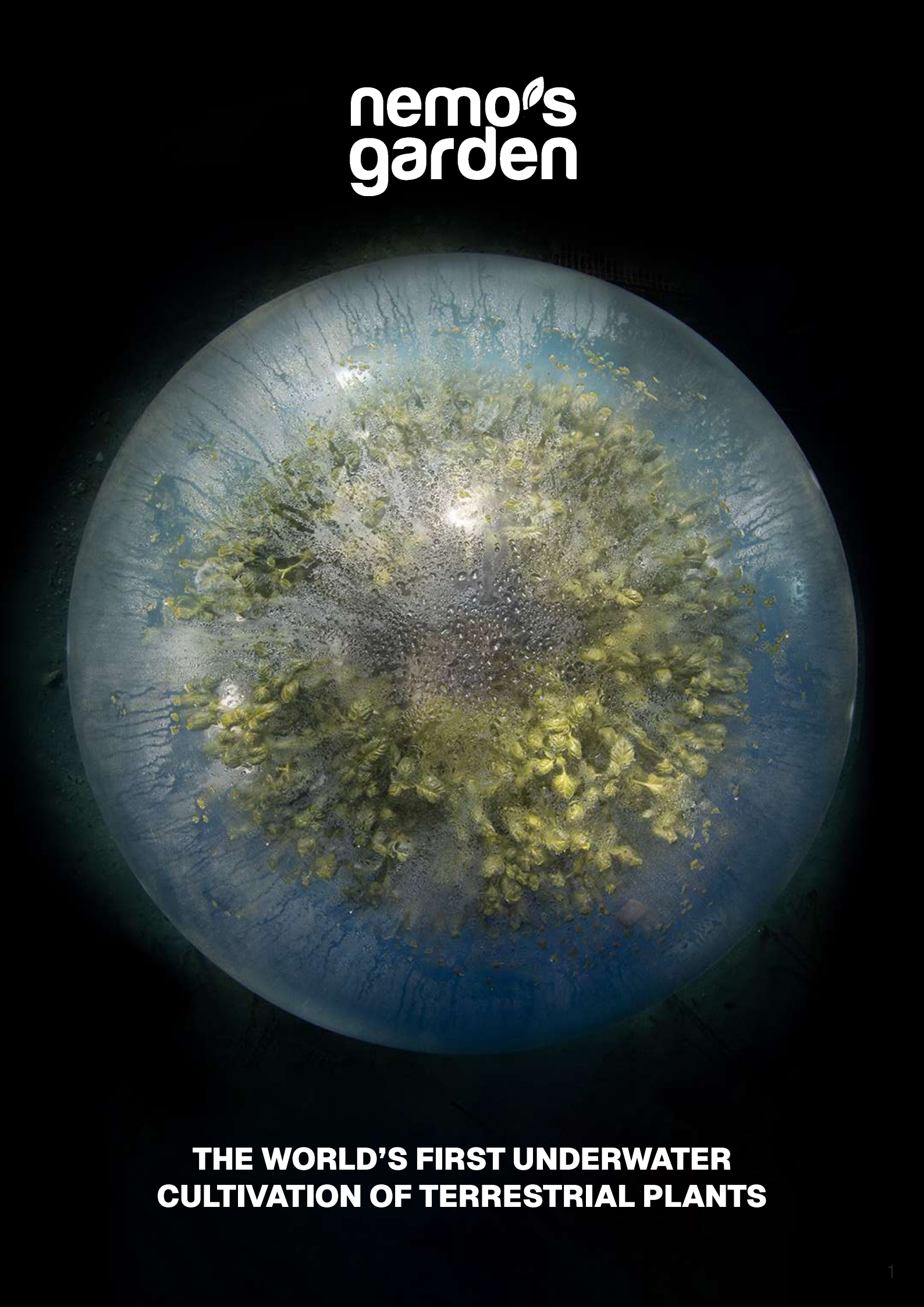
nemo's garden



THE WORLD'S FIRST UNDERWATER CULTIVATION OF TERRESTRIAL PLANTS

Nemo’s Garden is the first ever **underwater greenhouse modular system**, pioneering sustainable agriculture.

It works as a **hydroponic-based, self-sustainable system** composed of transparent pods, anchored to the bottom of the sea, floating below the surface of the water.

THE PROJECT GOAL

Deliver next-generation sustainable Agri-Tech for regions facing climate stress, resource scarcity, or the need for innovative solutions.

At Nemo's Garden, we practice **natural engineering —** an approach that works with nature, not to deplete it. Instead of forcing environments to fit our needs, we adapt to existing conditions and enhance their natural potential. It's about harnessing what's already there — light, pressure, temperature, humidity — and turning challenges into advantages, sustainably. The foremost important condition being the oceans and other bodies of water.

nemo's garden

NG S.r.L. Società Benefit

POSITIVE FOOTPRINT

Nemo's Garden is not only a technological endeavor, aimed at making underwater farming an economically viable, long-term alternative form of agriculture, but most and foremost it is an eco-friendly and self-sustainable project.

