Lecture - 15
Using the UN SDG to Identify Challenges

When we started teaching biomimicry you know one of the things that you must have by now learned about biomimicry is biomimicry is used for solving human problems. And even the first time when I was speaking what biomimicry many times, I was talking about human problems, looking for problems to solve, right? Now, take my students.

If I tell them go and use biomimicry to solve a problem, or if I ask you to go ahead and use biomimicry to solve a problem, what will you tell me? What will you ask me? You ask me, what is the problem I have to solve? And I would not know what to say. but I will tell you a problem to solve, right? So, I cannot just say teach you biomimicry without telling you.

So, it is like saying, please come to our house tomorrow, 10 of you come to my house, and you help me generate ideas. You will say, okay. All of you come to my house. And I say okay now generate ideas. Give me solutions. You will say what, give you solutions? What will you say? Yeah, we will give you solutions, but about what? So, therefore, you will notice that all solutions require a problem to be solved.

You cannot have a solution without a problem being solved. So therefore, if biomimicry provides you with solutions from nature, what is the problem you have to solve? Absolutely logical, right? And that is something that most of us forget most of the time, all the time, that for creativity, for solutions, you need a problem. And I will tell you what, one of the most difficult things in the world is looking for a problem.

Looking for a problem, I used to work with a company, and we decided that we will use creativity. And so, we called all the top leaders and we said okay, from tomorrow from next month, we are going to be doing a lot of solutioning, lot of creative

solutions. We all said okay. And we said next meeting, you come to us, and you say what are the three problems you have that we need to solve together.

You would not believe they struggled a lot. They struggled to find out what the problem is. So, what human nature is, if I give you a problem, you will readily come to a solution. But if I say give me a problem to solve, which is important for creativity, you will not know what to do. Same situation you will be in, right? You have learned some biomimicry.

You have learned that in biomimicry, the solutions come from nature. You have learned that in order to do that you can pick up the solutions and solve problems. Now you want to apply biomimicry. Therefore, what do you need? Shiva is going to teach me how to apply, how to get the solutions.

But now I am telling you, I need a problem. What is the problem you want to solve? Tough, right? Okay, not so tough, because I am going to introduce you to 17 problems. What, 17 problems? Yes. I am going to introduce you to 17 problems that are world problems. I am sorry what, world problem? Yes. 17 problems that everybody, every nation in the world faces.

And I am going to ask you to choose one. You would have already noticed it, right? In all the presentations, you have noticed that people are presenting some problems and they are saying this is how we solved it, which is what we are going to learn now.
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UN Sustainable Development Goals (UN SDG

You are now going to learn about the United Nations Sustainable Development Goals. We will explain to you in a very basic way and then of course, it is your job to go and read it in a deeper sort of way. But right now, what do you have in front of you? You have 17 problems to solve. 17, do not worry, you are not going to solve all the problems.

You just have to solve one in this program. So, what you see in front of you are 17 problems over the next 10 years that must be solved by every country in the world. Because these are common problems to all the nations in the world, some beautiful problems, very beautiful. Very, you know emotional problems.

Every one of them is very well thought out by a body of people who say, these are the problems we need to solve. When we started teaching biomimicry, we were happy to have stumbled upon this. This is probably the only program that connects the UN SDG to biomimicry. And for us, it is a proud moment, the four of us who are teaching this program.

It was a very proud moment that we were able to look at the UN SDG and be able to say, now we can connect the two. Because you see, now the students do not have a problem, none of you have a problem. Because each of you can choose one of these goals, one of these challenges, and look at these challenges and solve it. So my task now is very simple.

For the next maybe 10-15 minutes I am only simply going to inspire you to take up one of the goals, which means what? Which means I have to tell you something about the goals, right? I attended some programs on the UN SDGs. Extremely difficult, extremely difficult to sit through them. I am not going to punish you like that. I am going to make it very simple for you to go through them.

