

**Course Name: I Think Biology**

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**Week:12**

**Lecture:62**

**W12L62\_ Nature Relatedness**

Hello and welcome to the I Think Biology NPTEL course. Today's lecture is on nature relatedness. This week we were looking at the theme of biology, society and the environment. In the first lecture we had a discussion with Dr. Suhel Quader on biology education at school and college level, attitudes within science and the use of science to answer human or societal questions. In the second lecture we had a discussion with Dr. Ipsa Jain where we looked at the relationship between art and science. How science can be better visualized through art and the use of science communication and science education. In the third lecture we did a case study on feral dogs in urban India. So as you can see these three topics are intimately connected to the theme of biology and society.

And we are carrying forward that theme by looking at the subject of nature relatedness. And why are we talking about nature relatedness? So there is an almost universal understanding or acknowledgement that the global ecological crises of climate change and biodiversity collapse arise from a distorted human nature relationship. So if we have to do something about solving climate change or biodiversity collapse we also have to figure out how do we correct this distorted relationship. And there are two levels at which we need to look at this relationship. One is as human beings and the other is as students of biology.

As human beings the ecological crisis affects us all at an existential level. And Our survival depends on the preservation of nature. And the more specific reason is that of as students of biology we are placed in the rather strange position of trying to study the very thing that is fast disappearing from our lives. So it could be said that we have a greater responsibility to understand how people relate to nature. What are the underlying reasons for this disconnect? And how can we bring about this connection and then translate that into action at various levels? I should emphasize that I am not suggesting that forging a relationship with nature is just the sole domain of biologists.

Indeed all human beings need to develop this relationship. But as biologists with our special understanding of certain topics like ecosystem functioning, trophic levels, nutrient cycling by microbes, we can help people understand by giving specific examples and show how our very lives depend upon nature and our connection to it. And then through this understanding we can help forge this connection for other people. This can also help us become better biologists and I will explain how. Very often the study of biology seems very far removed from the process that we are trying to study whether it's genetic, developmental or ecological.

And that phenomena is far removed from nature which seems out there. Now this could be a protein that you're trying to study in the lab but this protein is part of say an E. coli cell and then that E. coli cell will be foraging naturally for a carbon source in its ecosystem and that ecosystem could be in our gut or it could be outside. This protein could also be part of an olfactory neuron in a fruit fly's brain which is firing and that fruit fly could be trying to hone in on some juicy rotting fruit at our local fruit walla.

So examining our personal relationship with nature helps us put these processes in perspective and renews our reasons for studying biology. It helps us understand that we don't study biology just with a human perspective but also to figure out the great bewildering biodiversity which is out there on our planet. One way of looking at nature is through the Ecosystems Services Framework. The concept of nature as an environmental service provider was formulated and discussed by several biologists from the 1970s onwards. This puts a monetary value on different aspects of nature and research has shown that the contribution of our of nature to our economy is in far greater excess of any man-made activity.

Ecosystem services are now defined as products and processes of natural systems that directly or indirectly benefit humans or enhance societal welfare. There are four categories of ecosystem services that have been described and these are shown on the slide. But is that the only lens through which we can view nature? Should we only look at nature for its extrinsic value for what it can do for us or is there an intrinsic value to nature? Something which also contributes to making us what we are. Several prominent biologists and non-biologists have commented on this human nature relationship. As an example, E.O. Wilson who wrote in his influential book *Biophilia*, from infancy we concentrate happily on ourselves and other organisms. We learn to distinguish life from the inanimate and move towards it like moths to a porch light. Wilson's hypothesis being that humans have an innate desire to connect to the natural world. That we have an inherent inclination to be in awe of nature. As an evolutionary biologist, Wilson was suggesting that our affinity to nature was hardwired into us.

Another famous American environmentalist Rachel Carson said in 1965 at an address that she gave to undergraduate students at a college, we still have not become mature enough to see ourselves as a very tiny part of a vast and incredible universe. A universe that is distinguished above all else by a mysterious and wonderful unity that we flout at our peril. Again making the point about the interconnectedness of all things and of humans being just one part of this web of life. If we look to the east or more specifically India, we have had several iconic environmentalists who have spoken about caring for the earth starting with Mahatma Gandhi. We are all aware of his famous words, the earth has enough for everyone's needs but not for everyone's greed.

Making the point that nature can indeed provide for us and much more provided that we live within her limits. Now Gandhiji was not an environmentalist in the modern sense but his ideas on development, technology, self-sufficiency, village economy, Swaraj and Sarvodaya indeed show his deep thinking about the human nature relationship and many streams of environmental philosophy from around the world including deep ecology acknowledge their indebtedness to Gandhiji's ideas and the lines that I quoted earlier have indeed become an ethic for modern environmentalism.

Another figure from the environmental movement that I am highlighting here is Sunder Lal Bahuguna. Bahuguna Ji was who was inspired by Gandhiji was one of the leaders of the chipko movement. The chipko movement was a spontaneous action by villagers in a village in Uttarakhand to save trees from being cut down by contractors and women were at the forefront of this action.

People started hugging trees in order to save them from being cut. Bahuguna Ji was a key figure in organizing this movement after its start. He also gave us the statement that ecology as permanent economy making the point that we need to follow the rules of nature or ecology and that will also maintain our economy without damaging the earth. So this is how we have been urged to think about nature but if we look at our present day reality we find something different. We are currently in what is known as the capitalocene or the age of capital.

Capitalism is the dominant socio-economic system by which our world now functions. It defines every aspect of our lives and usually we define capitalism or understand capitalism as the transformation of money into commodities and vice versa. More recently other definitions have come about and they have included nature in the definition. So one definition is given here as capitalism is a process in which money flows through nature. So basically it is making use of nature and it supposes an infinite expansion within a finite web of life which means that it is always in an expansionary mode without thinking about the finitude of nature.

