EMT 521 ENVIRONMENTAL SOCIOLOGY

COURSE UNITS – 3

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MODULE 1: CULTURE AND THE ENVIRONMENT

UNIT 1: CULTURE AND ITS ELEMENTS

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1.0 Introduction

Of all the so called "environmental uncontrollables", culture, or at least the study of it, is one of the most difficult to comprehend, take account of and harness to advantage (Food and Agriculture Organization, 1997). A culture seeks an identity and strives to maintain its individuality and distinctiveness while recognizing the fibres that connect them to other cultures in more subtle ways (Colbert, 2010). The roots of one's culture are considered the driving force behind how humans learn to behave (Harris, Moran & Moran, 2004).

2.0 Objectives

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

- Understand the meaning of culture;
- Know the various approaches to the study of culture and
- Appreciate the importance of culture.

3.0 Main Content

3.1 What is Culture?

Much has been written on the subject of culture and its consequences. Whilst on the surface most countries of the world demonstrate cultural similarities, there are many differences, hidden below the surface. One can talk about "the West", but Italians and English, both belonging to the so called "West", are very different in outlook when one looks below the surface. Terpstran (1987) has defined culture as follows: "The integrated sum total of learned behavioral traits that are manifest and shared by members of society". Culture, therefore, according to this definition, is not transmitted genealogically. It is not, also innate, but learned. Facets of culture are interrelated and it is shared by members of a group who define the boundaries. Often different cultures exist side by side within countries, especially in Africa. It is not uncommon to have a European culture, alongside an indigenous culture, say, for example, Shona, in Zimbabwe. Culture also reveals itself in many ways and in preferences for colours, styles, religion, family ties and so on. The colour red is very popular in the west, but not popular in Islamic countries, where sober colours like black are preferred.
Much argument in the study of culture has revolved around the "standardization" versus "adaption" question. In the search for standardization certain "universals" can be identified. Murdock (1954) suggested a list, including age grading, religious rituals and athletic sport. Levitt (1982) suggested that traditional differences in task and doing business were breaking down and this meant that standardization rather than adaption is becoming increasingly prevalent.

3.2 Approaches to the Study of Culture

Keegan (1989) suggested a number of approaches to the study of culture including the anthropological approach, Maslow's approach, the Self- Reference Criterion (SRC), diffusion theory, high and low context cultures and perception. There are briefly reviewed here.

3.2.1 Anthropological approach

Culture can be deep seated and, to the untrained can appear bizarre. The Moslem culture of covering the female form may be alien, to those cultures which openly flaunt the female form. The anthropologist, though a time consuming process, considers behaviour in the light of experiencing it at first hand. In order to understand beliefs, motives and values, the anthropologist studies the country in question anthropology and unearths the reasons for what, apparently, appears bizarre.

3.2.2 Maslow’s approach

In searching for culture universals, Maslow's (1964) hierarchy of needs gives a useful analytical framework. Maslow hypothesized that people's desires can be arranged into a hierarchy of needs of relative potency. As soon as the "lower" needs are filled, other and higher needs emerge immediately to dominate the individual. When these higher needs are fulfilled, other new and still higher needs emerge.

Physiological needs are at the bottom of the hierarchy. These are basic needs to be satisfied like food, water, air, comfort. The next need is safety - a feeling of well-being. Social needs are those related to developing love and relationships. Once these lower needs are fulfilled "higher" needs emerge like esteem – self-respect - and the need for status improving goods. The highest order is self-actualization where one can now afford to express oneself as all other needs have been met. Whilst the hypothesis is simplistic it does give an insight into universal truisms.

3.2.3 The self-reference criterion (SRC)

Perception of needs can be blocked by one's own cultural experience. Lee (1965) suggested a way, whereby one could systematically reduce this perception. He suggested a four point approach.
a) Define the problem or goal in terms of home country traits, habits and norms.
b) Define the problem or goal in terms of the foreign culture traits, habits and norms.
c) Isolate the SRC influence in the problem and examine it carefully to see how it complicates the pattern.
d) Redefine the problem without the SRC influence and solve for the foreign market situation.
The problem with this approach is that, as stated earlier, culture may be hidden or non-apparent. Un-earthening the factors in b) may, therefore, be difficult.

3.2.4 Diffusion theory

Many studies have been made since the 1930's to assess how new innovations are diffused in a society. One of the most prolific writers was Everett Rogers. In his book, "Diffusion of Innovations" (1962), he suggested that adoption was a social phenomenon, characterised by a normal distribution as shown in Figure 1.

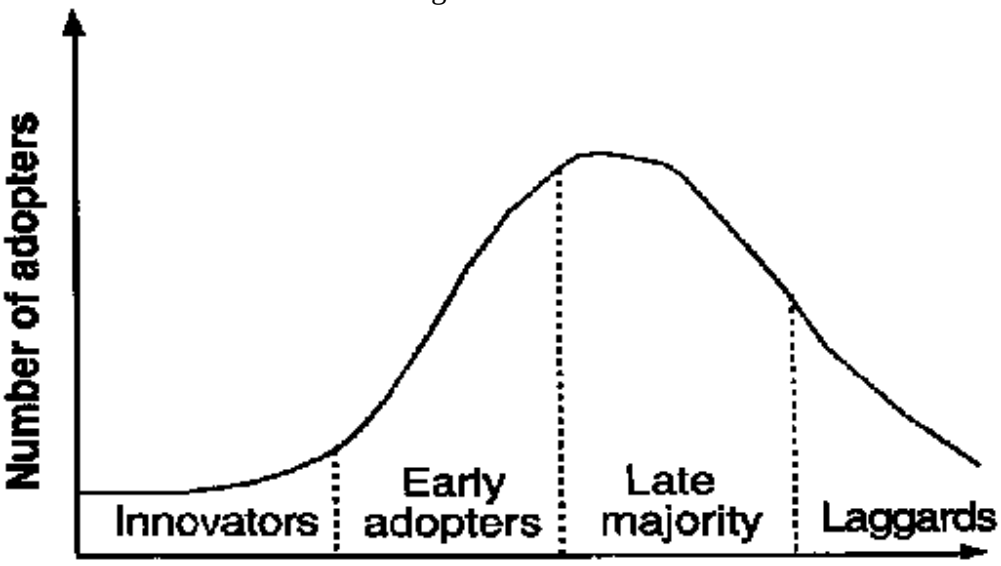

Figure 1: Adopter categories

In this case, the innovators are a small percentage, who likes to be seen to lead, and then the others, increasingly more conservative, take the innovation on. The adoption process itself is done in a series of stages from awareness of the product, through to interest, evaluation, trial and

either adoption or rejection (in the case of non-adopters). The speed of the adoption process depends on the relative advantage provided by the product, how compatible or not it is with current values or experiences, its complexity, divisibility (how quickly it can be tried) and how quickly it can be communicated to the potential market. In international marketing an assessment of the product or service in terms of these latter factors is very useful to the speed of its adoption. Most horticultural products, for example, have no problem in transfer from one culture to another, however specific types may have. It is unlikely that produce like "squash" would sell well in Europe, but it does in Zimbabwe.

3.2.5 High and low context cultures

Hall (1976) has suggested the concept of high and low context cultures as a way of understanding different cultural orientations. In low context cultures messages have to be explicit, in high context cultures less information is required in the verbal message. In low context cultures, for example like Northern Europe, a person's word is not to be relied on, things must be written. On the other hand, in high context cultures, like Japan and the Middle East, a person's word is their bond. It is primarily a question of trust.

3.2.6 Perception

Perception is the ability to see what is in culture. The SRC can be a very powerful negative force. High perceptual skills need to be developed so that no one misperceive a situation, which could lead to negative consequences
Many of these theories and approaches have been "borrowed" from other contexts themselves, but they do give a useful insight into how one might avoid a number of pitfalls of culture in doing business overseas.
Consumer products are likely to be more culturally sensitive than business to business products, primarily because technology can be universally learned. However there are dangers in over generalizations. For example, drink can be very universal and yet culture bound. Whilst appealing to a very universal physiological need - thirst - different drink can satiate the same need. Tea is a very English habit, coffee American but neither are universals in African culture. However, Coca Cola may be acceptable in all three cultures, with even the same advertising appeal.

3.2.7 Nationalism

Nationalism is a cultural trait which is increasingly surfacing. The break-up of Yugoslavia and the USSR are witness to the fact. In Western, developed countries a high degree of interdependence exists, so it is not so easy to be all that independent. In fact, blocs like NAFTA and the EU are, if anything, becoming more economically independent. However, less developed countries do not yet have the same interdependence in general, and so organizations need to reassess their contribution to the development of nations to make sure that they are not holding them "to hostage".
Culture is a very powerful variable and cannot be ignored. Whilst "universals" are sought there is still a need to understand local customs and attitudes. These are usually no better understood than by the making use of in country personnel.

4.0 Conclusion

Culture is something that is learned and it means different things to different people. For instance, the Muslim culture of covering the head by females may be alien, to those cultures which openly flaunt the female covering of head. There are different approaches to the study of culture and these include anthropological approach, Maslow approach, diffusion theory etc.

5.0 Summary

In this unit we have leant that:

i. Culture is defined as "the integrated sum total of learned behavioral traits that are manifest and shared by members of society".
ii. Perception is the ability to see what is in culture.
iii. In order to understand beliefs, motives and values, the anthropologist studies the country in question anthropology and unearths the reasons for what, apparently, appears bizarre.

6.0 Tutor Marked Assignments

1. Discuss the Maslow's approach to the study of culture.
2. Explain high and low context cultures.

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UNIT 2: ELEMENTS OF CULTURE

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1.0 Introduction

The major elements of culture are material culture, language, aesthetics, education, religion, attitudes and values and social organization (FAO, 1997).

2.0 Objectives

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

- Understand the meaning of material culture;
- Know language reflects the values of society and
- Education can transmit cultural ideas.

3.0 Main Content

3.1 Material Culture

Material culture refers to tools, artifacts and technology (FAO, 1997). Before marketing in a foreign culture it is important to assess the material culture like transportation, power, and communications and so on. Input-output tables may be useful in assessing this. All aspects of marketing are affected by material culture like sources of power for products, media availability and distribution. For example, refrigerated transport does not exist in many African countries. Material culture introductions into a country may bring about cultural changes which may or may not be desirable. Until the early 1990s, Zimbabwe did not allow both alcoholic and non-alcoholic beverages to be packed in cans. There were both economic and environmental reasons for this. Economically, Zimbabwe did not have the production facility for canning. Environ mentally, Zimbabwe had seen the litter in Botswana, caused by discarded empty cans. By putting a deposit on glass containers they ensured the empties were returned to the retailer, thus avoiding

a litter problem. However, with the advent of trade liberalization under the Structural Reform Program, the Government of Zimbabwe decided to allow the import of some 4 million cans as an experiment, after which it would assess the environmental impact. The result was a huge influx of canned alcoholic and other beverages not just from nearby Botswana and South Africa but from Australia, USA and Europe.

3.2 Language

Language reflects the nature and values of society. There may be many sub-cultural languages like dialects which may have to be accounted for. Some countries have two or three languages. In Zimbabwe there are three languages - English, Shona and Ndebele with numerous dialects. In Nigeria, some linguistic groups have engaged in hostile activities. Language can cause communication problems - especially in the use of media or written material. It is best to learn the language or engage someone who understands it well.

3.3 Aesthetics

Aesthetics refer to the ideas in a culture concerning beauty and good taste as expressed in the arts -music, art, drama and dancing and the particular appreciation of colour and form. African music is different in form to Western music. Aesthetic differences affect design, colours, packaging, brand names and media messages. For example, unless explained, the brand name FAVCO would mean nothing to Western importers, in Zimbabwe most people would instantly recognise FAVCO as the brand of horticultural produce.

3.4 Education

Education refers to the transmission of skills, ideas and attitudes as well as training in particular disciplines. Education can transmit cultural ideas or be used for change, for example the local university can build up an economy's performance.
The UN agency UNESCO gathers data on education information. For example, it shows in Ethiopia only 12% of the viable age group enrol at secondary school, but the figure is 97% in the USA.

3.5 Religion

Religion provides the best insight into a society's behaviour and helps answer the question why people behave rather than how they behave.

3.6 Attitudes and Values

Values often have a religious foundation, and attitudes relate to economic activities. It is essential to ascertain attitudes towards marketing activities which lead to wealth or material gain, for example, in Buddhist society these may not be relevant.
Also "change" may not be needed, or even wanted, and it may be better to relate products to traditional values rather than just new ones. Many African societies are risk averse, therefore,

entrepreneurialism may not always be relevant. Attitudes are always precursors of human behaviour and so it is essential that research is done carefully on these.

3.7 Social Organization

This refers to the way people relate to each other, for example, extended families, units, kinship. In some countries kinship may be a tribe and so segmentation may have to be based on this. Other forms of groups may be religious or political, age, caste and so on.

4.0 Conclusion

It is quite clear that there are elements of culture but the significant ones include religion, language, attitudes and values, aesthetics etc.

5.0 Summary

In this unit we have leant that:

i. Education can transmit cultural ideas or be used for change.
ii. Language reflects the nature and values of society.
iii. Attitudes are always precursors of human behaviour.

6.0 Tutor Marked Assignments

1. List and explain three major elements of culture.
2. Explain how aesthetic differences affect brand names and media messages.

7.0 Reference

Food and Agriculture Organization. (1997). Global agricultural marketing management. Food and Agriculture Organization, Rome, Italy.

UNIT 3: CASES OF CULTURAL ADAPTATION

TABLE OF CONTENTS

1.0 Introduction

The cases discussed under the main content illustrate humans adapting to specific environments (Stoffle, Toupal and Zedneno, 2003). These cases both inform and stretch cultural adaptation as they follow the course of adaptation in approximately the same time periods. In these cases we see that people usually arrive in areas already occupied by other people, causing a complexity in adaptation. This complexity has two major influences on adaptation. The people who already live there can be useful to the immigrants by teaching them and building an informed foundation upon which to adapt (Atran *et al.*, 1999). They can also compete for space and resources, causing a threat to the newcomers that itself may become the focus of adaptation. Our cases also demonstrate that the newly arrived human groups bring important cultural knowledge from previous places. Newcomers may initially believe they have ways to improve their new land, but these behaviors often cause dramatic natural resource mistakes. Examples of such false adaptations in North America include the suppression of American Indian land and forest burning (Boyd, 1999), the draining of wetlands by eliminating beavers (Cronon, 1983), and the channelization of Western rivers by destroying associated riparian habitats (Dobyns, 1981).

2.0 Objectives

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

- Understand how humans adapt to specific environments;
- Know years of adaptation by Scandinavian-American folk fishers and
- Afro-Caribbean and Bali people.

3.0 Main Content

3.1 100 Years of Adaptation—Scandinavian-American folk fishers

In the upper reaches of Lake Superior, approximately thirteen miles from the Canada-United States border, a jagged sliver of volcanic uplift forms what is known as Isle Royale (Stoffle, Toupal and Zedneno, 2003). Now a National Park, its wetlands and tree-covered ridges have

provided resources for humans and habitat for caribou, coyotes, moose, wolves, several fur-bearing species, birds, and waterfowl for thousands of years. Its terrestrial-lacustrine interface is comprised of rocky shorelines, small islands, and many harbors, which accommodated fishermen for hundreds of years. While the island is part of the same geologic formation as the Upper Peninsula of Michigan; its proximity and similarity to the North Shore of Minnesota contributed to its becoming a social, cultural, and economic extension of that area (Stoffle, Toupal and Zedneno, 2003).

When a wave of Scandinavian immigrants came to Minnesota in the 1880s, many settled along the North Shore, many of them were fishermen (Toupal, Stoffle, and Zedeño, 2001). Finding the area similar to their homelands, they settled in the protected coves and inlets from which they established fishing areas and subsistence farms. They also developed communities within which they could communicate in their native languages and continue their traditions. They preferred the company of those with whom they could enjoy traditional foods and who had the same style of thinking and work ethic.

Isle Royale attracted many of these fishermen. When they first came to fish the waters, they found other fishermen from diverse ethnic backgrounds including German, Irish, English, French-Canadian, Chippewa, and American (Karamanski, Zeitlin, and Derose, 1988). These people were displaced within five years of the arrival of the Scandinavians who afterwards and for the next one hundred and twenty years maintained exclusive usufruct rights.

