

# Balears Verd

A Proposal for the Regeneration of Land and Sea in the Balearic Islands and Beyond



Keywords: Greening Balearic Islands, Climate Change Adaptation, Mediterranean Report IMBE, Food Sovereignty, Regenerative Agriculture, Responsible Innovation.

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## 1. KEY MESSAGES

**The Balearic Islands are at the center of Climate Change.** We are in a state of [planetary climate emergency](#)<sup>1</sup> and we will be among the first to suffer from its consequences in the near future if no action is taken [today](#)<sup>2</sup>. According to the latest [report](#)<sup>3</sup> by the International Panel on Climate Change (IPCC), we only have a 66% chance of stopping a temperature rise to +1.5°C and avoid the serious [consequences](#)<sup>4</sup> of reaching +2°C. Scientists widely agree that without immediate [action](#)<sup>5</sup> we are currently heading towards 3°C<sup>6</sup>. The Institute Méditerranée de Biodiversité et Ecologie<sup>7</sup> recently confirmed that Climate Change advances 20% faster in our region than the average of the planet. In other words, the Balearic Islands are confronted with the worst possible Climate Change scenario.

**Desertification and crop loss are already upon us.** Rain deficit and high temperatures across Europe have notably affected [yield gains](#)<sup>8</sup> and [expectations](#)<sup>9</sup>, particularly in [specialized crops](#)<sup>10</sup> such as Spanish olive oil. Climate Change is forcing farmers to redesign their cultivation practices: within an accelerated desertification process, many crops cannot succeed, and will eventually see their productivity reduced. A rise of 1°C causes a 20% [crop loss](#)<sup>11</sup>. While increasing periods of drought are already a reality, [future scenarios](#)<sup>12</sup> include food shortages and rationing, mass migration, and species [extinction](#)<sup>13 14</sup>. Immediate efforts are needed to simultaneously adapt to climate change, reframe farming practices, recover secondary sector, increase Eco-literacy for energy and reduce resource use, and secure food sovereignty in the [Balears and beyond](#)<sup>15</sup>.

**Posidonia ecosystems are shrinking at an accelerated pace.** Posidonia is endemic to the Mediterranean sea and its biggest prairies are in the Balearic Islands. Posidonia, a plant covering not less than 55.000Ha of the Mediterranean, is a driver of the islands' major touristic assets: crystalline water, white sand beaches and marine life nursery. Because of its manifold ecological functions, posidonia has an economic value of no less than 40.000 Euros/year<sup>16</sup>. Yet, water contamination, temperature rise, coastal modification and uncontrolled boat traffic is causing a loss of 6% of posidonia prairies each year. From 2000-2018, +30% of posidonia prairies were killed. As posidonia grows slowly over decades, it is key to protect the remaining prairies and regenerate damaged areas as soon as possible to re-stabilize our sea's central ecosystem.

**Social, economic and political pressure is rising.** Despite [formal commitments](#)<sup>17</sup> to reduce emissions and lower temperatures, European and the local public are intensifying [pressure](#)<sup>18</sup> on policy-makers and corporations to turn their promises into [tangible action](#)<sup>19</sup>. Social movements and [unrest](#)<sup>20</sup> against Climate Change are on the rise and are most forcefully mobilizing those generations that will suffer the most from the inaction of today: our children. Pressure will continue to rise and will increasingly put into question the [legitimacy](#)<sup>21</sup> of our democratic processes when it comes to acting on Climate Change.

**The COVID-19 pandemic represents a unique window of opportunity for the Balears.** The containment of the COVID-19 pandemic confronts the islands with a historic economic crisis ais provoking a major recession of local economies with yet unforeseen effects. At the same time, the economic standstill has granted nature an unprecedented break for the regeneration of sea and land, and has put alternative forms of economic and social life into a new spotlight. While social structures of solidarity and care became central for managing the pandemic, they have also renewed attention towards community building, small-scale farming and food sovereignty. As European and international institutions suggest a Green New Deal for overcoming the crisis, the development of local, eco-oriented solutions is paramount for the creation of sustainable economies and resilient communities in the short- and long-term future.<sup>22</sup>

## 2. MOTIVATION

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**Environmental degradation is a wake-up call for the Balearic Islands.** Over the last years, scientific evidence has simultaneously revealed that the Mediterranean is Europe's [most waste-polluted sea](#)<sup>23</sup> and that its sea level rise is accelerating at an unprecedented pace while soil irrigation is suffering from [water shortages](#)<sup>24</sup>, resulting in crop yields and waater quality decline and the inability to address [food demands, security and public health](#)<sup>25</sup>. As put bluntly by the Mediterranean Experts on Climate Change, "Recent accelerated climate change has exacerbated existing environmental problems in the Mediterranean Basin, caused by the combination of changes in [land use, increasing pollution and declining biodiversity](#)<sup>26</sup>. In most impact domains (water, ecosystems, food, health, security), current change and future scenarios consistently point to significant and increasing risks during the coming decades".

**Beyond such alarm bells, convincing strategies to tackle the adaptation to Climate Change in the Balearic Islands are largely missing.** Citizens of the region are well aware of the consequences of inaction: "[in 80 years, Mallorca will be a desert](#)" was repeatedly voiced during climate strikes in 2019<sup>27</sup>. [Local chapters](#) of "*Fridays x Future*" and "*Extinction Rebellion*" are the first symptoms of increasing unrest among young generations, NGO's, and Citizen's Associations in light of missing responses to scientific evidence and the lived experience of Climate Change<sup>28</sup>. Yet, while the young are enthusiastically gaining knowledge and skills to counter the airy promises of policy makers and businesses, those with the greatest capacity and responsibility either ignore or simply lack the necessary know-how to put adaptation strategies into action.

**Climate Change is a collective responsibility, and demands response-able citizens.** The colossal challenge to find appropriate solutions to today's effects of Climate Change as well as to future risks and scenarios seems impossible to be tackled by [single institutions](#)<sup>29</sup>. Awareness and skills to develop societal responses across generations, social backgrounds, and professions are urgently needed. Farmers in particular lack the resources and knowledge for creating viable and sustainable innovations in agriculture that have the ability to mitigate Climate Change. The disproportionate dependence on food imports faced by the Balearic Islands, in turn, is threatening the food supply of [all of us](#)<sup>30</sup>. Local food sovereignty can only be reached if there is a collective cultural shift in consumption and collaboration.