But please bear with me. You must have some understanding of the goals before you actually choose the goal. So, your task is to understand the basics of the goals, why they are there, what they are about, how they are constructed, and how they are designed. And then use one goal, just take one goal for this program. Use one goal for this program, pick up one goal.

And you use biomimicry. Look at the process of biomimicry to solve that problem. So let us assume you choose good health and well-being. So, you have chosen good health and well-being. When you choose good health and well-being, you will pick up the problem of good health and well-being and you will use the process of biomimicry.

You look at the lessons of biomimicry, you look at the lessons of nature to solve the problem of good health and well-being. That is it. But unless I tell you how to read the goals right, how to go deep into the goals and look at the goals, how will you be able to understand the goals? So just bear with me, please. And just listen to what I am saying. Take notes.

We will also take you through the UN SDG website in a very detailed way so that you are able to understand this much better, okay? So just look at these goals for a minute. There are 17 goals. No poverty. And beautifully drawn right, beautifully drawn. Many of you can use it in your WhatsApp photograph. So, no poverty. Zero hunger. Good health and well-being.

I hope you are starting to say what am I connected to? What resonates with me? What is it I am starting to say I want to solve? Which goal do I want to put on my CV to say I am solving this problem? Which goal do I want to tell everyone I am solving? That

is what is called the emotional connection. What is the goal that you think you can solve.

That you can work day and night sacrificing everything just to solve the problem. Can you imagine who you can become if you can pick up one goal and dedicate your life to that goal? You know I have always believed every one of us is capable of winning the Nobel Prize, every one of us. You just have to want to win it. That is all.

Creativity is about willingness. What do I want to do? I want to be creative. I want to solve the problem. Okay, so no poverty. Zero Hunger. Good health and well-being. Such an important problem, no? Look at what happened during the pandemic. So important to understand that goal. Quality education. Again, huge problem. Look at the disparity. It would be nice if everyone is educated in an equal sort of way, right?

So beautiful it will be. And all these goals help to make the world so much better. Gender equality. One of the more popular ones at IIT Madras, gender equality. Clean water and sanitation. Again, very important. Affordable and clean energy. Of course, this is one very popular goal that a company is being built around it. Decent work and economic growth.

Industry, innovation, and infrastructure. You do not have to know all the goals by heart. Just have to find out which goal you like. Which goal you want to work with and then go deep into the goal. So, we are not going to memorize, we are not going to ask you to memorize the goals. That is silly. I am just reading it so that you start to get familiar with the pictures, the color.

You know the next time you see, that is the goal, right? Suppose I take off all the print from here, you know oh, that is the United Nations Sustainable Development Goals. It should become part of your speech. What are you doing? One of the things I am doing is to solve the UN SDG. How does it sound?

How does it sound? Sounds nice, right? At the end of this program, you go and tell your neighbor, hello, yeah, I am you know what, I am going to solve one of the world

problems. How does it sound? To reduce the inequalities. Sustainable cities and communities. Responsible consumption and production.

You know when we taught, when we were teaching the schools right, maybe I did not tell you, but I will, our experience with teaching children biomimicry. This was the goal all the children wanted to, were able to relate to. Because even today okay, even today, such a shame, I had lunch. And I am sorry to say I could not finish the rice on that plate.

I just could not finish. How much can I eat? How much can I eat? So, I had to throw away half the rice. I am so ashamed to say that. But so tragic, okay. Right in front of where you have to throw the food, there is this counter that constantly measures the waste. So, you know, suppose when you go there, it is 5 kilos. And then once you put the food in that bin, it says 5.2.

Then you know that because you have contributed 200 extra grams to that weight. Makes you feel bad. So responsible consumption and production. Climate action. Life below water. Wow, beautiful, no? Do we even bother about life below water? All we know is life above water. There is such a world completely different out there, right? Life on land, which all of us are familiar with.

