture of exploitation of environment and natural resources. As it is rightly quoted by Mahatma Gandhi that there is enough for the need but not for the greed of man, the greedy capitalism caused severe and irreparable damage to the environment. When the damage crossed all the tolerance levels i.e. by the end of 1980s then for the first time in the Brundtland Commission (1987) the concept of environmental sustainability emerged and defined more popularly the terminology of sustainable development.

Thus, since prehistoric period to present day industrial age we as a human being have our specific cultures and specific way to protect and conserve environments through different cultural practices and traditions. Many pre-industrial societies are still following their traditional cultural taboos, norms and values to protect and conserve their environment and thus using it in a well defined sustainable term than many of the industrialized civilized societies. The most important question in this context is that can we afford to ignore the issue of 'culture' in understanding the past and present of human- environment relations, and in canvassing possible future developments. Therefore, the time has come to rethink and redefine sustainability for future generation which is actually based on the intelligent use of natural resource by human beings.

Activity: Try to assess cultural traditions and practices used by many indigenous societies in the third world for environmental sustainability

4.3 SUSTAINABLE DEVELOPMENT AND ITS IMPORTANCE

Sustainable development focuses on improving the quality of life for all the Earth's citizens without increasing the use of natural resources beyond the capacity of the environment to supply them indefinitely. 'Sustainable' in this context means to maintain the necessary and desired characteristics of people, their communities and their surrounding environments for the long term (indefinitely). 'Development' in this context means to bring something to a fuller and better condition. It is a qualitative idea that should be distinguished from growth, which is purely a quantitative physical increase. The combination of these two concepts "sustainable" and "development" embody the world's need to preserve and improve certain areas in order for life (people, plants and animals) to endure.

Sustainable development entered the development discourse in the early 1970s. The 1972 UN Stockholm Conference on the Human Environment may be argued to be the first international conference that brought the concept of sustainability to the international arena. However, there is a general consensus in the literature that it was the 1987 World Commission on Environment and Development (WCED) that was largely responsible for providing the normative-conceptual bridge between environmental concerns and development outcomes (Langhelle, 1999: 145). Sustainable development was further legitimized following the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil in 1992 (known as Earth Summit); the United Nations Conference on Sustainable Development held in 1993; and the World Summit for Sustainable Development which was held in Johannesburg in 2002. These conferences facilitated the globalization of the concept and the establishment of an international consensus on the concept of sustainable development by the formulation of such action plans and guidelines as the Brundtland Report and Agenda 21.

The most popularly employed definition, provided by the Brundtland Report (WCED1987), argues, "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Another often-quoted definition of sustainable development is the one provided by Caring for the Earth: "improving the quality of human life while living within the carrying capacity of supporting ecosystems".

But what does this mean? What are the needs of the present? Take a minute and jot down five to ten needs that you have in your own life. Have you listed any needs that conflict with one another? For example, if you listed clean air to breathe, but also listed a car for transportation, your needs might conflict. Which would you choose, and how would you make your decision? If within ourselves, we have conflicting needs, how much is that multiplied when we look at a whole community, city, country, and world? For example, what happens when individual families' needs for firewood conflict with the need to prevent erosion and conserve topsoil? Or when one country's need for electricity results in acid rain that damages another country's lakes and rivers? Second important question is that how do we decide whose needs are met? Poor or rich people; Citizens or immigrants; People living in cities or in the countryside; People in one country or another; You or your neighbor; The environment or the corporation; this generation or the next generation. When there has to be a trade off, whose needs should go first? Many of these objectives may seem to conflict with each other in the short term. For example, industrial growth might conflict with preserving natural resources. Yet, in the long term, responsible use of natural resources now will help ensure that there are resources available for sustained industrial growth far into the future.

Studying the concept further raises a number of difficult questions. For example, can the long term economic objective of sustained agricultural growth be met if the ecological objective of preserving biodiversity is not? What happens to the environment in the long term if a large number of people cannot afford to meet their basic household needs today? If you did not have access to safe water, and therefore needed wood to boil drinking water so that you and your children would not get sick, would you worry about causing deforestation? Or, if you had to drive a long distance to get to work each day, would you be willing to move or get a new job to avoid polluting the air with your car exhaust? If we don't balance our social, economic, and environmental objectives in the short term, how can we expect to sustain our development in the long term? However, people concerned about sustainable development suggest that meeting the needs of the future depends on how well we balance social, economical, and environmental objectives or needs when making decisions today.