**In this proposal, we ask administrations to take a step beyond the declaration of climate emergency and call upon citizens and farmers to engage beyond protests and social movements.** Collectively, we can put into practice a plan for the massive regeneration of sea and land which will increase the natural fertility of soil and water, capture and retain rain, and absorb CO2, while expanding the ability of local food production, the population's Eco-literacy, and networked forms of collaboration. The Balearic Islands, a pioneer in tourist markets and their environmental consequences, could also become a pioneer of deep ecology.<sup>31</sup> A comprehensive strategy to tackle the decay of our soil, sea, landscape, and produce offers the chance to create a unique identity for the Balearic Islands in terms of tourism, trade, and local well-being. By increasing the capacity to act collectively across political parties, sectors, and segments of our society, we can foster a new culture of responsible innovation toward our sea and land.

**Towards the regeneration of land and sea in the Balears and beyond.** We propose a local adaptation plan to Climate Change which aims at the parallel re-greening of sea and land in the Balearic islands through public-private collaboration, the increase

of eco-literacy in our communities, and the transformation of environmental regulation and protection. Taken together, these strategies deliver high rates of return, bringing [multiple benefits to people and the economy](#)<sup>32</sup>.

Designed as a collaborative, cross-sector initiative, Balears Verd suggests six overarching strategies for the regeneration of land and sea in the Balears:

## **LAND**

**(1) Regenerate our soil**

**(2) Regreen our land**

**(3) Increase our eco-literacy and urban agriculture**

## **SEA**

**(1) Improve seawater quality**

**(2) Regreen our posidonia prairies**

**(3) Engage citizens into active environmental protection**

Balears Verd is working with and towards the UN Sustainable Development Goals, and will contribute to the 17 SDGs by enhancing local strategies of regenerative agriculture (see Annex).

## 3. Strategies for the Regeneration of Land and Sea in the Balearic Islands and Beyond

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### 3.1 LAND

#### (1) **Soil Regeneration:**

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##### **What's the problem?**

Our lands are too compacted by plows and tractors. This blocks the vertical descent of roots, forcing them to develop horizontally, resulting in greater sensitivity to drought and high temperatures. The compaction causes a low penetration of the water in the ground as well as a higher evaporation, factors that, combined with the use of chemical fertilizers, end up exterminating the microorganisms and earthworms responsible for the natural fertilization of the soil.

##### **What can be done?**

Soils can be regenerated, making them more permeable to rainfall and augmenting their water retention capacity. In particular, an [increase in the percentage of humus](#) (currently 1-2% while in a forest it exceeds 6%) and mulching lower the temperature of the soil while simultaneously covering and protecting it from the sun and wind using biomass, green manures and living plants<sup>33</sup>. As higher temperatures increase evaporation, it is more efficient to keep the land as fresh as possible if we want to improve water use, which will be increasingly scarce. Covering the ground with biomass also reduces the drying effect of the wind, which removes a good part of the rain and irrigation water.

##### **Key solutions:**

- ✓ **Regenerate the soil with organic matter:** soil can be regenerated within a 3-year span using regenerative agriculture techniques such as green crops, with tangible improvements from the 1<sup>st</sup> year onwards<sup>34 35</sup>.
- ✓ **Generate a circular economy for humus and food production<sup>36</sup>:** 30.000 tons of [kitchen waste produced by the hotels of Mallorca](#)<sup>37</sup> per year alone can be transformed into compost and humus, which would return vegetables and organic fruit to local residents and markets.

#### (1) **Land Regreening (Green Canopy):**

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##### **What's the problem?**

The “Vergel” (fruit trees, vegetables, chickens) and “Dehesa” (almond, carob, holm oak, cereals, legumes, cattle) have been traditional and efficient local strategies that have been gradually abandoned in favor of monocultures. The trees shade the cattle and the birds, and the prickly pears to the hens, who 'pay' with their fertilizer for the services provided. Cereals, fava beans and vegetables reduce soil exposure to the summer sun, while contributing their own shade to lowering the earth's temperature.

### What can be done?

Our tradition matches [Edible Food Forest Gardens](#)<sup>38</sup>, a proposal that combines trees, shrubs, plants, roots and vines working to build a mutually beneficial microclimate. They are central to island ecosystems. [Forests attract rain](#)<sup>39</sup>, an observation confirmed repeatedly in successful reforestation projects, cushioning and mitigating the effects of Climate Change, including posidonia<sup>40</sup> (see Annex).

### Key solutions:

- ✓ **Plant Edible Forest Gardens of 1 Million trees by 2025** (250.000 trees per year): Edible Forest Gardens absorb CO<sub>2</sub>, generate biomass, enhance food sovereignty and boost rural employment and biodiversity.
- ✓ **Engage relevant stakeholders:** Each firm, citizen's association, public administration body and school will plant and take care of its own food forest, either on public or private land. We have 28,000 public workers, 400,000 hotel beds, 170,000 students and 9,000 teachers, 40,000 companies, many of them with Corporate Social Responsibility (CSR) departments, who can plant their own forests. Food forests could also be integrated in the development of an Agrarian Park around Palma that could serve as a worldwide example of food sovereignty and local food production.

## (1) Urban agriculture and Ecoliteracy:

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### What's the problem?

By 2050, 70% of humanity will live in [cities](#)<sup>41</sup>, so it is urgent to investigate and realize local adaptation techniques and the production of plants adapted to semi-arid climates. Cities will [suffer](#)<sup>42</sup> particularly from Climate Change due to the preeminence of hard surfaces (squares, walls, roofs, asphalt, pavers) that absorb heat and accumulate it thanks to its thermal inertia and dark color.

