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Illustration: Jorge Mario Oráñez Duque

Blue Economy

The quest after the sustainable use of the oceans

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Our contribution to the sustainable use of ocean resources

During these last decades, accelerated economic growth and the overexploitation of resources has caused a degradation of ecosystems worldwide. Increasingly, stakeholders are realizing that this not only has consequences for the ecosystems themselves, but also for the foundations of the economic models that depend on them.

To counteract this trend, new economic approaches are being developed that favor the sustainable use of resources to maintain environmental integrity. Sustainability encourages us to consider three aspects: (1) economy, (2) society, and (3) environment, in finding global solutions for long-term development.

Nowadays, ocean ecosystems worldwide are on the brink of collapse. Sustainable use of their resources has become obligatory, even more in the face of climate change. Under the blue economy framework, sustainable economic approaches are developed, fostering the reasonable use of ocean resources for economic growth, improved livelihoods and jobs, and preserving the health of the ocean ecosystem itself. The term “blue” refers to all economies derived from the seas and oceans. Blue economies include a wide range of activities, from small-scale fisheries and tourism, to macro-scale processes such as transportation, energy or pharmaceuticals. In 2015, the United Nations member states proclaimed the Decade of Ocean Science for Sustainable Development (2021-2030), to reverse the degradation of marine ecosystems. This means we have major challenges to overcome in order to shape a sustainable use of the oceans worldwide, that is not just nominal, but which produces a real positive transformation of our oceans and coastal territories.

Moving towards a sustainable economy is a complex process. By relating decisions to longer time horizons, some of the costly investments in efficiency and renewable energy can be justified, but this requires research, development, and for investors—and humanity in general—to adjust their perspectives to long term thinking. This is also why, despite the rising awareness, the transition towards a blue economy has been slow. In order to accelerate it, current economic trends that rapidly degrade the ocean resources—such as industrial fishing—have to be abandoned, along with the inadequate care of marine resources and ecosystem services of the oceans. The basis for a successful, sustainable development is a profound knowledge on the economical, social and environmental aspects of marine ecosystems, as well as a wide perspective on how all these areas are interconnected.

CEMarin fosters research in marine sciences, but in order to generate positive impacts in society at large, we also embrace education, innovation and communication as key elements of our mission. We invite you to join us in this first edition of SONAR, a well known tool used by dolphins, whales and other animals to navigate, communicate, and map the underwater world. Scientists have found many other applications for sonars, in order to expand our knowledge of the marine territories. We expect this to be a tool for a better knowledge and understanding of the current situation of the marine ecosystems of Colombia and beyond.

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Colombia: an overview to sustainability in the oceans

Sustainability is gradually becoming a ‘must’ in development policies throughout the world. At the same time, the need for a ‘post COVID’ economic recovery occupies the headlines, while the need to promote this recovery from a perspective of a sustainable use of resources is mandatory in some countries around the world, particularly in Europe, Colombia, one of the world’s most mega diverse countries, has subscribed to the United Nations Sustainable Development Goals, proposing a gradual transition towards a conscious use of its natural resources, and has implemented public policies to protect our maritime territories. It is important to understand the reality behind these actions, particularly for researchers working in sustainability for our oceans.

Johanna Santamaria, Juan Felipe Blanco and John Josephraj Selvaraj are CEMarin researchers, experts in microbiology and biotechnology; ecology of estuaries and mangroves; and management of fisheries resources, respectively. We asked them to introduce us to their experiences in this area, to help us map the present and gain a perspective on the appropriate use of marine resources in Colombia and the region.

—What is your current perspective on marine sustainability, its viability and its relevance in the current global context?

Juan Felipe Blanco: Sustainability is important, not only locally but regionally. It is widely accepted that extractive uses —such as logging, in the case of mangroves and other coastal wetlands— is detrimental to ecosystem extent and health. A growing body of evidence links local deterioration of coastal ecosystems to regional processes, like carbon sinking and fish nursery. It is important to identify macro-systems sustaining regional livelihoods and economies, as in the case of the Atrato River Delta in the Southwestern Caribbean. Research is also showing the importance and viability of traditional man-

grove conservation and blue-carbon-based strategies at national and regional levels. Marine and coastal ecosystem sustainability needs to take into account the linkages and teleconnections with distant communities or sites, through resource use and ecosystem processes.