These Scandinavian-Americans preferred the solitude and independent lifestyle of fishing on the island (Jentoft and Mikalsen, 1994). They and their families established their fish camps and began adaptations to their new environment that would become the foundations of a new folk culture. The Scandinavian-American fishermen developed a herring industry. Instrumental in its success was the establishment of an exclusive relationship with the Booth; a company, which instituted credit relationships and provided them with provisions and equipment in the spring in exchange for their fish throughout the season (Kaups, 1975).

Their Scandinavian fishing heritage had some benefits in the new environment in spite of differences between ocean and lake fishing. Saltwater seine nets had been used to bring catches into the shore, and hooklines had been let down to the ocean bottom. The rocky shorelines of Isle Royale ruled out use of the seine nets, so they began using gill nets of different sizes placed at different depths to catch trout, whitefish, and herring. The lake waters were too deep to fish the bottom with hooklines, so they suspended them with floats and weights to depths up to 200 feet (Kaups, 1975).

Another adaptation occurred with boats. Many of the Swedish immigrants had been boat builders, and they quickly adapted boats like the Mackinaw to handle the conditions of Lake Superior (Toupal, Stoffle, and Zedeño, 2001). Some fishermen built their own herring skiffs, which resembled the *sjekte* used along the inner coast of eastern and southern Norway. These boats ranged from fifteen to seventeen feet long, four to five feet wide, and about two feet deep. The fishermen seldom went more than two miles from shore, the approximate extent of the herring fishery (Kaups, 1975). In some instances, a fisherman might have two boats, a nineteen-footer for fishing closer

to shore, and a twenty-four-footer for going further out (Toupal, Stoffle, and Zedeño, 2001).

From these boats, they learned to manage their nets and hook lines in the temperamental lake waters, to read the currents and lake bottom for rock reefs and passages, and to read changes in the weather that might indicate the onset of severe storms. Living on the island from April to November, the fishermen and their families soon learned to read wind, cloud formations, and fog conditions that promised a difficult if not dangerous lake and to gauge how long they might be able to work their nets safely (Stoffle, Toupal and Zedneno, 2003).

Several of the Scandinavian-American fishermen worked with Minnesota fish hatcheries, providing milt and spawn in the fall and planting young fish in the spring prior to the first fishing season (Stoffle, Toupal and Zedneno, 2003). While most of the fishermen used hooklines and gill nets, a few who could afford to do so experimented with pound nets. They found the pound nets so effective that, particularly when used in spawning areas, they could decimate a fish population within a few seasons. Wanting to maintain healthy populations, they soon abandoned the pound nets for the traditional gill nets, in order to keep their supply of fish.

The fishermen continued to learn about the underwater environment. Small islands, for example, were good net areas because of shallow water, reefs, shelter from the wind, and proximity to deeper waters (Toupal, Stoffle, and Zedeño, 2001). The reefs had bottom structures beneficial for lake trout spawning. They tracked fish populations by reef, noting increases and declines from one season to the next. They could detect changes in fish populations and behavior caused by seasonal and climatic conditions such as equinox disturbances, storms, squalls, and full moons (Toupal, Stoffle, and Zedeño, 2001). This allowed them to determine when a reduced catch was due to natural conditions and when it was due to fishing pressure, the latter resulting in changes in set times or mesh size. They made changes that included mesh size and/or the length of time they would leave nets on the reefs so that fewer and larger fish were taken and the population could recover.

As a five-generation example of adaptation, the Scandinavian-American fishermen of Isle Royale exhibit the characteristics of adapting knowledge of one environment to another in order to obtain and use resources, and of developing new strategies, which ultimately became folk traditions (Stoffle, Toupal and Zedneno, 2003). Succeeding generations increasingly embedded these strategies in their culture. Many families had natural resource connections through “pet” birds, foxes, mink, and moose. Places became special because of their topographic uniqueness, viewscapes, and community and family histories. Collectively the places and natural resources became their homeland, which can be understood as a cultural landscape.

3.2 400 years of adaptation—Afro-Caribbean People

African people have been in the Caribbean for 16 generations (approximately 400 years) (Stoffle, Toupal and Zedneno, 2003). The geography of the Caribbean ranges from volcanoes rising from the ocean floor throughout the Lesser Antilles, to large, low, flat expanses of limestone in the

Bahamas and Barbados, to the large complex mountains on islands like Jamaica and Hispañiola (Stoffle, Toupal and Zedneno, 2003).

African people were brought into the Caribbean as slaves. They immigrated with neither tools, animals, nor domestic plants, yet they were to make many adaptations, which are central features of their contemporary culture (Stoffle, Toupal and Zedneno, 2003). Today, there is a debate as to whether these derived from memories of Africa or were gleaned from lessons learned in the Caribbean. The Rastafarians of Jamaica are a people who farm the rocky hillsides of mountains. In their gardens, they use swidden horticulture, which turns the limestone rocks into soil (Stoffle, Toupal and Zedneno, 2003). By using terraced walls and rotating fields, they are able to improve the soil. They are known to protect many species and varieties of certain crops like yams, which are planted in different niches as a hedge against fluctuations in rainfall and to take advantage of different types of soils (Stoffle, Toupal and Zedneno, 2003).

In the Bahamas, African peoples developed an elaborate system of gardens in which a variety of drought resistant and irrigable crops were planted (Stoffle, Toupal and Zedneno, 2003). Their understanding of the environment is reflected in how they remove land crabs from their gardens. One local plant, Nicker Bean (*Caesalpinia bonduc)*, has a hard round marble-like seed. When the land crab makes a burrow in a garden, instead of digging him out or killing him, the seed of this plant is dropped into the burrow. Being hard and round, the seed cannot be moved out the burrow by the crab, which is so finicky that he cleans all foreign objects out of his home. Eventually frustration causes the land crab to move away from the garden and burrow elsewhere (Stoffle, Toupal and Zedneno, 2003).

3.3 1,250 years of adaptation—People of Bali

In the middle of the volcanic archipelago of Indonesia is the island of Bali, with habitats ranging from montane forests in the highlands to terraced rice fields on the slopes, to wetlands and coral reefs along the coast (Stoffle, Toupal and Zedneno, 2003). Rice, developed over one thousand years ago, has become a staple food to the Balinese. Fifty generations (approximately 1,250 years) of religious and social practices that sustain rice cultivation represent a series of rational adaptations that have survived centuries of social instabilities such as shifting kingship boundaries (Stoffle, Toupal and Zedneno, 2003).

The production of rice is embedded with rituals for planting, maintenance, irrigation, and harvesting (Stoffle, Toupal and Zedneno, 2003). The season commences with temple festivals and pilgrimages to the lakes to obtain holy water to sprinkle on the fields. Planting begins by walking the fields with water buffalo to prepare the soil. Ceremonies for planting the fields involve carrying young stems of rice cultivated for this purpose to each field. Water temple priests work with the local *subaks*, or farmer associations, that determine local cropping patterns and arrange the irrigation and planting schedule. This relationship of religion and ecology depends upon the farmers' acceptance of and reliance on the water temple priests who must coordinate irrigation of hundreds of terraced rice fields among hundreds of farming communities (Stoffle, Toupal and Zedneno, 2003).

Beginning at the highest volcanic lake on the island, the water is metered down through many *subaks* in a staggered planting and irrigation cycle (Stoffle, Toupal and Zedneno, 2003). The farmers who receive the water first voluntarily stop irrigating when directed by the water temple priests, and the farmers at the next level, who have just prepared their fields, begin irrigating. This pattern is repeated until the last farmers have received their water. The system results in optimal water sharing, minimal pest problems, and some of the highest rice yields in the world. As an adaptive system, water temple irrigation combines natural and cultural cycles. Seasonal rains, long growing seasons, rice paddy ecosystems, and pests are integrated with religion to control timing and amounts of irrigation water, which influences planting, care, and harvesting of the rice fields (Stoffle, Toupal and Zedneno, 2003).

4.0 Conclusion

Humans tend to adapt to their new area when they arrive from their former settlement. Some prefer to settle where they will continue to carry out their occupation be it fishing, boat making, farming etc. When a wave of Scandinavian immigrants came to Minnesota in the 1880s, many settled along the North Shore, many of them were fishermen (Toupal, Stoffle, and Zedeño, 2001). Finding the area similar to their homelands, they settled in the protected coves and inlets from which they established fishing areas and subsistence farms.

5.0 Summary

In this unit we have leant that:

i. Adaptation to a new environment can occur in many ways which include occupation.
ii. African people were brought into the Caribbean as slaves with neither tools nor domestic plants, yet they were to make many adaptations.
iii. Competition for space and resources can pose a serious threat to new settlers in their new environment.

6.0 Tutor Marked Assignments

1. Discuss how Jamaican Rastafarians carry out agricultural practices.
2. Briefly explain how social and religious practices have sustained rice cultivation among the Bali people.

7.0 References and other Resources

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UNIT 4: IMPACT OF CULTURE ON THE ENVIRONMENT

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1.0 Introduction

The intersection between environment and culture is undeniable, from agriculture to art to the industries and professions that dominate different societies (Overton, 2017). In places like Japan or the Caribbean, where fishing is a prominent livelihood for many, issues of pollution in the water will be of much greater concern than in landlocked or desert-covered countries. In an area that relies on coal mining such as West Virginia, individuals may be much more opposed to green energy initiatives and stubbornly defend their way of life despite an outside narrative that discourages the continuing use of fossil fuels (Overton, 2017).

2.0 Objectives

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

- Understand the impact of religion on the environment;
- Know responses of people to their environment and
- Behaviour across cultures.

3.0 Main Content

3.1 Religion and the Environment

Religion has also had a large influence on the way societies and cultures view and interact with their environment (Overton, 2017). The Christian Bible teaches that humans are “stewards” of the Earth, which can be interpreted in multiple ways. Some Christians take this as a sign that the natural world is theirs to use as they wish; they are higher than plants and animals and have the right to take any resources they may want. Other Christians see their role as more similar to that of a protector; they have a sacred duty to take care of nature and make sure that the planet is healthy. However, in many South and Eastern Asian religions, humans are not seen as separate from the rest of the natural world, and are instead viewed as just another component of a greater spirit or cycle of life. In Hinduism, for example, a person may be reincarnated as an animal many times over until they eventually attain nirvana. In Taoism, all energy is part of the Tao: “the Way” or “the One,” which is sometimes described as the “flow of the universe” and a

manifestation of nature. In both of these traditions, it is necessary to show respect towards the natural world because adherents view themselves as inseparable from the all-encompassing "oneness" of life in the universe (Overton, 2017).

3.2 Human Responses and the Environment

The ability of human beings to adapt individually and socially to naturally or artificially occurring conditions of their environment is striking. Some geographers and historians have tried to account for the rise and fall of civilizations on the basis of the strategies used to adapt to environmental conditions. For instance, Toynbee (1962) suggested that the environment (topography, climate, vegetation, water etc.) presents a challenge to its inhabitants. Responses of the inhabitants to their environment may be adaptive, maladaptive or creative. Rural people in India and some other regions of the world burn dried animal dung for heating and cooking in the absence of an adequate supply of firewood. This response could be first considered adaptive and creative, but in the long run, such a practice destroys the environment because the dung is no longer available for use as fertilizer. This indicates that there is a delicate relationship between the people and the environment.

Whiting (1964), in his study of the role of the environment in the development of culture and individual personality, observed that in tropical climates, diets are mainly based on fruits and roots leading to low protein consumption. Whiting has tried to show causal influences of climate on culture and personality development. Some others like Barry, Bacon and Child (1957), have argued that the relationships of culture and personality to the environment are mainly bio-directional and interdependent. They argued that non-nomadic agricultural cultures seem to emphasize dependence, responsibility and obedience in child rearing practices. Hunter/gatherer cultures, on the other hand, emphasize independence and innovation.

People who are stationed at one place in an organized community, rural or urban, require structured organization and therefore, require obedience and compliance. On the other hand, hunter/gatherers inculcate independence and resourcefulness in their children so that their children can face unpredictable environmental demands. It seems that an environment provides fertile soil for the development of a culture and an individual that can best survive in that particular environment.

In the process of adaptation to an environment, equilibrium is achieved through the dual processes of adaptation (changes in people and culture) and adjustment (changes in the environment). It is vital to mention that in many cases, this equilibrium is threatened when we fail to take a long term perspective on the consequences of changes in the environment in which we live. For instance, uncontrolled use of various categories of pesticides may provide the short-term advantage of increased production of a crop, but it may produce long term negative effects such as loss of lives of animals and the introduction of new diseases in man, animals and plants. It may also lead to long term deleterious effects on the ecological balance between humans and the environment. The killing of frogs in the paddy fields of Kerala in India for export to earn money and to meet western demands for a food delicacy creates an imbalance in the ecology of the paddy fields leading to an increase in the population of insects (no longer eaten by frogs) that destroy the crops

4.0 Conclusion

The ability of humans to adapt individually or collectively and socially to naturally or artificially occurring conditions of their environment is uniquely important. Rural people in India and some other regions of the world burn dried animal dung for heating and cooking in the absence of an adequate supply of firewood. This response could be first considered adaptive and creative. Religion has also had a large impact on the way societies and cultures view and interact with their environment.

5.0 Summary

In this unit we have leant that:

i. In the process of adaptation to an environment, equilibrium is achieved through the dual processes of adaptation and adjustment.
ii. It seems that an environment provides fertile soil for the development of a culture and an individual that can best survive in that particular environment.
iii. The environment (topography, climate, vegetation, water etc.) presents a challenge to its inhabitants.

6.0 Tutor Marked Assignments

1. Discuss how the killing of frogs in paddy fields in Kerala, India is increasing the population of insects.
2. Discuss how different religious groups view and interact with the environment.

7.0 References and other Resources

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UNIT 5: CULTURAL PRACTICES THAT PROTECT THE ENVIRONMENT

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1.0 Introduction

Culture is comprised of values, beliefs and norms shared by a group of people (Kideghesho, 2009). In this sense, 'culture conditions individuals' perceptions of the world, influences what they consider important, and suggests courses of action that are appropriate and inappropriate' (Millennium Ecosystem Assessment, 2005). Cultural factors, for example, can influence and regulate people's behaviors towards the species and their habitats (e.g. consumption patterns) and, therefore, act as an important driver of environmental change (Kideghesho, 2009)

2.0 Objectives

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

- Understand the impact of taboos in environmental protection;
- Know the meaning of totemic species and
- How they are protected through religious beliefs.

3.0 Main Content

3.1 Taboos

Taboos against specific actions and behaviours are common in virtually all human cultures (Kideghesho, 2009). They are moral or cautionary restrictions placed on certain actions by authority of people (e.g. kings, priests, elders, etc.). They derive mainly from religious and long-established traditional beliefs and social customs, and some have developed as a response to environmental problems and logic derived from indigenous knowledge. Conservation-related taboos may be categorized as specific species taboos and habitat taboos. The specific species taboos protect flora and fauna in space and time; they regulate and prohibit harvesting, detrimental use and consumption. Habitat taboos control access and use of resources in a particular area, e.g. in sacred habitats, thus checking anthropogenic interference detrimental to flora, fauna and their habitats (Kideghesho, 2009).

3.2 Sacred (Totemic) Species

Many African societies consider specific species to be of religious and spiritual significance (Kideghesho, 2009); these species play a symbolic role in respective clans and tribes. To underscore the importance of totemic species, some families or clans are named after the species. For example, in the Ikoma tribe of western Serengeti in Tanzania, some people are called Wankuru or Makuru (tortoise, *Geochelone pardalis*), Nkumari (green water snake, *Philothamnus angolensis*), Mahiti (hyena, *Crocuta crocuta*) or Machaba (a sacred elephant tusk) (Kideghesho, 2009). The adoption of animal names is also widespread among the clans of Ngoni tribe of Ruvuma in southern Tanzania. The popular names include Tembo (elephant, *Loxodonta africana*), Komba (bush baby, *Galago crassicaudatus*), Mbawala (bushbuck, *Tragelaphus scriptus*), Nguruwe (bush pig, *Potamochoerus porcus*) and Nyoka (snake) (Kideghesho, 2009). The totemic status assigned to different species has a significant role in species survival as they are less subjected to human impact, and are protected through taboos and beliefs that prohibit harvesting, hunting, killing, consumption or destruction of their habitats (Kideghesho, 2009). In Serengeti, unlike other ungulates, elephant (*Loxodonta africana*) and bushbuck (*Tragelaphus scriptus*) have suffered minimally from illegal hunting (Campbell and Hofer, 1995), probably because of their totemic status (Kideghesho, 2008). In other parts of the world, Colding and Folke (2001) also attributed taboos on sacred species and habitats to survival of species of ecological and global importance (e.g. endangered and endemic species). Populations of these species are relatively high in localities where they are considered to be sacred or totemic.