### What can be done?

We have to redesign our cities towards food, energy and construction sovereignty. To do so, citizen's Eco-literacy needs to be increased, which will also equip the population with skills and knowledge to create and live from [urban agriculture](#)<sup>43</sup>. [Greening our cities](#)<sup>44</sup> has the double function of mitigating the increase of temperatures and reducing greenhouse gas emissions through the development of proximity food production, which further secures food sovereignty in urban environments. Similarly, rainwater harvesting should be another priority right now since hard surfaces gather large amounts of water that end up at the sewage system without further reuse.

### Key Solutions:

- ✓ **Create Innovation Centers for teaching and developing skills in Ecoliteracy:** Citizens, farmers, teachers, administrative staff, and companies can be trained in adapting and preparing collectively for Climate Change, facilitated through the creation of spaces for learning and experimenting with regenerative agriculture, food production, and sustainable bio-construction. Innovation centers for Ecoliteracy around the world serve as inspiring role models and partners for local efforts<sup>45 46 47</sup>.

- ✓ **Establish a network for urban agriculture:** Growing food close to where it is consumed improves food sovereignty of cities and can mitigate the temperature rise in cities. A network for urban agriculture boosts local employment, strengthens local communities and serves as a powerful educational asset that will gain a life of its own. A network of urban agriculture includes: (a) Using the city's shadows: any south Wall has a north side, therefore a shadow. City shadows can be cleverly used to avoid blazing summer midday sun; (b) Cultivation tables: urban gardening on wheels allows us to redesign spaces while shadowing terraces and floors. Recycled pallets are a free, abundantly available resource; (c) Vertical Gardens: Green Roofs and Vertical Gardens can colonize otherwise uninhabitable spaces and contribute to lower urban temperatures.

## 3.2 SEA

### (1) Posidonia Ecosystem regeneration:

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#### What's the problem?

Anchors and chains of yachts rake the marine floor, killing in hours many years of posidonia growth. Posidonia grows only 1 cm per year, and it is extremely sensitive to dumping of chemicals, sewage, brine and mechanical aggression. Albeit posidonia areas are restricted for mooring, the lack of fixed anchoring points contributes to the further destruction of posidonia prairies. In order to regenerate, the deterioration of posidonia needs to be brought to a halt immediately.

#### What can be done?

We propose a triple bottom action:

- › A combination of mooring points will order and limit the maximum amount of yachts and boats that can anchor on each spot
- › Each mooring point will also be an artificial reef, which will also work as a marine life nursery
- › These anchoring points will be designed as figurative sculptures, to provide a new, exciting angle for scuba and free divers, and creating a new touristic attraction that will help to connect visitors with that it is below the/their boats.

#### Key solutions:

- ✓ **Regulate and limit anchor slots:** In order to be sustainable, a spot has to have a maximum carrying capacity. This will be easily self-organized by the number of anchor points.
- ✓ **Generate a simple, direct living example of tripple-bottom line:** We are in desperate need of impact examples to inspire the next appropriate technology innovations. Learning by doing, inspiring by teaching.

### (2) Sea Regreening:

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#### What's the problem?

To stop the current deterioration of seagrass prairies we need to adress both the issues of water quality, water salinity and plastics. Mitigating the increase in ocean temperatures will require collective global action, however we can develop local, collaborative solutions to alleviate local threats to Posidonia prairies.

Blue Ecologists and Green Ecologists fight their own fights, disconnected. School activities are not really connected with active climate change actions.

## What can be done?

IMEDEA, (Instituto Mediterráneo de Estudios Avanzados) has successfully developed a posidonia reforestation protocol after a pilot project in Talamanca Ibiza and Pollensa Mallorca. We can include sea water tanks on our land reforestation greenhouses to engage students in the cultivation and care of posidonia planters, using the small plants that come to the shore after each strong storm. The practical result of growing and returning viable seedlings back to the sea and anchoring them at the seabottom adds up to the educational values of the whole process.

An innovative Biorock method<sup>48</sup> to speed up coral growth has also been successfully tested on posidonia. Therefore, we can add this new microelectricity technology to our mooring points adding a fourth dimension to the tripple-bottom approach.

## Key Solutions:

- ✓ **Include posidonia cultivation tanks in our greenhouses:** Engage students and schools to combine theory and practice. Biology, chemistry, physics, geography but also literature, poetry or philosophy can be connected and synchronized with the posidonia project.
- ✓ **Establish an information network :** We need to connect the dots between what happens on land and in the sea. First, we need Blue and Green Ecologists working together, it is time to merge. We also need to connect schools with climate change awareness. Balears Verd will engage schools to collect local data to monitor the starting point and the regeneration process and pace. Bio-indicators, biodiversity, contamination parameters, soil and water analysis to better understand what is happening and how to reverse degradation. We need to visualize and understand that data is not abstract information detached from reality but has direct implications ifor our environment, economy and lifestyle.

## (3) Transformation of environmental protection

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### What's the problem?

Streams and discharge pipes throw astonishing amounts of water and sludge into the sea, within a context of a thirsty land in desperate need of water and nutrients. When 20 liters of rain falls in a short, intense rainfall event, the water treatment plants cannot absorb the excess volume and the excess enters the sea without any control. Desalinization plants also throw their brine directly into the sea, at a concentration 3 times higher than sea water that Posidonia cannot tolerate <sup>49,50</sup>. Since Posidonia is extremely sensitive to higher salt content, this has a negative effect on their condition. In a similar way, microplastics currently outnumber marine plankton in a 20:1 ratio.<sup>51</sup> Plastic bags, bottles and containers end up in the sea, breaking down and entering the trophic chain. Microplastics are confused as food by the fish. Since microplastics also accumulate contaminants, finally entering to humans via fish consumption.<sup>52</sup> Posidonia is 5 times more efficient in capturing CO2 than a wood so each sq meter counts as five land equivalents.

### What can be done?

First, we have to stop overwhelming the sewage system and be fully aware that the uncontrolled discharge means throwing away to the sea what we have previously and anonymously dropped at our homes. Second, we cannot seriously tackle posidonia regeneration without a "B" plan for plastics, brine and periodical overflow events. Cleaning of brooks and better overcapacity strategies are paramount. Awareness and consciousness of garbage lifecycles among our population is key for reducing total dumping volumes.