John Josephraj Selvaraj: Sustainability should be a guiding axis for all of our efforts and decisions related to the use of marine fisheries resources. We need globally coordinated efforts, with national and local ownership, to create awareness and appropriate actions in support of sustainable management. In Colombia, strengthening actions at the local, regional, and national levels are needed for achieving sustainability of marine ecosystems and fisheries resources. We need a holistic and informed approach to sustainable management, using nature-based methods and solutions, with the inclusion of technology-based strategies.

Johanna Santamaria: Great efforts are needed to educate the population in order to help them to understand the importance of sustainability in any terrestrial or marine environment. Governments need a genuine desire to intelligently protect the environment, and to design sustainability policies based on social and ecological demands. These policies then need to be effectively implemented around the world. How viable is this? for now, it is not, but it is becoming more necessary as time passes.

—What do you think marine science should be focusing on today, in order to tackle the main or most urgent problems of sustainability in the oceans?

JFB: In a country such as Colombia, characterized by megadiversity, pressing social issues, armed conflicts, and the demands of economic development, research programs in marine science should be able to address both basic and applied questions. Indeed, I do not believe in a separation between



Mangroves Photo: Juan Felipe Blanco

them. Instead, there are applications of science—as a method—paraphrasing Louis Pasteur. Given the limitations of funding, working with public and private sectors to solve “applied” questions or challenges is one way to address basic research questions too. Even with intramural funding not restricted by the need to find immediate applications, taking a “big picture” approach may help to foresee applications of basic research, or at least to disseminate knowledge to non-expert audiences. Considering how our research links to Sustainable Development Goals could be a good starting point. Moreover, I firmly believe that we must inform the public, and particularly decision makers, to gain advocates for the protection of the oceans and coasts, and to apply pressure on local and central governments to solve problems derived from unsustainable practices.

JS: We need to educate the public, and research the ecological functioning of marine environments.

JJS: In the area of education and capacity building, we need to push our boundaries. We need to build awareness on oceans and sustainability early in the school curriculum, invest in professional programs related to marine science, and deploy highly skilled human resources to support robust decision making on marine sustainability. Clear action plans must be established for political and public engagement, to guarantee that knowledge and insights generated are reaching stakeholders and decision-makers, without losing cultural identity and values. Actions should seek to improve the livelihoods of local populations, and to take ideas beyond scientific publications, and make them relevant and impactful with local actions.

—What are the major issues you have encountered in your research work in this area, at the local level?

JFB: In the Urabá region, and many other coastal regions of Colombia, including marine protected areas (MAPs), the major issues I’ve encountered are in law enforcement, due to institutional weakness, worsened by armed conflicts and delinquency. For example, despite the legal protection of mangroves with MAPs and collective African-descendant territories, illegal logging is frequent in many areas of the Caribbean and the Pacific. Criminal activity like this is both a threat to the ecosystems, and an impediment for field work. I have lost small equipment, experimental settings, and permanent plots due to logging, clearing and vandalism, forcing me to adapt experimental designs or even to abandon field sites. In more recent years, I have moved over to remote sensing to study ecosystem dynamics in deforestation hotspots, in order to avoid the hassle of field surveys. Finally, implementation of sustainable practices requires a dialogue among multiple institutions and local communities, and, most importantly, it requires advocating for nature through education, as well as mass media—adding tasks and challenges to researchers.

JJS: There are many limitations, but the ones that are perhaps the most important in the Pacific coast of Colombia are policies, regulations, and investment from the state. It is a complex topic, as actions on sustainability should also deliver social and economic benefits for populations that depend on these resources. We need a holistic approach, an integrative vision that recognizes the realities of communities with a focus on actions that are real, possible, and appropriate for the local and national context. We need more investment in the Colombian Pacific, bringing more alignment between political interests and the needs of fishers and the local population. Capacity building, coupled with appropriate decision-support systems and processes, will take us towards sustainability.

