

Block

6

CULTURAL DIMENSIONS OF DEVELOPMENT AND BIODIVERSITY CONSERVATION

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January, 2013

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ISBN-978-81-266-

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Further information on Indira Gandhi National Open University courses may be obtained from the University's office at Maidan Garhi, New Delhi-110 068.

Printed and published on behalf of the Indira Gandhi National Open University, New Delhi by the Director, School of Social Sciences.

Laser Typeset by : Mctronics Printographics, 27/3 Ward No. 1, Mehrauli, New Delhi-30

Printed at :

BLOCK 6 CULTURAL DIMENSIONS OF DEVELOPMENT AND BIODIVERSITY CONSERVATION

Interest in the relationship between people and their environment has a long history in anthropology. Since the early development of the discipline in the 19th century, scholars have been concerned with the ways in which societies interact with their environment and utilise natural resources, as with the ways in which natural processes are conceptualised and classified. Numerous research experiences by ecological anthropologists demonstrated the intimate associations between local communities and their environments and the extensive knowledge generated through these associations.

The study of culturally specific knowledge has been a staple of anthropology since the turn of the 20th century. Interest in traditional ecological knowledge has been growing, partly due to recognition that such knowledge can contribute to the conservation of biodiversity, endangered species, protected areas, ecological processes, and to sustainable resource use in general. Environmental anthropologists, conservation biologists, ethnobiologists, other scholars, and the pharmaceutical industry all share an interest in traditional knowledge for scientific, social, or economic reasons. Local knowledge and learning about biodiversity refers to a process of acquiring, applying and interacting with a unique body of knowledge developed by groups of people who are indigenous to a specific geographical area. Throughout the world, concern has been expressed about an ongoing and accelerating loss of traditional knowledge and biodiversity based learning systems, and many have searched for ways to preserve both.

Ecological and Environmental anthropology can most productively be viewed as a single interrelated discipline, with ecological anthropology focusing more on basic academic research and environmental anthropology being more focused on contemporary environmental issues and having more of an applied, practicing, critical, and/or advocacy approach. Assuming that the learner has no prior knowledge of the subject of environmental anthropology, this Block, will focus on analysis and the application of anthropological knowledge to the most pressing environmental issues facing the contemporary world: indigenous environmental knowledge, conservation of biodiversity, sustainable natural resource management, intellectual property rights and applied environmental knowledge. In the Unit 1 we will discuss an overview of indigenous environmental knowledge held by indigenous communities. The Unit 2 explains the imperative to focus on biodiversity conservation. The Unit 3 describes various issues related to intellectual property mechanisms to address indigenous rights or to conserve biological resources controlled by indigenous groups. The Unit 4 covers a comprehensive understanding of applied environmental anthropology, including the history of applied anthropology, environmental issues like biodiversity conservation, sustainable agriculture, and indigenous knowledge etc.

UNIT 1 INDIGENOUS ENVIRONMENTAL KNOWLEDGE SYSTEMS AND DEVELOPMENT

Contents

- 1.1 Introduction
- 1.2 Development of the Concept Indigenous Knowledge System
- 1.3 Meaning and Relevance of Indigenous Environmental Knowledge
 - 1.3.1 Meaning and Definition of Indigenous Environmental Knowledge
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- 1.5 Various Thematic Fields of Indigenous Environmental Knowledge Research
- 1.6 Indigenous Knowledge versus Western knowledge: Commonalities and Differences
- 1.7 Summary
- 1.8 References
 - Suggested Reading
 - Sample Questions

Learning Objectives



By the end of this unit, you should be able to:

- define meaning and concept of indigenous environmental knowledge;
- describe types and characteristics of indigenous knowledge;
- recognise the importance of indigenous knowledge towards development;
- explain the various themes covered in indigenous knowledge research; and
- distinguish between indigenous and western knowledge.

1.1 INTRODUCTION

In this unit, we will discuss an overview of indigenous environmental knowledge held by indigenous communities. The unit focuses on defining indigenous knowledge and understanding its core characteristics and controversies. Indigenous/Tribal/Rural communities have long had a relationship and significant interdependence with the lands and environments in which they live. These lands, forests, and water bodies' environments are vital for their survival, providing a wide array of substances for food, shelter and implements. Further, they also provide a source for a variety of objects for both ritual and everyday use. The land, forest and environment play a very significant role in cultural, religious and social systems of indigenous communities. These people are custodians and stewards of their lands, forests and environments, and have been entrusted by ancestral charters to care for these through successive generations.

Indigenous communities have an intimate knowledge of many aspects of their surroundings and various resources in their daily lives. The communities' dependence on the environment around made them acquire the knowledge and value of many plants, animals and other natural resources by trial and error. From many centuries these communities have learned how to grow food and to survive in a sometimes difficult environment. They know what varieties of crops to cultivate, when to sow and weed, which plants are poisonous and which can be used for medicine, how to cure diseases and how to maintain their environment in a state of equilibrium.

Consequently, humans became the storehouse of knowledge of many useful as well as harmful plants and animals; accumulated and enriched through generations. This knowledge was passed on from one generation to another, usually verbally, without any written document and called traditional/local knowledge or indigenous environmental knowledge. Indigenous knowledge or local environmental knowledge is the knowledge that people have gained through inheritance from their ancestors. Over centuries, indigenous people around the world have developed their own, locality-specific knowledge and practice, which is an important part of the lives of the people. It is a people-derived science, and it represents people's creativity, innovations and skills.

1.2 DEVELOPMENT OF THE CONCEPT INDIGENOUS KNOWLEDGE SYSTEM

Indigenous cultures have been the object of research by anthropologists since many years. Anthropological research has basically played the role to study the cultures, worldviews and knowledge of peoples outside their own culture. The reason for interest of anthropologists in this subject varies and has undergone some shifts in the course of the history. There is growing acknowledgement that culture-specific worldviews and ways of knowing play important roles in the lives of people. In numerous countries the indigenous food systems and health care as well as systems of governance are built on indigenous worldviews and knowledge systems.

For thousands of years, aboriginal/indigenous peoples around the world have used knowledge of their local environment to sustain themselves and to maintain their cultural identity. Only in the past decade, however, has this knowledge been recognised by the Western scientific community as a valuable source of ecological information. Today, a growing body of literature attests not only to the presence of a vast reservoir of information regarding plant and animal behaviour but also to the existence of effective indigenous strategies for ensuring the sustainable use of local natural resources.

Indigenous knowledge refers to the multi-dimensional understandings developed by a culture based on its local environment and its long history of inhabiting that environment. 'Indigenous knowledge' (IK) as a term has emerged over the two decades to describe the knowledge of a group of people local to a given situation, sometimes used interchangeably with 'local' knowledge [Ellen and Harris 2000]. In the 50's and 60's, theorists of development saw indigenous knowledge as inefficient, inferior and an obstacle to development. At present indigenous knowledge is seen as a pivotal in discussion on sustainable resource use and

balanced development (Brokensha, 1980). In the current development discourse, formulations about indigenous knowledge recognise that derogatory characterisation of the knowledge of the poor and marginalised populations may be hasty and naive. In contrast to modernisation theorists, advocates of indigenous knowledge underscore the promise it holds for sustainable development (Warren, 1991; Orlove et al., 1996).

The use of the term 'indigenous' began with Robert Chamber's group at the Institute of Development studies, University of Sussex, in 1979. Others have written about indigenous technical knowledge, (A special issue of the IDS Bulletin featured the term 'Indigenous Technical knowledge') (ITK) which can be contrasted with modern scientific knowledge. Thirty years ago, most of the academics working in the area of indigenous knowledge represented Anthropology, Development Sociology and Geography. Today, important contributions are also being made in the fields of many other disciplines. It is a fact that contemporary research and advocacy of indigenous knowledge is founded upon the earlier pioneering writings of anthropologists like Conklin and Lewis. It is also true that many of the early researchers who identified themselves as ethno-scientists continue the current work on indigenous knowledge and people. These knowledge systems have been variously described as 'People's Knowledge', 'ethno-science,' and 'folk-ecology' (Barker et al., 1977). The 'ethno' prefix is widely used in ethno-ecology, ethno-botany, ethno-zoology, ethno-medicine, ethno-soil science, ethno-agronomy, ethno-linguistics and ethno-aesthetics.

The systematic investigation of traditional environmental knowledge began with a series of studies on the terminologies that people of different cultures use to classify objects in their natural and social environments. These early studies by anthropologists and natural scientists revealed that all cultures recognize natural classes of animals and plants, and that traditional cultures are as much concerned with classifying their world as are Western scientists. Much of this knowledge appeared to be clearly esoteric: many of the named species served no obvious useful purpose. Also, there was often a close correspondence between scientific taxa and the categories of plants and animals established by aboriginal peoples. Early studies by anthropologists and natural scientists also recorded indigenous knowledge of plant and animal behaviour. Local interpretations of natural phenomena were often at odds with scientific explanations (possibly rooted in a spiritual ideology); nevertheless, they revealed a wealth of underlying empirical knowledge (Martha Johnson, 1992).

Concurrent with these early studies was a rising political pressure to recognise the rights of aboriginal peoples and a growing environmental movement searching for alternative approaches to Western science and technology. This changing social and political climate resulted in a shift away from theoretical studies to more applied research. Recent emphasis has been on understanding the ecologically sound practices that contribute to sustainable resource use among indigenous peoples and ways that this knowledge can be successfully integrated with the scientific resource management of the West (Martha Johnson, 1992).

Traditional environmental knowledge gained international recognition through such documents as the *World Conservation Strategy* IUCN et al. 1980) and *Our*

Common Future (WCED 1987). Both reports emphasised the need to use directly the environmental expertise of local people in managing natural resources. They stressed that sustainable management of natural resources could only be achieved by developing a science based on the priorities of local people and creating a technological base that blends both traditional and modern approaches to solving problems (Martha Johnson, 1992).

It also gained international recognition after the United Nations Conference on Environment and Development (UNCED) held in June 1992 in Rio de Janeiro. Agenda 21, one of the environmental agreements signed at UNCED, emphasizes that governments and intergovernmental organisations should respect, record, and work toward incorporating indigenous knowledge systems into research and development programs for the conservation of biodiversity and sustainability of agricultural and natural resource management systems. Other international documents, such as the 1980 “World Conservation Strategy” by the International Union for the Conservation of Nature and Natural Resources (IUCN), also paved the way for the recognition of the important role played by indigenous knowledge in biodiversity and human development. The value of indigenous knowledge systems in facilitating development is now gradually being recognized by governments and developments agencies. Today, indigenous environmental knowledge is a growing field of inquiry, both nationally and internationally, particularly for those interested in educational innovation (Peter Mwaura, 2008).

Activity

Name some of indigenous group who are living near by your locality?

1.3 MEANING AND RELEVANCE OF INDIGENOUS ENVIRONMENTAL KNOWLEDGE

Before going to know the meaning, definition and scope of indigenous knowledge, it is important to first understand the meaning of terms what is ‘traditional’ or ‘indigenous’. Traditional essentially means “to hand down” or “hand over” therefore, traditional knowledge (TK) is passed on from one generation to another usually orally. Whereas the term ‘indigenous’ means “someone or something that is native or originating from a given place. Indigenous, as the adjective of indigene, when applied to peoples, means “group or culture regarded as coming from a given place. In the contemporary environment, indigenous people are a group of people and/or descendants: “who have a historical continuity or association with a given region, or parts of a region, and who formerly or currently inhabit the region”.

In the dictionary sense, “traditional” usually refers to cultural continuity transmitted in the form of social attitudes, beliefs, principles and conventions of behaviour and practice derived from historical experience. However, societies change through time, constantly adopting new practices and technologies, making it difficult to define just how much and what kind of change would affect the labelling of a practice as “traditional.” According to Warren the term ‘traditional knowledge’ denoted the 19th Century attitudes of simple, savage and implies a rather static perception of knowledge with low level of change.

For this reason, some scholars prefer the term “indigenous ecological knowledge.” This helps avoid the debate about tradition and explicitly emphasises indigenous people. However, similar knowledge is found among non-indigenous groups such as outport fishermen and farmers. These groups have also acquired their knowledge and skills through hands-on experience living in close contact with their environment. Like this, in course of time the term ‘traditional knowledge’ is replaced with ‘indigenous knowledge’ because the term implies non-static and dynamic. Traditional knowledge and indigenous knowledge are contested terms, with widely varying definitions and interpretations. In this unit, I do not attempt to go into these contestations, but briefly provide some broad idea of the terms to set the background for the rest of the unit.

1.3.1 Meaning and Definition of Indigenous Environmental Knowledge

There are several terms and meanings in use to describe the body of expertise and knowledge held in indigenous communities. And it is important to first understand what this knowledge is all about and the terms used to describe it. However, what is meant by ‘indigenous knowledge’ is not very clear at the moment when it is rapidly coming into current use with development planners. Many terms have been developed in literature to refer to the collective knowledge of local people. Indigenous knowledge can be defined as a body of knowledge built up by a group of people through generations of living in close contact with nature (Johnson, M. 1992). A broader definition is that indigenous knowledge is the knowledge used by local people to make a living in a particular environment (Warren, D.M. 1991). These are simple but convenient definitions. However, indigenous knowledge is much more complex. In fact, a variety of terms have been used to describe this form of unique knowledge. These have included such terms as “local knowledge,” “traditional knowledge,” “indigenous traditional knowledge,” “indigenous technical knowledge,” “traditional environmental knowledge”, “indigenous environmental knowledge”, “rural knowledge”, “traditional ecological knowledge”, “folk knowledge, ethno-ecology, ethno-science, peoples’ science and so forth. However, these terms have similar meanings. All terms for knowledge belonging to various groups of ethnic grassroots people. Nonetheless, they all share a certain common idea and address the same broad issues, which are used interchangeably to refer to that knowledge which is generated and transmitted by local communities, over time, in an effort to cope with their own agro-ecological and socio-economic environments.

However, the term “indigenous” has become so politicized over recent campaigns on “the rights of indigenous peoples” that it tends to exclude such local communities who may have lived in an area for a long period of time and developed their own system of local knowledge but are not the original inhabitants. That is one of the reasons why some writers prefer to use the following (Box:1) other terms to describe indigenous knowledge, which are broader concepts referring to the knowledge possessed by any group living in a particular area for a long period of time.

Term, synonyms	Meaning, salient aspect implicit significance, antonym
• indigenous knowledge (internationally the most widespread term) • endogenous knowledge • native knowledge/expertise • local knowledge • sustainable knowledge • traditional knowledge • autochthonous knowledge • people's knowledge • folk knowledge, folk science, folk competence • little tradition • community knowledge • cultural knowledge, cognition (in the restricted sense) • ethnic knowledge • culturally specific knowledge • ethnoscience • (used here to denote local knowledge; previously used to denote the field of research): scientific (systematic) character; examples are: ethnobotany, ethnosociology, ethnomedicine, ethnopharmacology, ethnoepidemiology • (cultural) knowledge system (superseded "ethnoscience"): systematic character, generating rules (if x then y) and structures • (cultural) belief system, (cultural) meaning system: mean the same as "knowledge system", but imply a less scientific character • everyday knowledge, practical knowledge, mundane cognition, vernacular, common sense, generalist: informal, practical, applied, as opposed to academic, specialist, expert knowledge or as opposed to ritual knowledge • science of the concrete : based on that which actually exists/is visible • experiential knowledge : as opposed to theoretical knowledge, speculation • experimental knowledge : trial-and-error, as opposed to controlled experiment • farmers' knowledge : knowledge relating to the farm as an economic unit • peasant knowledge as : opposed to elite knowledge; implies experiences of dependency	culturally integrated knowledge; knowledge of small, marginal/non-western groups of internal origin, as opposed to exogenous or external knowledge implies knowledge of a natural character, closeness to nature knowledge rooted in local or regional culture and ecology sustainable within the natural and cultural environment handed down, old, oral (implying static, low level of change) of internal origin, culturally integrated broadly disseminated knowledge, knowledge as potential for political resistance, as opposed to elite knowledge traditional, rural (in industrial societies) tends to denote oral knowledge, as opposed to great tradition related to small social units culturally integrated and practice-oriented related to an ethnic "we"-group (ethnicity) specificity, singularity, particularity

Even though there is no universally accepted definition of indigenous knowledge in literature, there are a number of definitions describe of “indigenous knowledge”, and most of them are confronted by some fundamental problems of differentiating it from other types of knowledge. This is in part due to the differences in background and perceptions of the various authors who come from varied fields ranging from Social Anthropology to Agricultural Engineering. Nevertheless, the various definitions also have some common traits.

Since there are numerous definitions of indigenous knowledge found throughout the literature, for your knowledge let us discuss few of them.