### Key solutions:

- ✓ **Eco-education programs.** We need to make visible the invisible. This is how simple actions like the mooring point-artificial-reef-sculpture comes into play. We do not need expensive and complex procedures, but keen, effective actions that quickly engage citizens and stir their interest for their environment.
- ✓ **Artificial wetlands:** In a thirsty land, it is obvious that using an artificial wetlands approach is the next thing to focus on. Reducing the total flow entering the main sewage system with multiple, small artificial wetlands will also create greener surface and biomass while alleviating the existing depuration plants.
- ✓ **Stop Plastic:** Plastic cleaning campaigns are not enough. We have to radically stop entering plastic into our land and water ecosystems. Plastic is too precious and should be saved for better purposes. Melt plastic to recycle and change of social habits towards plastic.

## 4. Why support Balears Verd?

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*“I would like to endorse the document Balears Verd. It is an excellent analysis of the general problem of climate change and its particular effects on Mallorca. The course of action it puts forward is practical and offers hope. Continuing the present agricultural regime will become increasingly impossible as conditions deteriorate. Indeed not taking preemptive action will result in accelerating costs for repair: the Sant Llorenç disaster and the Almond disease are examples.*

*The beautiful background of rural Mallorca and fruits and foods it produces are what bring discerning visitors to the island, but these qualities are less and less appreciated by its urban inhabitants. They are distinct products of a unique rural economy which is neglected and urgently needs imaginative support.”*

John Sergeant, Architect and former farmer, Emeritus Fellow, Robinson College,  
University of Cambridge

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*“Scientists conclusively show that planting billions of trees worldwide is by far the most effective and cheapest way to deal with the climate crisis. I have long thought, and argued in articles and books, that regenerative agriculture and forestry are the only proven strategies to remove carbon from the atmosphere.”*

Fritjof Capra. Physicist, Writer. Director of the Ecoliteracy Center, Berkeley, California.

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*“The Mediterranean region and, in particular, Mallorca and the Balearic Islands, are ground zero for climate destabilization. The science is clear and so is the proper answer that is described here in detail. It requires a systematic and rapid response to the regeneration of natural capital to absorb carbon, rebuild soils, protect and enhance biological diversity, regenerate forests, conserve water and protect human health. The result could well be a model of expanding possibilities and hope for many other regions.”*

David Orr. Writer, and environmental activist. Director Emeritus of Oberlin College. Ohio.  
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*“Miquel Ramis' commitment to regenerative culture is deep and authentic, and his proposal for an action plan for climate change is absolutely timely. All those concerned with the integrity of nature and the well-being of planet earth should pay attention to the vision and plan Balears Verd”.*

Satish Kumar, founder of Schumacher College and editor emeritus of Resurgence and Ecologist Magazine.  
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*“Environmental degradation as a result of mass tourism, the effects of on-going climate change and COVID-19 seem to have created a window of opportunity for the Balearic Islands to thoroughly rethink their economy. As such, they could become a lighthouse example for the Mediterranean region and beyond of a tourism-based economy that is not only sustainable, but regenerative. Commonland enables and catalyses large-scale, holistic landscape restorations such as the Balears Verd could become, and is in conversation to explore how Commonland might support the further development of Balears Verd in an advisory role or as an active partner.”*

Bas Van Dyck. Developer at Commonland, Netherlands.

## 5. Endorsements and Supporters

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A hundred academic, cultural, social and business endorsements showcase a cross-cutting glimpse of the great potential of a focused and motivated citizenship:

Aedificat  
Annapurna Mamidipudi

Andreu Genestra  
Aranda, José Maria  
ArbreBalear  
Amics de la Terra  
Artifexbalear  
AAVV  
AAVV  
AAVV  
AMPAU/ Marco Menéndez  
Azorín Pablo  
Bestard, Bartomeu  
Balears Int. College  
Beth Neco  
Bibiloni, Joan  
Biel Mesquida  
Biochar Circle  
Bosch, Montserrat  
Block, Phillipe  
Buades, Joan  
Caballero, Gaspar  
Ca Na Toneta  
Capra, Fritjof  
Berkeley  
Carabassa, Vicenç

Fundación Colegio Arquitectos Técnicos  
Max Planck Society Research Fellow  
Deutsches Museum Munich.  
Restaurante 1\*Michelin. Cuina de la Terra.  
Avanç Filmacions educatives  
Asociació Balear de l'Arbre  
ONG. Sandy, Elisa, Adrian  
Miquel Ramis  
Asociacions de Veïns d'es Forti  
Asociacions de Veïns, Son Rapinya  
asociació de Veïns de Son Flor  
Empresa Constructora Construcción sostenible.  
Documentalista  
Cronista de la Ciutat de Palma.  
Allison Colwell. Directora. Sa Porrassa Campus.  
Artista  
Músico  
Escriptor i Periodista.  
Empresa. Christer Soderberg.  
UPC. Grup Recerca CIGITED-UPC  
ETH Zurich. Director NCCR. Socio ODB Engeniering.  
Escriptor i Professor  
Pionero Agricultura Ecológica. Parades de Crestall.  
Restaurant SlowFood. Maria i Teresa Solivellas.  
Físico y Escritor. Director del Ecoliteracy Center.  
UDI. Master Ciencias del suelo. Univ. Lleida.  
Investigador CREA.

Carayon, Stephane  
 Cardona, Jesus  
 Carles Oliver  
 Carme Riera  
 Centre de Resiliencia de Mallorca  
 Cleanwave  
 COAITB  
 Cohen, Scott  
 COMMONLAND  
 Comparini, Bering  
 Contreras, Jesus  
 Costa, Joan  
 Cotseli, Irina  
 Cusí, Eugenia  
 David, Lara K.

