SDG 14 Life Below Water Transcription

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**Introduction**

Good afternoon good day and good morning no matter where you are and today is another session on the SDGs and it's very exciting to have Professor David Smith to be with us. This is introductory lecture for the whole topic about 2030 Agenda.

**Speaker**

And let me say a few words about the lecture today Professor David C. Smith, he’s Coordinator for the Institute for Sustainable Development at the University of the West Indies, I will tell you a little bit later about the university. My name is Lichia Yu and I would be the interviewer and accompany Professor David Smith on this lecture tour.

A few words about David, he's one of the Author of The United Nations Global Sustainable Development Report 2019, it is a very important report because it reviews what has happened, progress made, challenges encountered of the first four to five years of implementing 2030 Agenda. He is also a member of the Science and Policy Advisory come up to establish the Jamaica protected area system, was President of the Caribbean Conservation Association and a Regional Counselor for IUCN, which is one of the oldest world conservation unions. As the Assistant Resident Representative in the UNDP multi-country office in Jamaica, he led the climate change, environmental management and the disaster risk management portfolio for the multi-country office in Jamaica.

So you could see that David has a vast amount of experience and insights in terms of this particular SDG Goal 14 Life Underwater.

**The University of the West Indies**

Before I went into the subject matter of the day let me say something about University of the West Indies. It is one of the most important universities in the region, it has campuses in four different countries and also has developed even before the Covid online presence. It serves 14 countries scattered around the Caribbean islands and has 50,000 students, his institute focuses on science policy interface in climate and energy cities security and safety and the last one is environment and disaster management. And in other words, the work of the institute is very much in the direct development of evidence to support policy making especially related to the implementation of SDGs.

**Lecture Overview**

With this word I would launch today's lecture on the SDG 14 Life Underwater by Professor David Smith. So this is the content of the lecture first we will explain what is the SDG 14 and then go into the more specifics about challenges progress and what young people can do in contributing the realization of this particular goal.

**Q1a**

So let me ask you David the first question, tell us **what is SDG 14 and why should we bother with it.**

**Linkages to other goals**

Thank you very much Lichia very good question. One of the things we point out in the Global Sustainable Development Report for 2019 is that many of the goals are linked to each other. And if you pursue just one goal and forget how it's linked to the other goals you can sometimes go backwards instead of forwards. So Life Underwater which is Goal 14 has a strong positive influence on other goals, we are very much of course involved and interested in trying to reduce poverty around the world, we are very much involved in trying to reduce hunger around the world. And Life Underwater, life particularly the oceans makes a very strong contribution to reducing poverty and alleviating hunger and providing food for many millions of people around the world. As a result, it's also providing decent work and economic growth, there's 60 million fishers around the world who get their income and their livelihood from working mostly on the oceans and a few who might also be working in fresh waters as well. Many major cities around the world are on the shore of the ocean and they influence the ocean and are influenced by it. They were placed there as major cities because they were at the side of the ocean and this contributes to the well-being and livelihoods of the people who live in those cities, the ocean also has a major role to play in climate change and that's something which will come up several times as we speak. If you could show the next slide please.

**Linkages to other goals**

Now this is the other way around what is it that influences life underwater. There are goals which influence life underwater and how we progress on those goals will affect life underwater and then make of other effects as well. How we deal with water, we need fresh water for agriculture we need fresh water for food for drinking for our daily lives. How we manage that water and whether we take good care of it particularly after we've used it profoundly influences the quality of the oceans so if we pollute water and then allow it to run into the ocean then we have created a problem.

So many of us may say well I don't live anywhere near the ocean but if you live near a river you need to bear in mind that what you do to that river will eventually end up in the ocean. The way in which we use energy contributes to climate change and climate change has a profound influence on the ocean. The cities and communities we live in many of those might be near the sea, some may be near rivers how we pollute and whether we pollute, how we deal with our waste products whether they be solid waste or byproducts of industry or whether simply it's the byproducts of our going about our daily lives may profoundly affect the ocean.