===== SONAR*

Currently, Juan Felipe Blanco aims to understand drivers of mangrove extent and ecosystem function from landscape and macro-ecological perspectives. His central question is how carbon stocks and fluxes respond to both natural and anthropogenic drivers both at regional and national levels. His work focuses on the Urabá Gulf, in the Southwestern Caribbean, showing that logging is unsustaina-

ble, with potential consequences to regional climate change via the carbon cycle. This has motivated decision-makers to promote alternative (non-timber) uses of mangroves, such as ecotourism, honey bee keeping and fishing, among others. Within his research he has found three key aspects: 1) Mangroves in the Urabá Gulf are distributed along a gradient of landscape transformation ranging from urban and rural contexts to wild contexts, being Turbo City and the Atrato River Delta the two extremes both contextual and geographical. 2) Mangroves in the Atrato River Delta are the most productive across the Americas. 3) Mangroves in the delta of the Atrato River sustain local fisheries providing extensive fringing nursery areas and habitat. These research findings served as the scientific basis of a recently-issued State Department Ordinance for protecting mangroves through sustainable use and improved governance¹.

Santamaría and her team are exploring endophytic and epiphytic microorganisms, looking for substances with potential in the biotechnology industry. At the same time, they seek to understand the ecology of these communities, since it could be useful for programs on the sustainable use of natural resources. Natalia Comba, Early Stage CEMarin Researcher, is part of this project. She also has found in her own work, that populations of marine epiphytes could potentially be a source of substances to be used industrially².

John Josephraj Selvaraj focuses on fisheries resources management and operational oceanogra-

phy, particularly along the Pacific coast of Colombia. With his group, he has carried out several research projects looking for the identification of potential fishing zones and the effects of climate change on the distribution of fisheries, and resulting social implications. This has allowed them to develop decision support tools and platforms for near-real-time oceanographic information, accessible to the



Snails on mangrove soil. Photo: Juan Felipe Blanco

phical wider fishing community. All initiatives involve an active participative approach towards the community, supporting adaptive management strategies for sustainable use of marine resources, coupled with capacity building. One of his current research projects, sponsored by CEMarin, is the *Prediction and seasonality of potential habitats for dolphin-fish (Coryphaena hippurus) and tuna (Scombridae) and their relationship with environmental changes in the Tropical Eastern Pacific Ocean*. This research is also conducted by Estefania Isaza, Early Stage CEMarin Researcher.

¹ <https://www.semana.com/contenidos-editoriales/atrato-el-rio-tiene-la-palabra/articulo/manglares-que-unen-al-atrato-con-el-caribe/551275>

² <https://www.cemarin.org/es/actividad-enzimatica-en-bacterias-epifitas-de-macroalgas-marinas/>

³ <https://www.researchgate.net/project/Prediction-and-seasonality-of-potential-habitats-for-dolphinfish-Coryphaena-hippurus-and-tuna-Scombridae-and-their-relationship-with-environmental-changes-in-the-Tropical-Eastern-Pacific-Ocean>

⁴ <https://www.cemarin.org/en/xv-colombian-ichthyology-congress/>



Algae communities sampling, Providencia Island. Photo: Santiago Estrada

RESEARCH REPORT



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Towards a holistic assessment and management of small-scale fisheries: insights from the Colombian Pacific coast

Small-Scale Fisheries (SSF) contribute more than half of the total fisheries catch and provide food security, nutrition, employment and multiplier effects to local coastal economies. Despite concerns about declining catch trends in tropical areas worldwide, adequate stock assessments of main target species are often hindered by the poor quality and quantity of data available. Even if data challenges are overcome, the multi-species, and multi-gear nature of tropical SSF demands to go beyond the single-species management approach and embrace a more holistic approach that not only accounts for the ecological impacts of fishing (e.g. reduced biodiversity, reduced abundance of by-catch species, changes in taxonomic composition and size structure of biological communities, and changes in trophic dynamics), but also acknowledges that SSF exhibit the complexity of social-ecological systems. Tropical coastal fishing communities are often marginalized sectors of the society, belonging to

ethnic minority groups with weak participation in decision making. Therefore, understanding fishers' motivations and hurdles is an essential input to SSF management.