The goal of sustainable development is to improve living standards and the quality of people's lives, both now and for future generations. Rapid population growth rates can make it difficult for countries to raise standards of living and protect the environment because the more the people, the greater the need for food, health care, education, houses, land, jobs, and energy. Responding to the needs of a rapidly growing population can challenge a country's ability to manage its natural resources on a sustainable basis. For example, people may not be able to get access to safe water because more and more households, farms and factories are using increasing amounts of water. Deforestation may occur as trees are cut to provide fuel for cooking, building materials, or land for grazing and agriculture. Desertification may occur as land that has been intensively farmed becomes depleted of its nutrients or eroded when trees whose roots systems once anchored the soil are gone. The air may become polluted as people crowd into cities, the number of cars increases, people use more and more energy and economies continue to industrialize.

However, the record on moving towards sustainability so far appears to have been quite poor. Though we might not always hear about it, sustainable development

(and all the inter-related issues associated with it) is an urgent issue, and has been for many years, though political will has been slow, paced at best. For example, there are

- 1.3 billion without access to clean water;
- About half of the humanity is lacking access to adequate sanitation and living on less than 2 dollars a day;
- Approximately 2 billion without access to electricity;

Late Anil Agarwal, founder editor of Down to Earth magazine argued that millions of people lived within the biomass-based subsistence economy. For these millions, the Gross Nature Product was more important than the Gross National Product. For them, environmental degradation was not a matter of luxury, but a matter of survival. Development was not possible without environmental management. In fact, what was needed was to regenerate the environment for development. He made us look beyond “pretty trees and tigers” to see environmental issues not as people versus nature – a conservation perspective – but as people versus people. The involvement of local communities, therefore, in environmental management was a prerequisite for sustainable development. More focus is needed on developing technologies that are “environment friendly.” Advances in such technologies would have a profound impact on all manners of society.

Thinning of ozone layer in North; deforestation; desertification; threatened marine diversity; radioactive contaminates; rapid industrial growth and air pollution are some of the consequences of present generation’s activities which is needed to be controlled and delimited for the security of future generations. Therefore, sustainable development considerations incorporated into policies, work plans and actions will help address pressing sustainable development needs around the world in the knowledge that without a decent quality of life, supported by sustained broad-based economic growth, people cannot maintain environmental protection measures.

Activity: Demonstrate the human activities causing environmental problems and outline the needs of present and future generations in sustainable terms

4.4 VIEWING OF SUSTAINABLE DEVELOPMENT IN DIFFERENT WAYS

The sustainable development debate is based on the assumption that societies need to manage three types of capitals (economic, social, and natural), which may be non-substitutable and whose consumption might be irreversible. Daly (1991), for example, points to the fact that natural capital can not necessarily be substituted by economic capital. While it is possible that we can find ways to replace some natural resources, it is much more unlikely that we will ever be able to replace eco-system services, such as the protection provided by the ozone layer, or the climate stabilizing function of the Amazonian forest. In fact natural capital, social capital and economic capital are often complementarities. A further obstacle to substitutability lies also in the multi-functionality of many natural resources. Forests, for example, not only provide the raw materials for paper (which can be substituted quite easily), but they also maintain biodiversities, regulate water flow, and absorb CO₂.

Another problem of natural and social capital deterioration lies in their partial irreversibility. The loss in biodiversity, for example, is often definite. The same can be true for cultural diversity. For example with globalization advancing quickly the number of indigenous languages is dropping at alarming rates. Moreover, the depletion of natural and social capital may have non-linear consequences.

Consumption of natural and social capital may have no observable impact until a certain threshold is reached. A lake can, for example, absorb nutrients for a long time while actually increasing its productivity. However, once a certain level of algae is reached lack of oxygen causes the lake's ecosystem to break down suddenly.

If the degradation of natural and social capital has such important consequence then the question arises why action is not taken more systematically to alleviate it. Cohen and Winn (2007) point to four types of market failures as possible explanations: First, while the benefits of natural or social capital depletion can usually be privatized the costs are often externalized (i.e. they are borne not by the party responsible but by society in general). Second, natural capital is often undervalued by society since we are not fully aware of the real cost of the depletion of natural capital. Information asymmetry is the third reason-often the link between cause and effect is obscured, making it difficult for actors to make informed choices. Cohen and Winn close with the realization that contrary to economic theory many firms are not perfect optimizers. They postulate that firms often do not optimize resource allocation because they are caught in a "business as usual" mentality.