Peace, justice, and strong institutions. And partnership for the goals. Partnership is a beautiful word, right? It immediately evokes positivity, partnership. Why are two people partners? What is the meaning of partnership in entrepreneurship? When two people get together because both of them are strong in something or the other.
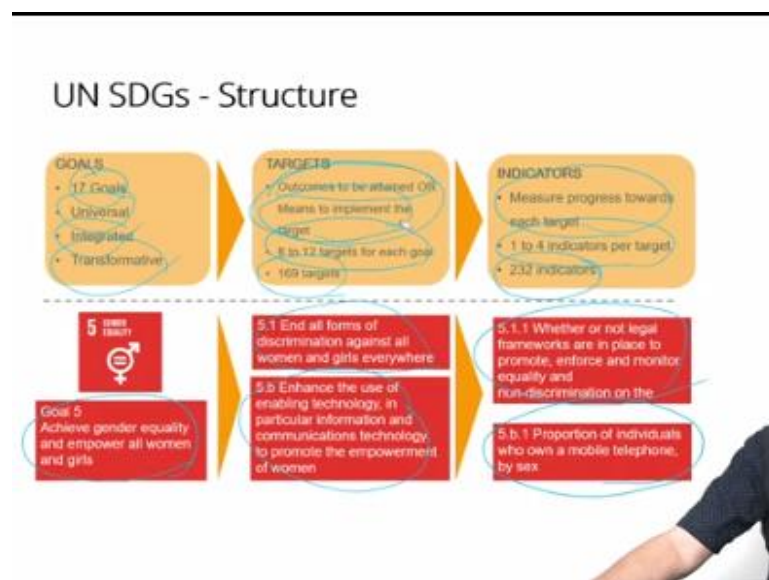
So even if I am weak in accounts, but I am good in selling, and you are good in accounts, and not so great in selling, the two of us become partners. I sell, and you do the accounts. So, partnership for the goals. How do we partner with all the nations to achieve these goals? I do not know who thought of that. Normally if I was doing this, I would have stopped at 16.

And I love that because when I did my project, I used that as the problem I wanted to solve. How does nature make partnerships happen? That is the question I asked.

Alright, so now you have a fair idea as to what the goals are. This is common to all of the world. Very well-thought-out goals. Each goal is a deep study. Right now, we are saying there are 17 goals.

And now you can start to choose and all that. Before you start choosing let us see a little more about the goals, just a little more. Not too much, right? Do not run away from this, please.

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Okay, now that you have learned what the general UN SDGs are, let us look at the structures. It is always nice to learn a little more deeply about the structure. And let me use the pen. So, there are 17 goals, that is clear. Universal, all over the world. Integrated, we will see how. And transformative. I am sure many of you already know. See, achieving.

What is the meaning of transformative? When you achieve these goals, it transforms the world. Imagine a world where quality education for everyone. Imagine a world without hunger. Imagine a world without poverty. Transformative. Targets? Every goal has a target and an indicator. What is the meaning of target? Target means what are the outcomes to attain.

It is not so difficult to understand, right? Outcomes to attain or means to implement a target; outcomes or means. There are about 8 to 12 targets, which makes it easier for you now. You just have to pick up a target and solve that problem. Let us see how.

There are totally 169 targets. Indicators are, so just, when you have a problem and you are given a target, you should know how to achieve it, right?

What is the measure to achieve each target? How do you know that you are achieving it; measure. You start with 0. Oh, I have achieved so much, I have achieved so much. Measure to achieve. And there are 1 to 4 indicators per target, totally 232 indicators. Just numbers, that is all. Just to tell you how it is structured. For instance, take gender equality.

Let us assume you take gender equality as a goal that you want to challenge, that you want to achieve. What is gender equality? The goal is defined here. Achieve gender equality and empower all women and girls. This is the large goal. Achieve gender equality and empower all women and girls. What are targets? There are two targets. One is, here in this case there are 2 targets.