4.0 Conclusion

Taboos against specific actions have helped in protecting flora and fauna in different societies and across cultures where they exist. Also, in many societies especially on the continent of Africa, some specific species of plants and animals are considered to be sacred and worshipped and this has helped to protect and increase their population.

5.0 Summary

In this unit we have leant that:

i. Taboos are moral or cautionary restrictions placed on certain actions by authority of people (e.g. kings, priests, elders, etc.).
ii. Many African societies consider specific species to be of religious and spiritual significance.
iii. Totemic status assigned to different species has a significant role in species survival as they are less subjected to human impact.

6.0 Tutor Marked Assignments

1. In an African country of your choice, list five species of animals, stating their common and zoological names that have totemic status.
2. What are the roles of taboos in biodiversity conservation?

7.0 References and other Resources

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MODULE 2: CULTURE AND BIODIVERSITY CONSERVATION

UNIT 1: SACRED NATURAL SITES

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1.0 Introduction

Uluru (Ayers Rock), Mato Tipila (Devil's Tower), Mt Kiliman jaro, Mt Kailash, Sagarmatha/Chomolongma (Mt Everest), Lake Titicaca, Lake Baikal, the Ganges and Brahmaputra rivers are but a few of the sacred natural sites that include some of the most iconic places on the planet (Verschuuren, Wild, McNeely and Oviedo, 2010). Among such sacred natural sites are thousands more that remain little known and unsung, such as the Dai Holy Hills, the Holy Island of Lindisfarne, the Golden Mountains of Altai, the sacred groves of the Western Ghats, the sacred lakes of the Niger delta and the numerous sacred islands, groves, and springs found throughout the world. The list is very long, uncounted and in a sense uncountable ((Verschuuren, Wild, McNeely and Oviedo, 2010). In these places nature and humanity meet, and people's deeper motives and aspirations are expressed through what is called 'the sacred'. Many of these places are virtually ignored, some receive pilgrims by the million, and yet others are the closely guarded secrets of their custodians. People of faith or religion, or of no particular faith, find inspiration in these places, and they resonate across a wide spectrum of humanity. Sacred natural sites, therefore, concern the well-being of both nature and humans and encompass the complex intangible and spiritual relationships between people and our originating web of life (Verschuuren, Wild, McNeely and Oviedo, 2010).

2.0 Objectives

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

- Understand the meaning of sacred natural sites;
- Know its connection to religion and
- Its importance to nature conservation.

3.0 Main Content

3.1 An Overview of Sacred Natural Sites

Sacred natural sites consist of all types of natural features including mountains, hills, forests, groves, rivers, lakes, lagoons, caves, islands and springs (Verschuuren, Wild, McNeely and Oviedo, 2010). They can vary in size from the very small: an individual tree, small spring or a single rock formation, to whole landscapes and mountain ranges. They consist of geological formations, distinct landforms, specific ecosystems and natural habitats. They are predominantly terrestrial but are also found in inshore marine areas, islands and archipelagos. They may also be the location of temples, shrines, mosques and churches, and they can incorporate other features such as pilgrimage trails. In some sites nature is itself sacred, while in others sanctity is conferred by connections with spiritual heroes, religious structures or sacred histories (Verschuuren, Wild, McNeely and Oviedo, 2010).

The interest in sacred natural sites from the perspective of nature conservation lies in the components of biological diversity that they harbour, such as the species of animals and plants, the habitats and ecosystems, as well the ecological dynamics and functions that support life within and outside the places. The term ‘sacred natural sites’ implies that these areas are in some way holy, venerated or consecrated and so connected with religion or belief systems, or set aside for a spiritual purpose. The vast majority of sacred natural sites were arguably founded by indigenous or folk religions and spiritualities, but many were subsequently adopted or co-opted by mainstream religions (Verschuuren, Wild, McNeely and Oviedo, 2010).

3.2 Importance of Sacred Natural Sites in Conservation of Nature and Culture

Many sacred natural sites have been well protected over long time periods and have seen low levels of disturbance (Verschuuren, Wild, McNeely and Oviedo, 2010). Many are demonstrably high in biodiversity and represent a strong biodiversity conservation opportunity. Sacred natural sites also represent ancient and profound cultural values. The roles of sacred sites’ custodians from indigenous, local community and mainstream religions are expressions of dedicated efforts that cultures that have specifically, if not always consciously, cared for nature in various ways. While sacred natural sites are connected to the human spirit and intangible heritage they also have strong material components. In addition to being places where animals and plant species survive, they provide resources such as water and medicines and other ecosystem services, they are the location of events and ceremonies, and traditionally are sites of education. They link to livelihoods in many ways and the concepts of cultural services and human well-being are associated with them (Millennium Ecosystem Assessment, 2005). They support pilgrimages and tourism, both of which have large associated service sectors and generate significant economic activity.

The urge for the protection of sacred natural sites have also been recognized by the Convention on Biological Diversity (CBD) and the UN Permanent Forum on Indigenous Issues. The CBD in 2004 developed the Akwe Kon voluntary guidelines for the conduct of cultural, environmental and social impact assessments regarding proposed developments that may affect sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities (Secretariat of the Convention on Biological Diversity, 2004).

At the political level, the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is an important benchmark. Article 12 in particular provides significant political leverage for developing appropriate policies for the protection and recognition of sacred natural sites at the national level. *It states: Indigenous peoples have the right to manifest, practice, develop and teach their spiritual and religious traditions, customs and ceremonies; the right to maintain, protect, and have access in privacy to their religious and cultural sites; the right to the use and control of their ceremonial objects; and the right to the repatriation of their human remains* (UNDRIP, 2007).

Among international conservation NGOs, the Nature Conservancy has developed a planning tool for the conservation of sacred sites and cultural heritage in protected areas and tested it across countries in Central America such as Honduras, El Salvador, Mexico and Guatemala (Secaira and Molina, 2005). The WWF, in Dudley *et al.* (2005), studied sacred sites in 100 protected areas. The Millennium Ecosystem Assessment (MA) adopted the concept of cultural services (including spiritual) as one of the four kinds of ecosystem services (the others being protecting, provisioning, and regulating). In the 'Conditions and Trends Assessment' (deGroot *et al*., 2005) and 'Policy responses' (Ghosh *et al*., 2005) developed under the Millennium Ecosystem Assessment sacred sites are recognized as areas of key interest for the conservation of biodiversity and culture but it is also concluded that more research is needed to understand how they further contribute to human well-being.

4.0 Conclusion

Sacred natural sites consist of all types of natural features including rivers, lakes, lagoons, mountains, hills, forests, groves, caves, islands, springs etc. They vary in size and may be the location of a worship centre for a particular religious group. They are also important because of the role they play in the conservation of different species of flora and fauna.

5.0 Summary

In this unit we have leant that:

i. Sacred natural sites are predominantly terrestrial but are also found in inshore marine areas, islands and archipelagos.
ii. Many sacred natural sites have been well protected over long time periods and have seen low levels of disturbance.
iii. In addition to being places where animals and plant species survive, sacred natural sites provide resources such as water and medicines and other ecosystem services.

6.0 Tutor Marked Assignments

1. With relevant examples, show your understanding of sacred natural sites.
2. Discuss the roles of sacred natural sites in the conservation of nature and culture.

7.0 References and other Resources

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UNIT 2: SACRED GROVES

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1.0 Introduction

Sacred groves are tracts of virgin forest with rich diversity, which have been protected by the local people for centuries for their cultural and religious beliefs and taboos that the deities reside in them and protect the villagers from different calamities (Khan, Khumbongmayum and Tripathi, 2008). Every sacred grove carries its own legends, lore, and myths which form the integral part of the sacred grove. An inextricable link between present society and past in terms of biodiversity, culture, religious and ethnic heritage exists in sacred groves. Sacred groves are distributed across the globe, and diverse cultures recognize them in different ways encoding various rules for their protection (Khan, Khumbongmayum and Tripathi, 2008). Sacred groves act as an ideal centre for biodiversity conservation. Several plants and animals that are threatened in the forest are still well conserved in some of the sacred groves. It has been observed that several medicinal plants that are not to be found in the forest are abundant in the sacred groves. Further, rare, endangered, threatened and endemic species are often concentrated in sacred groves. The sacredness, religious beliefs and taboos play a significant role in promoting sustainable utilization and conservation of flora and fauna of the region (Khan, Khumbongmayum and Tripathi, 2008).

2.0 Objectives

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

- Understand the meaning of sacred groves;
- Know some sacred groves around the world and
- Understand the roles of sacred groves in biodiversity conservation.

3.0 Main Content

3.1 Sacred Groves around the World

In Asia and Africa, care and respect for nature has been influenced by religious beliefs and indigenous practices (Khan, Khumbongmayum and Tripathi, 2008). The existence of sacred groves has been reported in many parts of Asia, Africa, Europe, Australia and America by

Hughes and Chandra (1998). Groves are also reported from Ghana, Nigeria, Syria, Turkey and Japan (Gadgil and Vartak, 1976). A document of MAB (1995) has described the sacred groves present in Ghana, Senegal, and Sumatra. Several small size sacred groves were reported from Nepal by Ingles (1994). Various sacred sites associated with rich vegetation in Bangladesh were reported by Hussain (1998).

The Dubla Island sacred grove in Sundarbans mangrove forest in Bangladesh harbours rich vegetation and is a place of worship for low caste Hindus, who visit it once in a year for prayer (Islam *et al*., 1998). In Afghanistan, after advent of Islam, the creation and conservation of sacred grove became a part of historical and geographical tradition of the rural people (Mohamed, 1998). The positive role of sacred groves in the socioeconomic and cultural lives of many rural folks in Ghana has been possible because of the collective efforts of people to protect them (Michaloud and Durry, 1998).

However, in Mongolia sacred groves are not protected by the Government but few sacred places which have been declared officially as sacred sites are protected by the Government (Gongorin, 1998). Ramakrishnan (1996) reported the existence of sacred groves in different parts of India and they are known by different names in different areas (Bhakat, 1990). Examples of sacred groves around the world as compiled by Barrow (2010) are shown in Table 1

Table 1: Sacred Groves and Reasons for their Establishment

Types of Sites	**Examples**	**Reasons for Establishment**
Garden of Gethsemane	Israel	Christian Biblical Olive Garden
Yew trees	Europe	Graveyards where yew trees may predate the grave yard
Redwood groves	Pacific coast of N. America	Guardians of spirits of ancestors, burial grounds
Shaman forests	Machiguenga (Matsigenka) in S. Peru	Small clearings related to symbiotic relationship between *Cordia nodosa* and a species of ant – used for protection from evil forces thought to inhabit the cloud forests of the Andean foot hills.
Kaya forests	Kenya-Mjikenda people of the coast of Kenya	91 known covering an area of 10–200hectares each. Over 40 declared as 'National Monuments' and are listed as a World Heritage Site
Sacred groves	Ghana, Zimbabwe, Tanzania, Mongolia, India, Japan	In Japan Shinto and Buddhist sacred groves cover over 110,000 ha (Hamilton, 1998). Ghana has over 2000 sacred groves;

		China 400; Nepal hundreds; Tanzania (Zigna group) 660. In India 13,720 described but estimates are of over 100,000
Monastic groves	Ethiopia, Eritrea, United Kingdom, Nepal, Thailand	Developed by different religions, often in areas which were or have become sacred. Many of these groves are sources of important relic biodiversity

Sources: Robertson, 1987; Chandrakanth and Romm, 1991; Sayer *et al*., 1992; Ntiamoa-Baidu, 1995; Negussie, 1997; Jeanrenaud, 2001; Teklehaimanot and Demisse, 2001; Githitho, 2003; Urtnasan, 2003

3.2 Sacred Groves and Biodiversity Conservation

Since time immemorial conservation of natural resource has been an integral part of diverse cultures in different ways (Khan, Khumbongmayum and Tripathi, 2008). The traditional worship practices show the symbiotic relation of human beings and nature. Indigenous communities all over the world lived in harmony with the nature and conserved its valuable biodiversity. In course of time, science and technology developed and industries were established and expanded to meet the increasing demands of the people (Khan, Khumbongmayum and Tripathi, 2008).

Various anthropogenic activities have altered the structure and function of different ecosystems all over the world (Khan, Khumbongmayum and Tripathi, 2008). One of the most conspicuous effects of ecosystem perturbation has been the depletion of biodiversity. Disappearance of species due to habitat alteration, overexploitation, pollution, global climate change and invasion of exotic species is so fast that many valuable taxa may vanish even before they are identified and their scientific value is discovered. In view of the adverse effects of biodiversity degradation, ecologists, environmentalists and conservationists has made conservation of biodiversity as an issue of global, national and regional significance. Many areas have been declared as protected areas and various in-situ and ex-situ conservation practices have also been undertaken in different parts of the world. Many laws governing the biodiversity conservation have also been enacted from time to time (Khan, Khumbongmayum and Tripathi, 2008).

Besides these formal laws, there were many traditional conservation practices of indigenous communities in many parts of the world, which contributed to the conservation and protection of biodiversity (Khan, Khumbongmayum and Tripathi, 2008). A good example of such traditional practices is the conservation and protection of small forest patches by dedicating them to the local deities by various indigenous communities of the world. Such forest patches are called “sacred groves”. Sacred groves are the tracts of virgin forest that were left untouched by the local inhabitants, harbour rich biodiversity, and are protected by the local people due to their cultural and religious beliefs and taboos that the deities reside in them. The sacred groves of Asia and Africa and royal hunting forests are historical examples (Chandrashekara and Sankar, 1998; Kanowski *et al*., 1999). It is believed that these sacred virgin forests date back to thousands of

years when human society was in the primitive state. Gadgil and Vartak (1975) have traced the historical link of the sacred groves to the pre- agricultural, hunting and gathering stage of societies. Hence, these virgin forests are believed to be pre-Vedic in origin. The area of sacred groves ranges from few square meters to several hectares. There exist some fascinating examples of forest patches harbouring native vegetation, which have been intertwined with various aspects of indigenous, cultural and religious practices along with the associated taboos (Gadgil and Vartak, 1976). Physically, it is a piece of forest land, but culturally, it is associated with deities, rituals and taboos.

Sacred groves provide the inextricable link between present society to the past in terms of biodiversity, culture, religious and ethnic heritage (Khan, Khumbongmayum and Tripathi, 2008). In the present day society, there are several endogamous populations that continue to practice many forms of nature worship. The concept of sacred groves could be traced to such communities as have preserved several virgin forests in their pristine form by dedicating them to the ancestral spirits or deities. As a result, sacred groves still possess a great heritage of diverse gene pool of many forest species. Some of the species present in sacred groves are considered as sacred. These 'sacred' species have socio-religious concept of the sacred groves intertwines carefully with various socio-cultural and religious beliefs, and taboos, and ecological services of sacred groves (Khan, Khumbongmayum and Tripathi, 2008).

All forms of vegetation in sacred groves are supposed to be under the protection of reigning deity of that grove, and the removal of even a small twig is a taboo (Vartak and Gadgil, 1973). Collection and removal of any material from the sacred groves is prohibited (Khan *et al*., 1987, Khiewtam and Ramakrishnan, 1989). Sacred groves can be used as indicators for potential natural vegetation (Schaaf, 1998) and are vital for well-being of the society. Sacred groves or sacred trees serve as a home for birds and mammals, and hence, they indirectly help in the conservation of living organisms (Islam *et al.*, 1998).

The sacred groves provide a number of ecosystem services such as reduction in erosive force of water, conservation of soil, maintenance of hydrological cycle, availability of water of desired quality and natural dispersal of seeds of useful species. The sacred groves also help in maintaining the desirable health of ecosystem, reduce habitat destruction, conserve the viable population of pollinators and predators, serve as the potential source of propagules that are required for colonization of wastelands and fallows, conserve the indigenous flora and fauna and preserve the cultural and ethical practices developed through indigenous knowledge of generations (Ramakrishnan and Ram, 198; Godbole *et al*; 1998, Godbole and Sarnaik, 2004, Tiwari *et al*., 1998a, b, Singh *et al*., 1998). Thus, traditional nature worship practices as followed in different parts of world do contribute to the promotion of the regional/national goals of conservation of biodiversity.

4.0 Conclusion

Sacred groves are pristine forests that harbor rich flora and fauna that are protected through religious beliefs. They help in biodiversity conservation and they exist in many countries especially on the continent of Africa.