An example of that is that scientists in Spain and Portugal have recently found clear evidence that microplastics that's plastics that are part of products that we use things like deodorants and various other things and the byproducts of plastic that we've thrown away have ended up in our diet.

The reason being they went into the water then to the sea, fish ate them, we ate the fish and the Plastics ended up in us so we need to be very aware of how we influence life underwater.

And then of course climate change with acidification, what is that? climate change is caused by the different gases which we put into the atmosphere and particularly carbon dioxide, carbon dioxide gets absorbed by the ocean and as it's absorbed by the ocean it acidifies the ocean as well that has a profound effect because it makes it difficult for larval fish whether they be bony fish that we eat or crustaceans fish with shells, the acidification of the ocean makes it difficult for these animals to develop and this means that we will have less and less of them as time goes on so we have to be very careful about how we treat the ocean. Next slide please.

**Q1b**

Then **what can SDG 14 do? What kind of targets what kind of indicators the policy makers have put together so that we can actually follow and make progress on this?**

**Targets**

Very good question. As you may have guessed one of the first thing we want to do is reduce the pollution of the ocean, there's way too much man human made that say junk or waste products and so on which just end up in the ocean because we are very lazy about the way we dispose of our waste products and garbage. We used to think of the ocean as a vast almost infinite place where you could do anything but no it's not infinite

and it's free

yes it's free and we put a lot of things into it so we want to reduce pollution we want to manage the ecosystems of the ocean whether they be coastal or deep ocean, we have to start managing those better because we are doing a fairly poor job right now of managing them. We definitely have to address acidification for the reasons I mentioned already and we need to look at fish. How are we managing our fishing?

Are we making sure that poorer people that artisanal fishers have good access to the fish stocks that will feed millions and millions of people mainly in developing countries? Or is it that the developed countries are able to go in with modern equipment and grab all the good fish and take it away and that may leave communities near the sea out of the food that they need? On the next slide we talk about protecting Marine areas.

**Targets**

We need to conserve larger areas of the marine space so that animals and plants can thrive there and then possibly move out to populate other areas. The economics of the way that we deal with the oceans is wrong, we've treated it for most of our lives as if it was free and open and almost infinite and as a result we've created numerous problems. Now to fix those problems we have to fix our economics as it relates to the ocean, it also means we have to look at small island developing states who use the oceans an awful lot in terms of fisheries and well as tourism and make sure proper economic benefits come to those islands without having the problem of destruction of the parts of the ocean which support those economic benefits.

All of that takes science, we have to really understand the role of science and the role of science is to help us to understand evidence to help us to understand the way in which the oceans actually work so that we can increase equity for small-scale fishes. And we already have a law called the UN convention on the law of the sea that's already in place and it's a great instrument law for all the countries of the world to get together and put in place the different provisions of that law so that we can make sure we take care of the oceans. If we don't do that we're going to see it get worse than it is

and that would not be a good situation, definitely would affect the well-being of many people on the planet.

If I remember correctly the law of the sea also sort of defines the rights of the country in terms of access and use of ocean resources isn't it?

Yes and it sets for example the limits of those resources how far away from your shoreline can you consider that to be your resources and then where are the resources that the world would consider to be the technical term is beyond national jurisdiction but those are the common resources those are the resources which we all share and because we all share them we have to be very careful about the way we manage them.

**Q2**

Yeah well it's very interesting, some perhaps we could sort of reflect and ponder a bit into almost eight years now since 2016. **Are we making progress in terms of trying to restore or safeguard the ocean? What are the challenges that has been confronting human societies?**

**Progess?**

I think we've made some progress but at the same time we have to remember that we are quite far back in many of the areas of ocean management.

Since 1870 we've managed to damage 50% of the wheat coral reefs that we have and that's not good because a quarter of the species that live in the ocean live in coral reefs so we are probably familiar with the Great Barrier Reef in Australia it's the longest Barrier Reef in the world, some of us in the Americas are aware that there is another Barrier Reef on the east coast of Belize which is the second longest Barrier Reef of the world. These are extremely important ecosystems they have all kinds of animals and plants living there and they're very important for the people who live near them but we have been destroying them.