D. M. Warren, a leading academic in indigenous knowledge and development, defines indigenous knowledge as “unique to a given culture or society” (1991). A society’s uniqueness stems in part from the uniqueness of the local environment and the conditions it presents. Therefore, indigenous knowledge is founded on the relationship between humans and their unique natural environment. According to him the “term indigenous knowledge’ (IK) is used synonymously with ‘traditional’ and ‘local’ knowledge to differentiate the knowledge developed by a given community from the international knowledge system sometimes also called western knowledge or scientific knowledge system, generated through universities, government research centers and private industry. IK is the knowledge that unique to a given culture or society. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities.

Chambers (1983) defined it as “a cumulative body of knowledge generated and evolved over time, representing generations of creative thought and actions within individual societies in an ecosystem of continuous residence with an effort of coping with the ever changing agro-ecological and socio-economic environment. For Grenier (1998) it is “the unique, traditional, local knowledge existing within and developed around specific conditions of women and men indigenous to a particular geographic area”. Not only does this definition claim that the knowledge is specific to the locality, but it also emphasizes the unique relationship between the holders of the knowledge and the geographical location they inhabit.

Traditional Ecological Knowledge is defined by Johnson (1992) as: “a body of knowledge built up by a group of people through generations of living in close contact with nature. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use. TEK is both cumulative and dynamic, building upon the experience of earlier generations and adapting to the new technological and socio-economic changes of the present.

“Indigenous Environmental Knowledge (IEK) as defined by Tiu (2007) is “the accumulated knowledge and skills of indigenous people and their relationships with the environment”. IEK is vital because it emphasizes local knowledge of fauna and flora and provides an avenue for linkage to biodiversity conservation efforts. An understanding of indigenous people’s prior knowledge is essential to make biodiversity conservation more meaningful. People will not remember conservation messages if they are not relevant to their everyday life and concerns (Orsark, 2005).

Indigenous knowledge reflects many generations of experience and problem-solving by ethnic groups at the local level, and no experience of one country can exactly replicate another. Most writers, however, favour the use of the term “indigenous knowledge” although some writers make a distinction between “indigenous knowledge” and “local knowledge”. “Indigenous knowledge” is said to refer to the knowledge possessed by the original inhabitants of an area, while the term “local knowledge” refers to the knowledge of any people, not necessarily indigenous, who have lived in an area for a long period of time (Langill, S. 1999).

While using similar definitions, by the various authors, the conclusions drawn that none of the definitions is essentially contradictory; they overlap in many aspects. Most authors explain their perception of indigenous knowledge, covering only some aspects of it. Analysis of this selection of definitions reveals that several interrelated aspects appear to be more or less specific to IK. IK is:

- locally bound, indigenous to a specific area.
- culture- and context-specific.
- based on experience.
- held by individuals or communities.
- embedded in community practices, institutions, relationships and rituals.
- non-formal knowledge.
- orally transmitted, and generally not documented.
- dynamic and changing.
- adaptive to local culture and environment.
- holistic in nature.
- often tested over centuries of use.
- closely related to survival and subsistence for many people worldwide.

Indigenous Knowledge is not confined to tribal groups or the original inhabitants of an area. It is not even confined to rural people. Rather any community possesses indigenous knowledge i.e. rural and urban, settled and nomadic, original inhabitants and migrants. There are other terms, such as traditional knowledge or local knowledge, which are closely related, partly overlapping, or even synonymous with “indigenous knowledge.” In this unit mostly the term “indigenous knowledge” is used to cover all those concepts of knowledge systems.

Activity

List out different terms of indigenous knowledge used in the literature?
Write one definition of indigenous knowledge which is appropriate according to you?

1.3.2 Relevance of Indigenous Environmental Knowledge

Indigenous knowledge is of great significance in all the countries. In many countries, for instance, indigenous knowledge influences many areas of life; its role in the social and economic well-being of the nation and in the management of its resources and the environment is immense.

Indigenous environmental knowledge is the human capital of both the urban and rural people. It is the main asset they invest in the struggle for survival, to produce food, provide for shelter or achieve control of their own lives. Significant contributions to global knowledge have originated with local people, for instance for human and veterinary medicine. Local knowledge is developed and adapted continuously to a gradually changing environment. It is passed down from generation to generation and closely interwoven with people's cultural values.

It is beyond doubt that indigenous knowledge is important for the survival of many indigenous communities and the preservation of biodiversity. Michael Warren (1991) notes that indigenous knowledge provides the basis for grassroots decision-making, much of which takes place at the community level through indigenous organisations and associations where problems are identified and solutions to them are determined. "Solution-seeking behavior is based on indigenous creativity leading to experimentation and innovations as well as the appraisal of knowledge and technologies introduced from other societies,"

Indigenous people can provide valuable input about the local environment and how to effectively manage its natural resources. Outside interest in indigenous knowledge systems has been fueled by the recent worldwide ecological crisis and the realisation that its causes lie partly in the overexploitation of natural resources based on inappropriate attitudes and technologies. Scientists now recognise that indigenous people have managed the environments in which they have lived for generations, often without significantly damaging local ecologies (Emery, 1996).

Another writer, Thrupp also notes that indigenous knowledge empowers local communities, contributes to development and increases self-sufficiency (Thrupp, L.A. 1989). Indigenous food production and preservation systems, for example, contribute significantly to food security. Indigenous knowledge, in its various manifestations, also gives cultural pride and motivation to solve local problems with local ingenuity and resources. It is a crucial aspect of sustainable development. For thousands of years local communities have been managing their environments using indigenous knowledge technologies and know how. These have been proven to be superior in many cases than alien technologies. Indigenous knowledge technologies and know-how rely on locally available skills and materials and are thus often more cost-effective than exotic technologies introduced from the outside (IIRR, 1996a).

Today, many local knowledge systems are at risk of becoming extinct. This is because globally natural environments are rapidly changing, and there are fast-paced economic, political, and cultural changes. Practices vanish, when they are inappropriate, in the face of new challenges, or because they adapt too slowly. However, many practices disappear because of the intrusion of foreign technologies, or development concepts, that promise short term gains or solutions to problems. The tragedy of the impending disappearance of local knowledge is most obvious to those who have developed and make their living from it. A case of profound knowledge of the use of wild plants as food is a good example from many countries. These plants are especially vital for the survival of the poor during food shortages, when there are no other means of satisfying basic needs. Moreover, the implication for others may also be detrimental, when skills, technologies, artifacts, problem-solving strategies and expertise are lost. Local knowledge is a

part of people's lives. Especially, the poor depend, almost entirely, for their livelihoods on specific skills and knowledge essential to their survival. Accordingly, for the development process, local knowledge is of particular relevance to the following sectors and strategies:

- **Agriculture**, knowledge related to crop selection, intercropping, planting times.
- **Animal husbandry and ethnic veterinary medicine**, knowledge of breeding strategies, livestock characteristics and requirements, plant uses to treat common illnesses.
- **Use and management of natural resources**, knowledge of soil fertility management, sustainable management of wild species.
- **Health care**, knowledge of plant properties for medicinal purposes.
- **Community development**, common or shared knowledge provides links between community members and generations; and
- **Poverty alleviation**, knowledge of survival strategies based on local resources.

Current interest in IK is overwhelmingly driven by research into sustainable development practices in developing countries and the scientific community's concern about loss of bio-diversity of species and ecosystems, and the future implications of that for the whole planet. The convergence of humanitarian and scientific interests is leading to a scramble to document this knowledge in electronic databases so it can be firstly preserved and secondly, shared and utilised.

The following are some of the features of IK which have relevance to conservation and sustainable development:

- **Locally appropriate**: IK represents a way of life that has evolved with the local environment, so it is specifically adapted to the requirements of local conditions.
- **Restraint in resource exploitation**: production is for subsistence needs only; only what is needed for immediate survival is taken from the environment.
- **Diversified production systems**: there is no overexploitation of a single resource; risk is often spread out by utilising a number of subsistence strategies.
- **Respect for nature**: a 'conservation ethic' often exists. The land is considered sacred, humans are dependent on nature for survival, all species are interconnected.
- **Flexible**: IK is able to adapt to new conditions and incorporate outside knowledge.
- **Social responsibility**: there are strong family and community ties, and with them feelings of obligation and responsibility to preserve the land for future generations (Source: Dewalt, 1994).

Indigenous knowledge is an important natural resource that can facilitate the development process in cost-effective, participatory and sustainable way. The

basic component of any country's knowledge system is its indigenous knowledge. It encompasses the skills, experiences and insights of people, applied to improve their livelihood. To ignore people's knowledge is almost to ensure failure in development (Brokensha, 1980). Since indigenous knowledge is essential to development, it is often suggested that it must be gathered and documented in a coherent and systematic fashion (Brokenshaw, 1980; Warren, 1995). According to the 1998/99 World Bank Development Report, knowledge, not capital, is the key to sustainable social and economic development. Building on local knowledge, the basic component of any country's knowledge system is the first step to mobilize such capital. Therefore, development activities, especially those that aim to benefit the poor directly, need to consider IK in the design and implementation stages of the process.

1.4 TYPES AND CHARACTERISTICS OF INDIGENOUS ENVIRONMENTAL KNOWLEDGE

In every society and culture different age groups such as elders and the young possess various types of knowledge. Apart from this women and men, farmers and merchants, educated and uneducated people all have different kinds of knowledge:

- **Common knowledge** is held by most people in a community; e.g. almost everyone knows how to cook rice (or the local staple food).
- **Shared knowledge** is held by many, but not all, community members; e.g. villagers who raise livestock will know more about basic animal husbandry than those without livestock.
- **Specialised knowledge** is held by a few people who might have had special training or an apprenticeship; e.g. only few villagers will become healers, midwives, or blacksmiths.

The type of knowledge people have is related to their age, gender, occupation, labour division within the family, enterprise or community, socio-economic status, experience, environment, history, etc. This has significant implications for research and development work. To find out what people know, the right people must be identified. For example, if boys do the herding they may know, better than their fathers, where the best grazing sites are. If we ask the fathers to show us good pastures, we might only get partial information. Development professionals sometimes think villagers know very little, when in fact the wrong people have been interviewed.

It is important to realise that local knowledge — as with other types of knowledge - is dynamic and constantly changing, as it adapts to a changing environment. Because local knowledge changes over time, it is sometimes difficult to decide whether a technology or practice is local, adopted from outside, or a blend of local and introduced components. In most cases the latter situation is most likely. For a development project, however, it does not matter whether a practice is really local or already mixed with introduced knowledge. What is important before looking outside the community for technologies and solutions, is to look

first at what is available within the community. Based on this information, a decision can be made on the type of information that would be more relevant to the specific situation. Most likely, it will be a combination of different knowledge sources and information types.

This again has important implications for the research and development process. It is not sufficient to document existing local knowledge. It is equally important to understand how this knowledge adapts, develops and changes over time. How this knowledge is communicated is also significant, and by whom, both within and beyond the community.

In addition to the relationship with the natural environment and association with time and adaptation, Ellen and Harris (1996) provide the following special characteristics of indigenous knowledge, which distinguishes it broadly from other knowledge. According to them in the literature IK is:

- **local**, in that it is rooted in a particular community and situated within broader cultural traditions; it is a set of experiences generated by people living in those communities. Separating the technical from the non-technical, the rational from the non-rational could be problematic. Therefore, when transferred to other places, there is a potential risk of dislocating IK.
- **tacit** knowledge and, therefore, not easily codifiable.
- **transmitted orally**, or through imitation and demonstration. Codifying it may lead to the loss of some of its properties.
- **experiential rather than theoretical knowledge**. Experience and trial and error, tested in the rigorous laboratory of survival of local communities constantly reinforce IK.
- **learned through repetition**, which is a defining characteristic of tradition even when new knowledge is added. Repetition aids in the retention and reinforcement of IK.
- **constantly changing**, being produced as well as reproduced, discovered as well as lost; though it is often perceived by external observers as being somewhat static.

1.5 VARIOUS THEMATIC FIELDS OF INDIGENOUS ENVIRONMENTAL KNOWLEDGE RESEARCH

Indigenous Knowledge is more than just technologies and practices. While IK research originally emphasised indigenous technical knowledge of the environment, it is now accepted that the concept of IK goes beyond this narrow interpretation. IK is now considered to be cultural knowledge in its broadest sense, including all of the social, political, economic and spiritual aspects of a local way of life. Anthropologists and other development researchers, however, have found the following themes of IK to be of particular interest (Box. 2).

Box. 2: Various Thematic Fields of Indigenous Environmental Knowledge

1. Environmental knowledge, environmental cognition
 - 1.1 Knowledge on the natural environment (e.g. plants, animals, ecosystems, natural disasters) classification systems for plants, animals, soils, water and weather empirical knowledge about flora, fauna and inanimate resources and their practical uses worldview or way the local group perceives its relationship to the natural world
 - 1.2 Knowledge on the anthropogenically modified environment (e.g. risks, “management “of tropical soils, agroecological knowledge)
 - 1.3 Knowledge on the social and political “environment” (neighborhood groups, structures of the dominant group, state structures, development projects)
 2. Livelihoods: resource management knowledge and the tools, techniques, practices and rules related to pastoralism, agriculture, agroforestry, water management, gathering of wild food and fishing.
 3. Health: (medicinal and health knowledge, information on traditional health practices-ethnomedicine, ayurveda, unani, siddha etc., diagnosis and therapy)
 4. Indigenous technical knowledge (ITK)
 5. Local Governance: Organisational and management knowledge including knowledge on conflict management (legal knowledge), and common property resources etc
 6. Knowledge on persons, structures and relationships within the own society (social cognition)
- Indigenous Traditions: local cultural practices, stories, narratives and others

(Source: Antweiler, christoph. 2004)

Generally, the most familiar fields of indigenous knowledge, which can be analytically distinguished, are factual knowledge and capabilities relating to specific themes (Box. 2). There exists local knowledge on the environment, on agriculture, indigenous technical knowledge (ITK), and local medical knowledge for instance. Environmental knowledge is by far the most intensively studied field (cf. Croll and Parkin 1992, Williams and Baines 1993). Examples of environmental knowledge would be knowledge on the occurrence of useful plants in a region, or knowledge of the natural risks associated with people using them (Oliver-Smith 1996 as a recent overview). Examples from the field of technology would be local knowledge about irrigation schemes, or systems for tropical soil management. Examples from the medicinal field would include knowledge on how to reach a particular diagnosis, on therapeutic capabilities or about healing options. A further important distinction within local knowledge is of a theoretical nature, distinguishing its general manifestations. Box. 3 shows the most important forms and gives a number of examples. The examples given have deliberately been taken from both the traditional fields and from modern contexts, and especially from the development sector. This is designed to illustrate the fact that local knowledge is not only a traditional or rural or alternative form of knowledge, but is in principle a universal mode of knowledge and knowing (Antweiler Christoph, 2004).

Box. 3: Forms of Indigenous Environmental Knowledge

General forms of knowledge	Examples
1 Declarative knowledge	
1.1 Factual knowledge	- animals, plants, temperature, social status, prices, salaries, administrative levels
1.2 Categorical knowledge	- categories of organisms, colours, kinship, development project types
2 Procedural knowledge	
2.1 General processes, rules	farming calendar, religious calendar, environmental crises, household cycle, development project cycle
2.2 Specific processes (“scripts”, schemes, plans)	- everyday routines, e.g. greetings and farewells, natural resource management, ritual sequences, project request schema
3 Complex knowledge (concepts; belief systems/ knowledge systems)	Cosmology, therapies, models of “honour”, of “marriage”, of “justice”, cropping systems, decision-making procedures

(Source: Antweiler, christoph. 2004)

To begin with, local knowledge may be of a declarative nature (point 1 in Box. 3). This might be knowledge of specific facts relating to the natural environment, the social environment, the knower’s own society, specific facts relating to neighbouring groups, or details on development organisations. Local knowledge can, however, be of a more complex nature, involving categories and classifications (1.2). A classic example is knowledge on categories of plants and animals. The high practical value of such classifications to the respective populations has only become evident in recent years (Hunn 1982:839-844; Berlin 1992). Local knowledge may also relate to processes (2). This might for instance comprise knowledge on rapid changes in the natural environment, or in market prices for goods, or in experiences with long-term development measures.

Within the branch of procedural knowledge, a further distinction can also be drawn which is of high practical relevance, between knowledge on general processes (2.1) and knowledge on specific processes (2.2). Examples of the former would be the planting times of crop plants or a religious calendar. The latter would include e.g. knowledge on the precise sequence of steps within processes, e.g. in rituals or everyday activities.

Activity

Visit any local community/tribal group and list out their practices of indigenous knowledge?

