

The Director of the Tyre Coast Nature Reserve: Nahed Msayleb

Q1: How are you seeing the impact of the Climate Change in the nature reserve, you have a direct observation on its effects on the quality of the coastal environment and then Asma mentioned the importance of engaging the local population in terms of activity and tourism; I know you have been working hard in order to engage local stakeholders in the management of the reserve; according to this, in your opinion how the tourists and touristic sector can be engaged in the co-design and implementation of adaptation initiatives, in dialogue with the stakeholders, the authorities, and the scientific community, in order to adapt in this very important environment and location, to climate change?

A: Thank you Arnau for inviting me and also thank you Nuria for the invitation and Congratulations on this very interesting conference.

Regarding the first question about the effects of the climate change on the reserve of Tyre coast, given that the Tyre Coast Nature Reserve is both a marine and coastal nature reserve, it has many ecosystems and we look at the assessment of the effects of the climate change from an ecosystem-based approach, that is we look at the broken connectivity between different components of the ecosystems.

TCNR is wealthy with a diversity of ecosystems: it has a marine ecosystem, it is a wetland designated as RAMSAR site, it has the last remaining sand dunes' ecosystem in Lebanon, and it has an agricultural ecosystem. This entails a diversity of stakeholders and beneficiaries; so let's step back and look at the major environmental changes or climatic changes how they translate and materialize. There are mainly two climate change components:

Precipitation, and the raise in temperature

These two parameters materialize into an oscillation in rainfall patterns, like torrential rain, and shift in seasons' timing, as well as an acute change in temperature, plus the overall increase in the mean annual temperature. All these factors are influencing the water storage and availability. So how these conditions do reflect on the environment?

They alter the balance inside the ecosystems, and between the components of the ecosystems. For instance, in the sea it will lead to an expansion of toxic species, because of the raise in sea surface temperature and because of nutrient and pollutants' load. So, this by itself ignites a chain reaction, because it will affect the

plankton and the pelagic fish and also seagrass and sea fans, which are considered engineering species. So these species have become extinct along the entire Lebanese coast, which had an altering effect on water quality; so imagine the effect on the other species in the sea! This is from one side.

From another side, we have an invasion of alien species that are coming from the Red Sea, and maybe from the Atlantic Ocean through Gibraltar by migration, and by the sea currents. This has been more accentuated by the raise in temperature and the differences in water temperatures, because these species follow the more comfortable temperature zones for them, hence invading our waters and gradually replacing our endemic and local species.

So, this balance that existed before, and the local marine ecosystem equilibrium with its related biodiversity have been broken and the invasive species are time by time replacing the local and endemic species and altering the source of livelihood for the fishermen, this vulnerable society group. This is the effect on the marine biodiversity and ecosystem. On the other hand, given that the reserve is classified as a RAMSAR site due to the existence of the springs of “Ras El Ain”, constituting the main source of domestic water for the entire city of Tyre and its surrounding villages, the main source of irrigation water for the entire agricultural zone of “Ras Al Ein”, and one remaining part flows into the sea forming an estuary. So with the trends we were monitoring and analyzing since thirty years about the rainfall and temperature trends in our region, we noticed that the average rainfall had shown a slight decrease in the overall rates by about 38 mm over the last 29 years. Moreover, another important parameter related to rainfall, is the change or variation in the annual rainfall time series, that is rainfall season and patterns. This shift in the rain season affects the agricultural production, and by consequence it will affect the livelihood of the farmers and the consumers eventually.

The temperature trends in Tyre and along the entire coastal area of Lebanon, had increased in the last three decades on average by 1.4 degree, which is reflected on the sea level rise, the occurrence of heat waves, and accordingly on the increase in plant transpiration and surface water evaporation, or EvapoTranspiration (ET), and the overall demand on water for irrigation. So, even if upon the evaluation of the trends of water budget provided by the springs of “Ras Al Ein” had not decreased greatly, the demand on water, specifically surface water, had hugely increased, which means that if we don't adopt more sustainable water uses or enforce more

rational water and natural resources' uses, this is going to accentuate the consequences and repercussions of climate change.

For the second question about how we involve or how is it possible to involve the tourists specifically in the adaptation to climate change, this couldn't be done from only one side, because eventually the tourists are beneficiaries, end-users; so we need to make an integrated approach, where tourists will be among the stakeholders, that are involved in the overall impact and interaction on the adaptation, or adaptability to climate change effects. Hence, as Asma already said, there are certain governmental regulations and policies that should be adopted, and this is by for instance ratifying and adopting, implementing and enforcing the international conventions, like the Barcelona Convention, and now the Paris Agreement. These are really crucial because they are based on multiple studies and facts that alert us of the future that seems now not really very bright, but we need to act like ... "yesterday" or 10-20 years ago! This is first.