Part of the destruction is because the temperature of the ocean is rising, part of it is because we have been building coastal developments all ironically many of them for tourism so that people can come and lie on the beaches which are created by the coral reefs. And also because of the way in which economics has worked because sometimes we have not managed our fisheries very well we have overfished the coral reefs and when you start disturbing the ecosystem and removing too many of the fish, the reef themselves suffer as well and the whole system starts to degrade.

In terms of other concerns about 1/3 of fish stocks are not being fished sustainably now that's in a sense good news that 2/3 of fish stocks are being managed sustainably but we do need to pay attention to the third that are not and that means we need to manage those, we need to learn more about the fish stocks, we need to learn who's doing the fishing, where do the fish end up because often what happens is that the people who do the fishing aren't necessarily just fishing for people in their villages or in their towns or communities, those fish may end up thousands of miles away.

And the economics of that the way in which fish are moved around the world and the demand for fish in distant countries is often a driver in unsustainable use of fish stocks. And we can think of high value species such as like tuna for example or lobster the demand for these often originates very far away from where those animals actually develop. If we look at the next slide.

**SDSN says:**

It's a concerning if people go to the Sustainable Development solutions networks index and dashboard, you will learn a lot about how well we are moving forward on different goals of the SDGs and you can go and click on the different targets and see how well we're working on those targets as well.

This is the overall picture of SDG 14 and all the red, the yellow and the orange are indications of where challenges still exist. What's missing is green, countries go green when they have matched the SDG and you can see there's no green there unfortunately, everybody still has challenges.

Now if you go down below this level and look at some of the targets then there's one target which has a lot of green and that is that when we look at the threats to biological diversity caused by exports and imports, we're doing reasonably well there. There are a lot of green countries but overall for how we would like to manage the oceans which is most of the planet. As you can see from this we're not doing well, the reds are severe challenges, the oranges are major challenges, the yellows are challenges that still remain and the green which you can't see is we've met the goal so overall the world still has a lot of work to do.

The gray countries in this map are those countries which either do not have a coast, they're landlocked or they don't have enough information where we could be able to figure out if they are doing well or not so unfortunately the picture is not the way we would like it. It's actually completely the opposite of what we would like so we need to pay a lot more attention to this goal especially if we recall what we said at the beginning how much it influences other goals like feeding people and making sure that they have sufficient food that they're lifted out of poverty. The ocean plays a major role in those goals and we are not managing it well enough to be able to get the contributions we need from the ocean to address those goals.

Yeah it seems to me it's a very difficult task isn't it. Looking at this map one is that so many countries are implicated, everybody has to do their bit in terms of not allowing emission of the waste into the ocean.

Second that is the economic dynamism in this so there's a supply and demand and so there's a market mechanism that has to be looked at.

And third there are so many territory which belongs to nobody right so who should spend the money and the resources to take care of it, I think this is this is really a big dilemma.

Yes it's very much a dilemma, particularly as you mentioned those resources beyond what we sometimes refer to as the exclusive economic zone or the 200 mile limit sometimes people call it but yes those marine resources which exist outside of countries territorial waters and also those marine resources which we refer to as migratory or straddling fish stocks. I remember when I first went to a meeting in IUCM and they mentioned this and I thought well that sounds like a really interesting name but what does it mean and it's very simple.

Fish tourism

Exactly the fish don't stay in necessarily in one place and grow up in one place and become adults in one place. Turtles are very good at migrating around so they will be born on a beach somewhere in the Caribbean and then migrate to where the food is and then eventually when they become mature they come back to that beach. There are tuna and large fish we call them pelagic species that just move around and sharks they move around whales move around. A lot of the ocean species just move around to wherever they can find the food or the other resources they need because there are no borders there and they've been doing this for millions of years. The problem comes well who owns these resources? Well nobody really owns them but if you are a country where the young larvae of a fish are developing, your actions in managing those parts of the environment may have a profound impact on another country which catches that animal when it becomes an adult.