1.6 INDIGENOUS KNOWLEDGE VERSUS WESTERN KNOWLEDGE: COMMONALITIES AND DIFFERENCES

Based on the characteristics of indigenous knowledge, some differences between indigenous knowledge and scientific (or western) knowledge emerge, suggesting an added value indigenous knowledge holds due to its alternative strategies and different worldview. Indigenous knowledge develops through extended experiences in a specific environment, resulting in concrete information which relies on evidence directly from these experiences (M. Howes and R. Chambers, 1980). In contrast, scientific knowledge breaks down and rearranges collected data often far removed from the specific experience (Agrawal, 1995). Second, indigenous knowledge originates within the community, which contrasts with scientific knowledge which is often influenced by many outside sources unrelated to the local culture or environment. Thus, indigenous knowledge is locally-focused, based in the reality of the specific community and its cultural, moral, political, and cosmological implications. Scientific knowledge prides itself on its universal validity, divorcing itself from the local context (T. Banuri and F. Apfell-Marglin, 1993). Third, scientific knowledge is documented as a means of maintenance, dissemination and validation; however, indigenous knowledge is most often orally disseminated which better suits its dynamic and local character (Agrawal, 1995). Fourth, the collective ownership of indigenous knowledge means it is highly dispersed throughout the community, whereas scientific knowledge is often held by “experts,” or centralized within a given group or state (Agrawal, 1995). Finally, in regards to the type of knowledge, on the one hand indigenous knowledge usually contains highly detailed, intimate information relating to livelihoods, in areas such as agriculture, agro-forestry, soil fertilisation, health care, and so forth. On the other hand, scientific knowledge often focuses on abstract ideas and philosophies, one step removed from concrete realities (Agrawal, 1995).

All of the assertions listed above are controversial, and many strong arguments have been made as to why there should not be such a distinct division between scientific and indigenous knowledge. In fact, some argue strongly that the dichotomy between the two types of knowledge is not only false, but also has negative consequences (Agrawal, 1995).

Some of the characteristics compared to so-called western scientific knowledge were put up by Wolfe et. al 1991:12 in this way:

	Indigenous knowledge	Western scientific Knowledge
Relationship	<i>Subordinate</i>	<i>Dominant</i>
Dominant mode of thinking	<i>Intuitive</i>	<i>Analytical</i>
Communication	<i>Oral</i> <i>Teaching through doing and story-telling</i>	<i>Literate</i> <i>Didactic</i>
Characteristics	<i>Holistic</i> <i>Subjective</i> <i>Experimental</i>	<i>Reductionistic</i> <i>Objective</i> <i>Positivist</i>

Data creation	<i>Slow/Inclusive</i>	<i>Fast/Selective</i>
Prediction	<i>Short time cycles</i> <i>Recognises the onset</i> <i>of longterm</i> <i>cycles</i>	<i>Short-term linear</i> <i>Poor long-term prediction</i>
Explanation	<i>Spiritual - includes the</i> <i>Scientific Hypotheses</i> <i>Theory and laws</i>	<i>Inexplicable</i>
Biological classification	<i>Ecological</i> <i>Inclusive-internally</i> <i>differentiating</i>	<i>Genetic and Hierarchical</i> <i>Differentiating</i>

(Source: Ole Henrik Magga, 2005)

Indigenous knowledge is oral, usually not written. But there is historical evidence of written cultures like the Maya culture. Learning is to do things. While western science tries to understand a whole from the pieces, indigenous knowledge sees things as wholes. Western science believes itself to be objective, while indigenous knowledge is deliberately subjective and sees human beings as part of the whole. Classification systems can be very different from western ways. One example is the Inuit taxonomic classification of living organisms which is more based on ecological thought than genetic relatedness. We could go on with this list. Most western scientists reject indigenous knowledge as a methodical and non-scientific. And it is true that western science is sometimes superior in its ways of accumulating data and make predictions. On the other hand, it is selective and very dependent on the way data are selected. Still, indigenous knowledge systems are said to be “high context” systems which means that they are designed to incorporate very high level of contextual information specific to a given locale. Indigenous knowledge -systems can consequently be very different from each other and there is no single indigenous system: “each group has a system specific to their locale” (Wolfe et al 1991: 13).

It is remarkable that most of the characterisations of local knowledge as given in the above criteria are negative while being defined in contrast to scientific knowledge (Mc Corkle, 1989). But that is natural as local and scientific knowledge are neither completely different nor entirely the same so they display both commonalities and differences at different points.

One fundamental difference between these two ways of knowing is that the sciences seek information, which is transferable to any spatial or social situation (*immutable mobiles*), i.e. which is not context-bound. As a result, scientists know a great deal about small sections of reality. By contrast, local knowledge systems seek specific knowledge spatially and are situation-bound, i.e. context bound information (DeWalt, 1994: Murdoch and Clark, 1994). In contrast to science, local knowledge occurs in some cases in the form of magic, and it lacks its own philosophical expression or knowledge (Knight, 1980). Further, differences between the two forms of knowledge exist primarily in the methods of knowledge appropriation/extraction and in the nature of the resources employed in the practical application of the acquired knowledge.

Therefore, a look at the “mechanics” of the intermingling of various knowledge systems and the complex relations among them in situations of cultural contact as seen in the course of history may be necessary in future. However, at this juncture it is sufficient to say that “Both are attempts to make sense of the world, to render it comprehensible to the human mind. Both are based on observations and on generalisations deriving from those observations” (Berkes *et al*, 1995). Researchers today can more easily correlate nature of local soils and plants with the rural people. Present knowledge also facilitates soil surveys and mapping in a few days which would otherwise take months (Howes, 1980). In this regard, Abdel Ghaffar Ahmed (1994) states that neither indigenous nor scientific knowledge should be over glorified. Instead, the right mix of the two knowledge systems can help to enhance the prospects for sustainable food production in rural areas. It is therefore necessary to consider local knowledge as the base on which to plan sustainable development. “Problems of resource management relate not only to physical planning and efficient deployment of modern input delivery systems, but also includes the local communities and their readiness to accommodate change” (Salih, 1992). What is required is a two-way flow of communication between modern technologists and ordinary peasant farmers. “The least that can be said is an idea borrowed from the people, developed by the agronomist and returned to the people again is much more likely to be adopted than something totally alien to the culture” (Richards, 1975).

1.7 SUMMARY

Indigenous knowledge can be defined as a body of knowledge built up by a group of people through generations of living in close contact with nature. A broader definition is that indigenous knowledge is the knowledge used by local people to make a living in a particular environment. These are simple but convenient definitions. However, indigenous knowledge is much more complex. In fact, a variety of terms have been used to describe this form of unique knowledge. These have included such terms as “local knowledge,” “traditional knowledge,” “indigenous traditional knowledge,” “indigenous technical knowledge”, “traditional environmental knowledge”, “rural knowledge”, “traditional ecological knowledge”, and so forth. However, these terms have similar meanings.

The origin of indigenous knowledge lies within the communities, though it is often influenced by outside sources over time. Indigenous knowledge is orally transmitted and not often recorded in other media. Indigenous knowledge is its collective nature, meaning that the entire community owns the knowledge instead of specific individuals. Indigenous knowledge is the basis for survival strategies and decision-making. It is used in several different areas, including agriculture, health, food preparation, education, and natural-resource management, among others. These knowledge systems include all areas of life because they are developed by the people as a matter of survival.

Various thematic fields of indigenous knowledge are as follows:

1. Environmental knowledge
 - 1.1 Knowledge on the natural environment (Ex: Plants, animals and eco-systems)
 - 1.2 Knowledge on Anthropogenically modified environment
 - 1.3 Knowledge on the social and political environment. (neighbouring groups, structures of the dominant groups, development projects)

2. Agricultural knowledge
3. Medical knowledge
4. Indigenous technical knowledge (ITK)
5. Organisation and management including knowledge on conflict management (Legal knowledge)
6. Knowledge of persons, structures, and relationship within their own society (social cognition)

Based on these characteristics of indigenous knowledge, some differences between this knowledge and scientific (or Western) knowledge emerge. Indigenous knowledge differs from scientific knowledge in that the former is a closed system while the later is an open system. Indigenous knowledge also differs from western knowledge in subject matter. It is concerned primarily with those activities that are intimately connected with the livelihood of people rather than with abstract ideas and philosophies. In contrast, western knowledge is distanced from the daily lives of the people and gives a more analytical and abstract representation of the world. Methodological differences do exist between both forms of knowledge. While science is open, systematic, objective and analytical; indigenous knowledge is closed, non- systematic and without any concepts. Indigenous knowledge systems are embedded in social and cultural milieu of their particular community and scientific knowledge seeks to distinguish very clearly between these different dimensions.

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Suggested Reading

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Sample Questions

- 1) Define meaning and definitions of indigenous knowledge.
- 2) Why indigenous environmental knowledge is important?
- 3) Describe different types and characteristics of indigenous knowledge.
- 4) Discuss the difference between indigenous and scientific knowledge.

UNIT 2 CONSERVATION OF BIOLOGICAL DIVERSITY

Contents

- 2.1 Introduction: Anthropology and Biological Diversity
 - 2.2 Concepts of Biological Diversity and Conservation
 - 2.3 Importance of Biodiversity and its Conservation
 - 2.4 Conservation as Social and Political Process
 - 2.5 Cultural Perspectives and Approaches to Conservation
 - 2.5.1 Environmental World Views and Folk Cosmology
 - 2.5.2 Spiritual Ecology
 - 2.5.3 Sacred Places
 - 2.5.4 Sacred Groves
 - 2.5.5 Protectionist and Community-based Conservations
 - 2.6 Summary
 - 2.7 References
- Suggested Reading
- Sample Questions

Learning Objectives



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

- understand the meaning and components of biodiversity;
- explain the imperative to focus on biodiversity conservation;
- learn how biodiversity conservation in productive spheres is being missed in the ongoing global discourse; and
- know the role of culture in biodiversity conservation.

2.1 INTRODUCTION: ANTHROPOLOGY AND BIOLOGICAL DIVERSITY

Anthropology is concerned with the ways human societies interact with their environment from bio-cultural and comparative perspective approaches. While appreciating the diversity of cultures and environments and their interactions, anthropology emphasizes the cultural relativism for understanding other societies. Cross-cultural understandings of the environment and resource use practices are an enduring concern to anthropology. In particular, environmental anthropology aims to understand how the environment is perceived, conceptualized and classified by diverse cultures and the diverse ways of resource use practices cross-culturally. This concern has both theoretical and practical significance and particularly in the context of current debates on the conservation of biological diversity.

Biological diversity (or in short, biodiversity) simply means the diversity of life. It refers to the variety and variability among living organisms, and the **ecological**

complexes in which they occur. As we know, there are various kinds of organisms existing on the earth and the humankind is one among them. All life forms have their own intrinsic value and role in providing the conditions for emergence and maintenance of other life forms. In particular, they all provide the basis of life for human beings and survival of our diverse cultures. In other words, our life on the earth depends on the existence and survival of other living organisms, which provide various services directly and indirectly. So, there is growing recognition on the value of biological diversity as vital to human life.

On the other hand, paradoxically, biological diversity is rapidly eroding due to anthropogenic causes. Therefore, conservation of biological diversity is rising as an issue of global concern. It became an international agenda since the last three decades, and subject matter for various disciplines such as Conservation Biology, Environmental Science, Environmental Anthropology, Geography etc. Environmental Anthropology, unlike other disciplines, by incorporating the bio-cultural approach, explores and emphasizes the importance of culture for biological diversity and conservation and vice versa.

2.2 CONCEPTS OF BIOLOGICAL DIVERSITY AND CONSERVATION

The term **biological diversity** was first used by E.A. Norse and R.E. McManus in 1980 in biology; and later the shortened term **biodiversity** was coined by Walter G. Rosen in 1985 for a conference “The National Forum on Biodiversity” held in Washington D.C. in 1986. But, it became popular with an international Convention on Biological Diversity, which was adopted at the United Nations Conference on Environment and Development (UNCED) (the Rio “Earth Summit”) held at Rio de Janeiro in June 1992 and came into force in December 1993, by which time it was ratified by 168 countries.

The first most-used definition of the biodiversity was provided by the Convention on Biological Diversity (CBD). According to the CBD (1992) “ ‘Biological diversity’ means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (Article 2). The second most-used definition of biodiversity was given by the Global Biodiversity Strategy (WRI, IUCN, and UNEP, 1992) as “the totality of genes, species, and ecosystems in a region.” Besides these two, there are numerous definitions for this concept.

Box

Biological Diversity: It is defined as the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

As the above definitions indicate, biological diversity is the richness and variety of life on earth. The variety of life is expressed in a multiplicity of ways. It is generally understood in terms of genes, species, and ecosystems. The three constitute different levels of biological organisation, and these are referred to as Genetic, Species, and Ecosystem diversities respectively.

- 1) **Genetic diversity:** Variation of genes (or variety of individuals) within a species is Genetic diversity. For e.g., differences in pest resistance among rice varieties, varieties of a crop species including cultivated plants and its wild relatives; domesticated animals and wild animal relatives, etc.
- 2) **Species diversity:** Diversity among species (or variety of species within a region) is Species diversity. For e.g., floral diversity, faunal diversity, endemic species, etc.
- 3) **Ecosystem diversity:** Diversity at the habitat or ecosystem level (or variety of ecosystems) is Ecosystem diversity. For e.g., forest ecosystems, grassland ecosystems, aquatic ecosystems, etc.

Thus, biological diversity has three primary components/levels. Among them, species is treated as the most fundamental element of biodiversity. Besides the components, biodiversity can also be understood with its attributes such as, composition, structure, and function. Composition refers to the variety of living organisms, structure, to biological systems in which they occur, and function, to the ways in which they interact with each other and the physical environment. Among them, interaction is considered the principle mechanism that shapes the characteristics and functions of the biodiversity. In other words, biodiversity is not simply an umbrella covering a mosaic of heterogeneous elements. It represents a composite entity shaped by the continuum of all its components and their interactions.

On the other hand, the conservation, according to the World Conservation Strategy (IUCN, UNEP, WWF 1980), is “the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs and aspirations of future generations. Thus, conservation is positive, embracing preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment.” In other words, “conservation is a philosophy of managing the environment in such a way that it does not despoil, exhaust, or extinguish it or the resources and values it contains”.

2.3 IMPORTANCE OF BIODIVERSITY DIVERSITY AND ITS CONSERVATION

Biological diversity is a complex and multidimensional reality. It is the key to adaptive success in the biosphere, and the basis of life on the earth. The concept is widely used across the world by the scientific community, conservationists, economists, environmentalists, industrialists, and general public. It is perceived, understood and interpreted differently by different sections of the society. This is perhaps because of the diversity of life itself, which shapes the world's diverse cultures. For instance, most of the world's biological diversity exists in majority of the third world/developing countries, which fall in the tropical regions with diverse environments. So, the developing countries are considered as the cradle of biodiversity (biodiversity rich), where as the developed countries are poor in biodiversity. Majority of the populations in the developing countries are from rural and tribal areas, most of whom are nature dependent. Their lives and livelihoods are intimately linked to biodiversity. Therefore, the perspectives of the nature dependent populations such as tribals, peasants and fisher-folk vary

from that of the urban affluent society. The perspectives of the “global South” (developing countries or Third world or Eastern world) vary from that of the “global North” (developed countries or Western world or Euro-American world).

With the varied perceptions of biological diversity, various reasons exist for its conservation. Thus, there are various ways of understanding the biodiversity from the values and worldviews of different cultures. The varied understandings range from the perspectives of cosmocentric (or ecocentric) to anthropocentric and for the values of moral, ethical, aesthetic, economic and ecosystem services of biodiversity. These provide the basis for managing the biological diversity.

Current discourses on biological diversity draws attention for two reasons: growing recognition of the importance of biodiversity on the one side and the rapid erosion of biodiversity on the other side. The importance of biodiversity can be understood in two dimensions: values and levels. The value dimension considers biodiversity for: a) intrinsic value (ecocentric), and b) anthropocentric value. The former views nature as innately valuable, or in other words, biological diversity has an intrinsic value that is worth protecting regardless of its value to humans. The latter views biological diversity as economically valuable, as it performs a number of services for human beings, which have economic, ecological, aesthetic or recreational values. It considers biodiversity as a resource that can be used for human wellbeing.