5.1: end all forms of discrimination against all women and girls everywhere, a huge target, huge target. Enhance the use of enabling technology in particular information and communication technology to promote the empowerment of women. Target. What are the means? Means is whether or not there's legal framework.

So therefore for 5.1, the measures are, the indicators are, whether or not legal frameworks are in place to promote. So, therefore, you want to achieve the target of there should be no discrimination. How will you measure it? Suppose you go and say I know there is no discrimination against women. I have achieved it. What is the measure?

What is the measure that you have? Then if you say I have established legal frameworks to promote, enforce and monitor equality and non-discrimination, then we will say yeah, very good, excellent. So, target, indicator. Similarly, target for enhancing the use of enabling technology. The proportion of individuals who own a mobile phone, mobile telephone.

So therefore, when you want women to use technology, and you say that is the target you have to achieve, then the question is what is the measure? The measure is the

number of individuals who own a mobile phone by sex. So, therefore, before I started looking at this goal, I had only two girls owning a mobile phone out of 10.

Because I worked to enable the use of, you worked to enhance the use of enabling technology, I now have enabled, because of the technology I have brought in, because of my innovation, I have been able to get about 7 girls out of 10 to use mobile phones. Now you know I just want to point out one thing here, right? Now there are two types of targets.

You will notice, right? It says 5.1 and it says 5.b. What does it mean? So, when you say 5.1 it is the outcomes, the targets that are outcomes. When it says 5.b it is the means to implement the target. So, both of them are under target. One target means what is the outcome. What do I need to achieve. What is the outcome to be attained? The second is the means to attain.

So, therefore, ending all forms of discrimination against all women and girls everywhere is one outcome target. Enhance the use of enabling technology, in particular, information and communication technology to promote the empowerment of women. Enable it, okay simply short it means to enhance the use of enabling technology. The minute I say that, it is a means to achieve, right?

So, means to implement or outcome to be attained. Now outcome to be attained, there is a measure for it. So, when you say 5.1 it is the outcome. 5.1.1 is the measure for that outcome. So here, it is whether or not legal frameworks are in place. That is the measure for the outcome of 'end all forms of discrimination'.

For the means of 'enable the use of technology' the measure is the proportion of individuals by sex who own a mobile phone. So simple, right? So, 5.1, when it is 5.1 it is the outcome to be attained. When it is 5.b it is a means to implement. When it is 5.1.1 it is a measure for the outcome. When it is 5.b.1 it is a measure for the means. Clear? Absolute.

But you do not have to really you know; this is just to familiarize yourself. The real challenge is what is the goal you want to choose? Once you have chosen the goal,

when we take you through the website, you will be able to negotiate the website and read a lot about the goals.

The more and more you read about the goals, the more and more information you have about the goals, you will be able to find out what is the problem you want to solve.

Sustainable development. UN SDGs dimensions are sustainable development. No, just to read through. So, what is happening is, okay the more important thing is the second paragraph. Okay let us, why do we not do one thing, let us just look at sustainable development, do not get bored, just look at it. Development that meets the need of the present without compromising the ability of future generations to meet their own needs.

So therefore, when you do something now, you meet the needs of the present people. But you do not do anything to harm the ability of future generations to meet theirs. So supposing you say that if I put fertilizer in the land, I will have some great crops over the next 100 years.

Or the next 50 years, the crop will be so nutritious, that particular fertilizer. But when you put that particular fertilizer, you will have great fun for 50 years. At the end of 50 years, all the land in the world will go dry. This means for generations that start to live their life after 50 years, there will be nothing to eat. Is that okay? No.

So, you take care of your needs, but you ensure that the future is also taken care of, which is sustainable development. So beautiful, no. So beautiful. So altruistic, at the same time, caring for oneself. Everything is contained in that. That word sustainable development should be some byword for you from now on. You should be using it more often, and understanding it. So here are the goals, what do they do?