The proponents of de-growth reckon that the term of sustainable development is an oxymoron. According to them, on a planet where 20% of the population consumes 80% of the natural resources, sustainable development cannot be possible for this 20%: "According to the origin of the concept of sustainable development, a development which meets the needs of the present without compromising the ability of future generations to meet their own needs, the right term for the developed countries should be a sustainable de-growth".

Another way of viewing Sustainable development is that, it is required to be seen as a system-a system that connects space; and a system that connects time. When you think of the world as a system over space, you grow to understand that air pollution from North America affects air quality in Asia, and that pesticides sprayed in Argentina could harm fish stocks off the coast of Australia. And when you think of the world as a system over time, you start to realize that the decisions our grandparents made about how to farm the land continue to affect agricultural practice today; and the economic policies we endorse today will have an impact on urban poverty when our children are adults. The concept of sustainable development is rooted in this sort of systems thinking. It helps us understand ourselves and our world.

The four visual metaphors introduced in this section represent different ways of "seeing" sustainable development. No single metaphor is better than another; each has its place in helping us to understand sustainable development in all its complexity.

The mobile: The mobile is a useful metaphor when trying to explain the interdependency of sustainable development activities. Each lobe on the mobile represents an aspect of human development. When changes are made in one area, the equilibrium of the entire mobile is affected – for the better it is hoped. The entire structure remains in motion until a new equilibrium is found. The mobile metaphor is a useful reminder that the full range of possible consequences should be considered carefully before implementing a development initiative.

Lenses in a sphere: This metaphor helps to capture the idea that the perspective you begin with colors your impression of the problems, possible solutions, and likely outcomes. For instance, looking at sustainable development through an environment lens is likely to highlight environmental needs and suggest environmental approaches – perhaps to the exclusion of other possibilities. That would also be true if you looked through the political lens, or social developmental lens. The implication is that every need should be viewed through as many lenses as possible in order to understand the need in all its dimensions and to fashion an integrated response.

The egg of sustainability: In the “egg of sustainability”, humanity is represented as the yolk and the ecosystem as the egg white. Together, they represent a complete, but fragile entity. This metaphor is used to communicate the idea that people are an integral part of an ecosystem and that the well-being of both people and the ecosystem needs to be improved together. Only when both the human and the ecosystem conditions are good or improving can you have a sustainable society.

A system in balance: The Systems Perspective of sustainable development is borrowed from systems engineering, which solves multifaceted problems by applying knowledge from a variety of disciplines in effective combinations. The systems perspective recognizes that there are a number of distinct circles of sustainable development activity, each with its own theories, priorities, and activities. However, when addressing complex human development needs, it is rare to find one of these needs in isolation. It is helpful to think of the circles overlapping – sometimes to a greater extent, other times to a lesser extent. In the places where one or more of the circles overlap, you find hybrid approaches that draw from the strengths of each intersecting discipline.

Activity: Think and pen down different ways of looking at sustainable development in your place of residence

4.5 REDUCING EMISSIONS FROM DEFORESTATION AND LAND DEGRADATION (REDD)

In recent years, estimates for deforestation and forest degradation were shown to account for 20-25% of greenhouse gas emissions, higher than the transportation sector. Even with these new numbers it is increasingly accepted that mitigation of global warming will not be achieved without the inclusion of forests in an international regime. In this context, Reducing Emission from Deforestation and Land Degradation (REDD) are a set of steps designed to use market/financial incentives in order to reduce the emissions of greenhouse gases from deforestation and forest degradation. Its original objective is to reduce green house gases but it can deliver “co-benefits” such as biodiversity conservation and poverty alleviation. “Reducing emissions from deforestation and forest degradation” implies a distinction between the two activities. The process of identifying the two is what raises questions about how to measure each within the REDD mechanism, therefore their distinction is vital. Deforestation is the permanent removal of forests and withdrawal of land from forest use. Forest degradation refers to negative changes in the forest area that limit its production capacity.