And so we have a shared responsibility not just because we like to say that we're all here but because literally the biology of many species which support life, which supports human well-being don't simply exist in one exclusive economic zone, the animals don't care about countries, they care about where the food is, they care about where the resources are and they move around to those resources and we as a whole need to manage those resources properly so that we can continue to see benefits from the ocean.

It seems to me the institutions that we set up for the purpose of protecting the ocean, protecting the fish fishes are too rigid to cope with the mobility of the fish. Maybe this is a little bit beyond our lecture.

It maybe but you're quite right. We're the ones who invented the countries and the islands and so on, we didn't create the biology of the species that we're interested in. And as a result I think what has begun to happen more and more is countries are beginning to realize that you have to manage resources with other countries. And so for example we see things like Regional Seas Agreements where we understand that the biology of say spiny lobster in the Caribbean that the animals are spawned in the eastern part of the Caribbean and the larvae make their way steadily westward and eventually they will settle and grow up but if you don't manage the entire Caribbean from the east to the west then you're not going to see the species prosper. And the same occurs in the Pacific and the way in which we would want to manage say tuna or dolphin or wahoo or mahi-mahi all these large fish which move around, we've got to come up with more enlightened ways of managing them that goes beyond national jurisdictions, goes outside of national jurisdictions and cooperates with other countries even if we don't like those countries very much. Because if we don't the biology will simply come to bear and we will start wondering what happened to all those fish that I used to eat.

**Q3**

Yeah so in a way you we already sort of went into the **challenges in implementing this SDG 14** so perhaps say a few more words especially about some of the tragedy of the comments that you touched on.

**Key Challenges**

Yes one of the entry points for transformation to meet the goals the Sustainable Development Goals that we mentioned in the Global Sustainable Development Report is what we refer to as the global commons. Those are the resources that support life and human well-being on the planet but aren't necessarily owned by either any particular individual or any particular group of people or any particular country. And the ocean is a very good example of that. Most of the resources within the ocean are not owned by a particular country. Now that's good in one sense and bad in another because it's good because it means anybody with the means can go out and go and fish and come back with valuable food to feed their communities their countries and so on. It's bad in one sense because if nobody owns the commons then nobody takes care of them and it often means that everybody uses them and so everyone is going and taking out but nobody's putting back. And so because of the way in which we manage the commons, we see a problem that they are being degraded because while we all use them nobody's gotten around to maintaining them, we go out there and we take out fish because well there are plenty of fish and there'll always be fish except that that isn't necessarily true.

If we don't manage the commons properly, we will see degradation and we're already seeing degradation if we recall about a third of the fisheries that exist aren't being managed the way they should be and they're being degraded and they're not managed sustainably.

So we have to come up with better ways of seeing the commons better ways of managing them and changing our attitudes so that we add to the this has great value for me. If it has great value I should also be helping to maintain that value so that we maintain that value for a long period of time and that's why I say the economics are bad.

We often don't value the commons, wefor example in economics we tend not to value goods that we don't have to pay for that's not good because if we don't ascribe a value to it even though we are getting value from it, it's likely that the value will eventually erode. And we need to include in our economic models ways of measuring values of things which we previously took for granted because they were all there and there was plenty of it. We need to be changing the way in which we use our economics and coming to grips with the fact that yes they do have a value and they're not infinite.

So we don't have all the regulations and we don't have all the economic models that we need to deal with the ocean and there are different ways of looking at how we would manage the ocean and we need to come together as different countries within the world to figure out how best we do that. But in addition to that and this is a not just a problem for small island developing states but there's a problem for many of the tropical countries and developing countries. Our ability and capacity to enforce is relatively limited, for many countries the exclusive economic zone is very very large compared to the size of the country and so the ability to go out and patrol to stop people from coming into your countries, waters and taking out valuable materials is limited and so we need to look at that.