Self-Sustaining by Design

Nemo's Garden is more than a technological innovation—it's a self-sustaining ecosystem rooted in ecological balance and long-term viability. Designed to function in harmony with its environment, the system relies entirely on renewable energy and natural processes.

Renewable energy powers operations, while seawater is naturally desalinated to provide freshwater for irrigation. Inside the biospheres, a highly stable microclimate and optimal thermal conditions created by the surrounding sea, support healthy plant growth—replicating the benefits of a traditional greenhouse without external energy inputs.

This method proves that agriculture can be efficient and sustainable, even in the most unexpected environments.

Eco-Conscious by Nature

Nemo's Garden is designed to exist in **symbiosis with the marine environment.** Unlike conventional farming or industrial systems that often disrupt natural ecosystems, our underwater biospheres have a **minimal ecological footprint—and in many cases, a regenerative impact.**

The structures act as artificial reefs, creating sheltered habitats that encourage the return of marine life and biodiversity. By providing calm, protected spaces in areas, Nemo's Garden contributes to the **restoration of underwater ecosystems** rather than their degradation.

This holistic approach reflects our core philosophy as well as working towards circularity.

nemo's garden

Key Benefits:

Reduction of land use

Underwater agriculture is a smart solution for a growing population and a planet with limited arable land. **It doesn't require deforestation, offsets habitat destruction, and one day may support sustainable farming without competing for space with traditional agriculture.**

No freshwater waste

Nemo's Garden utilizes natural evaporation and condensation processes within its biospheres to produce freshwater. This method mimics the natural evaporation of seas, allowing for the collection of fresh water without the need for external irrigation sources.

Stable temperatures

Nemo's Garden underwater environment champions a **more consistent climate, protecting plants from extreme weather and especially temperature fluctuations.** This creates ideal growing conditions, potentially, year-round, while surface climates become increasingly unpredictable.

No pesticides

Nemo's Garden's plants grow in an obviously controlled and protected environment. **The biospheres are a pest-free habitat, isolating the plants from external contaminants and antagonists that typically affect crops grown in traditional soil environments.**

Nutrient-rich plants

Due to the unique underwater conditions, such as higher atmospheric pressure and a different light spectrum, **plants grown in Nemo's Garden have much higher concentrations of essential oils, over 31.5% higher antioxidant activity, and a 13.3% increase in polyphenols compared to plants grown in soil.**

Marine Synergy

The biospheres can serve as safe havens for marine life, enhancing local biodiversity, and can be coupled with nearby fish farms to repurpose nitrogen-rich waste as natural fertilization—closing resource loops. This model is especially suited for regions with limited arable land but abundant ocean space, where local communities are already familiar with sea-based livelihoods. By aligning with existing cultural and environmental conditions, Nemo's Garden offers a scalable, sustainable alternative to traditional agriculture.

Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers, have caused widespread ecological damages and negative human health effects.

Conventional agriculture is one of the most resource-intensive human activities, accounting for nearly 70% of global freshwater withdrawals. In many regions, irrigation relies heavily on non-renewable groundwater sources, drawing from aquifers at unsustainable rates. Meanwhile, increasing competition from urban development and industry is intensifying pressure on already-stressed water systems.

As global food demand continues to rise, the sector is being forced to produce more with less—particularly less water and arable land—placing urgency on alternative methods that are both resilient and resource-efficient.

Only a fraction of the Earth's surface — about 10-11% — is arable land, and much of it is already overexploited, degraded, or unavailable for further agricultural expansion. In stark contrast, over 70% of the planet is covered by water—an immense, largely untapped space.

With Nemo's Garden, we propose a radical rethinking of agricultural boundaries:

by leveraging underwater environments for cultivation, even accessing a small percentage of this vast aquatic territory could dramatically relieve pressure on land resources.

This approach not only opens new frontiers for food production but aligns with our philosophy of **working in harmony with nature,** rather than exhausting it.

HOW IT WORKS

The Biosphere

The biosphere is a real underwater “greenhouse” hatch, with a semi-spherical shape. Like a large transparent room anchored at the bottom of the sea, it holds around 2,000 liters of air and may float at a depth of 6 to 11 meters below the surface.

Hydroponic Farming

Our greenhouse is hydroponic-based, meaning plants grow in a flowing nutrient-rich-film solution instead of soil. We have designed and installed a specific system: a 10-meter (400-inch long) segmented-spiral tube where fresh water mixed with fertilizer flows, accommodating up to 100 seedbeds. The shelfs remain available for other equipment/operations, nurseries or microgreen.