De Churtichaga, Jose María  
 De la Mata, Toni  
 De Lucas, Ivan  
 Ecocreamos  
 Ecohabitar  
 EcoMallorca  
 Edificam  
 Ermacora, Thomas  
 Ernst, Jürgen  
 Es Ginebró  
 Escarrer, Maria Antonia  
 Escola Activa de Mallorca  
 España, Luís  
 Esplugas, Josep  
 EtiCentre

Factoria de Somnis  
 Frahms, Nils  
 Fundación Biodinámica Mallorca  
 Fundació per la Vida  
 Fundación Orquesta Nacional Jazz  
 Fundació Pilar i Joan Miró  
 Furgol, Nina  
 Gaiá, Catalina  
 Garcia, Alejandro

Portugal  
 Garcia, Alvaro  
 Garden Hotels  
 Gob Menorca  
 Gascón, Jordi  
 Graves, Tomás  
 Hernandez, Luís Miguel  
 Holles, Joe  
 Hubert, Laurent  
 IMEDEA  
 Irueste, Enric  
 Kumar, Satish  
 Lambert, Stephen

Lull, Guillem  
 Marques, Guilhermina  
 Mallorca`s Biochar

Pagès i Forner (Boulangier-Peyson)  
 Coordinador DEM (Directrius Estratègiques Menorca)  
 Arquitecto IBAVI. Save Posidonia Project.  
 Escriptora.  
 Lluís Llabrès.  
 ONG for a plàstic-free world. Jose Escaño Roepstorff  
 Colégio de Arquitectos Técnicos de Baleares  
 Fundador. New Lab, Nueva York.  
 Regenerative Landscapes Restauration Projects.  
 Director Creativo. Comparini Asociados.  
 Catedratic Antropologia. Univ, Barcelona.  
 Escultor.  
 Pianista y Cantante.  
 Dir.Gen. Grupo TAST. Presidenta Pimem Restauración.  
 Architect, Forrester. Co-Director Auroville Earth Institute,  
 India.Unesco Chair Earthen Architecture.  
 Dr. Arquitecto. Ex-Vicedecano Universidad Miami.  
 Escultor.  
 Actor  
 Eduardo Ramos. Empresari i Pioner Agricultura Ecològica.  
 Revista Bioconstrucción.  
 Alfonso Trías. Portal ecológico online.  
 Empresa Constructora. Conchita Pfitsch.  
 Social Entrepreneur. Clair Villages London Director.  
 Inversor  
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 Consejera Sol Meliá Hotels.  
 Centro Educativo  
 Empresario y Doctor.  
 Director Postrado Dinamización Local Agroecológica. UAB  
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 Grupo5, Muneval, Sostenible XXI, Brillosa, Nartha, Fusteria Font,  
 Autrex (Tot Herba) ...)  
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 Dtor ejecutivo Iniciativas Richard Driehaus España y

Economista  
 Cadena Hotelera (11 hotels) Jaume Ordines  
 Miquel Camps- ONG. Custodia del Territori.  
 UB. Profesor Antropologia Universitat de Barcelona  
 Escritor y músico.  
 Abogado.  
 Patrono Fundació Iniciatives del Mediterrani.  
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 Institut Mediterrani d'Estudis Avançats / UIB/CSICU  
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 Educador. Fundador del Schumacher College.  
 Associate Consultant University College London:  
 Honorary Research Fellow, University Of East Anglia  
 Peasant. Ancient wheats recovery.  
 UTAD. Univ. Alto Duero. Lab Head from CITAB  
 Centro de Invest. & Tecnologias Agroambientais e Biológicas  
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Oliver, María

.Oliveras, Elsa  
Orr, David  
Pastor, Xavier  
Paul Bernatas  
Pep Banyó  
devils.  
PIMEM

Plasencia, Adolfo  
Permamed  
Pipkin, Oscar  
Pocapoc  
Pons, Montserrat  
Ramage, Michael

Ramirez, Alfonso  
Ramirez, Rafael  
Regenag Ibèrica  
Reyes, Toni  
Rigo, Antonio  
Rinaldi, Michelle  
Riu Hotels  
Sampol, Dolores  
Save the Med  
Sebastián Caldentey  
Sergeant, John  
Soler, Rafael

Sybillà.  
Soberats, Pere  
Son Amar  
TENDAM Grup

Tarabini, Antoni  
Tomeu Caldentey  
Toni Perera  
Transition Towns España  
UIB Lince  
UIB Smart Uib  
UIB  
UIB  
UIB  
Vegas, Fernando, Dr Arquitecte  
Vell Marí  
Viva Hotels  
Vidal Valicourt, José  
Viridetum  
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Pedro Barbadillo  
Redactora del Pla Parc Agrari Palma  
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Moviment Ecolocal Mallorquí. Atuk, Lara  
Guillem Coll. Empresario.  
Architecture, Design and Landscaping. Deia.  
Consultora de Arte y Agricultura.  
CEO Schörghuber Corporate Group  
Investigadora, doctora en biología,  
Profesora asociada UAB i UIB  
Interiorista  
Escritor y Educador. Oberlin College. Ohio.  
Oceanógrafo  
Ex-Director General Timberland  
Bluesman i Tereser. Harmònica Coixa Blues Band/Blue

Gustavo de Vicente. Gerente.  
Confederación Pequeña i Mediana Empresa de Mallorca.  
UPV. Autor de "Is the Universe an Hologram?" MIT Press.  
Asociación Permacultura Mediterránea  
Fotógrafo. Director Projectes Centro Unesco de Mallorca.  
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Centre Experimental Figueres Son Mut nou.  
Cambridge Univ. Doctor. Ms Arquitectura, Ms Ingenieria  
Estructural. Director, Centre for Natural Material Innovation.  
UNAM. Doctor Arquitecto. Univ. Autónoma de Mèxico.  
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Agricultura Regenerativa Ibèrica.. Ana Digón.  
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UPV. Doctor Arquitecto. Profesor emèrit Univ. Polit.  
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Projecte innovació Cases Llucies.  
Grup Investigació Empreses i Destins Turístics  
Laboratori Empreniment e Innovació Social  
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Autor de " Designing Regenerative Cultures"  
Empresa Constructora. JM Cereijo.  
Youth in Permaculture