Using the Colombian Pacific as a case study area of tropical, data-limited SSF, several ecological indicators of the impact of fisheries were estimated based on the composition of the nominal catch of different gears used in SSF at three different coastal zones. The results showed that taxonomic, size-based, functional and conservation features of the nominal catch vary greatly with geographical location and gear type used. Overall, handlines and longlines tended to select larger sizes and higher trophic level species than nets but they also caught a higher proportion of intrinsically vulnerable species and species of conservation concern. This challenges the idea that more selective gears have overall lower ecological impacts. In contrast, nets

targeted a wider range of species and sizes (although focusing on small or medium sized fish) and also caught a higher diversity of trophic and spatial guilds. Bottom trawls exhibited a high percentage of landed by-catch; an undesirable feature for any fisheries in terms of sustainability. These results emphasize the need to consider the potential ecological impacts of the Colombian Pacific SSF, which had been mostly ignored in the past.

A characterization of the socio-economic conditions of small-scale fishers, and an estimation of the different gears' profitability, were carried out



Juvenile fishes of several species are a common component of the by-catch of bottom trawl fishers in rural coastal areas of the Municipality of Buenaventura, Colombian Pacific. Photo: P. Herrón



Fishers using 2.75" gillnets to target mainly the white shrimp, the most valuable species in the markets of Buenaventura, Colombian Pacific. Photo: P. Herrón

at three coastal villages of the central Colombian Pacific. Fish annual consumption in the studied villages was very high (237 kg per capita), something that has been obscured in national statistics that position Colombia as a country with very low fish consumption rate. The fishers' gear choices were influenced by the value of their target species and potential profits but also by access to markets, access to fishing grounds and the local socio-economic conditions. Overall, a high market demand for shrimp species, coupled with relatively easy access to fishing grounds and easy operation of the gears, drove the majority of fishers of the central

Colombian Pacific to use gillnets with small mesh sizes and bottom trawls. Highly variable catches and profits, coupled with relatively high entry and operational fishing costs, led to an overall low economic income for small-scale fishers, which inevitably increases their already vulnerable socio-economic condition.

In order to transition towards more holistic assessments and management of tropical SSF we recommend the inclusion of ecological indicators, as part of regular SSF monitoring of temporal trends. Such inclusion will allow the consideration of potential ecological impacts of fishing during decision-making processes. Additionally, investments in strengthening the social capital of coastal fishing communities and consideration of local socio-economic and cultural contexts in the design of fisheries management measures, while promoting co-management schemes, will facilitate the path towards sustainable SSF in tropical coastal areas of the world.

Associated publications

Herrón P, Castellanos-Galindo GA, Stähler M, Díaz JM, Wolff M (2019) Toward ecosystem-based assessment and management of small-scale and multi-gear fisheries: Insights from the tropical eastern Pacific. *Front. Mar. Sci.* 6:1–17

<https://doi.org/10.3389/fmars.2019.00127>

Herrón P, Kluger LC, Castellanos-Galindo GA, Wolff M, Glaser M (2020) Understanding gear choices and identifying leverage points for sustainable tropical small-scale marine fisheries. *Ocean Coast. Manag.* 188:105074

<https://doi.org/10.1016/j.ocecoaman.2019.105074>

RESEARCH REPORT



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The role of seagrass in coastal protection – findings from a physical perspective

Although often overlooked, seagrass beds are important ecosystems, ubiquitously found in marine coastal areas worldwide. Seagrass ecosystems constitute one of the most diverse and productive environments on Earth and provide habitat for a great variety of marine species. In addition, they provide a wide range of ecosystem services, such as the production of oxygen, the improvement of water quality, the sheltering of important species and the prevention of shoreline erosion by damping waves and storm surges. However, seagrasses are in global decline, and human disturbance, eutrophication, mechanical habitat destruction and overfishing have caused a loss of 30,000 km² in just the last decade.

The role of seagrass in coastal protection is crucial, and so the loss of seagrass ecosystems poses severe threats to the inhabitants of coastal areas. Seagrass attenuates the currents, dissipates wave heights and stabilizes the coastlines being considered as a ‘soft system’, to reduce the risk of flooding and erosion during sea level rises and extreme wave events.