5.0 Summary

In this unit we have leant that:

i. Sacred groves provide a number of ecosystem services such as reduction in erosive force of water.
ii. Sacred groves provide the inextricable link between present society to the past in terms of biodiversity, culture, religious and ethnic heritage.
iii. Traditional worship practices show the symbiotic relation of human beings and nature.

6.0 Tutor Marked Assignments

1. State five functions of sacred groves.
2. With illustrations, define sacred groves.

7.0 References and other Resources

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UNIT 3: SACRED NATURAL SITES AND SPIRITUALITY

1.0 Introduction

Sacred trees, groves and forests exist all over the world, have been important to people for thousands of years, are protected, have strict rules of use and contribute to rural livelihoods (Barrow, 2010). The conservation movement has tended to downplay the importance of sacred trees and groves. Most sacred forests predate government conservation, but due to increasing pressures many groves are under threat. Forest and conservation authorities should increase support for their conservation and management. Likewise most mainstream religions could re-evaluate their relationship to trees and sacred nature because their managing institutions can provide important support for our natural and spiritual heritage (Barrow, 2010).

2.0 Objectives

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

- Understand the connection between some trees and spirits;
- Know the significance of sacred trees and
- Understand how plant diversity helps in the conservation of traditional cultures.

3.0 Main Content

3.1 Residence of Spirits

Bambara villages in Niger usually have a Tamarind tree (*Tamarindus indica*) where the spirits reside, and among the Galla in Kenya a certain tree is consecrated as holy (Porteus, 1996). In Ireland solitary thorn trees (*Crataegus monogyna*) are associated with fairies as a meeting tree. The Waramunga of northern Australia believe that certain trees harbour the spirit of a child. The Baobab has numerous cultural and mythical associations in Africa and Madagascar because of its shape, longevity, multitude of uses and as a residence of spirits (Porteus, 1996; Lewington and Parker, 1999).

3.2 Significance of Sacred Trees

The ancient forests and trees provided, and continue to provide, people with shelter, food and medicine, but also helped shape their consciousness (Barrow, 2010). Many large and slow growing trees were and are objects of deep respect and reverence. Sacred trees have strong spiritual meanings for people for many reasons. The sheer longevity of trees is a key reason and the ancient yews (*Taxus baccata*) found in many churchyards throughout northern Europe testify to this (Lewington and Parker, 1999), as do Baobab trees (*Adansonia digitata*) in Africa. Homage has been paid to the fig tree in almost every religion and culture. The Bodhi tree (*Ficus religiosa*), under which Buddha attained enlightenment, is a representation of the axis of the world and the tree of life (Mansberger, 1988; Boachardon, 1998). *Ficus carica* is the first plant mentioned in the Bible where the Prophet Amos was a ‘Shepherd and dresser of Sycamores’ (Amos, 7:14). For Hindus, the mythic World Tree is represented by a banyan (*Ficus bengalensis*)

which sheltered the infant Lord Krishna (Hamilton, 1998). The world tree is associated with the sacred tree of the garden of Eden, or the Tree of Knowledge or Tree of Life (Porteus, 1996).

3.3 Monastic and Temple Trees

In parts of China, holy hill forests in temple gardens were protected, though during the 1960s and 1970s many were destroyed. Since the 1980s many have been restored and the number of species is increasing. This recovery of plant diversity helps in the conservation of traditional cultures and benefits the environment (Peng *et al*., 2003), for example Gingko (*Ginkgo biloba*), which is important economically, survived in such gardens and is used as a basis for restoration (Verschuuren, 2007).

4.0 Conclusion

Sacred natural sites exist all over the world and have been essential to people for thousands of years. They are protected, have stringent rules of use and contribute to rural livelihoods. Some of these sacred natural sites are believed to be the dwelling place of some deities.

5.0 Summary

In this unit we have leant that:

i. The Waramunga of northern Australia believe that certain trees harbour the spirit of a child.
ii. Ancient forests and trees provide people with shelter, food and medicine, but also help shape their consciousness.
iii. *Ficus carica* is the first plant mentioned in the Bible where the Prophet Amos was a 'Shepherd and dresser of Sycamores' (Amos, 7:14).

6.0 Tutor Marked Assignments

1. Highlight the significance of sacred trees.
2. Citing relevant examples from across the globe, show the connection between trees and spirits.

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UNIT 4: BIO-CULTURAL DIVERSITY

1.0 Introduction

Because of sacred natural sites' outstanding cultural and biological values, understanding how these values may be linked is crucial to developing appropriate conservation approaches (Verschuuren, 2010). Posey's statement that biological and cultural diversity are inextricably connected was one of the first articulations of the concept of bio-cultural diversity (ISE, 2006) and only a few scientists have attempted to define bio-cultural diversity since. Existing definitions are broad, often based on the overlap of language and the distribution of species in the environment (Harmon and Loh, 2004; Maffi 2001, Stepp *et al*., 2002), and need to be redefined to a specific local context.

2.0 Objectives

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

- Understand the meaning of bio-cultural heritage;
- Know the link between biological and cultural diversity and
- Know how indigenous people preserve world's biodiversity.

3.0 Main Content

3.1 Bio-cultural Heritage

The International Society of Ethnobiologists (ISE) code of ethics (2006) has developed a basic definition suitable for the purpose of conserving sacred natural sites which once adopted does not need to be limited to indigenous peoples, traditional societies and local communities:
Bio-cultural heritage is the cultural heritage (both tangible and intangible, including customary law, spiritual values, knowledge, innovations and practices) and biological heritage (diversity of genes, varieties, species, ecosystems...) of humans, which often are inextricably linked through the interaction between humans and nature over time and shaped by their socio-ecological and economic context. Bio-cultural heritage of sacred natural sites may be passed down from generation to generation, developed, owned and administered collectively by their custodians and communities (Verschuuren, 2010). Not surprisingly, significant overlap exists between areas with sacred natural sites that contain high biodiversity and areas with high cultural diversity.

3.2 Hotspots of bio-cultural values?

There is increasing interest to merge biological and cultural diversity into the concept of 'bio-cultural' diversity to apply it in ecosystem management and nature conservation strategies (Cocks, 2006; Harmon, 2007; Verschuuren, 2007). Several scientific inquiries have been made to map the extent of bio-cultural diversity (Harmon, 1996; Maffi, 2005; Skutnabb-Kangas *et al*., 2003; Stepp *et al*., 2002). For example Loh and Harmon (2005) measure bio-cultural diversity by parameters for cultural diversity (numbers of languages, ethnicities and religions) and biological diversity (numbers of bird, mammal and plant species) at the national level. While these studies indicate countries where biological and cultural diversity are inextricably linked, they provide

only limited guidance for supporting the conservation of sacred natural sites because many sacred natural sites are found outside the high bio-cultural diversity areas indicated by these studies (Verschuuren, 2010). Sacred natural sites have been recognized as hotspots of biodiversity (Metcalfe *et al*., 2009) but also feature outstanding cultural, spiritual and religious values. Therefore, the importance of many of these sites may be better reflected when speaking of hotspots of 'bio-cultural' values.

Indigenous people preserve up to 80 per cent of the world's biodiversity and they speak most of the world's 6000 to 7000 languages commonly accepted as indicators for cultural diversity (Sobrevila, 2008). Many languages are rapidly disappearing, together with the biological and cultural diversity intrinsically connected with indigenous people. Indigenous territories comprise 7 per cent of the world's surface – officially recognized by nation states – and another estimated 13 per cent go unrecognized (Posey and Dutfield, 1997). Examples of these are biodiversity hotspots that cover 2.3 per cent of the earth's surface (Myers *et al*., 2003), mega diverse wilderness areas cover 44 per cent of the planet (Mittermeier *et al.*, 2003), protected areas 12 per cent and Indigenous and Community Conserved Areas 20 per cent (Chape *et al*., 2008).

4.0 Conclusion

A good understanding of the cultural and biological values of sacred natural sites will help in developing appropriate conservation that will continue to promote their survival over time.

5.0 Summary

In this unit we have leant that:

i. Indigenous people preserve up to 80 per cent of the world's biodiversity and they speak most of the world's 6000 to 7000 languages.
ii. Bio-cultural heritage is the cultural heritage of humans.
iii. Bio-cultural heritage of sacred natural sites may be passed down from generation to generation.

6.0 Tutor Marked Assignments

1. Define bio-cultural heritage.
2. List three parameters of cultural diversity.

7.0 References and other Resources

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UNIT 5: GLOBAL RECOGNITION OF SACRED SITES

1.0 Introduction

At the global level, protected areas are supported by a lot of programmes, conventions and declarations (Wild and Mcleod, 2008). These are, in the order of their establishment, the Man and the Biosphere Programme (1970), the Convention on Wetlands, also known as the Ramsar Convention [CBD] (1971), the World Heritage Convention (1972), the Convention on Biological Diversity (1992), the Convention for the Safeguarding of Intangible Cultural Heritage (2003), and the Declaration on the Rights of Indigenous Peoples (2007).

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2.0 Objectives

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

- Understand the meaning of the Man and the Biosphere Programme (1970);
- Know the meaning of the Convention on Wetlands and
- Know the World Heritage Convention (1972) etc.

3.0 Main Content

3.1 The Man and the Biosphere Programme (MAB) 1970

The Man and the Biosphere Programme established the biosphere reserve model, which set the standard for integrating human needs into protected area management. The establishment of biosphere reserves that are recognised under UNESCO's Man and the Biosphere Programme, are highly innovative and demonstrate new approaches to conservation and sustainable development. They are under national sovereign jurisdiction, yet share their experience and ideas nationally, regionally and internationally within the World Network of Biosphere Reserves. There are 529 sites worldwide in 105 countries. The Man and the Biosphere Programme, through meetings of biosphere reserve networks, has in recent years taken the lead in identifying and drawing out lessons from the management of sacred natural sites.

3.2 Ramsar 1971

The central messages of the Convention on Wetlands are conservation, and wise or sustainable use. The Convention maintains a List of Wetlands of International Importance – currently there are moremthan 1,708 wetlands designated for special protection as Ramsar Sites, covering 153 million hectares. These may not always necessarily be protected areas under the IUCN definition, although they often overlap with areas covered by other protective designations. A number of sacred natural sites fall within Ramsar recognised wetlands of international importance. While sacred values do not have thus far a significant profile under the convention, improved guidance on cultural values is currently under development.

3.3 World Heritage 1972

Through the Convention, UNESCO seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world that is considered to be of outstanding value to humanity. The Convention has 184 state signatories and provides for the designation and listing of World Heritage Sites. It is incumbent on the international community as a whole to protect World Heritage Sites irrespective of the territory on which they are located. Currently listed are 660 cultural sites, 166 natural sites, with 25 being of mixed cultural/natural designation. Many World Heritage Sites contain sacred natural sites and landscapes. While focusing on tangible heritage, the World Heritage Convention has increasingly recognised intangible values (Rössler, 2003).

3.4 Convention on Biological Diversity 1992

Signed by 150 government leaders at the 1992 Rio Earth Summit, the Convention on Biological Diversity is dedicated to promoting sustainable development. It recognises that biological diversity involves more than plants, animals and microorganisms and their ecosystems – it is also about people, the need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment. The convention has emphasised traditional knowledge and protected areas.

3.5 Living Heritage 2003

The 2003 Convention for the Safeguarding of Intangible Cultural Heritage (ICH) or living heritage, addresses domains that include: oral traditions; the performing arts (such as traditional music, dance and theatre); social practices, rituals and festive events; knowledge and practices concerning nature and the universe; and traditional craftsmanship. It is, therefore, concerned with many practices that are related to sacred natural sites. The domain of “knowledge and practices concerning nature” is of particular relevance. Prior to the establishment of the convention, UNESCO ran a programme proclaiming “Masterpieces of the Oral and Intangible Heritage of Humanity” in which masterpieces related to sacred natural sites were recognised.

3.6 Declaration on the Rights of Indigenous Peoples

This United Nations Declaration was endorsed in 2007, provides a framework for the rights of Indigenous Peoples and includes reference to: “recognising that respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment”. At the global level, therefore, there is a broad framework for considering cultural and spiritual values and recognising and preserving sacred natural sites within protected areas.

4.0 Conclusion

At the international arena, protected sites are supported by a number of programmes and conventions and these include Convention on Biological Diversity, Convention for the Safeguarding of Intangible Cultural Heritage (ICH) or living heritage etc.

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5.0 Summary

In this unit we have leant that:

i. It is incumbent on the international community as a whole to protect World Heritage Sites irrespective of the territory on which they are located.
ii. The central messages of the Convention on Wetlands are conservation, and wise or sustainable use.
iii. The Convention on Biological Diversity is dedicated to promoting sustainable development.

6.0 Tutor Marked Assignments

1. Highlight the main messages of living heritage of 2003.
2. Describe the convention on biological diversity of 1992.

7.0 References and other Resources

Rössler, M. (2003). "World Heritage Sites: Toward linking the tangible and the intangible". In Harmon and Putney, *op. cit*

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MODULE 3: POLLUTION, POLICIES AND CONSERVATION PROGRAMMES

UNIT 1: IMPACTS OF AIR POLLUTION

TABLE OF CONTENTS

1.0 Introduction

Air pollution is the release into the atmosphere of various gases, finely divided solids, or finely dispersed liquid aerosols at rates that exceed the natural capacity of the environment to dissipate and dilute or absorb them. These substances may reach concentrations in the air that cause undesirable health, economic, or aesthetic effects. Air pollution is a familiar environmental health hazard. We know what we're looking at when brown haze settles over a city, exhaust billows across a busy highway, or a plume rises from a smokestack. Some air pollution is not seen, but its pungent smell alerts you.

2.0 Objectives

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

- Know the effects of air pollution on man;
- Understand the effects of air pollution on animals and the
- Know the effects of air pollution on ecosystem

3.0 Main Content

3.1 Effects of Air Pollution

3.1.1 Acid rain

When air pollution, specifically sulfur oxides and nitrogen oxides, are released into sky through fossil fuel burning, it creates the phenomenon known as acid rain. Water, high in the atmosphere, combines with these chemicals and becomes acidic in nature. It then scatters the ground,

disguised as normal rainfall. Acid rain has been known to cause harm to humans and animals alike, and even damage crops.

3.2.2 Increased global warming

Air pollution directly accelerates the rate at which global warming happens by depleting the Ozone layer. Global warming refers to the increased temperatures Earth continues to experience. These higher temperatures lead to the melting of the polar ice caps and icebergs, which elevates sea levels and creates concern for the human race.

3.2.3 Health challenges

Air pollution is known to cause irritation in the eyes, lungs, nose, and throat. It creates respiratory problems and exacerbates existing conditions such as asthma and emphysema.
When continually exposed to air pollution, humans become at higher risk for cardiovascular disease. Air filled with toxins can have a number of adverse effects on the arteries, and have even been a contributor to heart attacks.
Globally, 3.7 million deaths were attributable to ambient air pollution (AAP) in 2012. About 88% of these deaths occur in low- and middle-income (LMI) countries, which represent 82% of the world population. The Western Pacific and South East Asian regions bear most of the burden with 1.67 million and 936,000 deaths, respectively. About 236,000 deaths occur in the Eastern Mediterranean region, 200,000 in Europe, 176,000 in Africa, and 58,000 in the Americas. The remaining deaths occur in high-income countries of Europe (280,000), Americas (94,000), Western Pacific (67,000), and Eastern Mediterranean (14,000).

3.1.4 Wildlife endangerment

Most diseases and conditions that humans are susceptible to, animals are as well. Air pollution creates many of the same issues that humans face. Heavily polluted areas force inhabitants to seek new homes, which can negatively impact the ecosystem. Toxic chemicals also deposit over surfaces of water that can lead to the endangerment of marine life animals.

4.0 Conclusion

Air pollution is known to cause irritation in the eyes, lungs, nose, and throat. Acid rain has been known to cause harm to humans and animals alike, and even damage crops.

5.0 Summary

In this unit we have leant that:

i. Air pollution directly accelerates the rate at which global warming happens by depleting the Ozone layer.
ii. Globally, 3.7 million deaths were attributable to ambient air pollution (AAP) in 2012.
iii. Air pollution is a familiar environmental health hazard.

6.0 Tutor Marked Assignments

1. How does air pollution endanger wildlife?
2. Describe the impact of acid rain on man and animals.

7.0 References and other Resources

Air pollution causes, effects and solutions.
https://www.renewableresourcescoalition.org/air-pollution-causes-effects-solutions/. Accessed 07.07.2020.