That raises the question of equity, how do we ensure that there's equitable access to the important resources of the sea for those poorer people who find that access to artisanal fisheries is important to feed their communities? How do we make sure they continue to have access? How do we make sure that they will always be able to go out and catch fish that they need to feed their children? And as well going back to that one of the first things we mentioned has to do with waste and waste disposal. We cannot keep using the ocean as an infinite garbage bag, it's not, it's not infinite and it's not where we should be putting our garbage.

As I said earlier we are now starting to eat the microplastics that we put in several years ago they're now something that is part of our diet, we need to stop putting waste into rivers and just simply putting it onto a barge and sending that barge out of sight and then dumping it beyond the horizon. If we don't do that then we're going to continue to see problems with life underwater.

Yeah see to me that what you're saying is that we also need to change a bit of our mentality about sort of a one is sort of have a broader perspective in terms of how our behavior or lifestyle impact our environment, other people and the total ecosystem but also operating in a more collaborative as sort of a style more solidarity with each other rather than me first okay if I survive I'm okay.

So the problem with me first is that we run out of resources very much more quickly than if we have a more nuanced and inclusive way of accessing those resources and that means though that we also need to share knowledge we have to share knowledge and understanding about how do we manage different species, how do we manage the oceans as a whole, how do we manage the coastal zones. If we don't do that then we're going to see problems increase rather than decrease and we won't meet those goals.

Yeah but in this context the idea about intellectual property came to mind because science is not really sort of a part of a common heritage. Instead, science is proprietary it belongs to specific individual especially when you get down to the product side, the basic principles are probably still have to be developed so that is common. But then further down the road we need to look at if we want to preserve our coastal areas, we might need to use some high and technology and develop some… I don't know, particular tools and all this will cost money basically it's beyond many of these poor communities capabilities. So in a way we are entrusting countries of, developing countries, to take better care of the ocean without the necessary supporting them with the right resources.

Yes exactly and we need to come up with ways to improve the resources that developing countries have find ways of improving the resources that countries that have the legal or other jurisdiction they may be in the right place to take care of important resources. We should be empowering them and finding ways through maybe changing the economics to make sure that if we're enjoying the value of a product remote from where it was found that we pay enough to make sure that we will continue to enjoy those resources in the future. Otherwise we'll just simply be telling our children about well when I was your age we used to…

We eat a sushi!

Exactly yes! And they will look at us and say what is that and we'll have to say well it's something that was really great but we ate all of it and so you can't have any.

Yeah so similar to the fish they are mobile, as a matter of fact the waste the plastics all the other chunks are also mobile so this there's really in the ocean you cannot really talk about borders and who is responsible for what so we have to come together sitting around the table. But are we doing okay in terms of because right now in this one we have this conference of ocean conference, are we really sort of moving in the right direction from your point of view?

I think when you look at the people who've been measuring this and putting out the measurements in some cases we are moving in the right direction but in no case are we moving in the right direction at the speed we need to meet the goals in 2030. We're either moving too slowly or in some cases we're just moving in the wrong direction entirely and that is rather worrying so we do need to pay more attention to the oceans, we need to stop taking them for granted, we need to listen maybe more to I'll say it to the small island states because they have had their entire economies and lives profoundly influenced by the ocean so when they are talking about how the it can either in harm or fight against our quality of life we should listen. And we do need to I think pay a lot more attention to transboundary efforts to manage the oceans.

**Q4**

Yeah so maybe this is a good place to look at where there's somebody some country or some group or something that is actually going right and could be something that we look at and learn lessons from. So and also especially since our audience are young people **could you tell us something about how young people has been engaged and what they can do?**

**Sargassum**

Okay great! If you could show the next slide okay. Sargassum is a kind of seaweed, an algae that is found in the sea and used to be mainly found at least for the Atlantic in the northern Atlantic. It's more recently now been found in the South Atlantic as well. Now the picture that you're looking at is a beautiful tourist beach in Antigua except that the beach is completely covered in brown material. You can see these sorts of light brown towards the blue of the Sea and the reddish brown at the back, the reddish-brown part is sitting on a beach so underneath that reddish brown there is a beautiful white sand beach just the sort of beach that you see on tourist coasters welcoming people to come to the Caribbean. And the seaweed beyond that is seaweed waiting to come in and be washed onto shore.