To better understand the role of seagrass for coastal protection, we studied the physical processes behind it. The aim of this research is to understand the effects of free surface wave-seagrass interaction on the surrounding flow, and shoreward mean current mechanisms. To achieve this inves-



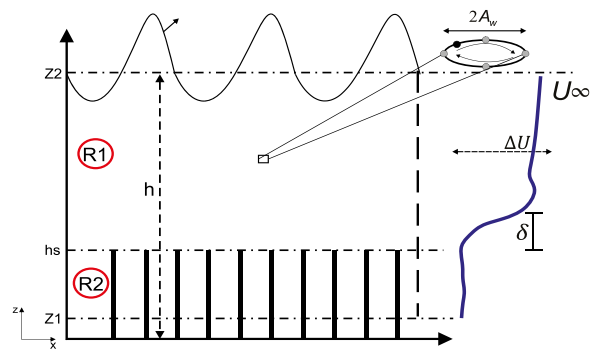
Often overlooked – Seagrass beds provide habitat for many marine organisms (left: seagrass, middle: lizardfish hiding in seagrass, right: sea urchin feeding on detritus between the seagrass).

Photos: J. Reichert

tigation, laboratory experiments along with analytical-mathematical approximations were developed, including the seagrass drag effects (damping source) on the flow.

We found that the presence of the seagrass attenuates the oscillatory velocity inside the seagrass patch and generates a shear layer (δ) at the top of the submerged canopy. The presence of the shear layer induces a strong vertical mixing across the top of the canopy and modulates wave-induced currents in the shoreward direction. The vertical mixing and the shear layer thickness are functions of the canopy density, but also of the horizontal orbital excursion value (A_w). Also, the more dissipated wave-induced orbital velocity inside the seagrass, the stronger vertical transport of mass between the water above and below the canopy top.

This simplified model has applications in large-scale models for coastal protection and ecosystem services. The wave decay by the seagrass drag appears to influence the mean shoreward currents. This, in turn, determines important coastal processes, such as sediment transport and nutrient distribution. Our research underlines the importance of seagrass for coastal protection, and calls for a sustainable use of its resources, in order both to protect the organisms and to maintain its essential ecosystem services for the inhabitants of coastal areas and beyond.



Laboratory experiments with plastic straw-seagrass mimic (left) were conducted to study the theoretical seagrass-wave flow scheme (right). There, the blue line is the horizontal velocity profile, $\eta(x,t)$ free surface wave profile, δ shear layer thickness, A_w horizontal orbital excursion, and h_s seagrass height. Photo: A. Cáceres Euse

Associated publication

Cáceres-Euse A, Variano EA, Toro-Botero FM, Gómez-Giraldo A, Osorio AF (2020) Simplified Model for Oscillatory Flow-Submerged Canopy Interaction. J. Hydraul. Eng. 146:4020073

<https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29HY.1943-7900.0001807?af=R>

ALUMNUS REPORT



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The benthic community in Tayrona National Natural Park harbors a great variety of corals, crustaceans, annelids, molluscs, echinoderms, and fishes. Photos: C. Eidens

I am a biologist with a strong focus on marine ecology. I received a diploma (master equivalent) and a Ph.D. from Justus Liebig University of Gießen in Germany. For my diploma thesis, I investigated algae-grazer interactions at the South China Sea in collaboration with the GEOMAR in Kiel (Germany) and the University of Malaysia, Terengganu (Malaysia). During my Ph.D. in the Systematics and Biodiversity Lab, led by Professor Dr. Thomas Wilke, I collaborated with the Leibniz Centre for Tropical Marine Research (ZMT) in Bremen (Germany), the Universidad Jorge Tadeo Lozano (Colombia), and the Instituto de Investigaciones Marinas y Costeras (INVEMAR, Colombia).

My research aimed to investigate the structure and resilience of benthic communities in Tayrona National Natural Park using spatio-temporal benthic community monitoring and quantification of benthic primary production in response to key environmental parameters. I received funding from CEMarin in order to conduct extensive field trips to Tayrona Park in close collaboration with INVEMAR, Parques Nacionales Naturales de Colombia, and local diving centers. Our studies on coral-dominated benthic communities in Tayrona Park indicated high spatio-temporal heterogeneity and high resilience capacities of the investigated ecosystems (Eidens et al. 2014). We found that there are complex hierarchical levels of local and

non-local environmental factors controlling the benthic community structures in coral reefs (Eidens et al. 2015).