Look at what they have done. They have harmonized three core elements. What are the three core elements? Economic growth, all of us need to grow economically, we all want money. Social inclusion. We always feel bad, right? We always feel bad when we are excluded no? There is exclusion everywhere. And all of us are trying to overcome that, right? We all want to be included.

We do not want to exclude. We do not want to be excluded. So why should we exclude anyone? And environmental protection. You know actually, to be honest, when I was in college, there was this word environment protection did not even occur anywhere. We did not even learn too much. Only now because of the damage that is being caused. So, every time we learn something new, it is because of the context.

It is because of what is happening in the world now. You cannot learn how to protect the environment. So, all the goals are encompassing all three core elements, the economic element, the social element, and the environmental element. And look at this last line, build an inclusive, sustainable and resilient future. Resilient means coming back, bouncing back.

What is resilience? Resilience is someone who fails, he is able to get up and start all over again. You say he is very resilient. So resilient future for the people, resilient future is a future that can bounce back from the present, bounce back from a problem. So that is the goal. Can you, you have beautifully drafted, right? I am sure even if you started saying, oh no.

What am I doing reading the goals? Suddenly you are waking up. You are saying this is part of my life. This is my world, my earth. So why should you not be interested in

this? And this is something that has been constructed by someone and handed over to you. All you got to do is pick up a problem and use biomimicry to solve that problem.

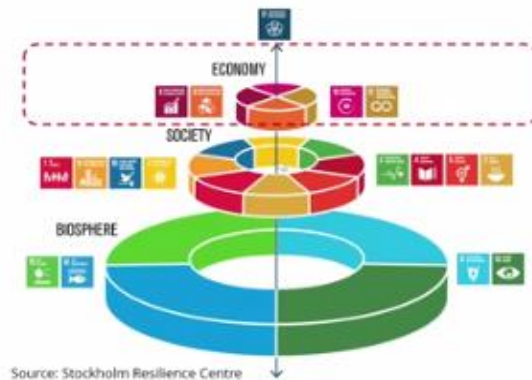**(Refer Slide Time: 25:02)**

Alright. Look at how the goals are arranged, right? So, it is called the nested model of sustainability, nested model. Nested model means, what is the meaning of nested? Nested means one inside the other. You may have seen these dolls right, one doll inside the other, a nested model of sustainability. So, there are three sections we notice, right? Economy, society, and biosphere.

So, this economy is divided, so the nested models are the three the economy, society, and biosphere. The economy is at the service of society. And society, the goals for society are within the boundaries defined by the biosphere. Do not worry about it, let us look at it once again. So, the three circles that you saw in the last slide, right?

The three circles are economic growth, social inclusion, and environmental protection. So, the economy is at the service of society and society within the boundaries of the biosphere, right?

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Economy – 4 Goals

Source: Stockholm Resilience Centre

So, for the economy, so totally how many goals? 17 goals. Leave the last one out, partnership of the goals leave it, so there are 16. For economy, there are 4 goals. We are just, you know what we are doing, right? Now it is very clear to you what we are doing. Simply taking up each goal. We started with 17. Then we said what are the goals about? Why the goals at all?

And then we said there are three aspects to the goals, economy, society, and biosphere. And now we are taking up each of those things and looking at how many goals for each of them, that is all. So how many goals for economy? There are 4 goals for the economy, that is all.

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Economy - UN SDGs

So do not, you can read it at leisure, I am not going to read it. So, the 4 goals for the economy are goal number 8. Goal number 8 is decent work. Goal number 10, reduce. See how it makes sense, right? Both decent work and reduced inequality go towards economy, and are linked to economy. Industry infrastructure is naturally linked to economy. Responsible consumption and production, are linked to economy.

So, economy there are 4 goals in the economy section, if you want to know, if you want to call it. And then what was the next one? Naturally, society. Society there are 8 goals. Eight goals in the realm of society, connected to society, 8 goals. Brilliant, right? Naturally.