## 6. Appendix

### 1. Overview of Key Objectives:

Strategy	Objectives	Quantity
<b>(1) Soil Regeneration</b>	Boost % of organic matter (3 years)	4%
	Double soil water retention capacity (1 year)	100%
	Reduce soil temperature 5°C (1 year)	5°C
	Produce fungid compost (6 months)	1 Ton
	Produce bio-fertilizers (6 months)	100 L
<b>(2) Regreening</b>	Tree planting 90% survival rate at 3 <sup>rd</sup> year	100 m <sup>2</sup>
	Verdeles, Dehesas, Food Forrest Gardens	100 m <sup>2</sup>
	Tree saplings adapted to Climate Change	1000 ud
	Posidonia planters in greenhouses	( Imedeia, STM)
	Posidonia Sea planting	( Imedeia, STM)
	Anchoring points-Artificial Reefs- Sculptures	To be determined
<b>(3) Urban Agriculture and Ecoliteracy</b>	Innovation centers	1000m <sup>2</sup>
	Urban gardens / shadowing	100 m <sup>2</sup>
	Cultivation Tables for urban gardening	10 m <sup>2</sup>
	Green Roods and Vertical Gardens	50 m <sup>2</sup>
	Schools data recollection and follow-up	

### 2. Estimated Budget:

Stakeholders (2020-2024)	Total
Innovation Centers / Eco-Literacy / Greenhouses / Tools (workshops, material, classes and teaching)	4 Million
Land owners (reforestation and soil regeneration)	4 Million
Associations and NGO`s (coordination and management)	800.000
Total cost for 4 years	8,8 Million EUR
Total cost per year	2,2 Million EUR/ Year

### 3. Options for Financing

Funds	Investment Opportunity
Balearic Islands Ecotax	Ecoliteracy program and innovation centers
Ministry for Ecologic Transition Spain	Ecoliteracy program and innovation centers
European Commission	Rural employment and local development
Philanthropy, private foundations and donors	Soil regeneration and edible forest gardens

## 7. Authors of the Proposal:

**Miquel Ramis** is the founder and director of Artifexbalear, a non-profit Association, declared of public utility, working since 2003 on the recovery and innovation of the Building Arts, Regenerative Agriculture and Appropriate Technology.

Based at Son Puigdorfila Vell, Son Rapinya, Mallorca, Artifex activities include classrooms, bioconstruction and regenerative agriculture workshops, land and water. Artifex has been working for more than a decade in the search for appropriate technology solutions, easily implemented, with local materials and resources. Sustainable construction, water, biomass, energy, regenerative agriculture, agroecology. Identifying solutions and execution processes for our climate range and offering proven experience in training and project execution. We believe that change can only be made by crossing the bridge between theory and practice. Also, that it will only be possible with an understanding between social, economic and environmental media.

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## 8. Key reports:

100 Economists reveals that protecting 30% of the planet yields 5:1 benefits.  
<https://www.campaignfornature.org/protecting-30-of-the-planet-for-nature-economic-analysis>

Risks associated to climate and environmental changes in the mediterranean region. MedECC Network (Mediterranean Climate Change Experts) 2019.  
[https://ufmsecretariat.org/wp-content/uploads/2019/10/MedECC-Booklet\\_EN\\_WEB.pdf](https://ufmsecretariat.org/wp-content/uploads/2019/10/MedECC-Booklet_EN_WEB.pdf)

1.000 Scientists of 153 countries declare the World Climatic Emergency  
<https://www.theguardian.com/environment/2019/nov/05/climate-crisis-11000-scientists-warn-of-untold-suffering>  
<https://www.larazon.es/sociedad/mas-de-11000-cientificos-declaran-la-emergencia-climatica-PH25553905>

2018 IPCC Report:

<https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>

El Mundo: Mediterranean Sea warms up 20% faster than Planet average.  
<https://www.elmundo.es/ciencia-y-salud/ciencia/2019/10/10/5d9f470bfdddf683b8b47af.html>

El País : Mediterranean Sea, Zero zone of Climatic Emergency.  
[https://elpais.com/sociedad/2019/10/08/actualidad/1570545300\\_377791.html](https://elpais.com/sociedad/2019/10/08/actualidad/1570545300_377791.html)

RTVE: +4º C de Temperature rise at Mediterranean before the end of century.  
<http://www.rtve.es/noticias/20191010/mediterraneo-mar-subira-metro-temperatura-cuatro-gradus-menos-siglo-si-no-actuamos/1981205.shtml>

The Guardian: Climate Change will turn South Spain into a Desert.  
<https://www.theguardian.com/environment/2016/oct/27/climate-change-rate-to-turn-southern-spain-to-desert-by-2100-report-warns>

IMBE: <https://www.imbe.fr>

IMBE Mediterráneo Paper, Nature Mag: <https://www.nature.com/articles/s41558-018-0299-2>

Ethiopia plants 353 M. trees in a day (within a 4B plan for 2030).  
<https://www.theguardian.com/world/2019/jul/29/ethiopia-plants-250m-trees-in-a-day-to-help-tackle-climate-crisis>

Pan African Initiative to reforest 100M Ha before 2030 <https://afr100.org/>

City of Milan will plant 3 M Trees for 2030  
<https://www.theguardian.com/cities/2019/nov/05/green-streets-which-city-has-the-most-trees>

## 6. Climate Action Proposals:

Implications of Climate Change for the US Army. Army War College.

[https://climateandsecurity.files.wordpress.com/2019/07/implications-of-climate-change-for-us-army\\_army-war-college\\_2019.pdf](https://climateandsecurity.files.wordpress.com/2019/07/implications-of-climate-change-for-us-army_army-war-college_2019.pdf)  
[https://www.vice.com/en\\_us/article/mbmkz8/us-military-could-collapse-within-20-years-due-to-climate-change-report-commissioned-by-pentagon-says](https://www.vice.com/en_us/article/mbmkz8/us-military-could-collapse-within-20-years-due-to-climate-change-report-commissioned-by-pentagon-says)

The One Degree War Plan. Paul Gilding, Jorgen Randers:  
<https://paulgilding.files.wordpress.com/2015/01/one-degree-war-plan-emerald-version.pdf>

The Victory Plan. Ezra Silk:  
<https://www.theclimatemobilization.org/victory-plan>

The Green New Deal:  
<https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf>  
<https://www.nytimes.com/2019/02/21/climate/green-new-deal-questions-answers.html>