After my Ph.D., I started working as a specialist for educational media production at the Institut für Film und Bild in Wissenschaft und Unterricht (FWU, Institute for Film and Image in Science and Education), editing scientific media productions and developing a digital biology schoolbook. Until

today, I am contributing to scientific teaching material that is used in various fields of education. As I saw my strengths in the educational sector, I started teaching biology and chemistry at a comprehensive school in Harsewinkel, Germany. My work allows me to combine my interests in science, education, teaching, media, and nature in the broader sense. Bringing my background gained from the various field experiences with the CEMarin and the collaboration of the different research institutes to our youngest generations, I hope to impart a deeper understanding of environmental issues, to give them the skills to engage in problem solving with informed and responsible decisions, and to take action to improve the environment.

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<https://peerj.com/articles/554/>

Eidens C, Hauffe T, Bayraktarov E, Wild C, Wilke T (2015) Multi-scale processes drive benthic community structure in upwelling-affected coral reefs. *Front. Mar. Sci.* 2:1–11
<https://www.frontiersin.org/articles/10.3389/fmars.2015.00002/full>



CEMarin part of the CONNECT research award

Within the framework of the "CONNECT Education-Research-Innovation" competition, organized by the German Ministry of Higher Education and Research (BMBF), a consortium of German and Colombian research and educational institutions—ColombiaCONNECT—recently won the research prize endowed with 1 million euros. The prize money can be used to establish and expand international networking and cooperation in research.

ColombiaCONNECT aims at the fair and sustainable use of bioresources in post-conflict Colombian society. Colombia is a megadiverse country, and its local and regional bioresources are both the basis for a healthy, sustainable and culturally acceptable diet for diverse population groups, and a pillar of Colombia's foreign trade. At the same time, the fair and sustainable use of bioresources, which is considered a mainstay for the fight against land and resource conflicts and thus for the long-term stabilization of the current peace process in Colombia,

is subject to great challenges. The problems arising in this context are further exacerbated by climate change and an increasing loss of biodiversity. In this tense domain between the global issues of resource use, sustainability, climate change and the conservation of biodiversity, a complex potential for conflict has emerged, but has been insufficiently investigated.

The present project therefore strives for an innovative transdisciplinary networking and meaningful complementation of the existing German-Colombian cooperation structures in the areas of peace and conflict research, biodiversity and climate impact research as well as bioeconomy and sustainable agriculture. The overall objective of the innovative collaborative project with high practical relevance is therefore to establish a permanent Colombian-German innovation network “ColombiaCONNECT - Fair and sustainable use of bioresources in a post-conflict society” (Fig. 1A).