Biological diversity can also be understood by the levels: 1) local people, 2) environment, and 3) humanity. The services and benefits of biodiversity spread across these levels and varies among them. Firstly, biodiversity is inextricably linked with the local people such as, tribals, peasants, fisher-folk, etc., who derive their livelihood directly from nature. They are wholly dependent on the biodiversity for survival. Biodiversity also provides insurance against their future. Secondly, for environment, biodiversity provides ecosystem services such as, photosynthesis, regulation of climate, soil and water conservation; maintaining of biogeochemical cycles - recycling of water, oxygen, carbon dioxide, nitrogen, sulphur, carbon, etc. Lastly, the humanity as a whole benefits from biodiversity in various ways and levels: for life supporting ecosystem services, for various raw materials from nature for consumption and for market, and the benefits of the local people contribute to that of the humanity as the locals are part of the whole. Moreover, biodiversity provides the base for cultural diversity with diverse ecological conditions.

Despite such significance, there is the erosion of biodiversity, and it is expanding and accelerating today mainly due to anthropogenic causes, and to a lesser extent due to natural causes and climatic perturbations. The human activities that cause the loss of biodiversity operate in various ways. These include: 1) globalisation of an industrial culture, 2) commodification of resources, 3) over-consumption/exploitation of resources, 4) destruction of habitats, 5) dominance of Western science over the local ecological knowledge, and 6) emergence of “agribusiness” with monocultures. However, the loss of biodiversity also results in the disappearance of cultural diversity since both are intimately linked.

On the other hand, biological diversity of various ecosystems remains poorly explored and the majority of species remain unidentified. According to a report of Convention on Biological Diversity (*Global Biodiversity Outlook 1*, 2001), globally around 1.75 million species to date have been described and formally

named, It is estimated that there are around 14 million more species exist but remain undiscovered, undocumented and unknown. They may be carrying more services/values and have more worth on the earth.

In view of the above, it is imperative to act for the conservation of biodiversity, notwithstanding the variations in values and reasons among different societies for biodiversity.

2.4 CONSERVATION AS SOCIAL AND POLITICAL PROCESS

Various perspectives have emerged for the conservation of biodiversity. Shiva (2003) provides three strands as: 1) Ethical concern – all life forms have value in themselves, independent of the value man puts on them. 2) Equity and social justice – arises from the marginal sections of the resource rich regions such as, tribals and peasants, for a struggle for self-reliance and sustenance. Since diversity protects the livelihood systems of different communities, it needs to be incorporated into the production processes in agriculture and forestry. Then it becomes conservation of ‘means of production’ of life itself. 3) Conservation for “raw material” – biodiversity provides strategic raw material for industrial production of food, pharmaceutical, fibres, energy, etc.

Under such strands, there are many initiatives and processes underway for the conservation of biodiversity, from local actions to global treaties. However, the ongoing discourse on the biodiversity and its conservation is predominated by the Western perspective (of the North/developed countries), which emphasizes mainly on natural/wild diversity (diversity of wild life) and almost neglects the cultivated/domesticated diversity (diversity of domesticated species). This is perhaps because: 1) The North is poor in biodiversity; 2) They are more concerned with the economic values of biodiversity, and the natural (wild) diversity is considered as a valuable resource that provides with raw materials to meet the economic needs and industrial requirements; 3) Their ethnocentric bias in understanding the complex process of biodiversity that links with the cultural diversity, and biodiversity rich developing countries as if they are consuming more resources, which is however not true as per the principle of “equity and social justice”; 4) Their top-down approaches for resource control and exploitation, as if they have a right and responsibility; 5) Their productive system of monocultures (uniformity of crops over diversity of crops) for agribusiness (market economy).

In view of the above, the North with its power and perspective dominates the South. For instance, a publication of IUCN, WRI, WWF, World Bank, and Conservation International (*Conserving the world's biological diversity* by McNeely, et al. 1990, quoted in Shiva, *et al.* 2003), demonstrates the values of biological resources in economic terms: consumptive use value, productive use value, etc. According this value framework, people who depend on nature for sustenance of basic needs are only “consumers”, and those who commercially exploit and produce for market are “producers”. It implies that the South is responsible for the destruction of biological resources and the North only can conserve it.

Further, the North deliberately attempts for substitution of biodiversity by uniformity of crops, trees and livestock (over mixed crops/farm, grove/forest and livestock) in production spheres of agriculture, forestry, and livestock in the developing countries through development interventions while undervaluing the local mixed cropping system, as if it is primitive and unproductive. But, the mixed cropping system is proved to be worthy for its economic and ecological values.

Anyhow, their productive system completely destroys the diverse cropping systems with the monocultures. It has a large impact on biodiversity in general and on the livelihoods of people of the developing countries in particular. Because, the domestication of resources is their critical strategy of survival, and when the crop diversity is replaced with the monocultures, it ends up with ecological and economic problems.

Thus, the crisis of the erosion of biodiversity is a crisis in the North as much as in the South, and the roots of the crisis of diversity in the South lie in the North. However, the developed countries, instead of accepting their responsibility and burden-sharing are trying to shift the burden on to countries that are not or less responsible. It is particularly evident at the recent Durban talks on climate change (The United Nations Climate Change Conference, 2011 at Durban). Further, they are trying for sharing of the benefits arising out of the utilisation of biological resources. It is evident in the Convention of Biological Diversity, which also focuses on natural diversity and neglects the diversity of cultivated.

On the other hand, the traditional and indigenous societies, most of who are from the South, have adapted “low-impact practices of use and management of biological resources, maintained over long periods of time with no detrimental effects on biodiversity. In fact, such cultural practices have often been found to contribute to sustaining and even enhancing biodiversity, while introducing subtle modifications that mimic natural processes” (Maffi 2010). Therefore, there is a growing recognition of the importance of cultural diversity for biodiversity conservation.

2.5 CULTURAL PERSPECTIVES AND APPROACHES TO CONSERVATION

People of diverse cultures perceive and interact with the environment in different ways. They are influenced by their environmental world views, cultural practices, values, etc. So, their values to biodiversity, driving forces and approaches to conservation vary. However, many traditional/indigenous peoples are considered to have managing diversity in productive ways with their intimate links with nature. Most of their cultural practices have tremendous effects in promoting conservation. To support these relationships, Zent and López-Zent (2007, quoted in Maffi and Woodley 2010) have identified certain actions as biodiversity-enhancing agents. These include:

- 1) The anthropogenic creation and maintenance of biodiversity landscapes through traditional low-impact resource management practices, supported by local cultural knowledge and spiritual beliefs.
- 2) The contribution of traditional farmers to the global stock of plant crop varieties and animal breeds.

- 3) The customary beliefs and behaviors that contribute directly or indirectly to biodiversity conservation, such as sustainable resource extraction techniques, sacred groves, Selective extraction, periodic abstinence from exploitation, proscriptive sanctions, ritual regulation of resource harvests, and buffer zone maintenance.
- 4) The dependence of socio-cultural integrity and survival of local communities on access to traditional territories, habitats and resources, which also significantly affect food security.

2.5.1 Environmental World Views and Folk Cosmology

Florence Kluckhohn (1953, quoted in Altman and Chemers 1984) described three general orientations to nature by people of different cultures and at different times of history. These are:

- 1) People as subjugated to nature – living at the mercy of powerful and uncompromising nature;
- 2) People as over nature – dominating, exploiting, and controlling the environment; and
- 3) People as part of nature – living in harmony with the environment.

It is possible that societies hold aspects of all these orientations to one degree or another, although one may be a more salient force.

People as subjugated to nature

In societies with little industrial technology or living in very harsh and unpredictable climates, environment is viewed as powerful, uncontrollable, and unpredictable. People in such societies can only adapt and usually become fatalistic to the environment. This view is peculiar to the earthquake regions of Los Angeles, Italy, Guatemala, and people living in hurricanes and tidal waves affected areas of the Pacific islands.

This view appears in medieval attitudes towards forests and the wilderness; it is reflected in the fairy tales and myths of Western Europe during the period from 12th to 15th centuries. Forest was considered as evil, dangerous and uncontrollable; it was also the abode of witches, demons and monsters (semi-human wild men) that preyed on people. For instance, R. Nash (1967) in his book, *Wilderness and the American Mind* wrote:

“The most important imaginary denizen of the wilderness of Medieval Europe was the semi-human Wild Man. His naked figure, covered completely with thick hair, appeared widely in the art, literature, and drama of the period According to folk tradition, the Wild Man lived in the heart of the forest as far as possible from civilisation. He was regarded as a kind of ogre who devoured children and ravished maidens” (p. 13, quoted in Altman and Chemers 1984).

This fearful and submissive view of nature is based on the inability of people to control nature, and on the association of nature with the supernatural and demonic. This view was even traced back to the early beliefs of Romans on forests, and Greek mythology on forest gods. Similar view appears in the early Judeo-Christian attitudes toward the desert which threatens to human survival, and people's only

recourse was to adapt and to hope that good behaviour would bring forth positive treatment.

Even in modern societies, people sometimes feel a sense of subjugation to and inability to control nature in times of natural calamities such as, earthquake, flood, drought, snowstorm, etc. Thus, from the ancient Hebrews to the Greeks, Romans, middle Ages, and even to the present, the Nature is powerful, uncontrollable, and uncompromising. Such features lead us to see nature as something to which we must adapt, bend and be respectful.

People as over nature

This view of Nature is diametrically opposite to the preceding one. It states that people are above nature, i.e., humans are superior to it. Humans are considered capable of dominating, exploiting and controlling nature. They have a right and responsibility to control, subjugate and bend the nature in accordance with human needs. This view has predominated in Western societies, particularly in America. It also reflects in many facets of our lives due to food production, use of natural resources, land use practices, and exploitation of the earth; innovation and use of pesticides, fertilizers, and other forms of technology to generate higher production; extensive mining activities, forest use and water management to the extent of deforestation and resource depletion. Such activities reflect our view that nature exists to serve people.

Historical and cultural roots of this orientation lie in the Judeo-Christian heritage of Western society, and the scientific and industrial revolution. As per the former, mankind is above all other creatures, they should increase, conquer the earth, and have dominion over all living things, transform the wilderness into fruitful and productive. These views were further perpetuated in modern Western society with the scientific and industrial revolution, which produced vehicles for conquering nature and reinforced the idea that people were above and separate from nature. Exploration to Space, building dams and bridges, controlling the temperature, medical advancements (curing illness, etc.), cracking the genetic code, success in animal cloning, etc. all attested to the predominant Western view of people as superior, separate from and above nature, and unique.

People as part of nature

It is prevalent in many contemporary and historical cultures, which states that humans are an intrinsic part of nature in the same way as other components of nature such as, animals, plants, thunder, lightning, etc. For example, the Pygmies of the Congo (formerly Zaire) say “The forest is a father and a mother to us, and like a father or mother it gives us everything we need – food, clothing, shelter, warmth ... and affection. Normally everything goes well, because the forest is good to its children” (Turnbull 1961). When misfortune happens, they believe that the forest is sleeping. So they say, “We wake it up by singing to it, and we do this because we want it to awaken happy. Then everything will be well and good again” (*ibid.*). Similarly, many American Indian cultures consider “the earth and land to be the mother, the sky the father, the animals brothers and sisters, all of whom live together as a family. People are no better and no worse than the other members of the earth’s family; they are all part of the family” (Neihardt 1961, quoted in Altman and Chemers 1980).

Harmony with nature is also reflected among the Pueblo Indians of America. Ortiz (1972) observes that they “consider the sun to be the father and the earth the mother. Earth and sun govern life and create an endless series of cycles – summer, winter, spring and fall, day and night, life and death, growth and decay” (quoted in Altman and Chemers 1980).

Similar orientations are also observed among the Konda Reddis of Andhra Pradesh in India. The Konda Reddis believe that earth is the mother and sky is the father (*talli-bhudevi* and *tandri aakasam*) and all of us (Konda Reddis and all the human beings) are their children. They also say that the forest, which is the shelter of plants, animals and spirit forms, is also created by the mother-earth. This is with the help of the father-sky, who is considered responsible for the rains and protective-shield from other powers including sunlight. The earth and the sky, which include sun, moon and stars also govern life and create the cycles of monsoon, winter, and summer; day and night; life, growth, decay, and death, etc. Konda Reddis also believe that human beings and other non-human forms including plants, animals, spirits, etc. are created by the same divine power and are believed to be bound by a common kinship bond of brotherhood. Further, the existence of all non-living things including hills, streams, rock, soils, etc. are also the creation of the mother-earth for the survival of the life-forms.

Thus, people and nature are interdependent. People live in harmony with nature. They believe that nature is to be preserved and cared for; and one must take only what one really needs, whether it is food, water, or some other resource. In some cultures, this value is carried to the extent of apologizing to nature when one takes something from it.

2.5.2 Spiritual Ecology

As the term indicates, spiritual ecology deals with the spiritual dimension of peoples in relation with ecology. It discusses the influence of spirituality (such as of religion) on nature in the context of maintaining the environment. Sponsel (2007) defined it as “a complex and diverse arena of intellectual and practical activities at the interface of religions and spiritualities on the one hand, and on the other, of ecologies, environments, and environmentalisms.” It explores the environmental consequences of religious or spiritual beliefs, values, and behaviors in particular sites, landscapes, and ecosystems. For instance, the traditional/indigenous views of nature as sacred or a life-giving force to be respected may be beneficial for conservation.

Spirituality is an inclusive term than religion, as it encompasses people who do not affiliate with any particular religious organisation such as a temple, mosque, or church. Yet, it is also an integral component of any religion in principle. It can be a powerful influence for individuals and societies, and can play a significant role in shaping the way people engage with the natural world and in fostering ecologically sustainable living. It may allude to the radical transformation which helps to cope with the crisis of nature, rather than mere religious affiliation and worship of nature. The root causes of environmental crisis are viewed in this approach as a moral crisis.

Spiritual ecology holds out some hope for a better future for the healthy environment and that of humanity. Although spiritual ecology alone is not sufficient in the context of various secular approaches, yet it is a necessary

component. It holds the promise of even greater achievements in the future, because, spiritual values which are non-material are more powerful to influence and shaping the human behaviour. It complements secular approaches to meeting the challenges of the environmental crisis. Finally, it may help to contribute for a better future with more greener, sustainable, and peaceful environment.

Spiritual ecology can best be understood with its components. These include sacred places, and sacred groves.

2.5.3 Sacred Places

Some sites or areas are believed extraordinary, usually in a religious or spiritual sense. They are regarded as sacred places. Their status is due to some outstanding feature or unique shape. They stimulate a feeling of some mysterious, transcendent and awesome, and result in special reverence and treatment. Individuals may experience a sacred place in different ways as a site of ritual, revelation, healing, transformation, fascination, attraction, danger, ordeal, connectedness, identity, etc.

A wide range of “natural” phenomena (or geographical feature) is considered sacred by one or another culture or religion. These include mountains, hills, caves, rocks, soils, rivers, streams, springs, waterfalls, lakes, forests, groves, islands, beaches, estuaries, and so on. A particular sacred place or area may encompass various individual sites and phenomena as integral part of the whole or a sacred landscape, such as waterfalls, springs, caves, and meadows on a mountain. Sites can be connected by a river, legends or stories, histories of individuals or groups, etc. There are numerous mountains around the world considered to be sacred. They are often associated with some legends or origin myths as abodes of the gods, or revered as dwelling places for the spirits of the dead, places where prophets received their wisdom, or retreats for prayer, meditation, and vision quests.

For instance, the mountain, Mount Kailas of Himalayas (located in Tibet and rising about 22,000 feet or 6,700 meters) has been sacred for Hindus, Buddhists, Jains, and Bon (indigenous religion in Tibet). They believe it to be the sacred abode of Lord Shiva, a member of the supreme divine trinity. So they do not even think of trying to climb it. Thousands of pilgrims follow the ancient tradition of circling the mountain on foot. The rugged trek (of 52 kilometers) is seen as a holy ritual that removes sins and brings good fortune.

Some sacred places annually attract thousands or even millions of pilgrims and other visitors. For instance, the sacred hill of Sabarimala, where millions of pilgrims visit every year is one of the most popular pilgrimage sites for Hindus. However, the visitation pressure may be problematic for some places. But, there are some sacred places where humans are excluded or access is strictly limited to a special class of individuals such as ritual specialists, healers, or elders.

Sacred places are complex phenomena that can be viewed in various ways ranging from natural (biophysical) to anthropogenic (cultural); prehistoric to recent; secret or private to public; single culture (or religion) to multicultural (or multi religious); intrinsic to extrinsic in value; uncontested to contested; and protected to endangered. Particular sacred places variously reflect with some combination of these aspects. Nowadays, many sacred places are contested by diverse and

conflicting interest groups. However, the sacred places with their spiritual values or special significance have been the sites for biodiversity conservation.

2.5.4 Sacred Groves

Sacred groves comprise of patches of forests or natural vegetation ranging from a few trees to several acres of forests. They are usually dedicated to local deities or spirits (ancestral, tree, or other). These groves are protected by local communities because of their religious beliefs and cultural practices such as, the abode of local deities, site for community ritual, etc.