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When you say even if it was not there, I will say okay, end the poverty. What will it affect? What is it about? You will say society. Zero hunger, what is it about? Society. Goal number 1, goal number 2. Goal number 3, is good health and well-being. What is it about? Society, for society. Number 4, quality education. What is it about? Society, right?

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Society - UN SDGs (II)

And number 5, gender equality. Naturally, society. Number 7, affordable and clean energy. Economy, society. Economy, society. If you look at the definition, definitely society. Ensure access to affordable, reliable, sustainable, and modern energy for all. I think the clincher is all. Make cities and human settlements. Naturally, society. Promote peaceful and inclusive societies for sustainable development.

Provide access to justice and all. Naturally for society. Justice for all, right? So, what is next now? We finished 8 plus 4, 12. Four are left. Four are biosphere, connected to the biosphere. I am sure, okay guess, biosphere. Naturally, life under water also.

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Biosphere - UN SDGs

So therefore 6, clean water and sanitation. Ensure availability and sustainable management of water. Biosphere. Climate action, goal number 13. The whole world is

working for it. But I like the words okay, take urgent action. So go ahead and see to it that all the wasteful electricity in your house is switched off. Start.

Start by taking action individually, right? The change, you must be the person who changes first. Who said that? Mahatma Gandhi. Life on land. Protect, restore and promote sustainable use of terrestrial ecosystems, life on land. That we are all used to. And my favorite, not because everything else is bad, but because life under water is something that when I read this, I said, wow. I have not even thought about it. Life below water is a biosphere-connected goal. That is all. So, 4 economy, 8 society, 4 biosphere.

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And finally, partnership for the goals. Strengthen the means of implement. I had great fun using biomimicry, finding out what solutions biomimicry has to offer for the partnership for the goals. It was a personal project. Unbelievable. The number of solutions I got, I never thought that nature would give me solutions for solving partnership for the goals.

When I present my personal project to you, you will understand. So that is the UN SDG 17 goals, nested model, right? Economy, society, biosphere. 4 goals economy. 8 goals biosphere, 8 goals for society. 4 goals biosphere. I hope you have corrected me, I hope you corrected me when I said, when I made a mistake. That shows that you are on your feet.

If you did not, that means you are not on your feet. So, get on your feet now. You have big tasks to do. You have a huge task in front of you. Imagine you are now on your shoulder, on your strong shoulders rests the weight of the world. Such a beautiful thing to have. What a great purpose in life, to be able to say I individually can work towards one goal.

And I have a friend of mine, right in front, nature my teacher who will teach me how to find a solution for that challenge, for that goal. How can this object be anything other than interesting? Any other adjective you use, you cannot, right? So, what you have learned is United Nations Sustainable Development Goals. Why did you learn them?

Because you need a problem to solve. That is how we started, right? You need a problem to solve. You will now choose a problem. You will now choose one of the problems and you will learn how to do biomimicry. Have the problem in front of you. Actually, you know what you should do, once you choose the problem, write down the problem in big bold letters and stick it on your wall so you see it every day.

And read more about it. You talk to people about it. Whenever you read the newspaper, you look for a problem. Does it exist in the newspaper today? Is there anything in the newspaper that talks about life under water. Then you will find that particular fish is disappearing. You say oh, that is the goal I want to solve, right?

They are talking about my goal. My goal is life under water. What is it? And you read it more. And suddenly they will say that a coral reef is disappearing. You will say wait, that is my subject, life under water. And that is how you start getting interested. And if the average age of this class is around 21, 22 and if all our lifetimes, expected lifetime is 80, you have 60 years to solve the goal.

You do not have what you have. And you can be proud, right? I have asked all my students to put the goal on their CV. So, when the person who is employing you looks at you, he says oh, great! This person is solving a world problem. Alright?