Looking at the origins of capitalism we generally associate it with the industrial revolution but here again historians have shown that the process of capitalism started much earlier and another global process was an intricate part of it and that was colonialism. So colonialism led to the establishment of a system of supply and of the mobilization of a labor force on a planetary scale. Historians now call the island of Madeira which is part of the coast of Portugal as an early case study in capitalism where many of the processes of capitalism could be seen over a span of two or three hundred years as European settlers arrived on the island and started to develop it. So I urge you to look up this citation which has been given here. I have highlighted one particular book on this topic and also a paper and I also urge you to look up these references.

Now given the establishment of this worldwide system of organizing resources and labor we need to look at some of the essential features of capitalism and these are given below and I'm sure you will recognize most of these words because they are part of our common parlance. A laissez-faire economy or what is known as the free market, limitless growth, private property, competition, freedom of choice and the associated figure shows the results of such a system in the generation of hierarchy and exploitation which has been one of the features of capitalism and I should remind you that this painting is more than a hundred years old. So what are the human implications of such a system? It gives rise to what is known as the dominant social paradigm and the features of that paradigm are the following. We value individual rights over that of the community. The individual becomes the unit of society and so we tend to think of my rights or my privileges over that of the groups.

Private property or ownership is the cornerstone of this system and is given importance over community managed resources and so this extends to natural resources such as water, food, forests, things which we normally think of as being the right of every human being and of needing to be free so that everybody can enjoy them. Since the system is built on creating demand it gives rise to consumerism where we measure the success of our lives by the goods we own or want to own at the price of things that really matter such as our relationships and finally it explicitly positions humans as outside nature with nature being in the service of human needs and wants. So this is the background against which we are talking about nature relationship relatedness and when we try and discover our relationship with nature it has to be at two levels. One is at that of direct experience and so this could be just going out and establishing contact with the natural world. Say whether you're playing at a playground, you're taking a walk in a city park, you're working in your balcony garden or more traditionally understood activities such as going on a hike or visiting a forest or a natural sanctuary.

The other aspect with which to understand this topic is that of the current economic

system which is the foundation of our modern society and the role it plays in fostering this disconnect with nature and then working to counter that actively. So that can only happen if we form networks and connections with people and organizations who are actually working at developing alternatives to the current system. Coming to more practical aspects there is active research going on about measuring the level of nature connectedness that people have. Several scales have been developed which try and measure this decidedly diffuse quantity. It should be noted that since these are subjective measures they will be extremely context specific and they need to be treated with caution when being applied to a particular group.

One such scale which is being developed is called the inclusion of nature and self, I N S. This imagines two circles, those being of the self and nature and then looking at the degree of overlap between these two circles where a complete separation of from nature will mean no overlap whereas a complete integration will mean complete overlap of these circles. And then the researcher has highlighted that there are three aspects to looking at this inclusion of self of nature and self and this is there is the cognitive aspect which is how integrated or how much do you feel nature to be a part of yourself. There is the affective aspect which means what is the concern or care that you show for nature. So this could be in terms of the plants and animals that you care for.

And then there is the behavioral aspect which is what is the motivation you have to act in the interest of nature and then this could translate into various actions that you commit on behalf of nature whether it's living sustainably, recycling, traveling by public transport, campaigning for say clean air or clean water. Another measure which is widely used is called the nature relatedness scale. This uses a set of questions for which the answers range from strongly disagree to agree strongly to determine the level of connection that you have with nature. There is much research to show that a stronger nature relatedness is associated with greater happiness for people, better mental health and physical health for both adults and children and especially for children and it also leads to ecologically sustainable behavior. Today however we are not going to look at these studies in detail but instead ask how can we go about building our relationship with nature and the answer to that turns out to be surprisingly simple.

It can be done by doing very simple actions such as just taking a walk and observing things that you notice on that walk. Now the walk can be done with a purpose in mind say you're going bird watching or you want to study butterflies or the walk could have no purpose and you just enjoy being out there. So developing your powers of observation, becoming aware of your surroundings is the first step and observing with specific questions in your mind will help you deepen your awareness. We have provided a very basic activity in the I Think Biology textbook for this purpose. Journaling or keeping

notes is a very critical aspect of this activity because it helps us to slow down and notice certain things and so I urge you to also maintain a journal when you're going out on your walk and shown here are examples from student journals where they have recorded various aspects of the walks that they have taken.

Apart from the individual level where we can continue to develop our relationship with nature there is also the aspect of the wider world. Are there any alternatives to the paradigms or to the dominant social paradigm that I spoke about? Unfortunately there are many from around the world and they have been practiced by indigenous cultures for hundreds of years. Indigenous peoples who only represent five percent of human population have been the stewards of 80 percent of the earth's biodiversity which means they have actively managed, cared for and preserved the land that they are a part of for hundreds of years and the stewardship has come from knowledge that stems from observation which are centuries old and their close interaction with nature and this knowledge is often embedded in a cosmology or a belief system which reveals the unity of life or the oneness of life and it considers nature as sacred and humanity to be a part of it. So such ways of being or paradigms are known by different names from around the world and they include things like Swaraj or buen vivir, Ubuntu which you must have heard of and I urge you to look these paradigms up. There are newer ones which have been forged and they include things like degrowth, eco-feminism, eco-socialism and much more and they all draw attention to the fact that there is inequity and hierarchy which exists in the current social economic system and then they posit alternatives that see us moving past these hierarchies and of humans existing in harmony with nature.

Many of these alternatives are documented on the Vikalp Sangam website and you should visit it to find out more about it. With that I urge you to start on your own journey towards rediscovering your relationship with nature. Thank you.