In the 1997, at the global climate agreement, the Kyoto Protocol, policies related to deforestation and degradation was excluded due to the complexity of measurements and monitoring of the diverse ecosystems and land use changes. This exclusion resulted in the formation of the Coalition of Rainforest Nations. Participant nations included Papua New Guinea, Costa Rica and other forest nations. In 2005, at the 11th Conference of the Parties (COP-11), the Coalition of Rainforest Nations initiated a request to consider ‘reducing emissions from deforestation in developing countries.’ The matter was referred to the Subsidiary Body for Scientific and Technical Advice (SBSTA). The United States challenged the proposal but failed in its attempts. Later, at the 2007 Bali United Nations Framework Convention on Climate Change (UNFCCC) meeting (COP-13), an agreement was reached on “the urgent need to take further meaningful action to reduce emissions from deforestation and forest degradation”. The deadline for reaching an agreement on the specifics of an international REDD mechanism, at least as regards to its being implemented in the short and medium term, was set to be the 15th Conference of the Parties to the UNFCCC (COP-15), which was held in Copenhagen in December 2009.

A number of NGOs, development agencies, research institutes and international organizations support developing countries that wish to engage in REDD activities. The World Bank's Forest Carbon Partnership Facility, the UN-REDD-Program, and Norway's International Climate and Forest Initiative are such examples. The genuine actors of REDD, however, will be the populations whose livelihoods derive from forests. Indigenous Peoples and forest-dependent communities will be the front liners of REDD, and the success of REDD activities will largely depend on their engagement. There are many corporative and financial lobbies behind the push for REDD. This is because a REDD strategy need not refer solely to the establishment of national parks or protected areas; by the careful design of rules and guidelines, REDD could include land use practices such as shifting cultivation by indigenous communities and reduced-impact-logging, provided sustainable rotation and harvesting cycles can be demonstrated.

The World Bank presently plays an important role in the progression of REDD activities. As one of the financial contributors to the REDD program, the World Bank has created a \$300 million fund, for the Forest Carbon Partnership Facility (FCPF). So far small grants of \$200,000 have been disbursed. This fund is aimed towards initiating REDD activities in developing countries. In addition, another World Bank facility, the Carbon Partnership Facility (CPF), is expected to be used in areas like the power sectors, transportation, urban development and other areas related to energy efficiency where greenhouse gases are generated.

The UNDP, UNEP and FAO have set up the UN-REDD Program, which is aimed at assisting developing countries in addressing certain measures needed in order to effectively participate in the REDD mechanism. These measures include capacity development, governance, engagement of Indigenous People and technical needs. The first initial set of nine countries was Bolivia, Democratic Republic of Congo, Indonesia, Panama, Papua New Guinea, Paraguay, Tanzania, Vietnam, and Zambia. The total number of funds allocated by the UN-REDD Program Policy Board up to date is US\$ 48.3 million, allocated to eight of these countries.

The REDD mechanism has been well received by some national governments. At the 2007 Bali Conference, the Norwegian government announced their International Climate and Forests Initiative, which provided \$500 million towards the creation and implementation of nation-based, REDD activities in the nation of Tanzania. The Norwegian government will work closely with international organizations such as UN-REDD to promote REDD activities in the area. In addition, the Government of Norway and United Kingdom contributed \$200 million towards the Congo Basin Forest Fund to aid forest conservation actives in Central Africa. Australia has joined the efforts to promote REDD mechanisms. Their \$200 million International Forest Carbon Initiative focused on developing REDD activities in these regions that are, areas like Indonesia, and Papua New Guinea. The governments of Spain and Denmark have recently become donors to the UN-REDD Program.

India also has made significant progress in addressing deforestation and stabilizing forest cover through a combination of policy measures and innovative forest management activities. But it is still grappling with the issue of forest degradation which adversely impacts livelihoods of millions of people in the country. India advocates a comprehensive approach to REDD. In its submission to UNFCCC in August 2009, India has elaborated REDD as Reducing Emissions from Deforestation in Developing Countries, Sustainable Forest Management (SFM) and Afforestation and Reforestation (A & R)' which further substantiates its comprehensive approach (MoEF, 2009).

Activity: Suggest and implement certain ways of reducing emission from deforestation and land degradation

4.6 ENVIRONMENT AND SUSTAINABLE DEVELOPMENT MEASURES IN INDIA

India is not only a land of rich cultural diversity but also possessing diversified forms of natural resources (flora, fauna, minerals, ores, etc). Richest in biodiversity, out of 25 biodiversity hotspots India possesses two of them. India's environmental concern can be traced back to 1853 when the Shore Nuisance (Bombay and Calcutta) Act was passed. Indian environmentalism was given an impetus in the latter part of 1970s by a number of movements directed to specific ends, notably the Chipko Movement because it gave environmentalists a human face, as this was a struggle involving poor rural people, not just scientists and educated city-dwellers. A breakthrough came in 1972 in the wake of the Stockholm Conference with the establishment of National Committee on Environmental Planning and Coordination (NCEPC) in 1972. It had the responsibility of reviewing policies and programs for the environment. Another milestone in environmental action occurred in early 1970s in the form of enactment of the Water (Prevention and Control) of Pollution Act of 1974. Under this law, Boards for Prevention and Control of Pollution of water were established both at the central and state levels with the necessary technical competence and legal powers to monitor the implementation of the law. To meet the expenses of the Boards, the Water Cess Act, 1977 was passed requiring industries to pay a cess on their water consumption.