Green New Deal for Europe:

<https://www.gndforeurope.com/10-pillars-of-the-green-new-deal-for-europe>  
<https://www.forbes.com/sites/davekeating/2019/08/28/the-eu-will-beat-the-us-by-launching-a-green-new-deal-this-autumn/>

Artículo by Jeremy Rifkin:

[https://elpais.com/elpais/2019/10/11/ideas/1570787583\\_304420.html](https://elpais.com/elpais/2019/10/11/ideas/1570787583_304420.html)

## 9. Sustainable Development Goals (SDG's) & Balears Verd:

SDG`s	Balears Verd
1: Poverty	Food Sovereignty, local resources increase, rural employment
2: Hunger	Food sovereignty, local ecological, nutrient-dense, fresh food
3: Health, wellbeing	Food sovereignty, local ecological fresh food, no chemicals
4: Education	Eco-literacy to citizens, schools and farmers.
5: Gender equality	Regenerative Agriculture methods fosters gender equality.
6: Water	Improved soil water capture and retention. More efficient water use.
7: Energy	Biomass for agriculture and energy production
8: Employment	Local workforce using local resources
9: Innovation	Appropriate technology as most cost-effective investment strategy.
10: Inequality	Food sovereignty. Access to land.
11: Cities	Urban and proximity agriculture, local employment, temperature/water
12: Consumption	Local ecological food production fosters local economy.
13: Climate	Regreening is the main and most effective climate change strategy. <i>(See 2020 Report 100 economists)</i>
14: Sea water	Posidonia reforestation. Regenerative Agriculture fights salinization.
15: Ecosystems	Regenerative Agriculture treats farm as ecosystems.
16: Justice, Peace	Food sovereignty and inclusive resources access.
17: Alliances	Cross-cutting alliance, network across Balearic society and beyond.

**9. In-Text References:**

- <sup>1</sup><https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biz088/5610806>
- <sup>2</sup><https://www.nature.com/articles/s41558-018-0299-2>
- <sup>3</sup><https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>
- <sup>4</sup><https://science.sciencemag.org/content/354/6311/465>
- <sup>5</sup><https://www.medecc.org/medecc-booklet-isk-associated-to-climate-and-environmental-changes-in-the-mediterranean-region/>
- <sup>6</sup><https://www.sciencedirect.com/science/article/abs/pii/S0921800916314513#!> Escenario de +3-4°C
- <sup>7</sup><https://www.imbe.fr/>
- <sup>8</sup><https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biz088/5610806>
- <sup>9</sup><https://science.sciencemag.org/content/361/6405/916.full>
- <sup>10</sup>[https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/short-term-outlook-summer-2019\\_en.pdf](https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/short-term-outlook-summer-2019_en.pdf)
- <sup>11</sup><https://www.euronews.com/2019/09/18/the-brief-climate-change-threatens-the-future-of-crops>
- <sup>12</sup><https://www.ipcc.ch/sr15/chapter/chapter-3/>
- <sup>13</sup><https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>
- <sup>14</sup><https://advances.sciencemag.org/content/5/5/eaav2539> Analiza coextinción especies.
- <sup>15</sup>[https://elpais.com/sociedad/2019/10/08/actualidad/1570545300\\_377791.html](https://elpais.com/sociedad/2019/10/08/actualidad/1570545300_377791.html)
- <sup>16</sup>[http://www.juntadeandalucia.es/medioambiente/portal\\_web/web/temas\\_ambientales/programas\\_europeos\\_y\\_relac\\_internac/programas\\_europeos/life/proyectos\\_ejecucion/LIFE09\\_posidonia/informe\\_layman.pdf](http://www.juntadeandalucia.es/medioambiente/portal_web/web/temas_ambientales/programas_europeos_y_relac_internac/programas_europeos/life/proyectos_ejecucion/LIFE09_posidonia/informe_layman.pdf)
- <sup>17</sup><https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
- <sup>18</sup><https://www.business-humanrights.org/en/liability-for-climate-inaction-who-will-be-next>
- <sup>19</sup><https://www.clientearth.org/press/lawyers-put-local-authorities-on-notice-over-climate-inaction/>
- <sup>20</sup><https://www.fridaysforfuture.org/>
- <sup>21</sup><https://www.independent.co.uk/environment/climate-change-sue-governments-companies-legal-action-warning-natural-disasters-clientearth-a7917106.html>
- <sup>22</sup> Protecting 30% of Planet's Land and Ocean Outweigh the Costs at Least 5-to-1  
<https://www.campaignfornature.org/protecting-30-of-the-planet-for-nature-economic-analysis>
- <sup>23</sup><https://www.sciencedirect.com/science/article/abs/pii/S0025326X19305612>
- <sup>24</sup><https://ec.europa.eu/jrc/en/science-update/worrying-effects-accelerating-climate-change-mediterranean-basin>
- <sup>25</sup><https://www.medecc.org/medecc-booklet-isk-associated-to-climate-and-environmental-changes-in-the-mediterranean-region/>
- <sup>26</sup>[https://www.medecc.org/wp-content/uploads/2018/12/MedECC-Booklet\\_EN\\_WEB.pdf](https://www.medecc.org/wp-content/uploads/2018/12/MedECC-Booklet_EN_WEB.pdf)
- <sup>27</sup><https://www.diariodemallorca.es/mallorca/2019/03/15/medio-millar-estudiantes-protestan-palma/1400572.html>
- <sup>28</sup><https://www.ultimahora.es/noticias/local/2019/09/27/1109359/huelga-mundial-por-clima-manifestacion-palma.html>
- <sup>29</sup><https://www.theguardian.com/commentisfree/2019/jul/10/individuals-climate-crisis-government-planet-priority>
- <sup>30</sup><http://www.ub.edu/geocrit/b3w-1000.htm>
- <sup>31</sup><https://www.saveposidoniaproject.org/es/> Impressive example of the use of local resources for ecobuilding.
- <sup>32</sup><https://gca.org/global-commission-on-adaptation/report> Research from the Global Commission on Adaptation finds that investing \$1.8 trillion globally in five areas from 2020 to 2030 could generate \$7.1 trillion in total net benefits.
- <sup>33</sup><https://www.mdpi.com/books/pdfview/book/318>
- <sup>34</sup><https://brownsranch.us/> From 1,7% to 11/ organic matter in the soil.
- <sup>35</sup><https://www.soilsforlife.org.au/case-studies/winona> 840 Ha Farm soil doubled organic matter in 10 years.
- <sup>36</sup><http://www.circulareconomysummit.com/en/about>
- <sup>37</sup><https://www.diariodemallorca.es/mallorca/2019/05/13/compost-hecho-restos-cocina-hotel/1416464.html>
- <sup>38</sup>[https://en.wikipedia.org/wiki/Forest\\_gardening](https://en.wikipedia.org/wiki/Forest_gardening)