Although the sacred groves in many parts of the world such as West Asia and Europe got demolished due to modern religions and changes in man's attitude towards nature, some of the sacred groves remained in India and a few other countries even today. In India, they are found all over the country, but abundant along the Western Ghats in the states of Karnataka and Kerala. They are known in various names such as *Devarakadu* (Karnataka), *Kavu* (Kerala), *Kovil kadu* (Tamil Nadu), *Sarna* (Chhattisgarh, Jharkhand), *Oran* (Rajasthan), etc. So far about 13,720 sacred groves have been reported in India, which is an indication of the extent and magnitude of the presence of sacred groves in the country. However, it is estimated that the total number of sacred groves in India is likely to be between 100,000 and 150,000.

The sacred groves in India can be understood in three categories: 1) Traditional sacred grove – a place of natural vegetation where some deity/spirit resides; 2) Temple grove – a place where a grove is created around a temple and conserved; and 3) Groves around the burial or cremation grounds. For temple groves, patches of forests or gardens have been specially created near established temples and declared sacred to ensure their protection and conservation. Sacred groves are maintained by local communities through customary taboos and sanctions with cultural and ecological implications. Thus, sacred groves are segments of landscape, containing vegetation and other forms of life and geographical features that are delimited and protected by human societies under the belief that to keep them in a relatively undisturbed state.

The groves are normally considered the property of gods. Since sanctity is ascribed to the plants of such groves and since spiritual beings are believed to reside in such places, touching plants (and animals) in the sacred groves is forbidden to all except temple priest and he is too restricted to offerings to the presiding temple deity and curing the ailments of local people. Ordinary human activities are voluntarily precluded there. These activities include felling of trees, gathering of wood/fuel and plants and leaves, grazing by domestic animals, planting and harvesting, hunting, dwelling. This ensured the conservation and preservation of the local vegetation for posterity.

However, the degree of sanctity of the sacred groves may vary based on place, community, and time; and restrictions may range from complete prohibition to partial relaxation (i.e., from the prohibition of not touching even the dry leaves and fallen fruits to a relaxation for collecting fallen parts of the trees but not to cut them).

The sacred groves serve as valuable repositories of biological (floral and faunal) diversity that have been conserved by local communities for generations in a

sustainable manner. They are the important places in which biodiversity is protected/preserved in mostly undisturbed natural condition through social taboos and sanctions that reflect spiritual and ecological ethos of the local communities. They help to preserve the representative genetic resources existing in the surrounding regions for generations. They act as traditional sanctuaries for rare and endangered species of flora and fauna. Thus, sacred groves are significant traditional practices of biodiversity conservation. They have also significance for cultural and religious life of local communities.

Activity

Identify certain practices that contribute biodiversity erosion as well as conservation from your culture or area, and explain why?

2.5.5 Protectionist and Community-based Conservations

Under the influence of its environmental world view as humans as separate from nature and meant to be dominant over it, the Western society perceived nature as existing in a 'pristine' state, unless and until humans encroach upon it for resource exploitation and for purposes of development. This pervasive view of nature has had profound impact on nature and implications for mainstream approaches to biodiversity conservation, because the Western society has mostly focused on the scope of resource extraction and transformation of nature on the one side, and on the role of 'other peoples' in threatening that 'pristine' state of nature on the other side. Therefore, they try to control, manage, and exploit nature through various coercive measures and top-down approaches, which include the reserved forests, protected areas, biosphere reserves, etc. These top-down approaches seek to construct an idealized state of environment of 'pristine state' or 'humans out' (i.e., excluding humans, prior to any human presence or prior to intensified human impact on the environment). Such idealized pictures have been used as baseline for developing conservation visions and to build benchmarks for measuring success in reaching conservation targets. Consequently, some areas of the environment are reserved and protected for wildlife (such as national parks, wildlife sanctuaries, etc.) by the state control. However, these protectionist conservation approaches often resulted in the forced removal of the local indigenous people who had lived for generations on lands purported to be "untouched" by human encroachment. Because, there is only about 10% of the earth remain unpopulated, 'pristine state' and suitable for 'set the land aside' approach, but the remaining 90% has the human presence, and majority of whom are nature dependent people for their life and livelihood. In fact, these people have also contributed positively to shaping the natural world, in the course of long-term adaptive interactions with their environments.

However, the top-down protectionist approaches have failed in getting the desired results due to their insensitivity to local ecological conditions, and undervaluation of the local cultures, which influence the local environment and vice versa. It is, however, realized later that the efforts of conservation with the exclusion of local people are fruitless.

In response to the recognized failure of the top-down approaches to ecological limits of protectionist conservation, the Community-based Conservation has become an alternative solution. This approach shifts the focus of conservation to nature as managed through inclusive, participatory and community-based actions,

from nature as protected through exclusive state control. It is based on the premise that local cultures have a greater interest in the sustainable use of resources than does the state or distant centres of power; that local communities are more cognizant of the intricacies of local ecological processes and practices; and that they are more able to effectively manage those resources through local or traditional beliefs and practices. Therefore, the involvement of communities living in the area to be protected is more ethical and also more effective. Thus, local people in this approach are believed to be part of the solution and not as part of the problem.

This approach helps in expanding conservation beyond protected areas into human-inhabited rural landscapes. It also helps in conserving the diversity of local productive systems, meeting the needs of local cultures, and for self-reliance and sustainability.

Biodiversity is the basis of life on earth and vital to human wellbeing. It is a complex and multidimensional reality. It is understood and approached from the values and worldviews of different cultures. The varied understandings range from the cosmocentric to anthropocentric perspectives. These provide diverse grounds for valuation and conservation of biodiversity. However, there is growing recognition of the importance of biodiversity across the world and the imperative to conserve it. Many initiatives and processes are underway for conservation from local actions to global treaties. The mainstream approach of conservation, which is dominated by the Western perspective, concerns for natural biodiversity for its economic benefits. It, however, deliberately neglects the diversity in productive spheres, which has profound impact on the biodiversity itself, besides eroding the traditional cultures and livelihoods. The dominant model of protectionist conservation with coercive measures is also failed due to its insensitivity to local ecological conditions. On the other hand, the traditional and indigenous people have tremendous practices of conservation developed based on their cosmocentric and ecocentric perspectives.

Activity

Biodiversity teaches us a lesson for balance, cooperation and compromise.
Learn how?

2.6 SUMMARY

Biological diversity is defined in the convention on Biological diversity (or in short, biodiversity) simply means the diversity of life. It refers to the variety and variability among living organisms, and the ecological complexes in which they occur. This includes diversity within species, between species and of ecosystems.

The loss of biodiversity appears to be accelerating because of habitat change, growth of population and technological change. The loss of biological diversity has become an important scientific and political issue since 1970 and increasingly addressed by anthropologists. Biodiversity conservation has become an issue in political ecology, one of the subfields of the environmental anthropology. In anthropology such conservation schemes may expose very different notions about the “rights” and value of plants and animals versus those of humans. Anthropologists have contributed to biodiversity conservation in many areas

like forest, marine ecosystem, pastoralism, and natural resource management etc. Anthropologists are involved in both protected area and agricultural resource conservation as researchers on indigenous knowledge and management, as practitioners in managing conservation programs, and as advocates for indigenous peoples' rights.

The cultural value of biodiversity and the importance of genetic resources in agriculture and medicine have added urgency to conserving biodiversity in anthropology. Anthropology's engagement with environmental conservation has been rooted in local or indigenous knowledge. The studies found that indigenous knowledge systems have enabled the various communities live in harmony with their environments for generations, and the systems are important tools in environmental conservation. Their local traditions, customs, beliefs and cultural rights also played an important role in environmental conservation and biodiversity. Many of the communities in the countries maintained shrines and protected forests which were used as places of worship and other rituals. In addition, certain trees or animals were considered sacred or totems, so they were protected.

Indigenous knowledge systems conserved the biodiversity of the local environment in many ways because of the cross-cutting nature of conservation measures. Such practices as the traditional protection of forests, shrines, watercourses, certain species of flora and fauna, as well as farming technologies that focused on indigenous food crops, contributed immensely to biodiversity. But the most notable biodiversity conservation practice was the protection of forests and shrines. For example, in India, indigenous people protect sacred groves or traditionally protected forests small patches of natural forests not less than 0.04 hectares established by ancestors for worship and other cultural rites. These sacred groves were protected by the inhabitants in accordance with customary laws. Apart from being used as places of prayer, they were also believed to bring rain. Among the indigenous community forests and water resources were used sustainably through restrictions of access, prohibitions, customs, beliefs and taboos. The protected forests, therefore, play an important role as habitats for a high diversity of flora and fauna. The main indigenous knowledge approaches to environmental conservation prevalent in the areas studied focus on the management and use of lands, forests, water and biodiversity. Indigenous knowledge thus provided the communities with well-tested coping mechanisms in environmental conservation.

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Sample Questions

- 1) What is biodiversity? What are its components?
- 2) Why is biodiversity important for us and why should we conserve it?
- 3) What are sacred groves? What is their role in biodiversity conservation?

UNIT 3 BIODIVERSITY AND INTELLECTUAL PROPERTY RIGHTS

Contents

- 3.1 Introduction
- 3.2 What is Bio-Diversity and its Relevance
 - 3.2.1 Threats to Biodiversity
- 3.3 The Interface of Intellectual Property Rights and Biodiversity
- 3.4 Problems of Protection of Bio-Diversity and Rights of Local/Indigenous Communities
- 3.5 Problems of Transfer of Knowledge
- 3.6 Summary
- 3.7 References
 - Suggested Reading
 - Sample Questions

Learning Objectives



By the end of this unit, you should be able to learn:

- What is Bio-diversity and what is its relevance;
- What are the threats to bio-diversity;
- What are Intellectual Property Rights and its relevance;
- The various Acts and international summits taking into account this interface; and
- The necessity and relevance of legal preserving of biodiversity.

3.1 INTRODUCTION

In the present century the most pressing concern for human beings is that of the environment, as the world is witnessing one environmental disaster after the other. One of the prime realisations of the present day is that the world is one; that every specie is dependent upon every other and if humans have to survive, they cannot do so without ensuring the survival of every other species. The environment is a system of interconnected relationships and flow of energy from one form to the other. The environment is thus a continuous flowing entity so that every aspect of it is affected by the others. For instance, if we cut rain forests in Brazil, the entire world's climate is going to be affected. The survival of coral reefs, tigers and forests are essential to the health and wellbeing of all those who occupy the globe. It has also been realised that it is not simply enough to have a green cover but what we need is to maintain bio-diversity, thus nature needs to be maintained as nature exists without interference from humans, as a system of interdependent species. Yet we are violating these principles time and again and then also trying to find solutions.

3.2 WHAT IS BIO-DIVERSITY AND ITS RELEVANCE

As the knowledge about our environment advanced it became clear that the natural world is not just a group of disparate individual species but an interconnected system. The plants and animals including humans live as communities that include the non-biotic parts of the environment also like water, forests, mountains and rocks. Everything has a relationship to everything else and survival is a matter of collective survival and not dependent on discrete individuals or even species. In the year 1972, the US environmental legislation passed the Endangered Species Act, the first of its kind that took into account the danger of disappearance of species of plants and animals. As the biologist, E.O. Wilson put it: the loss of genetic material in the form of species was an irreversible loss, a loss that could never be made up as humans could not play God even if they wanted to. There were basically two points of view from which such a loss could be viewed; one was from the point of view of deep ecology or a spiritual/ nature centric approach and the second being purely scientific and pragmatic taking into account the question of survival.

According to the first every species has equal rights to life and reproduction on this earth and the humans are not specially privileged to take up the resource base of other species that may lead to their extinction. This was also elaborated in spiritual ecology that views a spiritual and kinship bonding between human and the non-human world as parts of a larger whole. According to the second and more scientific view the species exist in symbiotic relationships with each other and maintain energy and resource flows that have a delicate balance. Thus while we may wish for preservation and care of all other species because we feel close bonding with them and recognize them as equal to us and having the same rights as us or we realise that we survive only as communities of exchange; either way it is evident that human survival is tied to that of other life forms and of natural environment.

Thus ethically we may look toward a spiritual or a rights approach granting spiritual equality or equality of rights and opportunities to those who may be perceived as are equally privileged as us. Scientifically we realise that we are parts of ecosystemic communities where all survive in relation to and not in isolation from each other.

The official term biodiversity to understand this interdependence of species was coined first in the year 1992, and the Global Biodiversity Strategy defined it in terms of three distinct dimensions, “the variety of genetically distinct populations within a given species; the ten million or so species of plants, animals, and microorganisms; and the diversity of ecosystems of which species are functioning parts” (Speth 2004:25).

It has also now been realised that each of these bio-systems may have been nurtured by a cultural system so that there is a distinct link between bio-diversity and cultural diversity. It has been scientifically recognised that each ecosystem with its variety of species forms a self- sustaining system that reproduces, eliminates waste products, recycles, purifies and sustainably exchanges resources so that an ecosystem can continue over generations and centuries. Human

activities like rituals and belief systems like cosmologies are parts of this ecosystem and help sustain them by their regulatory effects. We can, for example, refer to the work of Roy Rappaport (1968) on the Tsembaga, where he shows how ancestor worshipping rituals helps to maintain the species and their interdependence in a limited resource base.

Economically too the natural environment with its pristine resources provides livelihood to almost half the world's population who depend on gathering, hunting, fishing, agriculture and herbal medicines. In fact, wild plants are the richest sources for modern medicine and many communities possess large amounts of indigenous knowledge of the same.

Yet biodiversity is under threat, not from any natural sources but primarily from human beings who have tried to conquer Nature and exploit it beyond limits.

3.2.1 Threats to Biodiversity

Gustave Speth (2004: 30-42) has identified nine principal threats to biodiversity; namely land use conversion, land degradation, freshwater shortages, water course modifications, invasive species, overharvesting , climate change., ozone depletion and pollution.

Each of these is mostly caused by anthropogenic activities, the major culprit being a capitalist, consumer driven society that has pulled out the plugs from overconsumption and overexploitation. Although, human populations have increased to a very large extent it is not just population but a wasteful and lavish lifestyle that has led to the problems.

Land has been steadily converted for human habitations; primary forests have been removed for centuries to give way to agricultural land and urbanisation. The rate of growth of cities and concretisation is rising at exponential rates. It is believed that the natural forests of the tropics, one of the richest sources of biodiversity are disappearing at the rate of one acre a second. Even what is remaining is soon to be destroyed for the sake of so called development in countries like Borneo and the Amazon. The natural habitats of many species like the gibbon and the tigers are fast disappearing. In India, we are constantly facing the tensions between saving tiger habitats and the interests of mining and multinational companies. Even local people are protesting against tiger reserves saying that they occupy the place of money and job generating industries.

Remaining forest and land are getting degraded every day. Water tables are falling and wetlands being filled up for urban development. A case in point is the suburbs of Kolkata built on extensive wetlands that kept the climate of the city cool and replenished the water table. Already the temperature is rising and soon the city may face a water crisis. California presents one of the most serious situations of desertification and reports a loss of 60% of its fish species.

Fresh water that should primarily have been left for drinking is increasingly diverted to other uses such as for mining and construction; even for water sports and other wasteful activities. As of today the fresh water supply of the globe is depleting at an alarming rate. Many perennial rivers are drying up including the Yamuna in Delhi that presents a sorry picture of a drain rather than a river in the dry season. Pollution and discharge of industrial effluents is also killing the marine life and also poisoning them. Almost every day we hear news of either hundreds

of dolphins dying or penguins or many such sea and river creatures whose dead bodies float up in hundreds. Species like the Olive Riddle turtle on the coasts of Orissa are almost extinct.

Fresh water is also lost to damming of rivers that often cause overflow and floods. Forcible changing of natural flow of rivers is detrimental to life of species of marine animals and also for the pollution of the rivers that become stagnant and dirty once they lose their natural flow. The over harvesting of species has been one of the primary reasons for species extinction. We all know how the tiger and lion population of India was decimated for pure greed and unnecessary display of power and sport. The Cheetah was made extinct simply for ego satisfaction of a few royals who killed them to extinction only for so called sport. Even too much collection for food is now threatening the life of wild species such as deer, many varieties of popular fish like blue fin tuna and the whale. Even when legislations exist they are flouted with impunity and poaching and illegal logging account for more species loss than any other cause.