The next important step was the setting of the Department of Environment (DoE) in the Central Government in 1980. In 1981, steps were taken to control air pollution with the enactment of the Air (Prevention and Control of) Pollution Act, 1981. In 1985, the Department was transformed into a full-fledged Ministry of Environment and Forests. Its status improved significantly compared to the earlier back bench position of the DoE. An 'Umbrella' Act was also enacted by the National Parliament, entitled the Environment (Protection) Act, 1986. Unlike the earlier Acts, the scope of this act is broad, covering water, air, land and the inter relationships that existed among water, air, land human beings and other living creatures. On the eve of the Rio Conference in 1992, two-policy statements were expressed by the Government of India.

- 1) National Conservation Strategy and Policy Statement on Environment and Development, (June, 1992).
- 2) Policy Statement for Abatement of Pollution, (February, 1992).

For expeditious disposal of cases arising out of such accidents as Bhopal Gas Tragedy (BGT) and to provide early relief and compensation to persons, properties and environment, the National Environment Tribunals Bill, 1992 has been introduced in Parliament, which results in the formation of NET (National Environment Tribunal) in 1995.

Along with the evolution of above mentioned environmental policies, India is a signatory to a number of multilateral environment agreements (MEAs) and conventions. The International Cooperation Division in the Ministry of Environment and Forests has been renamed as International Cooperation and Sustainable Development Division (IC&SD). In addition to the work related to international cooperation in the field of environment, the Division has now been entrusted with the additional responsibility of coordinating the sustainable development activities.

This division is the nodal division for United Nations Environment Program (UNEP) Nairobi, South Asia Cooperative Environment Program (SACEP) Colombo. The Division also handles bilateral issues and matters pertaining to multilateral bodies such as the Commission on Sustainable Development, Environment Support Program of UNDP under Country Cooperation Framework -1, Global Environment

Facility (GEF) and the regional bodies like Economic & Social Commission for Asia & Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC), European Union (EU) and the India Canada Environment Facility.

In the area of sustainable development following new initiatives have been taken up by the Division:

- i) Preparation of State of Environment (SoE) Report;
- ii) Formulation of Sustainable Development Indicators (SDI).

The Ministry is the nodal agency in the Government for various environment related multilateral conventions and protocols. These include the Convention on International Trade in Endangered Species, Convention on Wetlands of International importance, especially as waterfowl habitat, Convention on the Conservation of Migratory Species of Wild Animal, Vienna Convention for the protection of the Ozone Layer, Montreal Protocol on Substances that deplete the Ozone Layer, Conventions on Biological Diversity, UN Framework Convention on Climate Change, Kyoto Protocol, the Basel Convention on Trans-boundary Movement of Hazardous Substances, Convention to Combat Desertification, Stockholm Convention on Persistent Organic Pollutants etc.

For ensuring sustainable use of renewable resources and also for efficient use of non- renewable resources India has a separate Ministry of Renewable Energy working efficiently and with compliance to international goals of meeting sustainable development.

Activity: Evaluate the position of India in compliance to the international efforts for sustainable development

4.7 CONTENTIONS AND DEVELOPMENT OF NATURE-FRIENDLY SUSTAINABILITY

The population has increased from a little less than one billion in the year 1750 to six billion in 2000 A.D. According to the UN projection, this is likely to be 10 billion by 2100 A.D. Increasing population has been putting great pressure on natural resources and carrying capacity of land has shrunk significantly. The growth of population is much more in less developed regions vis-à-vis more developed regions and, therefore, the problems of the developing regions are of more serious nature than those of the developed world. The scenario witnessed today is the grim picture of environmental degradation. Water and soil are so much polluted that humanity is facing an unprecedented crisis. The use of fossil fuel has also reached its peak. In this context, 'Peak oil' is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters a terminal decline. This concept is based on the observed production rates of individual oil wells, projected reserves and the combined production rates of fields of related oil wells. The aggregate production rate from an oil field over time usually grows exponentially until the rate peaks and then declines-sometimes rapidly-until the field is depleted. Therefore, an earnest effort will have to be made by the people to protect and preserve the environment and keep a balance between the two worlds of man. The major debate to develop nature friendly sustainability is between the developed and developing nations. As the statistics reveals that developed countries are the major emitters of green houses gases responsible for ozone depletion and rise in global temperature but the major sufferers of this emission are the developing countries or more specifically the third world. The impacts may be visible in the form of changing climatic conditions (unexpected rainfall; reversal of seasons; extreme winter and summer, etc), more frequent