Sargassum is interesting because it doesn't originate in the Caribbean, it's actually coming from the South Atlantic and the reason why it's coming there is likely to do with inputs coming from South America and Southern Africa agricultural inputs so rivers flowing through agricultural areas and taking fertilizers and organics and all manner of different kinds of pollutants into the sea and all these have a fertilizing effect they make plants grow. As well as it's likely that with increased ocean temperatures and possibly other effects of climate change that the conditions have now become very favorable for Sargassum to promulgate itself in the Southern Atlantic where it was not either present or wasn't present in very large numbers before.

And what happens is it drifts with the ocean currents and what's been happening is it ends up in the Eastern Caribbean on all the tourist beaches and then as it passes through the Eastern Caribbean, it ends up on the larger islands in the Caribbean and land ends up on their beaches and it keeps going and then its final resting place will be in Central America on the beaches of the on the east coast of Mesoamerica. So all of these beaches get inundated and completely covered in Sargassum. The problem with that is well first of all that these are beaches which are being used for tourism and you can't get to the beach anymore because it's buried under all the seaweed. The second problem is the seaweed rocks, it sits there on the beach and it rots and it smells awful. There's hydrogen sulfide smells and rotting animals because the seaweed is very good environment for lots and lots of small animals, crabs and small fish and all kinds of other things they live in those large mats of Sargassum when they're out on the sea. When that matter of Sargassum comes onto the land, it brings all the animals that were living there as well and they die so you can imagine that what where you used to have a beautiful beach you now have the smell of rotting seaweed, the smell of rotten eggs and the smell of rotting animals just sitting there.

Nobody wants to spend holidays there. It's a big problem and it is it's affecting the tourism industry throughout Mesoamerica and the Caribbean. So if we could have the next slide.

So it's a big problem, it's affecting the economics of tourism and tourism is the support for many of those countries. If it's not the primary way in which the economics of the country works it's definitely the secondary one and the livelihoods of many people in Central America and the Caribbean and parts of South America as well, depends very highly on beach tourism which is really badly affected by Sargassum. But the good news is that there are young people working to tackle the problem. So if we go to the next slide.

There is a company called algasorganics.com and this was set up by a young man Saint Lucia. St Lucia being one of the islands in the Eastern Caribbean which of course has the problem of the same picture that we saw and he decided that he would investigate how to take that seaweed and turn it into organic fertilizer so he collects the seaweed turns it into fertilizer and then sells the fertilizer to people who need fertilizer for growing crops and so on and so forth.

So he was covered in Ford's magazine and he's been doing a great job and he's not the only young person who has been looking at the ocean and trying to figure out ways of solving the problems that sometimes the ocean causes or using the ocean as a way of sustainably extracting value so that we can not only have the value but we can continue to have the value. So if we look at the next slide.

I'd suggest going to the //bransoncentre.co/entrepreneurdirectory/ and click on the words blue economy. These are just pictures of some young people who are working in trying to set up and run small businesses that make their living from the blue economy. In some cases they may be using it for diving and using it as entrepreneurial way of helping people to see the life underwater and making money from that.

There are others who are reaping and using products from the ocean and using that to be able to make money and there's a whole suite of different ways in which young people are finding ways to make money from the blue economy but also at the same time solving some of the problems that we have been talking about as well so they're taking things which may have been pollutants. They're one of the people in this slide is looking at figuring out how to take plastics and use them for something useful.

So yes there are young people figuring out how to solve the problems and there're quite a lot of young people who are coming up with really good ideas and trying to use those to solve the problems of the ocean and addressing some of the problems under Sustainable Development Goal 14.

Very inspiring thank you for pointing out this Branson Center definitely we should all go there and get ideas and also get inspired. So that we can do something about the ocean and at the same time creating some values around private life this is fantastic.