Industrialisation and use of harmful chemicals such as pesticides, chemical fertilisers and CFCs lead to the depletion of the ozone layer causing the increase in harmful ultraviolet rays that also cause global warming. This climate change has also been the reason for extinction of many species which cannot adjust to the rising climates as their ecological niche or food base are destroyed and they also fall prey to disease because of the temperatures. The places of extinct species are often taken up by the invasive species that then destroy the environment. For example. In the second stage of deforestation the land is often taken over by cactuses that are not useful in the way the original vegetation was.

Pollution caused by release of poisonous gases, chemicals in water and ground water pollution causes many lives to be lost and deceased and abnormal progeny to be born. Pollution can be of many kinds and even noise and electromagnetic waves are causing many species such as small birds and butterflies to be extinct. Many birds earlier common in cities like sparrows are no longer to be seen.

Thus, there are many reasons for the loss of biodiversity and most of these are as we have seen man made. Some of the worst causes of such depletion of biodiversity have been human greed as maximum loss is because of illegal felling and poaching. In most countries it is the state that now owns most of the natural assets like forests and rivers and it depends upon the nature of the state as to how the resources are taken care of. It is often found that in military regimes and corrupt states the natural resources are plundered and in democracies there are some avenues open for the public and the motivated people to take some action. For example, PILS (Public Interest Litigations) filed by environmentalists as well as street level protests and media actions can have some effect in democracies but such action cannot be taken under dictatorships. India, for example, has an excellent record of filing of such litigations but it is also set off by corruption that often reverses the benefits of good legislation and legal actions.

Intellectual Property rights are one such way in which legal actions can help preserve biodiversity especially in the face of rising commercial actions with respect to genetic materials.

Activity

Define biodiversity and its importance.

3.3 THE INTERFACE OF INTELLECTUAL PROPERTY RIGHTS AND BIODIVERSITY

According to the World Intellectual Property Organisation (WIPO): Intellectual Property refers to the creations of the mind: inventions, literary and artistic works; and symbols, names and images used in commerce. Intellectual property is divided into two categories; Industrial property and Copyright; while the former refers to tangible assets the latter refers to more of intangible goods that may be in the form of knowledge and writings or even songs and artistic creations. In this way IPRs are one of the chief mechanisms for protecting information and to keep them under control. The main idea is to let the party that has the right over the particular information or knowledge also reap the benefit of it.

The Convention on Biological Diversity was signed at the Rio Earth Summit in 1992. The Global environmental facility (GEF) provides funds for the conservation of biodiversity. The major objectives of the CBD (WWF International & CIEL Joint discussion Paper, March 2001) were to conserve biodiversity, to promote the sustainable use of its components and to achieve fair and equitable distribution of the benefits arising out of the utilisation of genetic resources. The last part of the objectives forms a close interface with IPR.

The need for an IPR act with respect of genetic resources and traditional knowledge systems that are custodians of such knowledge has become an imperative as growing capitalist markets are now encompassing genetic materials as commercial resources. With biotechnology emerging as the new science of modern times and huge profit making industries based on manufacture of pharmaceuticals, pesticides etc. that need information on genetic resources the centuries old indigenous knowledge systems are becoming prone to pilferage.

It is a well-known fact that the ancient knowledge systems that used many herbal medicines and knew the use of large varieties of crops and flora and fauna are being patented with impunity by multinationals taking away the rights of people who had carried this knowledge with them for centuries. It is now imperative for the policy and law makers to protect the rights of communities and also to seek to preserve the biodiversity on which this knowledge is based.

The Conference of Parties (COP) had discussed these issues with the WTO (World Trade Organisation) and pointed out the relevance of the interface between IPR and the Agreement on the Trade Related Aspects of Intellectual Property Rights (TRIPS).

There are four interrelated areas that become relevant in this respect.

- Access to and the Fair and Equitable sharing of benefits arising from the utilisation of Genetic resources.
- Preservation and respect for the Knowledge, Innovations and Practices of Indigenous and Local communities.
- Enforcement of sanctions in case of infringement of rights and adequate legal protection.
- Transfer of Technology

The term bio-piracy is now used for the pilferage of traditional knowledge and its patenting by multinational companies. Since most of these legislations originated in the west and are couched in western language and can be used only by literate people, it is a common phenomenon that knowledge of indigenous and local people is appropriated. In a number of cases where the multinational companies have attempted to patent traditional knowledge like that regarding Neem, Basmati rice and Turmeric, the Indian Government has had to step in to resolve the matter and to preserve the rights of people to their indigenous knowledge. All these products have been used in South Asia for centuries and are part of common household knowledge here, yet the companies had staked claims to these resources as their original inventions. Although some of these patents have been turned down yet many others remain that alienate local people from their own resources and livelihood.

In the Himalayan region, for example, many drug companies have patented the local herbal medicines used by local people especially women as household remedies. This has cut off the local people from these natural supplies to which they had access for centuries and they are now forced to buy these drugs from the market at exorbitant prices. Moreover, most indigenous people are neither recognized nor compensated for their knowledge that is appropriated by researchers in the pay roll of these companies. In fact, many anthropologists are no longer bringing to public the indigenous knowledge in such terms as they can be misappropriated.

Another danger from biotechnology is the use of modified genetic material and its release in the environment that may cause wide scale environmental damage. The existence of IPRs itself provides companies incentive for development of new plant varieties that can then be used commercially; danger being that these then replace the existing natural bio-diversity. The state machineries, often in collusion with large commercial companies push the sue of such genetically modified crops that may have disastrous results as happened with Bt cotton farming in Punjab where the use of such deeds and the consequent use of pesticides has made the rural areas of Punjab prone to cancer to a very alarming degree. The Convention on Biological Diversity (CBD) is thus committed to the *in situ* preservation of biological diversity.

The international agreement that specifically takes into account the question of IPR is the World Trade Organisation's TRIPS agreement. As written in the "Joint Discussion Paper" (2001:8) the TRIPS agreement is directed towards providing adequate and effective protection towards intellectual property rights and to "reduce distortions and impediments to international trade". Its main aim is to ensure that technological transfer takes place with an eye towards justice and equitable distribution and to ensure protection of rights of all concerned. It includes patents and 'sui generis' (spontaneously or naturally grown) systems for plant and biodiversity protection. These are important as they "play a key role in defining who gains access to information about genetic resources, how the benefits are shared (including traditional communities), and what technologies are developed and transferred with implications for conservation and sustainable use of biological diversity" (ibid).

3.4 PROBLEMS OF PROTECTION OF BIO-DIVERSITY AND RIGHTS OF LOCAL/INDIGENOUS COMMUNITIES

However, the TRIPS agreement has come under criticism for promoting commercial interests at the expense of preservation of biodiversity and rights of less powerful sections or communities or nations. It has often been seen as in case of basmati rice that IPR is granted to members of a country other than the one in which the knowledge is actually originated. Although, there are clear indications in the CBD that such knowledge must be obtained with prior and informed consent from the holders of this knowledge, it is often violated. Likewise, the injunction that the profits must be shared between the parties concerned is not implemented as the party which has more power simply appropriates the knowledge without acknowledgement.

There are several reasons as to why the transfer of knowledge is not done appropriately and why the IPR cannot be often successfully applied to the bearers of traditional knowledge.

- 1) Such knowledge is passed down over generations and although it may be familiar to most people in a community there is no specific ownership of this knowledge. For example most people know the benefits of the Neem tree in India but it is not recognised as 'somebody's knowledge'.
- 2) These are oral traditions and passed down as received wisdom over generations and not scripted and recorded. As such they are often not even overtly recognised as knowledge, just day to day practices; like using a Neem twig to brush one's teeth.
- 3) In many cases the practitioner's may not be aware of the exact value and the benefits of their practices.
- 4) There are hierarchies within the communities so that some people may have more knowledge than others and some categories such as women may be excluded from some kinds of knowledge; while it may be only women who may know of some other kinds of knowledge. In such cases it may be difficult to give IPR rights to entire communities although it has been done in some cases.
- 5) In most cases the communities begin to fight the case once a patent had been drawn out by an external party. Prior to that they are not even aware that their knowledge or practice can be converted into a patent. For example a sacred plant used by the people of Amazon, Ayahuasca, was patented to a US citizen and only then challenged by the Coordinating body for Indigenous Organisations of the Amazon Basin, the Coalition for Amazonian peoples and their environment, and the Center for International Environmental law and finally over turned. It was a similar situation for Neem, Turmeric and Basmati rice as well.
- 6) Most of the indigenous people do not have the expertise and literacy to either apply for patents or to challenge in case their rights are violated by an external agency or MNCs.. Consequently only a very minute fraction of Indigenous

people enjoy rights over what should rightfully have belonged to them. In any case they need the support of NGOs or other literate and knowledgeable people in order to secure their rights.

- 7) Also most of these laws are framed in western legal terms that may not be comprehensible to the local cultures which may have a completely different world view and approach to their ways of knowing things.
- 8) It is possible that because of internal hierarchy, even if the benefits are granted to a local community they may not actually reach the people who are sources of that knowledge.
- 9) In many cases of bio-piracy the more literate and savvy group or individuals simply translate the local knowledge into more viable forms and then appropriate it. Like they may decipher the chemical formula of a local medicine or translate the benefits of herbal medicine or plant into scientific terminology and then claim it as their own.

Thus, we find that there are many impediments to the successful application of IPR to such systems of knowledge that are not scripted, recorded or actually possessed by individuals or groups who are identifiable. Yet, there are many kinds of knowledge that are acquired by a people through their engagement with the environment and some of it can, of course, be neither coded nor ever transferred.

Activity

Define what is Intellectual Property Rights? How does it relate to Biodiversity?

3.5 PROBLEMS OF TRANSFER OF KNOWLEDGE

The commercial aspect of IPR is valid only if the owners are able to successfully transfer the knowledge to others and then reap the benefits of this knowledge. Some knowledge, for example, are only acquired through practice and cannot be directly transferred at all. For example the skills of the forest dwellers in identifying sounds and smells and to read the signs of the forest cannot be transferred at all. It can only be imbibed by long practice and participation in the ways of life of the people concerned.

As has often been seen the developed countries that have systematized a way of developing genetic resources as formal innovations are better able to use the benefits of TRIPS and also appropriate the knowledge of those that are not aware of these formal systems. In such cases they rarely share the benefits of the innovations with those from whom they have received the inspiration but have been able to formalise the knowledge in a form that enables them to use TRIP.

Such claims and actions often supported by the formal legal mechanisms as the more powerful parties often representatives of developed countries like USA and UK, are both well versed in the workings of these legal systems and have more resources at their disposal.

Such applications of TRIP are directly against the objectives of the CBD. Thus, there is a need to bring in the ethical parameters when knowledge is being transferred between unequal parties to see that the more vulnerable party is also included within the benefit sharing process.

The International Undertaking (IU) is one body that takes care of plant and agricultural genetic material, those that are specifically the concern of CBD.

One immediate fall out of unsuccessful application of TRIP and bio-piracy is that many indigenous communities are not any longer motivated to preserve their traditional knowledge base that is also conducive to the reservation of bio diversity and of precious genetic material.

In a recent field visit to a village in Himachal I found that the villagers have given up on cultivating at least forty varieties of rice that they cultivated earlier as they have mostly taken to cash cropping of apples. The state is also aggressively propagating cash cropping as against subsistence farming with its many varieties of food crops. The dangers of replacing a variety of crops with mono-cropping has been seen time and again. The value of having multiple varieties apart from their food value is that they ensure a degree of food security as some crops are able to survive if conditions are adverse for the others.

In case of just one variety, if anything happens to it then there is complete loss of life sustaining resources. On the other hand, a successful implementation of IPR will give incentive to indigenous cultivators and other subsistence livelihood followers to maintain their bio-diversity related cultural heritage; as they will also perceive commercial benefits arising out of them.

Thus, the IU (International Undertaking on Plant Genetic Resources for Food and Agriculture) is specifically directed to ensure the preservation and free exchange of genetic material that will ensure long term survival of all species. As is now well established the more the genetic variety available, the more the security of supply and survival increases. But the availability and continuity of genetic resources depends to a large extent on fair and equitable sharing.

Since the availability of plant and animal genetic variety is so essential for survival of life on the planet some aspects of TRIP are seen as non-conducive to such equity and survival of species. TRIP for example allows patenting of life forms like plants; something to which the CBD does not agree. Moreover, the parties get exclusive rights over such genetic resources for the duration of the patent that may be extremely dangerous in real life.

TRIP also has no provision for fair and equitable distribution of resources. Thus the IU was established to correct some of the overtly commercial aspects of the TRIP and to ensure more equitable and fair access to genetic resources of the world.

The basic principle underlying IU is that the plant genetic resources are a common heritage of human kind and should be available to everyone without restriction as they once were. The TRIP on the other hand views genetic resources as commercial propositions subject to trade agreements like commodities. The CBD looks upon biodiversity as essential for human survival and, therefore, is trying to work closely with IU.

However, as we have already discussed above, the very notion of commercialisation and commodification of knowledge and traditional practices is incompatible with how many indigenous people view their cultural heritage. Many of such knowledge may be held as sacred and be perceived as non-negotiable or non-commercial altogether. In many communities many assets including genetic resources may be viewed as the property of divinity and not of humans at all. In the Kinnaur region of Himachal, thousands of variety of nuts (*chilgoza*) lie in the forest but are not sold by the local people who only collect them for their own consumption as they say that this nut is the gift of the gods and should not be traded.

Thus, the concept of IPR or any kind of formal restriction of what many view as sacred or god given resources is itself inappropriate. Thus, even as of today the application of IPR to traditional systems of knowledge remains an area of both uncertainty and debate.

3.6 SUMMARY

In this Unit, we have discussed mainly what can be summed up as the effective ways to deal with commercialisation of practically every aspect of the world in which we live. Such a change has come upon us only in the wake of what we call modernisation where everything has become saleable in the market.

Acts like IPR to some extent try to prevent misuse of commercialisation and to ensure that in the situation of misappropriation of knowledge, some kind of legal redress is possible.

The most valuable resource that we have and which is under threat today is the varieties of life forms that have evolved on this earth over millions of years. No doubt in the natural process some have become extinct but the rate of extinction being witnessed in the present day world is unprecedented.

As we have seen in this unit humans are largely responsible for this rapid extinction and it is for us to reverse or stop this process otherwise we are all in danger of becoming extinct.

The various international legal measures that are being taken include the CBD and the IU. But then some like IPR can be used both ways and some like TRIP may be overtly against the principle of one world one life for every one as is advocated by environmentalists. As the global environmental issues tell us, to live we must ensure that everyone else lives including all life forms. But commerce on the other hand tends to divide resources between different units that claim exclusive as well as individual rights over certain resources that go against the principle that all of nature is a gift to the entire globe.

The unity of nature is being constantly divided by commercial interests and goes against the basic principles by which indigenous people have survived over centuries. The need for biodiversity and also free access of every one to plant and food resources is challenged by commercial needs to control and monopolize resources. The issues still stand unresolved and global governance through many acts and legislations is trying to find solutions that may ultimately protect life on earth.

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Sample Questions

- 1) What is biodiversity? Why is it necessary to have biodiversity?
- 2) What are the reasons for loss of biodiversity in the world today?
- 3) What is IPR? How does it relate to Bio-diversity?
- 4) What is CBD? Discuss its relevance.
- 5) Critically assess the impact of TRIP on biodiversity.
- 6) What kind of knowledge do indigenous people have? Can such knowledge be subjected to patents? Critically discuss.
- 7) What are genetic resources? How should we use them?
- 8) What kind of ethical approach is necessary towards environment? Give your own assessment.

UNIT 4 APPLIED ENVIRONMENTAL ANTHROPOLOGY

Contents

- 4.1 Introduction
- 4.2 History and Development of Applied Anthropology
- 4.3 Domains of Application in Environmental Anthropology
 - 4.3.1 Agriculture
 - 4.3.2 Human and the Environment
 - 4.3.3 Indigenous Knowledge: A New Applied Anthropology
- 4.4 Application of Indigenous Environmental Knowledge in Biodiversity Conservation
 - 4.4.1 Conservation of Forest Resources
 - 4.4.2 Conservation of Fisheries
 - 4.4.3 Applied Medical Anthropology
- 4.5 Summary
- 4.6 References
 - Suggested Reading
 - Sample Questions

Learning Objectives



After reading this Unit, you will be able to learn:

- the brief history and development of applied anthropology;
- major areas of applied work in environmental anthropology;
- commonly referred to domains in which applied anthropology is carried out; and
- the application and use of indigenous environmental knowledge in Conservation and Management of Natural Resources.