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UNIT 2: ENVIRONMENTAL POLICIES IN NIGERIA

TABLE OF CONTENTS

1.0 Introduction

In order to find solutions to key environmental problems and challenges of land degradation (deforestation, desertification and coastal and marine environment erosion), and air and water pollution, urban decay and municipal waste, as well as hazards of drought, coastal surges, floods and erosion, the Nigerian government elaborated a *National Environmental Policy* in 1989 (Federal Ministry of Environment, 2010). The policy was revised 1999 to accommodate new and emerging environmental concerns. The goal of the revised the policy is to achieve sustainable development in Nigeria and, in particular to (i) secure a quality of environment adequate for good health and well-being; (ii) promote the sustainable use of natural resources; (iii) restore and maintain the ecosystem and ecological processes and preserve biodiversity; (iv) raise public awareness and promote understanding of linkages between environment and development; and (v) cooperate with government bodies and other countries and international organizations on environmental matters.

2.0 Objectives

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

- National Policy on Drought and Desertification;
- National Erosion and Flood Control Policy and
- National Biodiversity Strategy and Action Plan etc.

3.0 Main Content

3.1 National Policy on Drought and Desertification

The National Policy on Drought and Desertification, in particular, recognizes that climate change could intensify drought and desertification in the part of the country

that are very prone to these environmental problems (Federal Ministry of Environment, 2010). Thus, the policy emphasized the need to equip relevant agencies, institutions and citizens adequately to collect, analyze and use climate data effectively to ameliorate and combat drought and desertification. Specific implementation strategies for the policy include: (i) strengthening of agencies, institutions and facilities for the collection and analyses of meteorological and hydrological as well as for dissemination of information; (ii) upgrading the existing national early warning facilities for more efficient service delivery; (iii) developing appropriate awareness programmes for formal and informal education to enhance knowledge on climate and environment issues; and (iv) encouraging appropriate land use that enhances carbon dioxide sequestration, such as afforestation, reforestation and agro-forestry. This also reduces soil erosion and increase crop productivity for economic development.

3.2 National Forest Policy

The National Forest Policy is geared towards ensuring sustainable forest management, promoting participatory process of development, facilitating private sector-forestry development and adopting an integrated approach to forestry development (Federal Ministry of Environment, 2010). Government is currently embarking on a number of afforestation programmes. Under the guidance of the African Union Commission, Nigeria is keying into the project on the "Green Wall Initiative" in which a "green wall" of trees (40 million trees annually in the next 10 years) will be planted across the dry-land area of Nigeria to not only push back deforestation and secure agriculture and livelihoods across the Sudano-Sahelian zone of the country, but also enhance the carbon sequestration of biological diversity resources in the region for climate change mitigation.

3.3 National Biodiversity Strategy and Action Plan

The goal of the National Biodiversity Strategy and Action Plan is to develop appropriate framework and programme instruments for the conservation of Nigeria's biological diversity and enhance its sustainable use by integrating biodiversity considerations into national planning, policy and decision-making processes (Federal Ministry of Environment, 2010). It provides frameworks for addressing (i) biodiversity conservation, (ii) sustainable use of biological resources, (iii) equitable sharing of benefits, (iv) conservation of agro-biodiversity, (v) biosafety, and (vi) biodiversity-industry interface, all of which should improve the quality of the country's biological ecosystems to play the essential role of moderating the global carbon cycle and climate.

3.4 National Erosion and Flood Control Policy

The goal of the National Erosion and Flood Control Policy is to ensure coordinated and systematic measures in the management and control of the climate-related hazards and risks of erosion and floods to reduce their impacts on the people and the environment (Federal Ministry of Environment, 2010). Key strategies for the implementation of the policy are to: (i) evolve a mechanism for forecasting, monitoring and control of erosion and

floods; (ii) review the land use laws and regulations; (iii) promote and strengthen training at all levels in erosion and flood prevention, management and control; (iv) creating public awareness to encourage participation; (iv) protection of the marginal lands by limiting utilization to their carrying capacity; (v) subjecting resources users and developers to guidelines in order to reduce the vulnerability of the environment to flood and erosion-related disasters; and (vi) providing early warning systems to avert the escalation of flood and erosion hazards. All these would have significant implications for climate change adaptation measures that would need to be adopted to increase people resilience.

4.0 Conclusion

Finding solutions to environmental problems require a holistic approach and that is why the Nigerian government has come up with different policies such as National Forest policy, National Policy on Drought and Desertification etc.

5.0 Summary

In this unit we have leant that:

i. The National Forest Policy is geared towards ensuring sustainable forest management.
ii. The goal of the National Biodiversity Strategy and Action Plan is to develop appropriate framework and programme instruments for the conservation of Nigeria's biological diversity.
iii. The goal of the National Erosion and Flood Control Policy is to ensure coordinated and systematic measures in the management and control of the climate-related hazards and risks of erosion and floods.

6.0 Tutor Marked Assignments

1. Highlight the frameworks of National Biodiversity Strategy and Action Plan.
2. State five key strategies for the implementation of National Erosion and Flood Control Policy.

7.0 Reference

Federal Ministry of Environment (2010). National Environmental, Economic and Development Study (Needs) For Climate Change in Nigeria

UNIT 3: LAND USE IN NIGERIA

TABLE OF CONTENTS

1.0 Introduction

Land is one of the most controversial assets of nature, an input of primary significance upon which the whole economy of any nation hinges; hence any policy on land affects the economy of the nation positively or negatively depending on whether a right or wrong policy is initiated (Okafor and Nwike, 2016). Prior to the promulgation of land use Act, land is completely owned by individuals, families and communities with the head who hold the land in trust for the use of the entire people. But the advancement of land use Act of 1978 altered the existing land tenure and vested all lands in the government (Okafor and Nwike, 2016).

2.0 Objectives

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

- The consequences of poor land use;
- Dramatic changes in land cover and
- Conflicts associated with natural resource.

3.0 Main Content

3.1 Poor Land Use

Land use and land cover change have emerged as a global phenomenon and perhaps the most significant regional anthropogenic disturbance to the environment (Federal Ministry of Environment, 2015). As is the case in Nigeria, rapid urbanization/industrialization, large scale agriculture and major changes in human activities have been identified as the major causes of the dramatic changes in land cover and land use patterns globally. Dramatic land cover and land use changes that would have once taken centuries now take place within a few decades.

Competing land uses such as agriculture and human settlements are contributing to the decline of forests and woodlands together with the rising demand for fuel wood and charcoal (Federal Ministry of Environment, 2015). Over harvesting, agricultural encroachment and unregulated burning are believed to be contributing to the decline of many species in the wild. The depletion and degradation of the natural resource base has extended to less stressed areas in the different ecological zones of Nigeria. Changes in land use policy have resulted in transferring control of

land and other natural resources management from the local authorities to the States. This control involves ancestral rights and authority of caring, protecting and managing forest resources, land, water and other such natural resources.

Poor land use planning and unclear tenure rights have been identified as a major catalyst to biodiversity degradation and loss in Nigeria(Federal Ministry of Environment, 2015). Poor land use planning has not only affected biodiversity but has also resulted in conflicts which has claimed human lives and further impoverished the Nigerian rural community.

Major conflicts such as the Jos crisis, the Tiv/Jukun crisis of Benue and Taraba States, the Fulani Herdsmen/Tiv crises of Benue and the Aguleri/Umuleri crisis in Eastern Nigeria are in one way or the other associated with biodiversity and natural resource access and use (Federal Ministry of Environment, 2015).

4.0 Conclusion

Land is a valuable asset that is used for agricultural and non-agricultural purposes such as building of houses, factories, road construction etc. If it is poorly used it can be degraded leading to catastrophic consequences such as erosion, pollution, biodiversity loss etc.

5.0 Summary

In this unit we have leant that:

i. Poor land use planning and unclear tenure rights have been identified as a major catalyst to biodiversity degradation and loss in Nigeria.
ii. Dramatic land cover and land use changes that would have once taken centuries now take place within a few decades.
iii. The depletion and degradation of the natural resource base has extended to less stressed areas in the different ecological zones of Nigeria.

6.0 Tutor Marked Assignments

1. Highlight uses of land.
2. Citing relevant examples, explain how conflict over natural resources are leading to loss of human lives.

7.0 References and other Resources

Federal Ministry of Environment (2010). National Environmental, Economic and Development Study (Needs) For Climate Change in Nigeria

Okafor, B.N. and Nwike, E.C. (2016). Effects of the land use act of 1978 on rural land development in Nigeria: a case study of Nnobi. British Journal of Environmental Sciences, 4(3): 1-16

UNIT 4: FOCUS ON TRADITIONAL AND INDIGENOUS KNOWLEDGE IN BIODIVERSITY CONSERVATION

TABLE OF CONTENTS

1.0 Introduction

The recognition of the contribution of relevant traditional and indigenous knowledge in relation to actions in support of biodiversity conservation and its sustainable and equitable use goes beyond its simple validation in the context of conventional science-based approaches to the study of biodiversity (United Nations University, 2013).

2.0 Objectives

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

- The importance of traditional and indigenous knowledge in biodiversity conservation;
- Biodiversity dependent services and
- The link between traditional cultures and the convention on Biological Diversity

3.0 Main Content

3.1 The Roles of Traditional and Indigenous Knowledge in Biodiversity Conservation

Traditional and indigenous knowledge related to biodiversity is central to elucidating its status and trends and for developing plausible scenarios based on community participation with regard to the way biodiversity is conserved and used (United Nations University, 2013). Biodiversity-dependent services such as provision of food and fiber, purification of water and air, climate regulation and many cultural and spiritual values that depend on it are key to human well-being and sustainable development. Learning about biodiversity, about how traditional and indigenous holders of biodiversity-related knowledge cope with biodiversity, how this knowledge is used to effectively manage biodiversity and to maintain ecosystem services at various scales, as well as which are the most appropriate approaches to promote education and raise further awareness on these issues.

The convention on Biological Diversity (cBD) calls for the need to: respect, preserve and maintain traditional cultures; encourage customary custodial use of biological resources in line with principles of sustainable use and conservation; and ensure equitable sharing of benefits

among holders while accessing biological resources and related knowledge in line with national legislation (United Nations University, 2013). By drawing attention to preserving local innovations and practices of 'indigenous and local communities following traditional lifestyles' it alerts the need for promoting awareness of the importance of biodiversity through various educational interventions, designing suitable educational curricula, and strengthening multilateral cooperation for education for conservation and sustainable use.

The World Heritage convention of United Nations Educational, Scientific and Cultural Organization (UNESCO) is an important instrument for the protection of cultural and natural heritage. The convention on cultural diversity, yet another multilateral policy instrument of UNESCO, recognizes the significance of cultural knowledge 'as a source of intangible and material wealth' especially in indigenous communities. Avowing the need for appropriate policies to strengthen the developmental role of traditional communities, UNESCO calls for cultural pluralism and free circulation of ideas. the importance of culture and development is fittingly underlined in the convention by calling for national and international action that recognizes the link in all countries, specifically in developing regions that still have rich repositories of this diversity. It says that there is a need to create a favourable atmosphere for production and propagation of varied cultural goods and services that have the strength to influence local as well as global levels (UNESCO 2005). By emphasizing the central role of culture and complementary nature of economic and cultural dimensions of development the convention highlights individuals' and communities' fundamental right to participate and enjoy.

4.0 Conclusion

Traditional and indigenous knowledge related to biodiversity is vital in the conservation of flora and fauna. It is important that this knowledge is preserved and enhanced for sustainable species conservation.

5.0 Summary

In this unit we have leant that:

i. The convention on cultural diversity, yet another multilateral policy instrument of UNESCO, recognizes the significance of cultural knowledge 'as a source of intangible and material wealth' especially in indigenous communities.
ii. The convention on Biological Diversity (cBD) calls for the need to: respect, preserve and maintain traditional cultures.
iii. Biodiversity-dependent services such as provision of food and fiber, purification of water and air, climate regulation and many cultural and spiritual values that depend on it are key to human well-being.

6.0 Tutor Marked Assignments

1. Discuss the significance of the convention on biological diversity.
2. Discuss the role of traditional and indigenous knowledge in biodiversity conservation.

7.0 References

United Nations University (2013). Traditional Knowledge and Biodiversity. United Nations University Institute of Advanced studies (UNU-IAS), 6F International organizations Center, Pacifico-Yokohama 1-1-1 Minato Mirai, Nishi-Ku Yokohama 220-8502, Japan.

UNIT 5: RIGHTS AND CONSERVATION

TABLE OF CONTENTS

1.0 Introduction

Attention to the rights of indigenous and local communities in protected area management is relatively recent. In the nineteen and twentieth centuries, many protected areas were established on land and resources held in common property by communities but perceived as terra nullius (nobody's property) when it came to asking permission, offering compensation and the like. The resident people were often expelled or severely restricted in terms of permissible uses of natural resources, often without compensation. Today, few people argue against the need to engage positively with resident or neighbouring communities in protected area management, and probably no-one would defend the proposition that human rights are less important in relation to protected areas than elsewhere. Moreover, around the world conservation agencies and communities are also "learning by doing" in an enormous variety of specific situations, trying to understand and apply an evolving body of international and national laws and regulations on the rights of indigenous peoples and local communities.

2.0 Objectives

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

- The meaning of indigenous people;
- The rights of indigenous people and
- Citizen's participation in environmental protection.

3.0 Main Content

3.1 The Rights of Indigenous People

The emergence of "human rights" as a subject of global policy is itself a relatively recent development. It first found expression in the after math of World War II, in the 1948 Universal Declaration of Human Rights (Borrini-Feyerabend, Kothari and Oviedo, 2004). Since then,

numerous international agreements have sought to translate the lofty ethical principles and values that serve as the foundation of human rights into practical obligations for "minimal standards" when dealing with people in general and vulnerable groups and individuals in particular. In this sense, recognizing and respecting these rights is seen as the minimum standard obligations, and violating rights as breaching these obligations.

The International Covenant on Economic, Social and Cultural Rights, which was adopted in 1966 and came into force ten years later, outlined rights in specific terms (Borrini-Feyerabend, Kothari and Oviedo, 2004). The specific concerns about the rights of indigenous peoples have emerged as part of this evolving body of human rights. Thus the International Labour Organization (ILO) Convention No. 169 Concerning Indigenous and Tribal Peoples in Independent Countries, adopted in 1989, defines Indigenous Peoples (In its policies on indigenous people, International Union of Conservation and Nature (IUCN) uses the definition or "statement of coverage" contained in the International Labour Organization (ILO) Convention 169 on Indigenous and Tribal People in Independent Countries (Oviedo, 2003). According to that Convention, indigenous people include: tribal people in independent countries whose social, cultural, and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations; people in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions.) and recognizes their rights to have their social, cultural, religious and spiritual values and practices recognized and protected (Art. 5) and the right to define their development priorities (Art. 7). It affirms indigenous peoples' rights to lands traditionally occupied by them in *toto* or in part and stresses that particular attention should be paid to the situation of nomadic peoples and shifting cultivators. Article 15 states that indigenous people should participate in the use, management and conservation of renewable and non-renewable natural resources. Article 16 states that indigenous peoples shall not be removed from the lands that they occupy and, if this is necessary as an exceptional measure, relocation shall take place only with their free and informed consent and with assured right of return and proper compensation.

3.2 Citizen's Participation in Protecting the Environment

In 1991, Caring for the Earth: A Strategy for Sustainable Living, published by International Union for Conservation of Nature, World Wildlife Fund and United Nations Environment Programme, recommended:

- citizen involvement in establishing and reviewing national protected areas policy;
- the effective participation of local communities in the design, management and operation of individual protected areas;
- a sustainable economic return from protected areas, making sure that much of this goes to manage the area and supports local communities;
- that local communities, especially communities of indigenous peoples, and private organizations should establish and manage protected areas within the national system;

- that the protected areas do not become oases of diversity in a desert of uniformity, by providing for their integration within policies for the management of surrounding lands and waters.

4.0 Conclusion

Indigenous people have the right to use the natural resources found in their locality. Even when forest areas are being designated as protected areas, the rights of the indigenous people should not be trampled upon i.e. their rights to social, cultural, economic, religious and spiritual values should be protected.

5.0 Summary

In this unit we have leant that:

i. Indigenous people include tribal people in independent countries whose social, cultural, and economic conditions distinguish them from other sections of the national community.
ii. Indigenous people should participate in the use, management and conservation of renewable and non-renewable natural resources.
iii. Indigenous people shall not be removed from the lands that they occupy and, if this is necessary as an exceptional measure, relocation shall take place only with their free and informed consent and with assured right of return and proper compensation.