Thank you

**Q5**

So maybe when we come to here, **what do you suggest besides be an entrepreneur because not everyone can take the entrepreneurial risk? But other things can young people do to promote SDGs and 14 and its progress?**

**Recommendations**

I would say definitely get involved and that doesn't sound necessarily like a big thing but it is a big deal. Find out if there are civil society groups or non-government organizations or just groups of people who are interested in the ocean or interested in ocean issues. If you live near the sea, try and find out what's going on with maybe the local group of fishermen what have you join groups that take advocacy positions, join young people's groups and learn about the different issues that are taking place that affect the ocean.

The Sustainable Development solutions network has a youth network so anybody around the world can click on that search it and click on the link and learn more about the Sustainable Development solutions network youth arm and see if there's anything that they're doing that might interest you. You might be able to form if there isn't a group of young people already involved in that group in your neighborhood, in your community, you may be able to work with them to set up a group of people and they will be able to support you. The Caribbean youth environment network, I put up there because though that is a group of young people throughout the Caribbean who are very concerned about the environment and how it affects their lives and they are taking action to address environmental problems throughout the Caribbean and raise awareness of what those problems are.

The second thing is learning how people are affected, it's very important to talk to people see how these different things affect their lives, how is climate change affecting people around you, how is pollution in the ocean affecting your life. A lot of people are going and doing beach cleanups that's one way of figuring out well yes pollution is affecting me because all this different plastic and other types of waste is ending up on the shoreline near where I live but it's also ending up on the shoreline near where lots of other people live as well so that might be one issue. But there may be other issues, there may be a shortage of fish, you may be living near where a coral reef is being damaged or you may be living near a dead zone that's affected by pollution caused by rivers that are taking pollutants into the senior where you are. But then it's important to take some action, it's not enough just to know how things are.

And if you yourself can't take action you should definitely start lobbying your government and your elected officials to take action, particularly your elected representatives, they tend to work on when people talk to them and say hey look you're my representative and this is an important issue what are you doing about this issue, are you raising it in the local government are you raising it at the national government what steps are you taking to help solve this problem.

And there should be consistent and persistent voices from young people to government representatives and to government as a whole letting them know that these are important issues because if your local officials, if you're a national elected officials don't know that it's an important issue they're not going to do anything about it and the way to make them know. This is not just for people who are scientists and others to say hey this is an important issue but for them to recognize that the people who voted them in or the people who might be able to vote them in or vote them out think that this is an important issue. So it's up to everybody to let our officials know what we think is important.

And finally it's very important to apply science and business to solve problems. It may mean that if you're a scientist and you're not very comfortable with business as some of the people we saw on the previous slide maybe you want to form linkages with people who are but it's also important not to just go into business without the science backing. You've got to make sure that there's good evidence that the science is on your side if you're planning on starting a business that might solve a problem. But you also need to understand the science to help to see how that can be applied to creating solutions to the problems that we're seeing and that usually means you're not working on your own. It means that you're finding other people that you are looking at other people who have maybe different skills, different interests and different knowledge from you and trying to bring people together to help address or solve a problem that's why being part of a network, being part of a group is useful because you may be able to find like-minded people with a variety of different skills they may be good at business and you maybe not, or you may be good at business and they're good at science, or they may be good at communications and mobilization. Pulling together people who can say well this is a problem that needs to be solved, let's work together and see if we can do something about it.

Not everybody is going to set up a small business that will solve a problem but we do definitely need more and more people figuring out how science can help solve the problems that we see and we definitely need more and more people aware of how important the ocean is to our well-being and how important the ocean is to everybody on the planet. And even if we aren't going to solve a particular problem let's make sure that we make our elected representatives and others aware that there is a problem and that it needs to be solved. So I would say let's think on those four areas and those would be my recommendations.

Thank you for very thoughtful recommendation. I think it is important that young people need to know and to be so that they can do their own research to find out what's going on but not stopping there. Instead they can take social actions, they can take economic actions, they can also work with other people who might have the solution but without being aware of the problem. So I thank you very much for giving such sound advice to the young people.