4.1 INTRODUCTION

Anthropology, the study of human beings, is a discipline that incorporates theory, method, applied and action. The most rapidly growing area within the discipline is applied anthropology, and there are more anthropologists employed outside academic institutions than within them. Applied Anthropology is the practical application of anthropological knowledge, theory and methods to areas of social concern and to the growth and development of society. As countries and regions around the world continue to experience environmental degradation and natural resource depletion, it is becoming increasingly important for applied anthropologists, to engage in efforts that mitigate this destruction by managing natural resources and protecting ecosystems. Applied anthropologists work for groups that promote, manage, and assess programs aimed at influencing human behavior social conditions. The scope of applied anthropology includes change and development.

In recent decades a number of terms have been given to these attempts to use anthropological research for the improvement of human conditions: action anthropology, development anthropology, practical/practicing anthropology, and advocacy anthropology. For the purpose of this unit, however, we will use the more widely accepted and generic term applied anthropology. This unit covers a comprehensive understanding of applied environmental anthropology, including the history of applied anthropology, environmental issues like biodiversity conservation, sustainable agriculture, and indigenous knowledge etc.

4.2 HISTORY AND DEVELOPMENT OF APPLIED ANTHROPOLOGY

Anthropology has two dimensions: (1) theoretical/ academic anthropology and (2) practicing or applied anthropology. Applied Anthropology encompasses the four sub-disciplines traditionally recognized in anthropology: archaeology, biological anthropology, cultural anthropology, and linguistic anthropology. Each of these contributes their own significant theoretical contributions and do not replicate the existing knowledge base of the others. Applied Anthropology fits this definition and therefore is considered to be the fifth subfield of anthropology.

Anthropology is conceptually and methodologically extensive, and thus is broadly applicable to virtually any topical domain. What makes anthropology applicable to any particular topical domain depends largely on the nature of the problem being addressed and the specific informational needs of those who are addressing. Before going to know the details about the applied environmental anthropology, it is important to first understand what is 'applied anthropology'. According to Erve Chambers (1987) applied anthropology is the "field of inquiry concerned with the relationships between anthropological knowledge and the uses of that knowledge in the world beyond anthropology." The term applied anthropology is used in both Britain and the United States to refer mainly to the employment of anthropologists by organisations involved in inducing change or enhancing human welfare (Bennett, 1996). A simple definition of applied anthropology is offered by van Willigen (1993) "anthropology put to use". Applied anthropology is broadly defined, as the direct use of anthropological theory, method, data, skills, and perspectives to identify, assess and solve specific human problems. Applied anthropologists or practicing anthropologists work (regularly or occasionally full or part time) for nonacademic clients. These clients include governments, development agencies, nongovernmental organisations (NGOs), tribal and ethnic associations, interest groups, social service and educational agencies, industry and businesses.

The concept of "applied anthropology" dates back to at least 1906, when it was used to announce the establishment of a diploma program at Oxford, while the term "practical anthropology" was used as early as the 1860s by James Hunt, founder of the Anthropological Society of London (Eddy and Partridge 1987). The British were the first to formally recognise the practical value of anthropology and also the first to employ applied anthropologists. E. B. Tylor considered anthropology to be a "policy science" and advocated its use in improving the human condition. Anthropology was first used in the administration of the British colonies under the rubric of indirect rule (originated by Lord Lugard) by Northcote Thomas in Nigeria in 1908 (Reed 1998).

Later on in the course of time a number of scholars in different parts of the world have written about applied anthropology. In United States scholars addressed anthropology's history of application. van Willigen (1993) in particular presents the broadest overview, as he integrates the work of these and other scholars in his discussion of the development of the field.

Anthropologists have historically involved themselves in matters of practical relevance both inside and outside the academy, where they have applied their expertise to specific social problems, in effect, field testing existing anthropological theories and methods and developing new ones. For example, applied anthropology developed first around the policy research and colonial administrative training needs of governments during the latter half of the 19th Century and the beginning of the 20th (Tax, 1945). From this experience grew a period of federal service in specific problem areas and political contexts, for instance, social problems associated with the administration of American Indian tribes (Collier, 1936), World War II (American Anthropological Association, 1942), and incarceration camps for Japanese-Americans during the war (Spicer, 1946). It was during this period that the Society for Applied Anthropology (SfAA) was founded, primarily to provide a formal network and professional identity among applied anthropologists. The SfAA developed and published the journal "Applied Anthropology," subsequently named "Human Organisation," which functioned as a compendium of applied anthropological research being conducted during that period.

During the next quarter century anthropologists became increasingly involved in designing and implementing strategies for social change, and in the process created a host of action-oriented approaches to human problems, within which an expanded array of research based roles was being developed. The anthropological literature of this period reveals the breadth of contexts and approaches in which anthropologists were intervening in human problems; for instance, in technological change (Spicer, 1952), development (Tax, 1960), culture change (Niehoff, 1966), and community advocacy and cultural brokerage (Schensul, 1973). Through anthropological involvement in these areas, guidelines of ethical behavior and professional responsibility were developed (SfAA, 1948) and revised (SfAA, 1975) during this period.

Anthropology's history of application to human problems is reflected in the wide array of contexts to which it has been applied. For example, van Willigen (1991) has compiled a "Source Book on Anthropological Practice" that contains descriptions of these contexts, from which he has gleaned at least 39 such "content areas" ranging from "agriculture" to "women in development" (van Willigen 1993).

Anthropologists have occupied an assortment of practitioner roles within the content areas identified by van Willigen. He identifies and describes these roles: "policy researcher, evaluator, impact assessor, needs assessor, planner, research analyst, advocate, trainer, culture broker, expert witness, public participation specialist, administrator/manager, change agent, and therapist" (van Willigen, 1993). Practitioner roles are not mutually exclusive and thus are likely to overlap within and vary between the content areas in which one practices. Anthropologists' practical experience in such matters has enabled them to further define practitioner roles across numerous contexts (Kushner, 1994), and it has inspired further

revisions to their ethical codes (AAA 1990; NAPA 1988; SfAA 1983). Departments of anthropology have responded to these developments by creating training programs for non-academic careers in applied anthropology (Trotter, 1988), such as at the University of South Florida (Kushner 1994).

While in the past, the application of anthropology was generally use to various public sociopolitical issues and problems, now it has broadened in all the sub-discipline of anthropology significantly in recent times. The application or actual use of applied anthropological perspectives, now extends to various areas such as environment, health and disease, conservation, natural resources, hazards, disasters, cultural resource management and sacred places etc. More and more anthropologists from the four subfields now work in such “applied” areas. Applied anthropologists work for groups that promote, manage, and assess programs aimed at influencing human behavior and social conditions. The scope of applied anthropology includes change and development abroad and social problems and policies Applied Anthropologists examine social issues, recommend policies, and address the practical needs of community groups, businesses, and public sector organisations.

Environmental Anthropology is a more recent outgrowth of Ecological Anthropology, which can be characterized as the study of the interrelationship between human groups, cultures, and societies and the ecosystems in which they are embedded in all times and all places across planet earth. Scholars have delineated environmental anthropology as becoming more prominent in the 1980s and typically focusing on analysis and application of anthropological knowledge to contemporary environmental issues. Ecological and Environmental anthropology can most productively be viewed as a single interrelated discipline, with ecological anthropology focusing more on basic academic research and environmental anthropology being more focused on contemporary environmental issues and having more of an applied, practicing, or advocacy approach.

Activity

Define what applied anthropology?

4.3 DOMAINS OF APPLICATION IN ENVIRONMENTAL ANTHROPOLOGY

Anthropology is conceptually and methodologically extensive, and thus is broadly applicable to virtually any topical domain. What makes anthropology applicable to any particular topical domain depends largely on the nature of the problem being addressed and the specific informational needs of those who are addressing it. Major subfields of anthropology evolved out of applied research, including formative work in urban, nutritional, political, legal, agricultural, maritime, environmental, and educational anthropology. Anthropology is particularly applicable because, unlike other disciplines, it incorporates scientific and humanistic aspects, biological and cultural components, and a range of unique perspectives and theoretical orientations that integrate these into a unified discipline. Moreover, it contains numerous fields and sub-fields of inquiry, each with its respective research methods and interpretive frameworks; it contributes a history of application to the practical resolution of human problems; and it

provides clearly articulated guidelines of ethical and professional responsibility. Thus, from its historical beginnings, application played a key role in shaping the foundation of academic anthropology. Anthropology, as a discipline rooted firmly in both the biological and social sciences, can make a difference in environmental management. Conceptually, it broadens our focus to consider human/ environment interrelationships.

The domains where applied environmental anthropology includes topics as diverse and the number continues to increase. They can be defined narrowly or broadly. For your information provides a list of common domains, though not exhaustive, including *agriculture, forestry, fisheries, mining, and other resource development; pesticide exposure, toxic waste disposal, and other environmental health issues; environmental restoration; tourism, public lands, and cultural resource management; the protection of traditional knowledge, values, and resource rights; ethnoecology, agrarian ecology, pastoral ecology, historical ecology, political ecology, ecofeminism, environmentalism, environmental justice, symbolic ecology, human ecology, sustainable development, biodiversity conservation, wildlife management, environmental risk, environmental education* and a number of other areas, many of them interdisciplinary in scope and methodology. The domains of application for applied anthropology are quite varied and have led to a growing number of specialisations. In this unit let us discussed some of the domains in applied environmental anthropology.

Socio-cultural anthropology in its classical forms has been concerned more with understanding than with changing, but especially in the 1980s, applied and development aspects in anthropology, became more recognised as legitimate and useful activities. In the USA, the Institute for Development Anthropology established a network and a regular Bulletin. Development anthropology is the study of development problems, such as poverty, environmental degradation, and hunger and the application of anthropological knowledge to solve those problems. It clearly emerged as a subfield in applied anthropology in the 1970s (Little, 2005). Development anthropology since, it's begin accompanying changes in government policies, international and local opportunities for anthropologists. Little, describes development anthropology practices as interdisciplinary collaborations with other social scientists, economists, ecologists and agriculturalists. He also notes the benefits of collaborative effort and sustaining methods like PAR but also stresses and work toward an integration of theory, method and practice to elevate the field into a noted sub-branch. For example he details how development anthropologists' key theoretical contributions have led to program modifications. To further demonstrate the importance of integrating theory, method and practice, he offers a case study of his work with the Kenya Wildlife Services to establish a project monitoring their initiative to protect the pastoral tradition in East Africa. He suggest that since development anthropologists are knowledgeable about indigenous peoples' use of natural resources in key wildlife regions, environmental organisations will continue to solicit their expertise on potential outcomes at the local level.

4.3.1 Agriculture

A very few social anthropologists found their way into the International Agricultural Research Centres, where they had an influence disproportionate to their tiny numbers, and the social anthropologists in aid agencies rose in numbers

and status, though they were still few. Applied anthropology in agriculture looks at the intersection between culture and agricultural practice. It also take into account economic situations and technologies of native population Rhoades states that “Agricultural anthropology is the comparative, holistic, and temporal study of the human element in agricultural activity, focusing on the interactions of environment, technology, and culture within local and global food systems...” (1984). Farmers practice methods that they feel will work best for them based on the peculiarities of their farm and the information they have inherited or accumulated through experience. Robert E Rhoades explains just how significant agriculture is to all humans it affects culture, technology, economics, societies and religions. He describes the domain of agricultural anthropology as concerned with the “human element in the agrarian system,” from production to consumption and symbolic systems of culture, from the origins of the agriculture to future developments. However, as Blaikie and Brookfield (1987) suggest, there are many outside forces based on social, economic, and political relationships that have a great deal of influence on the decisions they make. Farmers are constantly making changes in order to improve what they feel are the most important aspects of their operations due to constantly shifting external problems and policies. Because the farmer is the one who is held accountable for decisions made on the farm, “Research must come full circle from proper problem identification to farmer acceptance or rejection” (Rhoades 1984). He states that agriculture anthropologists strive to translate their knowledge of agriculture as a social and cultural practice to “technical and policy advances,” some working in academia and many more employed by international institutes, NGOs and governmental agencies.

The sub-branch agricultural anthropology is relatively young but Rhoades argues that intellectual work in agriculture done by early anthropologists was kept distanced, though it was often a part of ethnographies and a source of employment, with practitioners serving as liaisons among governments, colonies and peasants. He points to the new Deal’s Soil Conservation Service of the 1930s as the first time anthropologists worked in agriculture. Though applied and theoretical studies of agriculture practices published in other fields (such as sociology and economics) used anthropological field research, agriculture and anthropology failed to synthesize until the 1970s, when new doctoral research began to seek work as professional anthropologists in private and non-profit sectors.

Rhoades details stereotypes that have held back the profession and outlines strategies for developing a better model to secure employment: develop good communication; have basic familiarity with bio-scientific terminology; demonstrate clearly how anthropological methods can make a difference in terms of production, income, or nutrition; show how farmers are “expert ethno-botanists” with indigenous knowledge that is very useful to project goals; negotiate an integral place for themselves and their contribution early in the research process; and ensure that professional status is perceived as commensurate with the other affiliated scientists. He then describes three case studies in which agricultural anthropologists at the International Potato Center in Lima, Peru. He concludes his chapter by arguing agricultural anthropologists to develop a professional relationship with a public constituency, to the extent seen in other fields, such as economics, law, or education, as a means “to declare its relevance through action.” This will entail the communication of agricultural anthropological skills and ideas to an audience wider than the narrow community of practitioners,

as well as a modification of university training to incorporate coursework on application and policy, the material base of agriculture and the languages of agriculture sciences. His studies were widely read and influential far beyond and initiated key technological and policy changes. Social anthropologists helped development professionals generally better to appreciate the richness and validity of rural people's knowledge (e.g. IDS 1979; Brokensha, Warren and Werner 1980).

4.3.2 Human and the Environment

There are a number of approaches to a *human ecology* that have been applied since the early 1980s. These represent the increasing specialisation in anthropology, not only by the subfields that were described earlier on, but also by different theoretical approaches. Ecological anthropology there has been a long history of research on the formal systems of folk knowledge of natural resources. During the first quarter of the twentieth century, descriptive particularists emphasized the uniqueness of each culture as demonstrated in its particular knowledge of plants, animals, astronomy, etc. (e.g., Boas 1998; Kroeber c1948). In the eyes of descriptive particularists, the natural environment sets certain possibilities from which cultures, conditioned by their history and particular customs, elaborate their knowledge.

By the middle of the twentieth century, cultural ecologists tried to explain how subsistence patterns ("the culture core") evolve in response to the relevant parts of the environment and how they shape other cultural features such as social organisation (Steward, 1955). Cultural ecologists stressed the role of local knowledge in adapting to specific physical conditions (Orlove and Custred, 1980) and saw material causes behind the development of a system of traditional knowledge (Rappaport, 1967). Cultural ecologists were not far from the assertion, still prevalent, that groups which live in close relationship with natural ecosystems and depend on them have strong incentives to manage their resources in a sustainable way, which is reflected in their system of knowledge (Berkes et al. 1995). Human ecology searched for the ecological value of environmental knowledge embedded in folk taxonomies (Hunn, 1982). Building on the work of ethnobotanists and ethnobiologists, cognitive anthropologists have examined the structure and systematic nature of folk knowledge, documenting the complexity and sophistication of traditional knowledge (Berlin, 1992).

Particularists and cultural ecologists are both environmentally deterministic; that is, they believe that cultures are determined by the environment in which they were set. In contrast, human ecologists and cognitive anthropologists have contributed to the widespread acceptance of indigenous knowledge as systematic and valuable (Brush, 1993), and to the effort to preserve it. The recognition of the value of traditional knowledge has been the key step towards its incorporation into science (Brookfield and Padoch, 1994), the market (King and Carlson, 1995), agroecological systems (Altieri, 1989), and biodiversity conservation (Orlove and Brush, 1996). Following these different theoretical tendencies, applied anthropologists have largely contributed to the effort to recognize the value of folk knowledge by orienting their research towards ways of using and improving traditional knowledge to manage natural resources (Posey and Balée, 1989).

Thomas R. McGuire (2005) describes a variety of settings for applied anthropological work concerning human and the environment. For example,

practitioners specializing in this domain might conduct research on the management of renewable resources and the people depended up on them or how local knowledge can be used to build ecological sustainable communities or even on environmentalism as a social movement. He stresses the importance of theoretical foundation in all such work and discusses those key conceptual “building blocks” of environmental anthropology research: cultural ecology, political ecology and political economy. He maps these concepts according to a chronology of theoretical shifts in the field from the post World War II era to the present.

McGuire characterises the 1950s as a time when researchers in environmental anthropology were primarily interested in human ecosystems. Key questions addressed how individuals rather than market forces could be empowered to access and control resources in their region. He notes that during the 1980s and 1990s environmental anthropologists increasingly employed political ecology to bring these two levels together, “how political and ecological forces interact to cause social and environmental change.” Other environmental anthropologists have found such research too politicised in assuming that external forces should take priority, and they in turn substituted event ecology, focusing on the history of a significant environmental change in order to offer policymakers more workable solutions. Still others, having found the field insufficiently political are committed to liberation ecology and strive to promote alternative development strategies using community knowledge.

