UNIT 1 INDIGENOUS ENVIRONMENTAL KNOWLEDGE SYSTEMS AND DEVELOPMENT

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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
Cultural Dimensions of Development and Biodiversity Conservation

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

(Source: Antweiler, Christoph. 2004)
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

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

(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:

<table>
<thead>
<tr>
<th></th>
<th>Indigenous knowledge</th>
<th>Western scientific Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship</td>
<td>Subordinate</td>
<td>Dominant</td>
</tr>
<tr>
<td>Dominant mode of thinking</td>
<td>Intuitive</td>
<td>Analytical</td>
</tr>
<tr>
<td>Communication</td>
<td>Oral</td>
<td>Literate</td>
</tr>
<tr>
<td></td>
<td>Teaching through doing and story-telling</td>
<td>Didactic</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Holistic</td>
<td>Reductionistic</td>
</tr>
<tr>
<td></td>
<td>Subjective</td>
<td>Objective</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>Positivist</td>
</tr>
</tbody>
</table>
### Cultural Dimensions of Development and Biodiversity Conservation

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

(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)
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.

1.8 REFERENCES


Mc CORKLE, Constance M.1989Toward a knowledge of local knowledge and ist importance for agricultural RD&E. Agricultureans Human Values, Summer:4-12


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.