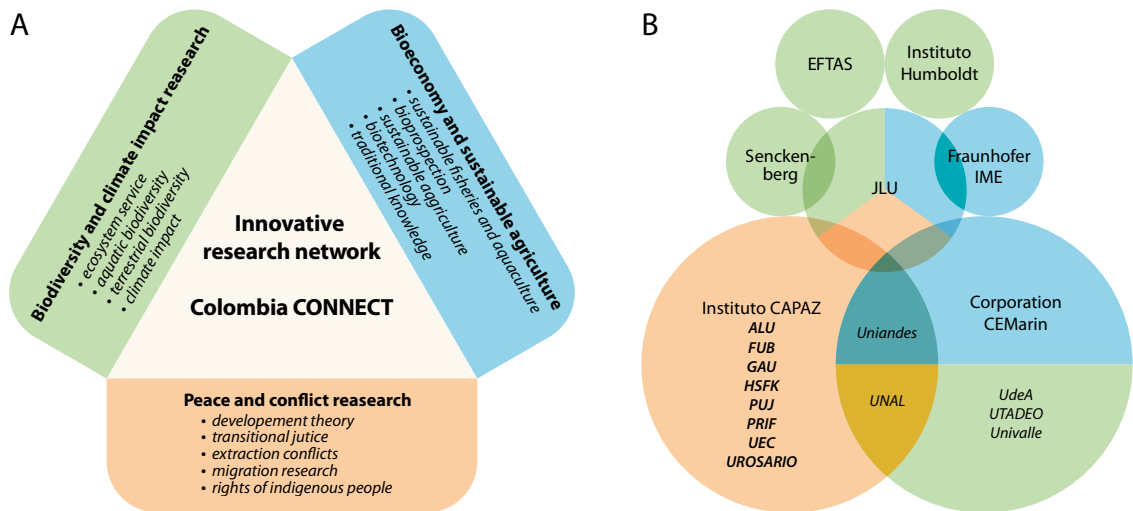


Figure 1: The three scientific pillars (bold) and thematic fields (italics) of the Colombia-CONNECT innovation network (A). Scientific coverage of these pillars and topics by the partners of Colombia-CONNECT (B).

The project has seven specific objectives: 1) to establish governance structures for the permanent work of the innovation network, 2) to publish a white book on the fair and sustainable use of bioresources in Colombia, 3) to implement transdisciplinary workshops, 4) to implement best practice projects, 5) to promote participation and public relations, 6) to develop a crowd platform, and 7) to prepare the institutionalization of ColombiaCONNECT (Fig. 1A).

ColombiaCONNECT consists of four German institutions: the Justus Liebig University of Giessen (consortium leader), the Senckenberg Society for Natural Resources Research in Frankfurt, the Fraunhofer IME, Bioresources Division in Giessen, and the remote sensing company EFTAS in Münster. Colombian partners are, besides CEMarin, the German-Colombian Peace Institute CAPAZ (Instituto Colombo-Alemán para la Paz) and the biodiversity

research center "Instituto Humboldt" in Bogotá (Fig. 1B). Furthermore, a close integration of additional social actors is planned, ranging from local interest representatives of small farmers, Afro-Colombian and indigenous groups, state actors and media to other German and Colombian SMEs.

CEMarin will mainly be responsible for the coordination of transdisciplinary best practice projects according to objective 4. Four best practice projects are carried out in cooperation with local enterprises for the targeted networking of the various actors, for the generation of project-relevant knowledge and for the preparation of collaborative research projects. In addition, CEMarin will employ and host the overall coordinator of ColombiaCONNECT. For the initial funding period, from September 1st 2020 to August 30th 2023, CEMarin will receive funds totaling 250,000 euros.

CEMARIN ACTIVITY REPORT

There is no doubt that 2020 has been an unprecedented year for all of us. At CEMarin it has also been an intense but fruitful year, following our mission to strengthen and promote marine sciences in the current global context.

In the following days, between the 28th of September and the 3rd of October, the International Conference on Marine Sciences - ICMS will take place. This event, opened to scientists, researchers and ocean lovers in general, will host some of the most renowned figures in marine sciences today: Daniel Pauly, Diana Pino, Robert Costanza, Jean François Flot, Joshua Cinner, Peter Wainwright, Luigi Cavaleri and the oceanographer Sylvia Earle. More information can be found at: marinescience.co

This year we also launched our *Manifesto for the Oceans*—an initiative of CEMarin, in alliance

with the Colombian Ocean Commission (CCO) and Conservation International (CI), created to unite the multiple actors involved in the use, regulation, investigation and protection of our oceans in the country and the region. It can be found at our webpage, cemarín.org.

Also, the celebration of World Oceans Day, organised by CCO, saw the inclusion of an academic panel, as well as our participation in the annual festivities organized by the Universidad de Antioquia and CES University. These activities were combined with the campaign #AsíCuidoLosOcéanos (“this is how I protect the oceans”), conceived to educate the general public of the urgent need to protect our oceans.

Between the 24th and 27th of July, the innovation challenge took place, organized by CI and the National University of Colombia, with the support of the CEMarin. Its goal was the design of alternative strategies to the use of expanded polystyrene in ar-