6.0 Tutor Marked Assignments

1. Define indigenous people.
2. What are the rights of indigenous people?

7.0 References and other Resources

Borrini-Feyerabend, G., Kothari, A. and Oviedo, G. (2004). Indigenous and Local Communities and Protected Areas: Towards Equity and Enhanced Conservation. IUCN, Gland, Switzerland and Cambridge, UK. xviii + 111pp.

Oviedo, G. 2003. “Indigenous peoples issues in the IUCN”. IUCN Internal Discussion Note, Draft 21, www.iucn.org.

MODULE 4: CONFLICT, NATURE AND NATURAL RESOURCES

UNIT 1: EFFECTS OF CONFLICT ON NATURE AND NATURAL RESOURCES

TABLE OF CONTENTS

1.0 Introduction

The significance of conserving nature and preventing conflict is formalized in the United Nations Sustainable Development Goals (International Union for Conservation of Nature, 2021). However, while there is a long history of scholarly and policy consideration of inter-linkages between war and environment in general, specific relationships between armed conflict and nature conservation have received relatively less attention. The linkages between conflict and nature and natural resources are not unidirectional but go both ways, with nature and natural resources playing a role in conflict, and conflict in turn affecting them. The impacts of armed conflict on nature are largely negative, although they vary widely in detail. These impacts can include direct killing of individual organisms for food or trade, degradation of ecosystems as both a tactic and a consequence of war, reduction in conservation capacity, and persecution of environmental defenders (International Union for Conservation of Nature, 2021).

2.0 Objectives

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

- The linkages between conflict and natural resources;
- Impacts of war on nature and
- Ecosystem-level consequences of conflict.

3.0 Main Content

3.1 The Linkages between Conflict and Natural Resources

Some 40 per cent of civil wars between 1950 and 2010 were associated with natural resources, and armed conflicts of all kinds have had significant impacts on the natural world (United Nations Environment Programme, 2009) However, the linkages between conflict, nature, and

natural resources vary and remain widely debated and imperfectly understood (Matthew et al., 2002; Halle et al., 1999; Humphreys, 2005; Le Billon, 2001; Lujala, 2010; Blattman, 2010; Van der Ploeg, 2011, Adger et al., 2014; Le Billon, 2006). Moreover, the linkages are not unidirectional but go both ways, with nature and natural resources playing a role in conflict, and conflict in turn affecting them. For example, natural resources have provided income to help finance many conflicts, contributing not only to their onset but also to lengthening them (Angrist and Kugler, 2008; Collier and Hoeffler, 2004; Collier and Hoeffler, 2005) Poor governance, scarcity, and unequal distribution of natural resources are other common connections to conflict (Homer-Dixon, 1994; Homer-Dixon, 1999). Although evidence on their specific impacts is incomplete and continues to be debated, difficult environmental conditions such as extreme climatic events are often associated with conflict, including local violence and the onset of civil war, as well as migration decisions and asylum applications (Adger et al., 2014; Hsiang et al., 2013; Hsiang et al., 2014; Buhaug, 2010; Theisen et al., 2013; Missirian and Schlenker, 2017; Harari and Ferrara, 2018). Sometimes the conditions that may drive conflict in one place do not do so in another seemingly similar location subject to the same environmental drivers. Explaining what causes peace is thus the flip side of, and equally challenging as, assessing what causes conflict. Global climate change adds further complexity to the situation, with the data confirming increasing trends for climate change and conflict alike (Adger et al., 2014; Breckner and Sunde, 2019)

3.2 Impacts of War on Nature

War impacts nature through direct killing of individual organisms, modifications of natural ecosystems, and reduced capacity for conservation implementation. At the organismal level, most impacts relate to deliberate killing for food; this may be particularly the case for primates and other large mammals (Vogel, 2000). During the 1994 war in Rwanda for example, 90 per cent of the large mammals in Akagara National Park were killed for food or trade, and poaching of ungulates in the Parc National des Volcans also increased (Kanyamibwa, 1998; Plumptre et al., 1997). The genocide sent thousands of people walking through protected areas, either to reach safety or to join the conflict, often killing animals for food and clearing trees along the way.34 The Vietnam War almost certainly accelerated the slide into extinction of the Critically Endangered Javan Rhinoceros *Rhinoceros sondaicus* in mainland Asia, as the Viet Cong shot them to supplement a meagre diet (Brook et al., 2014; Đài, 2004). During the 1996–1997 war in the Democratic Republic of the Congo, there was a fivefold increase in poaching in Garamba National Park; (de Merode et al., 2007) while in Nepal, the 1996–2006 Maoist insurgency forced troops guarding rhinoceroses and tigers to move to other duties, allowing a similar spike in poaching (Baral and Heinen, 2005). Increased availability of guns has been shown to have been a major driver of large mammal decline during the Angolan Civil War, which took place in the last quarter of the 20th century (Braga-Pereira et al., 2020). In Cambodia, there were marked declines in the relative abundance of animals during the country's periods of conflict from the 1950s to the 1990s (Loucks et al., 2009); in the Sahara Sahel, conflict has contributed significantly to the killing of the region's threatened species and the resulting population declines (Brito et al., 2018).

At the ecosystem level, environmental degradation is both a tactic and a consequence of war (Hupy, 2008). Its use as a tactic is perhaps most infamously exemplified by the use of defoliants in the Vietnam War (Orians and Pfeiffer, 1970), leaving a legacy of environmental devastation

felt to this day (Banout et al., 2014; Anh et al., 2017; Schecter et al., 1995; Zierler, 2011) and the deliberate setting ablaze of oil wells and related oil spills during the 1991 Gulf War (Alam, 1993). In the Middle East for example, agricultural land has been bombed and burned, and water has been contaminated in the recent conflicts (Sowers et al., 2017; Weinthal and Sowers, 2019).

Ecosystem-level consequences of conflict are common. For example, war may force soldiers, refugees and local people to overexploit forests for fuel wood (Draulans and Van Krunkelsven, 2002). There was a substantial presence of armed groups in Colombian forests from 1985 to 1997, and 2000 to 2015; while in some cases this generated "gunpoint conservation", more often, both guerrillas and paramilitaries cleared forests for cultivation of coca (Álvarez, 2003; Negret et al., 2019). Pollution is another ecosystem level impact of conflict, for example the noise from naval sonar – the use of which extends from war into peacetime – severely impacts cetaceans that depend on echolocation (Parsons et al., 2008). The ecosystem impacts of war also include indirect costs imposed on people through the degradation of ecosystem services, for example through changes in hydrology and associated water management and irrigated agriculture (Francis and Krishnamurthy, 2014).

4.0 Conclusion

Natural resources have been used at one time or the other to finance conflict by armed or rebel groups. Poor governance, mismanagement and corruption have led to groups carrying arms against their own government in order to have a fair share of their country's wealth especially if the resources are domiciled in their area.

5.0 Summary

In this unit we have leant that:

i. War impacts nature through direct killing of individual organisms, modifications of natural ecosystems.
ii. At the ecosystem level, environmental degradation is both a tactic and a consequence of war.
iii. The ecosystem impacts of war also include indirect costs imposed on people through the degradation of ecosystem services.

6.0 Tutor Marked Assignments

1. List ecosystem-level consequences of conflict that you know.
2. Explain how war impacts nature

7.0 References and other Resources

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UNIT 2: CO-OCCURRENCE BETWEEN CONFLICT AND BIODIVERSITY

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1.0 Introduction

Over the last 70 years, humans have waged war almost continuously in many of the world's most important places for biodiversity, including regions that hold many species found nowhere else, and which are severely imperiled (Hanson et al., 2009; Fjeldså et al., 2005). Here we show that species in general, and threatened species in particular, are more likely than expected to occur in areas that have experienced armed conflict. A mapping of all the birds, mammals and amphibians that are classified as threatened (Critically Endangered, Endangered or Vulnerable) on the IUCN Red List of Threatened Species™, overlaid with armed conflict events since 1989 from the Uppsala Conflict Data Program.

2.0 Objectives

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

- Conflict and biodiversity;
- Conflict and conservation and
- Conflict and displacement.

3.0 Main Content

3.1 Conflict and Biodiversity

Overall, 70 per cent of all birds, mammals and amphibians (the three largest taxonomic groups that have been comprehensively assessed against the IUCN Red List) have current ranges that overlap with armed conflict events (IUCN, 2021). For example, the symbol of peace, the Vulnerable European Turtle Dove (*Streptopelia turtur*), has a current range that overlaps with 41,061 armed conflict events. Across all species, the average number of armed conflict events contained in a species range is 2,169 (IUCN, 20201). This varies between 3,535 for birds, 1,739 for mammals, and 272 for amphibians, reflecting the fact that amphibians have much smaller range sizes than do mammals, which in turn have smaller ranges than birds. In fact, species are

even more likely to co-occur with armed conflict events than would be expected based on their spatial extent.

3.2 Conflict and Conservation: A Case Study of Columbia

Colombia's armed conflict dates back to the 1950s, when agrarian disputes led to the formation of Marxist-oriented guerrilla groups, some of which acquired control over large portions of the country as reported by Canavire-Bacarreza et al. (2018) but cited by Gómez-Creutzberg (2021). During the 1980s, illegal paramilitary groups were formed to counter guerrilla operations (Fergusson et al., 2014). In 1997, these groups coalesced into the Autodefensas Unidas de Colombia (AUC) whose fortification, along with increased military actions from the Colombian Army, resulted in one of Colombia's most violent decades (Centro Nacional de Memoria Histórica, 2012).

Areas of natural forest cover, high biodiversity and weak state presence overlap with most epicentres of Colombia's armed conflict (Álvarez, 2003; Morales, 2017; Negret et al., 2019) The forced internal displacement of over 7.8 million people from these areas led to land abandonment and spontaneous regeneration in some regions (United Nations High Commissioner for Refugees [UNHCR], 2019; Sánchez-Cuervo and Aide, 2013). However, the conflict has also caused deforestation. Paramilitary groups deployed forced displacement to seize valuable land for extensive cattle ranching, mining, palm oil and illegal coca plantations (Fergusson et al., 2014). In the Central Andes, forest fragmentation and degradation increased the vulnerability of the country (and its energy producing watersheds) to climatic oscillations such as El Niño (Baptiste et al., 2017)

Both guerrillas and paramilitaries have financed their operations through illegal crops and the drug trade (Stanford University - Centre for International Security and Cooperation, 2019). Crop eradication efforts have resulted in shifting patterns of deforestation throughout conflict areas. (Chadid et al., 2015; Dávalos et al., 2011; Fjeldså et al., 2005). Guerrillas also introduced illegal mining (primarily of gold) to fragile ecosystems, including national parks (Morales (2017; United Nations Office on Drugs and Crime (UNODC), 2016). At the same time, anecdotal evidence suggests that guerrillas enforced "gunpoint conservation" by using land mines to restrict hunting, logging, land clearing and settling in areas where these activities were contrary to their interests (Dávalos, 2001; Murillo-Sandoval et al., 2020).

4.0 Conclusion

Armed conflict can lead to mass destruction of biodiversity when gun men resort to using natural resources to finance their operations and at the same, it can prevent the activities of poachers, illegal loggers who prefer to stay alive by avoiding trouble spots even though they get their livelihoods from such areas.

5.0 Summary

In this unit we have leant that:

i. Across all species, the average number of armed conflict events contained in a species range is 2,169.
ii. Areas of natural forest cover, high biodiversity and weak state presence overlap with most epicentres of Colombia's armed conflict.
iii. Both guerrillas and paramilitaries in Columbia have financed their operations through illegal crops and the drug trade..

6.0 Tutor Marked Assignments

1. Discuss conflict and conservation using Columbia as your case study.
2. Discuss how conflict impact negatively on biodiversity

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UNIT 3: INFLUENCES OF NATURE AND NATURAL RESOURCES ON CONFLICTS

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1.0 Introduction

Conflicts are seldom, if ever, driven by one cause. While evidence for the geographic correlations between the state of the environment and factors affecting violence and social disruption is exceedingly robust, debate continues about the relative importance of different drivers of conflict (IUCN, 2021). Together with the condition of the environment and natural resources, other factors driving conflict include geographical, institutional, political, economic and social issues. A changing climate adds further complexity (Lee, 2009; Theisen et al., 2013) Moreover, the relationship runs in both directions: nature and environmental conditions can contribute to conflict; and conflict in turn, can have direct impacts on nature

2.0 Objectives

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

- Wildlife and conflict;
- Water and conflict
- Wildlife exploitation in conflict financing.

3.0 Main Content

3.1 Wildlife and Conflict

Sparse but increasing evidence indicates that exploitation of wildlife for illicit trade is funding and prolonging armed groups and insurgencies, as well as organized crime and designated terrorist groups such as the Lord's Resistance Army, the Janjaweed, Al Shabaab, Al Qaeda and the Taliban (International Institute for Sustainable Development [IISD], 2013; U.S. Government Printing Office, 2012; International Fund for Animal Welfare, 2013; Crosta and Sutherland, 2016). Generating US$ 7–23 billion per year, the illegal wildlife trade is increasingly lucrative due to low rates of detection and conviction, (Nellemann et al., 2016) and may be particularly prevalent where armed conflict disrupts formal economies. Such exploitation of wildlife to fuel

conflict sits alongside the long history of exploitation of non-living natural resources (diamonds, minerals, oil etc.) to fund conflict, and disputes over the allocation of such resources to drive conflict (Lujala, 2010; Lujala, 2008).

The UN Secretary General has called attention to the 50–90 per cent decrease in elephant populations in the Central African Republic and the Democratic Republic of the Congo, emphasizing that ivory is an important funding stream for the Lord's Resistance Army (UN Security Council, 2013). According to the United Nations Office on Drugs and Crime, Sudanese militia were responsible for the deaths of 2,000 elephants in 2007 alone (UNODC, 2011). In Afghanistan and Pakistan, the Taliban benefits from the trade in highly prized falcons (Barron, 2015). These examples underscore the urgency of viewing the wildlife trade not only through an environmental lens but also from the perspective of national security (Douglas and Alie, 2014). In response, a recent UN resolution escalated the severity of wildlife crime to that of arms and human trafficking, and the Global Environment Facility has allocated US$ 168 million to projects tackling wildlife trafficking and trade (United Nations, 2015; International Institute for Sustainable Development, 2018).

3.2 Water and Conflict

Water scarcity currently affects around 700 million people in 43 countries worldwide. Historically, variability in water supply, high population density, economic dependency on agriculture, and prolonged periods of water insecurity have been key factors for migration. This can lead to both temporary and permanent movements, depending on the duration and severity of water stress as well as the coping capacity of populations (International Organization for Migration, 2018). For instance, communities such as the nomadic pastoralists in Western and Eastern Africa migrate seasonally to ensure access to water resources. Climate change also functions as a multiplier of water scarcity; and can exacerbate water scarcity caused by exploitation and lack or mismanagement of water and related ecosystem services (Green et al., 2015; Vörösmarty et al., 2013). Trans-boundary water management is concerned with highly competitive resource management access issues. Water is needed to grow food and to generate electricity– it is a conflict multiplier if mismanaged (Sadoff and Grey, 2002).

4.0 Conclusion

Wildlife exploitation and illicit trade in wildlife are being used by armed groups to finance and prolong conflicts in some regions of the world. Also, water scarcity can lead to conflict as it is common between nomadic pastoralists and farmers in West and East Africa.

5.0 Summary

In this unit we have leant that:

i. Generating US$ 7–23 billion per year, the illegal wildlife trade is increasingly lucrative due to low rates of detection and conviction.
ii. According to the United Nations Office on Drugs and Crime, Sudanese militia were responsible for the deaths of 2,000 elephants in 2007 alone.
iii. Water scarcity currently affects around 700 million people in 43 countries worldwide.

6.0 Tutor Marked Assignments

1. Discuss how conflict is being prolonged through illicit trade in wildlife.
2. List four factors responsible for human migration.

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UNIT 4: NATURAL RESOURCE SCARCITY, CONFLICT, CLIMATE AND WEATHER

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1.0 Introduction

A 2013 synthesis of literature concluded that "amplified rates of human conflict could represent a large and critical social impact of anthropogenic climate change in both low- and high-income countries" (Adger et al., 2014). A broad range of conflict-related endpoints have been found to be associated with climate, with data suggesting that an increase in temperature is associated with an increase in conflict probability (Hsiang et al., 2013)

2.0 Objectives

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

- Natural resource scarcity;
- Changing climate and weather and
- Changing weather and conflict.