<sup>39</sup><https://www.weforum.org/agenda/2017/08/how-trees-in-the-amazon-make-their-own-rain/>

<sup>40</sup> On may wonder why is Posidonia included in the plan. This needs a little explanation: Mallorca has 3600 km<sup>2</sup> of surface, and 900.000 inhabitants. We should easily be able to plant 1 tree per inhabitant... every year...but this is not enough. Our coasts are not the limit of our biological borders, we are an ecosystem that includes the sea. Posidonia is not a seaweed but a plant, with roots, steep, leaves and fruits. It is the largest living organism in the world of about 8 kilometers in length, a 100,000 years old living organism, when only Neanderthals inhabited Europe and a UNESCO natural asset of the World Heritage. The Balearic Islands is the Community with the highest area of Posidonia of Spain, 50% of the total inventory with an area of 633 square kilometers. Our sea prairies are in fact marine woods, great CO<sub>2</sub> capturers, generators of marine life, and ultimately, the reason of the transparency of our sea. At the present moment, it is an endangered species, due to the combined action of the anchors and chains of the yachts and the climate change water temperature increase. The Imedeia has successfully replanted posidonia at Mallorca and Ibiza. It is our duty as custodians of our ecosystems to join elements and start to care about posidonia too.

<sup>41</sup><https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html>

<sup>42</sup><https://www.scientificamerican.com/article/urban-heat-islands-mean-warming-will-be-worse-in-cities/>

<sup>43</sup><https://www.geoplastglobal.com/en/insights/urban-farming-3-examples-implement-new-trend/>

<sup>44</sup><https://www.theguardian.com/cities/2019/aug/20/death-blackouts-melting-asphalt-ways-the-climate-crisis-will-change-how-we-live>

<sup>45</sup><http://centrolasgaviotas.org/inicio.html/realizaciones-html/> 8 million trees planted

<sup>46</sup>[https://www.auroville.org/contents/1121\\_1\\_Million\\_trees\\_planted.](https://www.auroville.org/contents/1121_1_Million_trees_planted.)

<sup>47</sup><https://www.barefootcollege.org/>

<sup>48</sup> Thomas Goreau: Biorock Technology. <https://www.biorock.org/content/method>

### Posidonia Reports:

Report desalination sewage and Posidonia. Silvia Tejada, Samuel Piña et Al. UIB.

[https://www.researchgate.net/publication/341521536\\_Hypersaline\\_water\\_from\\_desalination\\_plants\\_causes\\_oxidative\\_damage\\_in\\_Posidonia\\_meadows](https://www.researchgate.net/publication/341521536_Hypersaline_water_from_desalination_plants_causes_oxidative_damage_in_Posidonia_meadows)

.....

Effects of salinity on leaf growth and survival of the Mediterranean seagrass *Posidonia oceanica*(L.) Delile

<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiRuoqKsujqAhUID2MBHeErBDcQFjABegQIBBAB&url=https%3A%2F%2Fwww.sciencedirect.com%2Farticle%2Fpii%2FS0022098105000079&usq=AOvVaw0dtruwjmkKBXDt8Lfpnxw>

.....

Salinity tolerance of the Mediterranean seagrass *Posidonia oceanica*: recommendations to minimize the impact of brine discharges from desalination plants- Marta Manzanera et Al.

<https://digital.csic.es/handle/10261/59110>

.....

Impact of the brine from a desalination plant on a shallow seagrass (*Posidonia oceanica*) meadow

Javier Romero et Al.

<https://digital.csic.es/handle/10261/74464>

.....

Detecting water quality improvement along the Catalan coast (Spain) using stress-specific biochemical seagrass indicators. Javier Romero et Al.

<https://digital.csic.es/handle/10261/112832>

.....

Coastal inshore waters in the NW Mediterranean: Physicochemical and biological characterization management implications. Marta Manzanera. Jordi Costa.

<https://digital.csic.es/handle/10261/48872>

Duarte CM, Fourqrean J, Krause-Jensen D, Olesen B, 2006 ,Dynamics of seagrass stability and change. In: AWD Larkum, RJ Orth y CM Duarte (eds.). Seagrasses: Biology, ecology and conservation, *Springer*, The Nederalnds 271-294.

Romero J, 2004 a. Posidònia, Els prats dels fons del mar. Escola del mar, Centre d'estudis marins de Badalona, Àmbit de Medi Ambient, Sostenibilitat i Habitatge. Ajuntament de Badalona, 159pp.

Mateo MA, Cebrián J, Dunton K, Mutchler T, 2006, Carbon flux in seagrass ecosystems. In: AWD Larkum, RJ Orth, CM Duarte (eds). Seagrasses biology, ecology and conservation, *Springer*, The Netherlands.

<sup>49</sup> Posidonia Salt tolerance range is 35.5 to 39.5 PSU while desalination plants rise salt content up to 50 PSU. (Ruiz Fernandez et al., 2009). (Cambridge et al., 2017; Garcia et al., 2007).

<sup>50</sup> *Hypersaline water from desalination plants causes oxidative damage in Posidonia oceanica meadows* (Capó, Sureda et al 2020) The 8 desalination Plants of the Balears release up to 15 Hm<sup>3</sup> of hypersaline water/year.

<sup>51</sup> *Microplastics in a Marine Environment* ( Zobkov, Esikova,2016)

52