

Transcript of the Video

Esteve Corbera

Good morning. So what is a Social-ecological system (SES)? A SES is a biophysical unit together with its people and social groups and, of course, its cultural practices. So a Social-ecological system has within it this idea of an embeddedness. So we're talking about the merging of the physical, the ecological components of the world with the social components of the world and the cultural component as well. There is another important property in Social-ecological systems, which is interconnection. These components that I just mentioned, the social and the ecological, the cultural and social are interconnected with each other. And because of such interconnection a Social-ecological system is a complex reality because these components interact with each other continuously. This takes me to the second property of Social-ecological systems. They are not monolithic. They change over time. They change over time because the ecology changes, but also because society changes and both can change at the same time. They are in transition. Social-ecological systems change over time. Some scholars have identified six principles of Social-ecological systems or six characteristics.

The first one is that Social-ecological systems , as I said before , they are relational , relational means that these components are interconnected , but also the different components within the components are also interconnected .

Think about ecosystems , for example , how trees are connected to the soil , how soil is connected to microbiota and how trees are also connected to birds , to mammals and so on and so forth . There are networks of connection , and if we think for a minute about social systems alone , the same applies , right ? So you have people connecting with other people . You have people connecting with different types of actors , governments , NGOs , companies , companies connecting to all companies . Right . And all of these social actors at the same time are connecting to the ecology that I was mentioning before . Maybe there is a company that exploits trees. And if these exploitation is unsustainable, it might have a negative impact, for example, on mammals or birds and so on . So that's the first characteristic . It's a Social-ecological system . It's relational and it's network based .

The second one is that it's open , it's open and permeable . Right . A Social-ecological system usually , as I will mention later , is defined by boundaries . But these boundaries are permeable. Why ? Well , think again about these components within the components . New actors may appear in our Social-ecological systems . Migrants , for example , who come to live in a given territory . Birds that migrate , they are sometimes in the system at some point of the year and some of the times of the year they have migrated elsewhere.

Social-ecological systems are context dependent. The ecology , the geology , the physical properties of the unit obviously depend on where this system is located is not the same as Social-ecological systems in the mountains of Morocco than one Social-ecological system in the mountains of Spain , the characteristics of the soil may differ . The type of trees may differ . The type of social actors may differ .

A fourth characteristic is that Social-ecological systems are adaptive . Right? So the environment changes . For example , as a result of climate change . And then there are there are species within the ecosystem that



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adapt to these new temperature conditions or to these new rainfall conditions . And the same happens with the social components of our Social-ecological system . We humans have adapted for millennia to changing environmental conditions , but also to changing policies , to changing governments , to changes in the social fabric . Right . So we adapt to new market opportunities . We adapt to new cultural regulations or cultural rules . So that's a fourth important characteristic . Social-ecological systems are adaptive .

Finally, they can be, as I said before, dynamic but importantly non-linear. There might be changes in the system which are abrupt that may occur in a very short period of time. And that then may involve that some of these components that I was talking about, the ecology or maybe some social actors may not be able to adapt to such non-linear changes. Think, for example, about recurrent drought. What would be the effects of recurrent draws on the trees or the ecology of that given system? Maybe the drought is so severe and so recurrent that there are some species that simply disappear. Right. So we are not saying that the Social-ecological system would disappear, but some elements of it would disappear and would be probably substituted by others. And the same applies if you think about the social system where, for example, changing market conditions. If there are changes in the pattern of demand over certain natural resources, for example, there might be some social actors in disadvantage. They might not be able to adapt to these new markets, to these new patterns of demand, and would simply have to reinvent themselves.

And the final characteristic is that within all these relations that exist across components and within the components of each component, the ecosystem, the geology of these given unit, the social system, there are complex processes of causality. So if, for instance, we observe changes in the in the ecology of a given Social-ecological system, it's very likely that there is no one single cause of such change. There might be different elements or different processes influencing or determining such change. We talk about complex causality within Social-ecological systems. And again, if I have to give an example, for example, I will go back to trees and imagine a situation where trees in a given Social-ecological system are increasingly being locked. OK, so deforestation is proceeding apace. What are the causes of such deforestation? There might be distant causes as well, which is, for example, a growing demand of such type of trees in international markets. And it's about these growing demand that local actors are responding to . So here, if we want to regulate the logging of trees in these given socio ecological system, we obviously need to work with local actors.

But we also need to think about , for example , sustainability standards in the international market . And this is , of course , a complex thing to do . And this is why we talk about complexity and complex causality in Social-ecological systems .