On the other hand, there is the cooperation or collaboration between the Northern and Southern borders of the Mediterranean, and this is already being executed through the ENI CBC MED Program of the EU Funds, that the reserve is so far profiting from three funded projects, that are dealing or focusing on the climate change adaptation through the ICZM and EcAp concepts. This is from the governmental and international organizations' side, but from the stakeholders and the community side, they could collaborate through citizen science, which has so far helped scientists in surveying and collecting non-collectable data because the citizen are in direct contact with the natural resources, the climate patterns, the productivity of their lands, temperatures etc.. these are tangible and reliable sources of data when we lack for scientifically-collected data; so this is first that might help in seeing the entire picture, and making a more realistic vision about what is there in order to extrapolate, and to plan in light of the data that is there.

Second, there is the sustainable practices that could be adopted by citizen in general and tourists in specific, given that TCNR has the widest, most beautiful and cleanest public beach in Lebanon; This touristic zone of the reserve receives annually around 700 thousand tourists, which is huge considering the dimensions of the beach and the reserve.

So, if we succeed to make a shift in behavior regarding waste management on the beach, the use of water and other resources, applying the carrying capacity there

..., these much needed practices could be applied through participatory approach and dialogue with the diverse stakeholders of the reserve from the local community of the different sections: farmers of “Ras Al Ein”, the fisherman related to the marine zone, the tourists visiting the touristic zone and the scientists interested in the conservation zone,... these community groups, in addition to the local community of Tyre city surrounding the reserve, all are involved -and should be involved- in the adaptation endeavors to offset the effects of climate change.

For tourists, we are trying to incentivize and encourage the adoption of sustainable tourism and ecotourism by creating certain ecotourism packages, interconnected with the reserve, and by applying other ecologically friendly measures through the other touristic entities in Tyre which is considered as a touristic city.

Q3: we have all ideas about the adaptation strategies, with a lot of papers all around the Mediterranean; do you see from your experience that certain strategies in terms of tourism, are touristic authorities dealing with the future impacts of the climate change on these activities? We have plans, we have many documents, reports, but do you see that there are serious policies?

Second one, are tourists aware? When we are in holidays, the majority of people tend to forget everything, we want to have a very successful experience, we want to rest and spend fantastic days in wonderful places... first of all we have the idea of “adaptational strategies”, we tend to forget; are tourists real drivers of change? or can they be? what is the relation between health and tourism? For instance, tiger mosquitos, this can be a problem in attracting new tourists; how cities can offer good conditions, and try to include tourism in their attention strategies to climate change? Also speaking from their perspective, general and health perspectives, more mosquitos and other air-borne diseases, some politicians in Europe are concerned about sending people, their citizens, to Mediterranean areas where there are tiger mosquitos?

Answer: For the adoption of policies, or how the governmental response towards the adaptation to climate change is, also from the side of tourists... data revealed that a sustainable tourism is gaining an increase of an average of 13 % annually, which means that awareness about the importance to adapt to the deterioration of the status of the natural resources and to the effects of climate change, is really increasing worldwide; to describe how this reflects on tourism in Lebanon and on the governmental response or touristic response:

From the governmental side, we don't lack for policies for the proper response to climate change in Lebanon! what we lack for is the enforcement of these policies and regulations in the field; and reflecting on Martin's presentation about migration and how it reflects on human behavior, in Lebanon we are suffering from multiple crises: we have a political crisis, security crisis, economic and financial crises, so all these integrated or complimented by the environmental degradation due to climate change or other threats, all these together are reflected in human behavior, and different responses among communities to this situation; so this makes people, based on social psychology, adopt more consumerism, leading to what we call the "Tragedy of the Commons". This is when people face a crisis, they tend to grab the most of their "share" of this common good. So for instance, we face a difficulty on the beach of TNCR to abide by the carrying capacity of the beach, where everyone wants to profit from this beautiful beach that does not exist elsewhere, so that we can't reduce the number of visitors per day, and this by itself will have a huge impact on the natural resources and will exacerbate the effects of climate change, because they will generate more waste and use more resources, etc..

On the authorities' level, the good thing is that TNCR is a nature reserve (an MPA), which makes it profit from the execution of regulations to protect the site, its ecosystems, its assets, and at the same time to adopt international programs that go hand in hand with the international conventions and that tackle the adaptation to climate change. This is what makes us as a national reserve more active into adopting and applying proper responses, whether on community level or on institutional and authority level, to climate change.