3.0 Main Content

3.1 Natural Resource Scarcity and Conflict

The fundamental hypothesis is that scarcity of natural resources such as agricultural lands, forests, freshwater, oil and minerals, leads to overuse and degradation of natural resources, as well as conflicts, due to competition over limited resources (IUCN, 2021). The scarcity and degradation of these natural resources is further increasing in many parts of the world due to population and economic growth, as well as inequitable distribution of economic growth and wealth, including access to land. While many examples indicate a positive relationship between resource scarcity and conflict, hence supporting the neo-Malthusian approach, the argument and the robustness of empirical evidence to support it remains controversial (Homer-Dixon, 1994; Raleigh and Urdal, 2007; Urdal, 2008; Theisen, 2008; Acemoglu et al., 2019)

In addition to its possible linkages to conflict, evidence has shown that environmental decline also plays a role in migration, for example in causing people to leave their homes and move elsewhere, even to other countries (Reuveny and Moore, 2009; Adger et al., 2014; Le Billon, 2006), Environmental deterioration drives migration by reducing the availability and reliability of ecosystem services and increasing the exposure to hazard. However, human migration decisions are also influenced by economic, political, social and demographic factors (Black et al., 2011).

3.2 Changing Climate, Weather and Conflict

One study found a positive relationship between conflict and temperature across sub Saharan Africa since 1960, and combined this with climate projections to anticipate a 54 per cent increase in armed conflict (equivalent to 393,000 deaths) by 2030, in the absence of climate change mitigation (Burke et al., 2009). Another study similarly showed that the conflict in Syria, which began in 2011, could be attributed to climate change, together with poor governance and unsustainable agricultural and environmental policies (Kelley et al., 2015)

4.0 Conclusion

Conflict can arise over the use of natural resources especially when there is competition for such resources. Sometimes, conflict can lead to the formation of rebel groups fighting over the resources. Also, climate change can lead to a decline in natural resources and this can engender stiff competition over the limited resources.

5.0 Summary

In this unit we have leant that:

i. Scarcity and degradation of natural resources are increasing in many parts of the world due to population and economic growth.
ii. Environmental deterioration drives migration by reducing the availability and reliability of ecosystem services.
iii. Human migration is also influenced by economic and political reasons.

6.0 Tutor Marked Assignments

1. Show the link between natural resources and conflict.
2. How does climate change induce conflict?

7.0 References and other Resources

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UNIT 5: CONSERVATION, CONFLICT AND PEACE BUILDING

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1.0 Introduction

Following the debates on environmental scarcity and security over recent decades, an important line of work has emerged on environmental peace building (Bruch et al., 2016; Young and Goldman, 2015; Weinthal et al., 2014; Unruh and Williams, 2013); Conca and Wallace, 2012; Jensen and Lonergan, 2012; Matthew et al., 2009; Bruch et al., 2009; Ajroud et al., 2017). By taking a step beyond consideration of the drivers of conflict alone, environmental peace-building assesses options for environmental protection, conservation and cooperation as a means to create peaceful relations between and within states (International Union for Conservation of Nature [IUCN], 2021). Environmental peace-building encompasses improved natural resource governance, improved natural resource management, protecting nature in times of conflict, and trans-boundary resource management and international agreements (IUCN, 2021). The peace building context may involve post-conflict situations, but conservation opportunities may also emerge in areas threatened by conflict. More generally, environmental cooperation can promote peace by sustaining dialogue and bringing together adversaries

2.0 Objectives

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

- Land tenure and resource rights;
- Gender equality and women's empowerment and
- Improved natural resource governance.

3.0 Main Content

3.1 Improved Natural Resource Governance

Natural resource governance refers to the norms, institutions and processes that determine how power and responsibilities over natural resources are exercised, how decisions are taken, and

how citizens – including women, men, youth, indigenous peoples and local communities – effectively participate in, and benefit from the management of natural resources (Campese et al., 2016).
Improved natural resource governance should in turn improve both long-term prospects for the conservation of nature, and the extent to which environmental sustainability contributes to human wellbeing (IUCN, 2021). Good governance is generally associated with reduced conflict, and strengthening natural resource governance can contribute to improving governance overall (United States Agency for International Development, 2014).

Improved natural resource governance should enable all actors with natural resource rights, roles and responsibilities to engage in positive actions to sustain nature in ways that help advance social equity and human rights. It also allows for the effective operation of appropriate accountability and redress mechanisms to address failures and negative environmental or social impacts (IUCN, 2016). The following characteristics of improved governance provide the basis for preventing or resolving conflicts related to the use and management of natural resources (Springer et al., in press)

3.2 Inclusive Decision-Making

Inclusive decision-making involves the full and effective participation of groups with rights and interests in land and natural resources, including individuals and groups at risk of marginalization (IUCN, 2021). Participation enhances the effectiveness of natural resource governance by bringing multiple interests, perspectives and associated knowledge to bear on decision-making (IUCN, 2021). The need for inclusive decision-making concerns interactions between local communities and the state, but it is also relevant within communities – e.g. in relation to the views and interests of women, youth and other groups – and between local people and businesses, non-governmental organizations and other non-state actors (Springer, 2016; Farvar et al., 2018). Inclusive decision-making helps prevent or resolve conflicts by avoiding results that infringe on rights and interests, either due to a lack of information about what these are, or due to power dynamics that privilege rights and interests of certain groups (IUCN, 2021). Ideally, inclusive decision-making is implemented proactively, as it can be problematic when decisions have to be made quickly, for example, under conditions of war.

According to IUCN (2021), Policy options for improving outcomes for peace and nature through inclusive-decision making include:

• Establish, maintain and strengthen platforms to enable rights-holders and stakeholders, including women, men, indigenous peoples and local communities, to engage in dialogue and consultation on natural resource management decisions;

• Ensure that diverse groups are represented in decision-making platforms and processes, with particular attention to ensuring that potentially marginalized groups have the resources and support needed to participate effectively;

• Provide rights-holders and stakeholders with access to the information they need to participate effectively in their languages, and contribute their own knowledge to decision-making; and

• Verify that decisions take into account the systems, knowledge and traditional norms of rights holders, and integrate them into natural resource governance and management.

3.3 Land Tenure and Resource Rights

Land tenure and resource rights refer to the social relations and institutions governing access to land and resources, including who is allowed to use which resources, how and for how long, and under what conditions (Larson and Springer, 2016). Land and resources are fundamental livelihood assets for local people and form the basis for social and political organization, cultures, traditions and identities. Strong evidence shows that when communities have secure rights to forest land and resources, deforestation rates decrease and carbon storage is improved (Stevens et al., 2014). Clarifying and securing land and resource tenure reduces conflict by enabling people to defend their claims, and by avoiding multiple conflicting claims and activities (IUCN, 2021). Clear and secure tenure is also important for maintaining peace in post-conflict periods. According to IUCN (2021), policy options to improve outcomes for peace and nature by increasing tenure security include:

• Securing legal recognition, reflecting the full spectrum of existing tenure rights, including customary and informal rights, and integrating these rights within the formal national lands system (Food and Agriculture Organization (2012);

• Empowering community and civil society organizations to secure and defend tenure rights;

• Supporting capacities and processes for enforcing tenure rights against encroachment;

• Acknowledging and redressing conflicts caused by dislocation or violation of traditional rights, and establishing processes for compensation (Alcorn, 2014).

3.4 Gender Equality and Women's Empowerment

Gender equality refers here to women's and men's equal rights, freedoms, conditions and opportunities to access and control land and other natural resources (IUCN, 2021). Recognizing the rights of both men and women, regardless of background, age, race, sexual orientation, gender identity, ethnicity or religion, is important for avoiding conflict over natural resources.

Addressing gender equality can improve outcomes for peace and nature (IUCN, 2021), including through the following policy options:

• Legally recognize equal rights for men and women to inherit, own, rent and sell land, and to access, use and manage other natural resources;

• Prioritize women's empowerment and help women realize their tenure and resource rights by providing them with access to information, credit and services;

• Facilitate and support women's leadership and equal participation in decision-making on natural resource governance at all levels, especially in local government and natural resource governance bodies, but also in conflict mitigation and peace-building processes, including

women as, for example, leaders, mediators, delegates, signatories, witnesses, observers and gender advisors;

• Ensure that research, analysis, programme development, and project design and execution include and employ data disaggregated by gender and gender-responsive strategies, in order to identify gender gaps and advance gender equality in natural resource management and conflict mitigation.

4.0 Conclusion

Improved resource governance can help to prevent needless conflicts over the use of natural resources. Features of improved resource governance such as inclusive decision making, gender equality and women's empowerment, land tenure and resource rights etc. play a significant role in preventing conflicts over the use of natural resources, thereby promoting environmental peace

5.0 Summary

In this unit we have leant that:

i. Recognizing the rights of both men and women, regardless of background, age, race, sexual orientation, gender identity, ethnicity or religion, is important for avoiding conflict over natural resources.
ii. Land tenure and resource rights refer to the social relations and institutions governing access to land and resources.
iii. Participation enhances the effectiveness of natural resource governance by bringing multiple interests, perspectives and associated knowledge to bear on decision-making.

6.0 Tutor Marked Assignments

1. Explain natural resource governance.
2. Discuss the significance of inclusive decision making in preventing conflict over the use of natural resources?

7.0 References and other Resources

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MODULE 5: CLIMATE CHANGE, CLIMATE JUSTICE AND FOOD SOVEREIGNTY

UNIT 1: CLIMATE CHANGE

TABLE OF CONTENTS

1.0 Introduction

Climate change in IPCC (Intergovernmental Panel on Climate Change) usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCCC, 2011).

2.0 Objectives

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

- Climate change impacts;
- Projected future impacts of climate change on fresh water resources and
- The ecosystems.

3.0 Main Content

3.1 Climate Change Impacts

According to UNFCCC (2011), many natural systems, on all continents and most oceans, are being affected by regional climate changes, particularly temperature increases. Observed impacts include:

• Changes in snow, ice and frozen ground (including permafrost);
• Effects on hydrological systems;
• Changes on terrestrial biological systems;

• Trend towards earlier ‘greening’ of vegetation and longer thermal growing season;
• Changes in marine and freshwater biological systems associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation;
• Ocean acidification with an average decrease in pH of 0.1 units. The associated effects on the marine biosphere were not documented at the time of the assessment.

3.1.1 Projected future impacts

According to UNFCCC (2011), more specific information is now available on the nature of these impacts, across a wide range of systems and sectors. Examples of projected impacts include:

Fresh water resources and their management

• Runoff and water availability are projected to increase at high latitudes and in some wet tropics, and decrease over much of the mid-latitudes and dry tropics, some of which are presently water-stressed areas;
• Drought-affected areas will probably increase, and extreme precipitation events, which are likely to increase in frequency and intensity, will augment flood risk;
• Hundreds of millions of people are projected to be exposed to increased water stress.

Ecosystems

• The following ecosystems are identified to be most vulnerable, and are virtually certain to experience the most severe ecological impacts, including species extinctions and major biome changes:
  - ❖ On continents: tundra, boreal forest, mountain and Mediterranean-type ecosystems;
  - ❖ Along coasts: mangroves and salt marshes, due to multiple stresses;
  - ❖ In oceans: coral reefs and the sea-ice biomes.
• The progressive acidification of the oceans is expected to have negative impacts on marine shell-forming organisms such as corals and their dependent species;
• An intensification and expansion of wildfires is likely globally, as temperatures increase and dry spells become more frequent and more persistent;
• Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Food, fibre and forest products

• Moderate warming benefits cereal crops and pasture yields in mid- to high-latitude regions, but even slight warming decreases yields in seasonally dry and tropical regions. Further warming has increasingly negative impacts in all regions;
• Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes;
• Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries

Industry, settlement and society

• Areas most likely to be affected are the poorer, often rapidly expanding communities near rivers and coasts, which use climate sensitive resources and are prone to extreme weather;
• Where extreme weather events become more intense and or more frequent, their economic and social costs are predicted to increase.

4.0 Conclusion

Climate change can impact so many things in the world that we live in and these changes can have both negative and positive impacts. Prolonged drought for instance, will have negative impact on food production and can result in loss of biodiversity. In mid-to- high latitude regions, moderate warming benefits cereal crops.

5.0 Summary

In this unit we have leant that:

i. Increases in the frequency of droughts and floods are projected to affect local crop production negatively.
ii. Hundreds of millions of people are projected to be exposed to increased water stress.
iii. An intensification and expansion of wildfires is likely globally, as temperatures increase and dry spells become more frequent and more persistent.

6.0 Tutor Marked Assignments

1. What is climate change?
2. List five observed impacts of climate change.

7.0 Reference

United Nations Framework Convention on Climate Change (2011). Fact sheet: Climate change science - the status of climate change science today

UNIT 2: CLIMATE JUSTICE

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1.0 Introduction

Climate justice is a phrase used for framing global warming as an ethical and political issue, by relating the effects of climate change to concepts of justice, particularly environmental justice and social justice and by examining issues such as equality, human rights, collective rights and the historical responsibilities for climate change (Global Humanitarian Forum, 2009). Climate justice is also about sharing burdens as well as benefits in an equitable way thus, assisting in the creation of a harmonious society (Ghimire and Panday, 2017). Climate justice is geared towards uplifting marginalized group of people who are blameless victims of changed climate and make people aware of collective right, historical responsibility and equality (Ghimire and Panday, 2017). Simply, climate justice is analogous to what you need to do when you are given punishment for the crimes you never committed or you are to pay fine for the wrong deeds of others (Ghimire and Panday, 2017).

2.0 Objectives

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

- The meaning of climate justice;
- The need for climate justice and
- The role of developed economies in the drive for climate justice.

3.0 Main Content

3.1 The Need for Climate Justice

The United Nations Framework Convention on Climate Change (UNFCCC) in 1992 as cited by Ghimire and Panday (2017) recognized the need for equitable treatment of people who did not contribute to climate change but were at risk of bearing its brunt. Article 3, paragraph 1 of UNFCCC in 1992, states, ‘the Parties should protect the climate system for the benefit of present and future generations of humankind, based on equity and in accordance with their common but differentiated responsibilities and respective capabilities’.

A basic proposition of climate justice is that those who are least responsible for climate change suffer its gravest consequences and the ability of populations to mitigate and adapt to the negative consequences of climate change are shaped by factors such as income, race, class, gender, capital and political representation as noted Ghimire and Panday (2017) . As low-income communities possess few adaptive resources, they are particularly vulnerable to climate change. On top of that, such populations often receive an unequal share of disaster relief and recovery assistance. This is why the movement for climate justice demands solutions which are democratically controlled, socially just and framed within a context of human rights (Ghimire and Panday, 2017).

Developed countries, as the main contributor to climate change, in assuming their historical responsibility, must recognize and honor their climate debt in all its dimensions as the basis for a just, effective, and scientific solution to climate change (International Union for Conservation of Nature, 2010). The focus must not be only on financial compensation, but also on restorative justice, understood as the restitution of integrity to our mother Earth and all its beings (People's World Conference on Climate Change, 2011). Climate justice links human rights and development to achieve a human-centered approach, safeguarding the rights of the most vulnerable and sharing the burdens and benefits of climate change and its resolution equitably and fairly (Ghimire and Panday, 2017). To ensure climate justice, it is important that the impacts of climate change on the most vulnerable are minimized and at the same time the fossil fuel powered developed countries reduce their share of GHGs emissions and support developing countries and communities to adapt their livelihoods, protect their resources and embrace low carbon development (Ghimire and Panday, 2017).

4.0 Conclusion

Climate justice provides a link between development and human rights. It is quite germane to ensure that the rights of vulnerable groups, who contribute little or virtually nothing to climate change must be protected and their livelihoods must not be taken away from them because of climate change impacts.

5.0 Summary

In this unit we have leant that:

i. Climate justice is geared towards uplifting marginalized group of people who are blameless victims of changed climate.
ii. Climate justice links human rights and development to achieve a human-centered approach.
iii. Climate justice is a phrase used for framing global warming as an ethical and political issue, by relating the effects of climate change to concepts of justice.

6.0 Tutor Marked Assignments

1. Define climate justice
2. List some of the factors that must be in place in order to ensure climate justice.

7.0 References and other Resources

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UNIT 3: CLIMATE JUSTICE AGENDA

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1.0 Introduction

A climate justice agenda is founded on the principle of equity, across all aspects of climate change, but beyond that point it must be a living agenda (Adams and Luchsinger, 2009). Climate justice is geared towards uplifting marginalized group of people who are blameless victims of changed climate and make people aware of collective right, historical responsibility and equality (Ghimire and Panday, 2017). Simply, climate justice is analogous to what you need to do when you are given punishment for the crimes you never committed or you are to pay fine for the wrong deeds of others (Ghimire and Panday, 2017).