If the capsule results too long, we can think of splitting it into two capsules in this point

So after these kind of long introduction, probably you've been all thinking, OK, so are biosphere reserves are socio ecological systems? And I hope that all the points I've made resonated to you in one way or another as users of biosphere reserves, as inhabitants of biosphere reserves, as managers of biosphere reserves. I'm sure that you've been thinking that most of the issues I referred to are issues that can also be reflected in the realities of biosphere reserves around the world. Biosphere reserves are indeed a Social-ecological system because they have these defined unit. They have this defined territorial boundaries. These territorial boundaries define what is the ecological system or systems that are included in the biosphere reserve. What type of forest, what type of grasslands? What type of agricultural landscapes? What type of soils? Right. Let's not forget about the then the non-living part of the environment. It's also very important because without it we wouldn't have the ecosystems that we then see and observe.

And then of course , we have the people who live in the biosphere reserves in the outskirts of the biosphere reserve . We will talk about permeability afterwards . And also , of course , the actors who live within it or

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even the actors who don't live within it , but that have an important role in determining regulations . What can be done and what cannot be done within the Biosphere Reserve . In terms of , for example , natural resource management or agricultural practices and this is very important in biosphere reserves . Biosphere reserves are per se an institution . They determine certain ways of managing the environment that at the same time determine those complex relations that I was talking about before . Right . So the regulations that the biosphere reserve imposes on the people who live and who make use of the resources within the reserve have consequences on which relationships are established and what can or cannot be done with resources .

Of course , I mentioned before that Social-ecological systems are dynamic , they can change . So regulations in biosphere reserves could also change. Could adapt to changes in the environment. In the living and nonliving environment , but they could also change as a result to changes in society , to changes in culture . What if local actors , local people who live in the reserve have an idea about a new crop to be grown and they are thinking about deforesting. Should they deforest ? Or not ? The rules may say they cannot deforest. But can these rules be changed ? What would determine change ? Is it legitimate to ask for changes in the institutions that govern biosphere reserves so that local actors can make a different use of their resources? This is a question that deserves to be asked not only in biosphere reserves , but in any other kind of conservation institution or conservation practice , because societies are dynamic and so is the environment . Often regulations about conservation are focused on resources as they were when the Biosphere Reserve was established maybe 20 years ago . Are those resources is still there? Are they , for example , a as a result of climate change diminishing in quantity , in quality ? Does it still make sense to protect those resources? Or maybe they're going be lost anyway as a result of , you know , these global phenomena known as climate change . These are these are questions that socio ecological systems and particularly biosphere reserves should be asking all the time.

Whatever happens within a biosphere reserve, as I mentioned before, needs to be analyzed very. I would say with care, right? What I mean is not if I talked before about complex causality. This is something to take into account when we think about patterns of resource use and conservation within biosphere reserves. Who is to blame for certain practices that may go against the interest of the managers of their reserve? Maybe there is no one single actor to blame or the actor to be blamed is no local actor, but an actor sitting very, very far away of the Biosphere Reserve.

I would like to finish reflecting also on these two other ideas that I mentioned before , one is this idea of relationality. So thinking about the fact that all actors within the Biosphere Reserve are somewhat connected to each other and that at that same time these actors are connected to resources through different practices, through different cultural understandings of nature , and that all of these different connections are to be taken into account when we think about how to manage a biosphere reserve or what we want to make out of their resources within our biosphere reserve . And finally , I will end up with this idea of adaptiveness.

Biosphere reserves , the ecosystems within it will adapt to changing global environmental conditions . And reserve managers need to be aware of that. They need to be constantly monitoring the state of the state of the environment. Not necessarily to enforce further regulations to avoid changes, but to accommodate changes so it works for the benefit of the actors who live out of these resources.

And finally, in the same way that managers can adapt their expectation about resource use also local actors may need to adapt to changing priorities within the Biosphere reserve and of course, to the changing needs of the broader society where these biosphere reserves are located. And here what I have in mind is how Biosphere reserves for example may adapt to changes in demand of local tourism, for example. With the global COVID pandemic we are seeing for example –at least in Spain but I presume this is the same in other parts of Northern Africa and Morocco as well- where we have increasing number of national tourisms within protected areas. And this type of tourism may have some needs and some priorities which are different than

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for example international tourism. How then these biosphere reserves can adapt to such changing priorities and these changing needs? It's a question worth asking in the time of COVID.

Well, I hope my reflections were useful, they were maybe too abstract, so what I would recommend you to do is to is that you think about these issues through the lens of your own biosphere reserve, the biosphere reserve you like walking in the biosphere reserve where you live in, or the biosphere reserve that you manage. Thank you very much.