

Carlos Duarte, awardee in the Ecology and Conservation Biology category (12th edition)

In accepting the 2020 Frontiers of Knowledge Award in Ecology and Conservation Biology, I would first like to thank the BBVA Foundation for creating this family of awards that celebrate science's fundamental contribution to resolving the challenges humanity faces.

I wish to congratulate my colleagues, professors Pauly and Hughes, with whom I have the honor of sharing the award in this edition. And I wish to thank, and congratulate, my co-workers and students, past and present, for their contribution to the research I have carried out in my career as a scientist.

In its citation, the committee remarks on the importance of my contribution in providing the scientific basis and strategy – even the name – of the Blue Carbon, referring to the ability of a healthy ocean to sequester carbon. Since we first formulated the proposal, in 2009, the blue carbon strategy has come to play an increasingly prominent role in climate action.

By around the end of last century we had lost half the abundance of life in the ocean, the blue natural capital that sustains the functioning of marine ecosystems and the benefits we receive from those ecosystems. This destruction has entailed a huge loss of biodiversity. But it has also been one of the drivers of climate change, since 38% of the greenhouse gases emitted into the atmosphere by human activity derive, precisely, from the destruction and alteration of terrestrial and oceanic ecosystems. In fact, even the decline in the whale population to just 10% of its historical abundance is linked to climate change, since whales were not hunted for food but, literally, for burning, with their oil providing lighting for the city streets of Europe and North America for over a hundred years.

Nature-based climate action initiatives like Blue Carbon are especially effective because they involve decarbonizing the atmosphere to recarbonize the biosphere, thereby helping to achieve our climate goals while we restore the abundance of ecosystems. In fact the climate and

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biodiversity crises we face are connected both in their causes – development at the cost of damaging nature – and their solutions.

The decade we are in will decide the future of humanity, perhaps more than any other in human history, because it is our actions that will determine whether we leave our children and grandchildren – and they theirs – a planet that is damaged beyond our power to repair it or a planet with a stabilized climate and functional ecosystems able to sustain social development. To meet this challenge we are also living through the decade of the greatest scientific and technological development in our history.

We find ourselves in what Dickens described at the start of *A Tale of Two Cities* as the best of times and the worst of times; the age of wisdom and also of folly; the age of belief and incredulity; the era of light and of darkness; the spring of hope and the winter of despair. We are walking on the razor's edge.

The constant barrage of negative news stories and headlines about the future that awaits us do not move us to action, but to hopelessness and apathy, like the many young people who find themselves in the winter of despair, mired in the fast spreading syndrome of eco-anxiety. The intergenerational pact whereby one generation works to hand a better future to the next lies broken.

When I am asked what is the biggest threat the ocean faces, my answer is that the biggest threat is of us abandoning the goal of enjoying a healthy ocean. It is despair.

My generation has a particular responsibility for the environment crisis we are in, since from the year of my birth, 1960, thousands of species have been declared extinct – 467 species in the last decade alone – and the atmosphere has received two thirds of the greenhouse gas emissions accumulated since the Industrial Revolution. It is down to us to repair the damage done.

It is time for action, which, as the singer Joan Baez said, is the antidote to despair. We need to rebalance our discourse, as scientists and through the mass media that amplify our results, celebrating our victories and combating catastrophist misinformation. Last year, for instance, myself, Professor Hughes and other colleagues published a paper in which we argued that the abundance of life in the ocean could be largely restored within one human generation, by the year 2050. It will not be easy by any means; indeed it is a tremendous challenge. But it is not only possible, it is also an ethical obligation and a wise investment.

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It is time to act. Time to come up with solutions. In this environmental crisis, contributing knowledge is vital to provide solutions. Vital but not enough. We have the obligation to translate this knowledge into positive action and that means going a step beyond the practice of science. It is not enough just to produce results or new technological developments and publish them in the hope that society will see their utility and apply them. This attitude exudes complacency, as solutions are not created solely by science, but are co-created through the contributions of diverse social actors besides scientists and technologists, including politicians and regulators and, above all, the private sector and entrepreneurs, who have a fundamental role in making such solutions part of the real economy, of everyday life, and not just academic literature or exhibition material at fairs and congresses.

In fact the problem is precisely that our efforts to solve our climate and biodiversity crises have been relegated for decades to the realm of volunteerism, charity and philanthropic contributions, which exist on the surplus of time or monetary resources available in society. As it exists on such surplus resources, environmental action has been placed on the periphery of social action.

Environmental action will only attain the scale necessary to undo the damage to our planet, its climate and biodiversity, when it occupies a central role in society, as a driver of the economy, wealth creation and quality employment.

In fact, this shift from the margins to the center of things is already under way. The sustainability sector, in its broadest sense, is currently the sector bringing the highest sustained profitability to the financial sector, to the extent that the large fund managers demand rigorous sustainability plans from firms hoping to receive investments, including tangible commitments to climate action and biodiversity restoration. And this is not just an ethical commitment. The future of such investments would be jeopardized if the recipient firms did not stick to their plans.

Indeed the sustainability market is forecast to be worth 30 trillion dollars by the end of the decade. That is the biggest business opportunity since the Industrial Revolution, and the winners will be those who position themselves in this market as providers of finance, goods or services. The sustainability market will rely on the massive use of sensors, artificial intelligence, robotic systems and high connectivity. These are the technologies that will support the fourth industrial revolution, and it will be Generations Z and Alpha, the most technologically savvy in history, who will apply them. But to what end?



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Imagine the core activity of the fourth industrial revolution being to repair our planet.