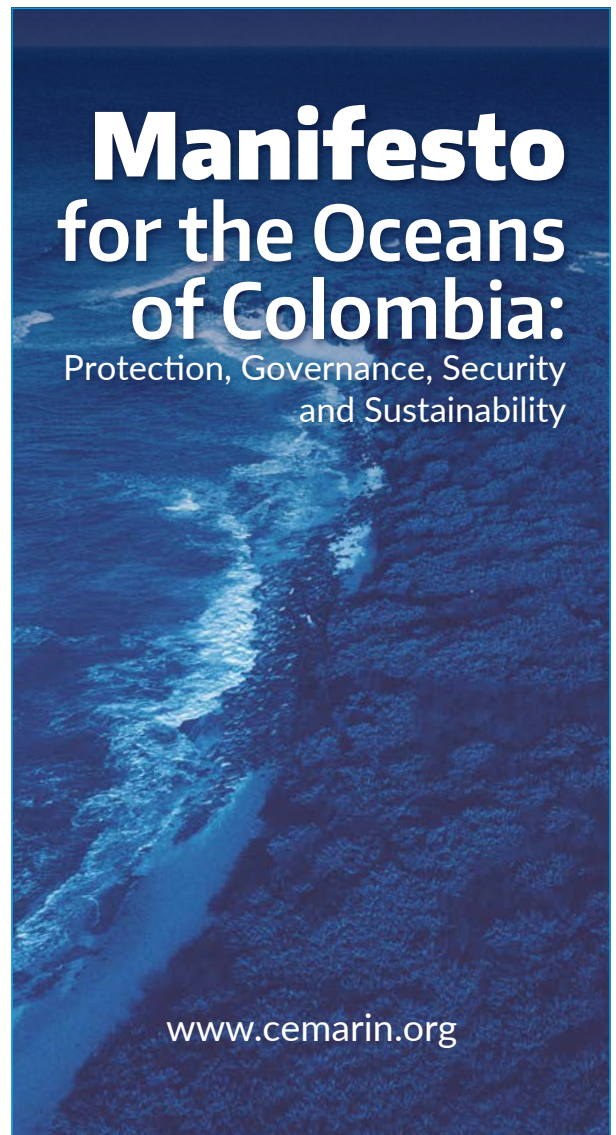
tisanal fishing. Alongside this, we created new digital platforms in order to strengthen our communication in times of social distancing; we were a part of multiple webinars and virtual panels, while our *Podcast por los océanos*, is now available at spotify and apple podcast. You can also subscribe to our digital newsletter sending an email to comunicaciones@cemarin.org

Last but not least, this year saw the first edition of the CEMarin Awards, as part of the celebration of CEMarin's 10th anniversary, created to commemorate the work of the people and organizations who are creating concrete actions in order to protect our marine ecosystems, appropriating concepts of sustainability, development and protection of the oceans in Colombia.

FEEDBACK ON THIS EDITION

We understand that one of the key elements to strengthen marine sciences in Colombia, and in the region, is the dissemination of scientific research, and communication between the multiple actors working in this area of knowledge. For this reason, we are growing our communication platforms, in order to generate wider conversations and adapt to the current global circumstances. We have moved CEMarin news to our bi-monthly digital newsletter, to give you more up-to-date information. We have created the *Podcast por los Océanos*, where we are beginning to explore the most relevant topics of the current state of marine sciences.


We would love to have your feedback on this edition, and on the topics and publications you would like to see on future editions. Please get in touch at comunicaciones@cemarin.org (also email us there if you would like to subscribe to our digital content).



Manifesto for the Oceans of Colombia:

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2020

TROPICAL OCEANS
FOR THE FUTURE

SEPTEMBER
28TH
OCTOBER
3RD

KEYNOTE SPEAKERS



Diana Ruiz Pino
Professor - *Sorbonne Université*
Climate change



Daniel Pauly
Professor - *University of British Columbia*
Marine resources/fisheries, living aquatic
resources management



Joshua E. Cinner
Chief investigator and Program 1 Leader
Climate change - *James Cook University*
Socioeconomic and natural resources +



Luigi Cavaleri
Associated Research - *CNR-ISMAR*
Oceanography



Peter Wainwright
Professor - *University of California-Davis*
Evolution and ecology of vertebrate
Biomechanics



Jean François Flot
Professor - *Université Libre de Bruxelles*
Molecular approaches to species
delimitation-Molecular systems +



Robert Costanza
Professor Vice Chancellor's Chair in
Public Policy - *Australian National University*
Sustainable solutions, ecological economics

**Special
Guest**



Sylvia Earle
President and Chairwoman - *Mission Blue*
Oceanography