occurrence of natural disasters (flood, draught, cyclones, etc), degrading water level and contamination of water bodies. Deforestation and land degradation are the obvious outcomes of increased industrialization and urbanization. World's dominant Economies are demanding for economic growth and a high rate of GDPs and GNPs while the world's environmentalists are concerned more with a sustainable and nature friendly living than to the merciless exploitation of natural resources.

The history of sustainability traces human-dominated ecological systems from the earliest civilizations to the present. This history is characterized by the increased regional success of a particular society, followed by crises that were either resolved, producing sustainability, or not, leading to decline. In early human history, the use of fire and desire for specific foods must have altered the natural composition of plant and animal communities. Since 8,000 to 10,000 years ago, Agrarian communities emerged which depended largely on their environment and the creation of a “structure of permanence”. A major driver of human impact on Earth systems is the destruction of biophysical resources, and especially, the Earth’s ecosystems. Social disruptions like war, crime and corruption, divert resources from areas of greatest human needs, damage the capacity of societies to plan for the future, and generally threaten human well-being and the environment. Broad-based strategies for more sustainable social systems include: improved education and the political empowerment of women, especially in developing countries; greater regard for social justice, notably equity between rich and poor both within and between countries; and intergenerational equity. According to Murray Bookchin, the idea that humans must dominate nature is common in hierarchical societies. Bookchin contends that capitalism and market relationships, if unchecked, have the capacity to reduce the planet to a mere resource to be exploited. Nature is thus treated as a commodity: “The plundering of the human spirit by the market place is paralleled by the plundering of the earth by capital.” On the other hand, Klein argues that nature should not be alienated from man and vice versa. Hence, in order to build and maintain a balance between the two, conservation approaches need to adopt a bottom-up and community involvement approach as opposed to a top-down and Yellowstone approach which alienates man from nature based on the premise that man is harmful to nature. One approach to sustainable living, exemplified by small-scale urban transition from towns to rural eco-villages, seeks to create self-reliant communities based on principles of simple living, which maximize self-sufficiency particularly in food production. Another example of nature- friendly sustainability is a non-governmental organization called Greenpeace which was established in 1971 in Amsterdam, Netherlands and since then is working with a goal to “ensure the ability of the Earth to nurture life in all its diversity and focuses its campaigning on worldwide issues such as global warming, deforestation, overfishing, commercial whaling and anti-nuclear issues.

Therefore, what is needed is a strong socio-political and legal framework which cannot be divorced from the present environmental concerns and also a strong people’s movement as the environment and its resources are not only for the people but by the people.

Activity: Discuss the role of developed and developing countries in the nature friendly sustainability

4.8 SUMMARY

Sustainability in its simplest form is the capacity to endure but for humans, sustainability is the long-term maintenance of well being, which has environmental, economical, and social dimensions. It encompasses the concept of union, an

interdependent relationship and a mutual responsibility position amongst all living and non living things on earth. Therefore, environment though one of the components but the most important dimension of sustainability as both economy and society are constrained by environmental limits.

Sustainable' in this context means to maintain the necessary and desired characteristics of people, their communities and their surrounding environment for the long term (indefinitely). The cultural aspect of the environmental sustainability involves the entire way of life that we have transmitted from one generation to another.

Third world is the main proponents of environmental sustainability and nature friendly developments on the planet earth. Majority of indigenous people residing in the third world are conserving and protecting the environment through their culture. Sustainable development and REDD are some of the methods adopted by them in this direction. India has also played a significant role and has adopted many approaches for sustainable development and environmental sustainability.

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Sample Questions

- 1) What do you mean by environmental sustainability?
- 2) Discuss the role of culture in maintaining environmental sustainability.
- 3) Define sustainable development and its importance in the present context of environment.
- 4) How India in the third world measures up to international efforts to hold sustainable development approaches?