2.0 Objectives

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

- Climate justice and equity;
- Climate justice and uneven growth
- Reducing exclusion in global decision-making on climate change.

3.0 Main Content

3.1 Climate Justice and Equity

According to Adams and Luchsinger (2009), some starting points to begin reframing current climate change debates, as part of a broader process of people claiming their rights to sustainable development and participation in decisions that affect their lives include:

Make justice the starting point: This is the only approach that is comprehensive enough to tackle climate change, foster sustainable economies, and be politically acceptable to the majority of countries.

Build on existing development and human rights agreements: Both adaptation and mitigation activities should be carried out under the well-established developments and human rights frameworks affirmed by decades of national and international policies and actions. Climate

change cannot be reversed at the expense of poverty eradication or by thwarting the right to development.

Step up action—urgently—to slow climate change: As a whole, the world has the knowledge, resources and technology to counter climate change. Given the escalating pace of global warming, it now has to act with far greater urgency to realize these commitments. Change is possible even if it requires major economic and political rearrangements around the core principles of equity and sustainable development.

Aim high—adopt the most ambitious targets: By aiming for the most ambitious targets, there is a greater possibility that adequate steps will be taken in time. Given the risks for small islands and low-lying territories, the world should take a precautionary approach and aim to keep temperature changes to a maximum of 1.5 degrees C. The 1990 baseline for emissions cuts must apply to all industrialized countries – it is unjust to allow extra years to be added to a history of overconsumption of atmospheric space. Overall greenhouse gas emissions should be reduced and kept at a ceiling of 350 ppm, and the trajectory of global emissions must shift downward no later than 2015.

Transform the systems and institutions that have created climate change: Tinkering around the edges describes much of the response to climate change so far. This falls short of what is needed. As the world stalls, only some people continue to reap rewards from current political and economic configurations. Billions more do not. Governance and development models should be built around notions of justice and equity, with the objective of working for the planet and people as a whole, and evening out imbalances that are not sustainable. It is not enough to talk about low-carbon pathways through technology, for example, without also rethinking current models of production, global trade and consumption patterns.

Reduce exclusion in global decision-making: Climate change talks and actions have featured a few voices and priorities, and neglected many others. The small island developing States (SIDS), least developed countries (LDCs) and indigenous peoples face particular threats that are not being adequately addressed, in addition to the injustice of being low emitters struggling to cope with severe impacts on development and even territorial integrity. The notion of developing countries being at the table should be refined to emphasize that this must include those who do not have a powerful role in the global economy.

Call on both industrialized and developing countries to set climate and development targets: Both climate change and development have to be viewed from a global framework under which appropriate, equitable and sustainable balances can be struck. Targets should be part of national planning and set in agreement with informed citizens about the kind of what world people want to share. They should reflect the notions of historical responsibility and common but differentiated responsibilities, as well as variations in development contexts.

Free up finance: The sums for halting climate change are large but feasible. There should be an immediate scaling up of investments to slow the pace of change and avoid more substantial future costs.

Back a public investment approach to climate change: Key decisions should be made by the public sector in accordance with public interests, and deliberately linked to objectives such as reducing emissions while ensuring equitable access to energy services required for development.

3.2 Climate Justice and Uneven Growth

Unequal economic growth slows poverty reduction rates (Oxfam, 2020). The World Bank concluded that continued unequal growth will barely make a dent in the number of people living on less than $1.90 per day by 2030; only a reduction in income inequality will help (Lakner *et al*., 2019). One estimate suggested it would take around 200 years at current rates to lift everyone above the $5.50 poverty line – a terribly inefficient and morally indefensible approach to poverty reduction (Woodward, 2015).

But unequal growth has another cost: it means that the global carbon budget is being rapidly depleted, not for the purpose of lifting all of humanity to a decent standard of living, but to a large extent to expand the consumption of a minority of the world's very richest people.

This is an injustice which is felt most cruelly by two groups who have contributed least to the climate crisis: the world's poorest and most vulnerable people around the world today – already experiencing the impacts of a world that is 1ºC hotter – and future generations who will inherit a depleted carbon budget and an even more dangerous climate.

4.0 Conclusion

In order to lessen the impacts of climate change on the vulnerable ones without reversing the progress that has been made in terms of poverty reduction, it is necessary to reduce exclusion in global decision making on climate change. The approach to tackling climate change should be a holistic one; synergy is needed among all the countries of the world in order to reduce factors and activities contributing to climate change.

5.0 Summary

In this unit we have leant that:

i. The world's poorest and most vulnerable people around the world today – already experiencing the impacts of a world that is 1ºC hotter.
ii. Governance and development models should be built around notions of justice and equity, with the objective of working for the planet and people as a whole.
iii. Both climate change and development have to be viewed from a global framework under which appropriate, equitable and sustainable balances can be struck.

6.0 Tutor Marked Assignments

1. Explain the link between unequal economic growth and the fight against climate change.

2. Of what relevance is climate justice to people in developing countries?

7.0 References and other Resources

Adams, B. and Luchsinger, G. (2009). Climate Justice for a Changing Planet: A Primer for Policy Makers and NGOs.

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UNIT 4: CLIMATE JUSTICE AND THE RIGHTS OF WOMEN

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1.0 Introduction

According to Davis, Roper and Miniszewski (2015), climate change does not affect everyone equally; women are disproportionately affected because they are often the ones who work closest to natural resources that are impacted by climate change (they gather wood for fuel, collect water and farm on a small scale). In addition, social and cultural inequalities often deprive women of information about climate change and limit their participation in decision-making processes about mitigation and adaptation plans.

2.0 Objectives

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

- Environmental issues through a climate and women's lens;
- Indigenous communities and the role of women and
- How climate change affect women.

3.0 Main Content

3.1 Environmental Issues through a Climate and Women's Lens

Environmental Issue	Climate Lens	Women's Lens
Energy and mining	» Fossil fuels produce carbon emissions. » Coal extraction techniques such as mountaintop removal destroy landscapes that store carbon. » Large-scale dams produce massive amounts of the greenhouse gas methane. » Dam construction and mining activities result in deforestation and vegetation loss.	» Women are less likely than men to be compensated for community displacement or livelihood destruction caused by resource extraction. » Energy projects bring an influx of men to the community, creating gender dynamics that can erode women's rights (increased exposure to sexually transmitted diseases), but also increase women's economic options (roadside stands, etc.). » Women resource rights activists are often targeted by the government and private sector in a different way than male activists. These women can face violence, including sexual assault.
Land use and livelihoods	» Forests absorb more carbon than they emit. Forest clearing accounts for about one-sixth of global carbon emissions. » Industrial agriculture and livestock production account for half of the world's human-caused greenhouse gases, when processing, packaging and transport are considered. » Synthetic nitrogen fertilizer breaks down into nitrous oxide—one of the most potent greenhouse gases.	» Women (especially indigenous women) depend on forests for food, health (medicinal plants) and livelihoods (fuel, dye). When forests are destroyed, so are the products women need to survive. » Women comprise 43 percent of the agricultural labor force in non-industrialized countries, but they have few to no land rights and are frequently excluded from land-use decisions.

		» In regions with restricted land rights, women can be forcibly displaced and lose access to fertile land for growing food.
Climate disasters and migration	» Climate disasters are growing increasingly frequent and severe and can lead to temporary or permanent community displacement. » Competition over diminishing resources can trigger conflict or forced migration.	Women are many times more likely than men to die during disasters. » Women have specific requirements during disaster response (sanitation, security, privacy, child-related concerns). » Migration of men who have lost their livelihoods due to climate change leads women to take on wider community leadership roles. This can considerably increase women's burden. » In post-disaster relief shelters or temporary camps, women experience high levels of violence.

Sources: IPCC, 2007; Blomstrom and Cunningham, 2009; McCully, 1996; FAO, 2013; Goodland and Anhang, 2009; EPA, 2014; FAO, 2011.

3.2 Indigenous Communities and the Role of Women

According to the United Nations, indigenous people constitute around 5% of the world's population and 15% of the world's poor (UN Department of Economic and Social Affairs, 2020). Based on an Organization for Economic Cooperation and Development (OECD) report on linking indigenous communities with regional development, indigenous populations are mainly concentrated in rural areas, compared to non-indigenous populations (OECD, 2019). This makes them more susceptible to changes in the local environment. For indigenous communities, the unsustainable use of natural resources, along with clarification of property rights over land and water, is not just a question of human rights, but also of survival. Where local populations are dependent on local natural resources, climate change and economic activity are damaging existing community-based natural resources management patterns. A pointed example of this is the Arctic (Nymand Larsen and Fondahl, 2014).

Women have been traditionally active in ecosystem preservation and maintenance of traditional knowledge, playing a fundamental role in environmental protection and conservation. However,

changes depicted from increased interaction with other communities, have marginalized women's role in natural resource management (OECD, 2018).

Safeguarding indigenous land and water rights has also been important for these communities, as it is linked with protecting their cultural and language diversity, and with mitigating the effects of climate change (as indigenous peoples are managing forests, which act as carbon sinks) (OECD, 2019). Indigenous women have been strongly advocating for sustainable development and environmental protection, and have been active in claiming land rights. In Sri Lanka, for example, they actively requested, and managed to get most of their land back, changing initial plans for a tourist resort project. Such achievements depend critically on guaranteeing equal access to the decision-making and to land rights (Oxfam, 2016).

The Native Women's Association of Canada, an umbrella organization for 12 indigenous women's organizations, has argued that indigenous women are more "likely to suffer disproportionate negative environmental effects from mining activities locally". They have also argued that the positive economic effects of the mining activities may not counterbalance the negative ones, unless supported by women's engagement in the decision-making processes, by more vocational education and training aligned to the cultural characteristics of the peoples and of women, and by limiting discrimination and violence against women.

According to their analysis, and despite the existing companies-communities agreements that are in place, indigenous women face a greater risk of exposure to mining-related toxic substances and climate change, because of both physiological and socioeconomic vulnerabilities, including their role in managing local land and water sources. Indigenous women generally also have less access to education and therefore do not have the same opportunities to work in the mining sector; they are most often the victims of sexual and other types of violence and abuse from people outside their communities; and they experience some of the negative effects from substance abuse from the men occupied in the sector (Bond and Quinlan, 2019).

4.0 Conclusion

Women pay a heavy price as a result of climate change because they work closest to natural resources that are affected by climate change (they gather wood for fuel, collect water and farm on a small scale).

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5.0 Summary

In this unit we have leant that:

i. Women have been traditionally active in ecosystem preservation and maintenance of traditional knowledge.
ii. Women are less likely than men to be compensated for community displacement or livelihood destruction caused by resource extraction.
iii. Women are many times more likely than men to die during disasters.

6.0 Tutor Marked Assignments

1. X-ray environmental issues through a climate and women's lens.
2. Explain why indigenous women in Canada face a greater risk of exposure to mining-related toxic substances and climate change.

7.0 References and other Resources

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UNIT 5: FOOD SOVEREIGNTY

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1.0 Introduction

Across the world, civil society, indigenous peoples and new social movements, - rather than academics or professional policy think tanks -, are the prime movers behind a newly emerging food sovereignty policy framework (Pimbert, 2009). At its heart, this alternative policy framework for food and agriculture aims to guarantee and protect people's space, ability and right to define their own models of production, food distribution and consumption patterns. This notion of "food sovereignty" is perhaps best understood as a transformative process that seeks to recreate the democratic realm and regenerate a diversity of autonomous food systems based on equity, social justice and ecological sustainability (Pimbert, 2009).

2.0 Objectives

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

- Food sovereignty;
- The ecological basis of food systems and
- Crises in food, agriculture and environment.

3.0 Main Content

3.1 What is Food Sovereignty?

"Food Sovereignty is the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self-reliant; to restrict the dumping of products in their markets; and to provide local fisheries-based communities the priority in managing the use of and the rights to aquatic resources. Food Sovereignty does not negate trade, but rather it promotes the formulation of trade policies and practices that serve the rights of peoples to food and to safe, healthy and ecologically sustainable production." (www.viacampesina.org).

3.2 The Ecological Basis of Food Systems

Geographically, most local food systems are embedded in complex, risk-prone and diverse environments, where most of the world's rural poor people live (Pimbert, 2009). These environments include mountains, hills and wetlands, coastal areas and the vast tracts of the semi-arid and humid tropics. They include the full range of ecosystems, from those relatively undisturbed, such as semi-natural forests, to food-producing landscapes with mixed patterns of human use, to ecosystems intensively modified and managed by humans, such as agricultural land and urban areas. Depending on the context, food systems may either be primarily or exclusively based on:

- Farm lands, with their domesticated and "wild" plants and animals
- Rangelands and migrating livestock
- Marine and freshwater environments and fisheries
- Forests and their many plant and animal foods and products
- Urban/peri-urban environments and small-scale agriculture and gardening.

3.3 Crises in Food, Agriculture and Environment

According to Pimbert (2009), small farmers, pastoralists, fisherfolk, and indigenous peoples across the world are increasingly being displaced from their livelihood base through a combination of factors, including:

- the imposition of inappropriate neo-liberal development models, nature conservation regimes and industrial technology that erodes indigenous knowledge and ecologically sustainable management systems based on local institutions and rights;

- inequitable property rights which diminish local communities' access to and control of the resources on which they depend for survival. Land, forests, water, plants, animals and other genetic resources are increasingly becoming commercialised and privatised commodities;

- the spread of liberalised markets in which small and medium-sized producers cannot compete with imported foodstuffs and are driven to bankruptcy. Small-scale producers in developing countries are especially harmed by competition from highly subsidised and capital intensive agriculture that produces commodities that can be sold more cheaply;

- falling prices of primary commodities, often brought about by the increased supplies that have been encouraged by World Bank/IMF structural adjustment policies and development assistance, supported by Western governments (such as increased coffee production in Vietnam);

- the withdrawal of government support linked to structural adjustment programmes which leads, for example, to the inability of small and medium farmers to access affordable credit and government services; inappropriate food and agricultural research by social

and natural science institutes that generates policies and technologies that often harm local livelihoods and environments throughout the world;

- standards for food products, production processes and food marketing that cannot be met by smaller farmers, fisherfolk and pastoralists, and international rules on intellectual property rights that can limit the ability and rights of farmers and indigenous peoples to save and exchange their seeds.

These factors also directly or indirectly undermine the economic wellbeing and survival of local food businesses (from village shops to corner stores in towns); providers of agricultural inputs (fishing gear, farm tools…); and people whose livelihoods depend on food processing and distribution (millers, butchers, bakers …).

3.4 The Environmental Costs of Modern Food Systems

Land use and biodiversity loss: More natural land has been converted to agriculture since 1945 than during the 18th and 19th centuries combined. Ecosystems that have been most significantly altered by modern agri-food systems include coastal areas, temperate broadleaf forests and grasslands, Mediterranean forests and tropical dry forests. The conversion of land for producing food, fibre, freshwater, timber, feed and fuel is a main driver of biodiversity loss in modern capital and energy intensive agricultural systems (MA, 2005).

Fisheries in crisis: Food production from wild fisheries has been affected by habitat degradation, overexploitation and pollution to a point where most of these resources are not sustainable without external interventions designed to enhance the abundance of fish stocks. In addition, escalating fishing pressure and use of unsustainable technologies have depleted fishing stocks globally (MA, 2005). This leads to an overall degradation of aquatic ecosystems.

Water use and pollution: Water is required in the production of food such as cereals, vegetables, meat and dairy products. Food production today uses about 70% of all fresh water withdrawals. Irrigation for agriculture is by far the greatest consumer of water and the diversion of more water to food and agriculture threatens environmental sustainability (MA, 2005).

4.0 Conclusion

Food sovereignty stipulates that people have the rights to define their own food and agriculture. It also supports the formulation of trade policies that promotes the rights of people to healthy and secured food.

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5.0 Summary

In this unit we have leant that:

i. Land, forests, water, plants, animals and other genetic resources are increasingly becoming commercialized and privatized commodities.

ii. Geographically, most local food systems are embedded in complex, risk-prone and diverse environments, where most of the world's rural poor people live.
iii. "Food sovereignty" is perhaps best understood as a transformative process that seeks to recreate the democratic realm and regenerate a diversity of autonomous food systems based on equity, social justice and ecological sustainability.

6.0 Tutor Marked Assignments

1. Define food sovereignty.
2. Highlight environmental costs of modern food systems.

7.0 References and other Resources

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