Activity

What are the different domains of applied anthropology?

4.3.3 Indigenous Knowledge: A New Applied Anthropology

The study of indigenous knowledge is a new revolution set in the domain of Anthropology. Indigenous knowledge research sets out explicitly to make connections between local peoples understanding and practices and those of outside researchers and development workers, notably in the natural resources and health sectors, seeking to achieve a sympathetic and in-depth appreciation of their experience and objectives and to link them to scientific technology (Sillitoe, 1998). In this context, participatory research techniques have been generated indifferent social sciences and the main thrust in such an approach is to make the people or the subjects into active collaborators in bringing about desired change. Technology transfer is now considered not as a top – down imposition but as a search for jointly negotiated advances, which results in cost-effective, time-effective programmes generating appropriate insights readily intelligible even to non-experts. Thus participatory approaches seek a more systematic accommodation of indigenous knowledge in research and technological interventions (Schaffer, 1989). The demands of indigenous knowledge and participatory research require the establishment of partnerships founded on dialogue. Anthropologists are better positioned to take up the tasks of incorporating indigenous knowledge into the development process as they are the pioneers in documenting indigenous knowledge systems through participant observation method that involves living with the subjects for a very long period. This being the hallmark of Anthropological research, the role-play of ‘Anthropologists as consultants’ in implementing development programmes becomes much more relevant compared to other social scientists.

Haile (1996) proposes that the idea of harnessing Anthropology to technical knowledge to facilitate development puts the discipline where it should be, at the center of the development process. This focus on indigenous knowledge has already resulted in reappraising theoretical as well as methodological aspects of Anthropology. The liability of indigenous knowledge is reflected in the theoretical shift from a structural to a processual and to a post-modernist perspective. Certain methodological advances to tailor interventions to local conditions have already been put forward by the Anthropologists in 'doing Anthropology' by a very different process.

The process involves the brokering of knowledge in which Anthropologists become researchers for and consultants to indigenous people and traditional communities (community-controlled research). They can also oversee that the indigenous knowledge is not patented for but used in the production of universal medical technologies, not for private commercial benefits. This will establish the 'dialogue' as the corner-stone of a new Applied Anthropology. In this endeavour, the greatest challenge to Anthropology vis-à-vis development debate is to develop criteria and indicators for sustainable development – health environments, sustainable livelihoods that are based on local, indigenous perceptions, classifications, values, measures of environmental quality and change that reflects local observations and knowledge systems, even if they seem 'magical', whimsical or destructive to the outsider.

Many applied anthropologists have conducted research on different aspects of indigenous knowledge. Some authors have focused on individual aspects of traditional knowledge (Brookfield and Padoch, 1994) while others have focused on the knowledge elaborated by different groups (Balée, 1994). In general, applied anthropologists have made the links between indigenous knowledge and the conservation of biological diversity, assuming that traditional societies have persisted because of their knowledge about managing natural resources. That is, applied anthropologists hypothesized that people who rely on natural resources for their livelihood must have developed methods to ensure the conservation of their environment (Vivian 1992), one of them being the knowledge of how to use and preserve the resources they use (Posey, 1990).

Applied anthropologists have also participated in the debate over the property rights of indigenous knowledge (Brush 1993), ways to compensate indigenous people for use of their folk knowledge (Posey 1990), and methods used to protect the property rights of indigenous people to their folk knowledge (Vogel 1994). Indigenous organisations (Singh Nijar, 1996) and their advocates (Shiva 1997) claim that indigenous people need a new system of legal protection that recognizes that most indigenous knowledge is owned by the community, not by individuals, and that the uneven distribution of knowledge within a culture does not spoil the principle of common heritage (Brush 1993). Researchers and indigenous activists are now proposing new laws designed to defend indigenous cultures. Applied anthropologists have played a significant role in proposing new ideas and laws to protect the intellectual property rights of communities (Brush 1993).

4.4 APPLICATION OF INDIGENOUS ENVIRONMENTAL KNOWLEDGE IN BIODIVERSITY CONSERVATION

Research interest in Indigenous Environmental Knowledge has been growing in recent years, partly due to the cognition that such knowledge can contribute to the conservation of biodiversity (Gadgil et al., 1993), i.e. endangered species, protected areas, ecological processes, and to sustainable resource use in general. Ecological anthropologists, Conservation biologists, ethnobiologists, other scholars, and the pharmaceutical industry all share an interest in traditional knowledge for scientific, social, or economic reasons.

In the course of the development of the field, the study of Traditional Ecological Knowledge began with the study of species identifications and classification (ethnobiology), and proceeded to considerations of peoples' understandings of ecological processes and their relationships with the environment (Williams and Baines, 1993). The analysis of many Traditional Ecological Knowledge systems shows that there is a component of local observational knowledge of species and other environmental phenomena, a component of practice in the way people carry out their resource use activities, and further, a component of belief regarding how people fit into or relate to ecosystems. In course of time working definition of Traditional Ecological Knowledge developed as a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

The focus on practical application of ethnoecology is inspired largely by Darrell Posey and his co-workers, who offer a broad definition of ethnoecology as, 'indigenous perceptions of "natural" divisions in the biological world and plant-animal-human relationships within each division'. This, in various aspects, is argued to have applications in development (Posey et al., 1984). Many authors prefer to use the term 'ethnoecological knowledge' rather than 'ethnoecology', restrict the meaning of the latter to the academic study of ethnoecological knowledge. Under the definition given, ethnoecological knowledge can be considered a subset of 'indigenous knowledge', defined by Purcell as, 'the body of historically constituted (emic) knowledge instrumental in the long-term adaptation of human groups to the biophysical environment' (Purcell, 1998). This definition deviates from that of 'indigenous people' in that the criterion of long-term historical association with a particular point in space is absent. The emphasis is rather on the retention of some measure of political, economic and cultural autonomy relative to the state and, consequently, a perspective on planned change different from that of extra-local actors (Purcell, 1998). Of the various terms used more or less interchangeably to refer to what Purcell has defined as 'indigenous knowledge' (Ellen and Harris, 1997), some of them prefer to use 'local knowledge'. This is adequately to emphasise the autochthonous character of such knowledge without the historical implications of the term 'indigenous'. In this unit, I use the terms more or less interchangeably, such that 'indigenous knowledge' is employed to refer to the local knowledge of, specifically, groups conventionally considered to be indigenous.

Indigenous knowledge is an important natural resource that can facilitate the development process in cost-effective, participatory and sustainable way. The basic component of any country's knowledge system is its indigenous knowledge. It encompasses the skills, experiences and insights of people, applied to improve their livelihood. To ignore people's knowledge is almost to ensure failure in development (Brokensha, 1980). Since indigenous knowledge is essential to development, it is often suggested that it must be gathered and documented in a coherent and systematic fashion (Brokenshaw, 1980; Warren, 1995).

In the following parts of the section we will discuss some of the works of applied and cognitive anthropologists dealing with Indigenous Environmental Knowledge, Conservation and Management of Natural Resources. The works of applied anthropologists have the greatest impact by making research on the topic relevant in the public arena.

4.4.1 Conservation of Forest Resources

Indigenous knowledge is the basis for local level decision-making in agriculture, healthcare, food preparation, education, natural resource management, and a host of other activities in rural communities. Forest resource conservation is a global issue. Forest is their main source of economy and livelihood. Tribes have evolved Indigenous knowledge system (IKS) that is vital in conservation of forest resources. Intimately tied to indigenous knowledge land management practices was the conservation of forests. Using indigenous knowledge know-how as well as rules, prohibitions and taboos, all the communities practiced forest conservation. For example in India the *Akas* a small tribal group inhabiting the sub-Himalayan have their own indigenous knowledge system useful in the conservation of forest resources. Numerous species of plants are not extracted from the forests. Similarly, some animals are neither killed nor eaten by these people. They spare the immature and pregnant animal in the forests. Small saplings of certain plants are not destroyed. Only required plant parts are collected from the nearby forests. As such, these people have developed an eco-friendly relation with the surrounding forest ecosystem. Conservation and management of plant and animal resources is not a new concept for the tribal people. Conservation of forest resources refers to the sustainable utilisation of the plant and animal resources. Various faith and beliefs that are pertinent in protection of sacred groves, from which extraction of plant material is restricted or tabooed. The festivals are linked to the forests. Traditionally, they practice an annual hunting ritual after worshipping the forest god. During such hunting, they spare pregnant as well as immature animals. The herbal practitioners belonging to the community do not promote over extraction of medicinal plants, fire and grazing (Gadgil M, 1998).

The communities in Kenya most of the farming was done on the edges of forests, leaving the thick forests untouched. This helped protect indigenous plants in the thick forests, which take a long time to mature. It also prevented land degradation. There were also tree and plant species that were considered sacred, or as totems, or were associated with some bad omens. For those reasons they were protected. For instance, *Ficus thonningii*, known locally in western Kenya as *pocho*, is considered sacred by many Kenyan communities including the Embu, Kikuyu, Kipsigis, Luhya, Luo, Maasai and Meru. The tree is not supposed to be cut down or its wood used for fuel. In Swaziland trees such as *bhubhubhu* (*Crotalaria*

capensis) and gcolokhulu (*Rapanea melanophloeos*) are protected from being used as sources of building materials. In almost all the communities, there were also plants and trees that were associated with shrines and water sources that were therefore protected (Peter Mwaura, 2008).

The communities valued trees for their beauty and products which included fruits and berries, medicine, fuel wood and construction materials. The various communities conserved them by harvesting them in a manner that allowed them to regenerate. There were restraints on the customary right of access to forests, thus checking the indiscriminate use of forest resources. There were also taboos and restrictions on gathering of plants, which limited to some degree the harvesting of plant resources. Some taboos prevented women and young people from cutting down certain trees. Menstruating women, for example, were prohibited from collecting medicinal plants; it was believed that if they did so that would reduce the healing power of the plants. These taboos ensured the conservation of many species. In many communities, big trees were not cut for domestic purposes; only small shrubs, reeds, and grass, which regenerate quickly were used, for example, for building houses. Among the communities in the Lake Victoria basin aquatic plants such as papyrus reeds and water reeds commonly used in making basketry, sleeping mats, fish cages and for thatching roofs were harvested sustainably. In the African Sahel the local populations in their region, through their indigenous knowledge systems, have developed and implemented extensive mitigation and adaptation strategies that have enabled them reduce their vulnerability to past climate variability and change, which exceed those predicted by models of future climate change.

Indigenous knowledge systems conserved the biodiversity of the local environment in many ways because of the cross-cutting nature of conservation measures. Such practices as the traditional protection of forests, shrines, watercourses, certain species of flora and fauna, as well as farming technologies that focused on indigenous food crops, contributed immensely to biodiversity. But the most notable biodiversity conservation practice was the protection of forests and shrines. Traditional leaders also designated certain areas as exclusion zones in order to conserve forests. Indiscriminate felling of trees and other vegetation in these areas was forbidden.

4.4.2 Conservation of Fisheries

Management of water bodies was also an important aspect of indigenous knowledge in land use and management. The communities that live around water bodies have used water resources as the basis for their livelihood. In many parts of the world, coastal fisheries are or were managed traditionally by community based systems of property rights and associated regimes of rights and rules that closely reflect social organisation and power structure. Ruddle (1994) reports that several conservation rules were traditionally employed by many communities in the Asia-Pacific region to ensure sustained yields. Some practices designed to conserve resources included live storage or freeing surplus fish during spawning migrations, setting up of closed seasons especially during spawning; placing taboos on fishing areas, reservation of particular areas for fishing during bad weather, size restrictions and in recent times gear restrictions. Some practices are based on ecological rationale such as the imposition of closed season that follow local knowledge about the spawning periods of key fish species and prohibit their capture during such periods.

In Africa there were strict rules on sizes of nets, types of traps and methods of fishing for specific periods of the year. Any young fish caught by mistake was thrown back into the water. The rules gave the fish opportunities for breeding while at the same time allowing the communities to fish for specific types of fish each season. The strict rules on the conservation of mangroves along the coastline provided a safe sanctuary for the breeding of these marine species and contributed towards nature conservation by controlling coastal erosion, accretion and water pollution. Also, the fishing communities were conscious of protecting their main source of livelihood. Therefore, totems and taboos checked illegal fish catches and promoted compliance.

4.4.3 Applied Medical Anthropology

Medical anthropology is the study of human health and disease, health care systems, and biocultural adaptation. The discipline draws upon the four fields of anthropology to analyse and compare the health of regional populations and of ethnic and cultural enclaves, both prehistoric and contemporary. Since the mid-1960s, medical anthropology has developed three major orientations. Medical ecology views populations as biological as well as cultural units and studies interactions among ecological systems, health, and human evolution. Ethnomedical analysis focuses on cultural systems of healing and the cognitive parameters of illness.

Applied anthropologists have also made marks in medicine. A growing number of occupational therapists, for example, use applied methods in practice. At the root, occupational therapy proposes that work and play are central to people's health and wellbeing.

With the advent of indigenous knowledge perspective, there is a radical shift in the mind set from viewing native systems of thought as naïve and rudimentary, even savage to a recognition that local cultures know their plant, animal and physical resources intimately (Nazarea, 1999). Tambiah (1990) attests that, in reality, rather than an empirical 'folk' science conforming to universal principles of 'real' science, what we have is multiple contrasting orderings of reality. People construct their worlds by their knowledge and live by it, and therefore an anthropology of knowledge should ask how these varieties are variously produced, represented, transmitted and applied.

In many tribal societies in the India and different parts of world knowledge related to these aspects is treated as esoteric and is associated with certain specialized roles, inherited by certain people, most notably, the shaman or the medicine man. The shaman treats disease essentially by religious means, through sacrifice and prayer. Herbs have healing power because of the prayers recited and rituals performed by the shaman. The etiology of sickness varies. The shaman seeks to restore the patient's relationship to the physical, metaphysical and social worlds –to correct the imbalance that is the root cause of illness. The recovery of good health and good relationship with fellow community members is achieved by one or more curing ceremonies.

Applied medical anthropology deals with intervention, prevention, and policy issues and analyses the socioeconomic forces and power differentials that influence access to care. In this triad, cultural anthropology is most closely allied with ethnomedicine. In the formative years, some anthropologists favoured

identifying the field as “ethnomedicine,” while others preferred “anthropology of health.” The term “medical anthropology prevailed, however, coming to represent a diversified range of orientations.

Indigenous people can provide valuable input about the local environment and how to effectively manage its natural resources. Outside interest in indigenous knowledge systems has been fueled by the recent worldwide ecological crisis and the realisation that its causes lie partly in the overexploitation of natural resources based on inappropriate attitudes and technologies. Scientists now recognize that indigenous people have managed the environments in which they have lived for generations, often without significantly damaging local ecologies (Emery, 1996). Many feel that indigenous knowledge can thus provide a powerful basis from which alternative ways of managing resources can be developed. Indigenous knowledge technologies and know-how have an advantage over Science in that they rely on locally available skills and materials and are thus often more cost-effective than introducing exotic technologies from outside sources (IIRR, 1996). Incorporating indigenous knowledge into research projects can contribute to local empowerment and development, increasing self-sufficiency and strengthening self-determination (Thrupp, 1998).

Activity

Define indigenous environmental knowledge?

4.5 SUMMARY

Applied Anthropology uses anthropological perspectives, methods and theories to solve human and environmental problems. While in the past, the application of anthropology was generally to various public sociopolitical issues and problems such as racial and gender discrimination, environmental justice, refugees, human rights, and peace and nonviolent conflict resolution, the arena has broadened significantly in recent times. The application, actual use of anthropological perspectives, now extends to various areas of government, including policy, law, law enforcement, and politics; business, industry, economic development, modernisation, urbanisation, and globalisation; communication and cyberspace; education and schools; health and disease; indigenous environmental knowledge, conservation, natural resources, hazards, and disasters; media, sports and entertainment; cultural resource management, sacred places, and religion; cultural survival and rights; and war, military, and security. The application of anthropological perspectives seems fairly limitless.

This unit covers a comprehensive understanding of applied environmental anthropology, including the history of applied anthropology, environmental issues like biodiversity conservation, sustainable agriculture, ethno-medicine and indigenous knowledge etc.

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Sample Questions

- 1) Discuss briefly history of applied anthropology.
- 2) Describe the different domains in which applied anthropologists work.
- 3) Indigenous knowledge and applied anthropology discuss?
- 4) Role of indigenous knowledge in conservation of biodiversity explain?