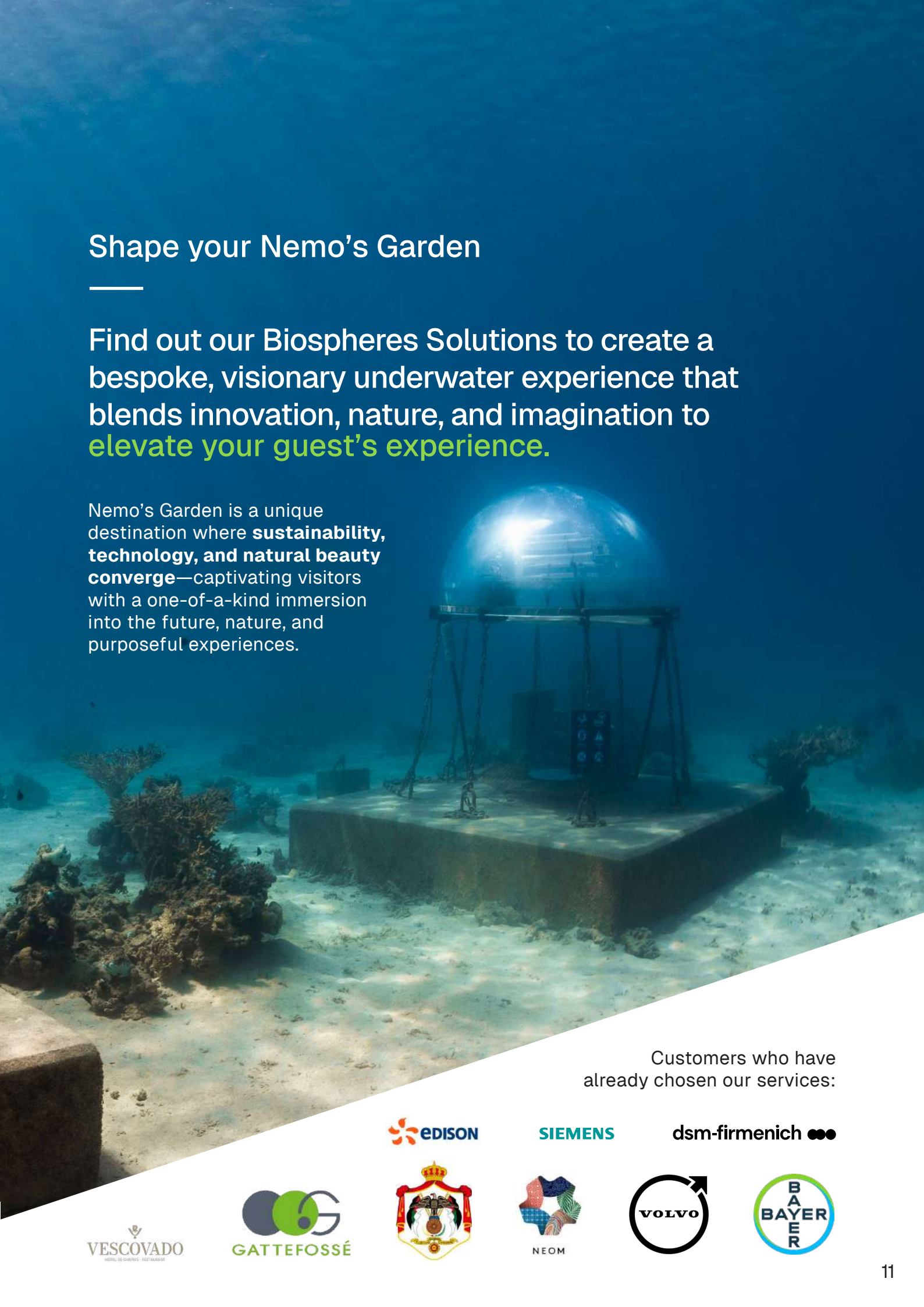
Freshwater Production

Sunlight and heat (greenhouse effect) cause seawater to evaporate, into distilled, fresh water. The inner volume quickly reaches high humidity levels and water can be seen condensing on the greenhouse’s inner surface, which is collected and mixed with fertilizers to nourish the plants. The irrigation water is stored in a tank at the end of the spiral, and a pump pushes water back to the top, where it descends by gravity, carrying food and oxygen to the plant roots.

A self-sustainable system

The warm and stable sea temperature, along with the cyclic evaporation and condensation of saltwater into fresh water, creates ideal growing conditions for plants in Nemo’s Garden. Underwater conditions, including increased atmospheric pressure (+1 ATM), light, and humidity, lead to accelerated growth and a higher concentration of essential oils and antioxidants, resulting in a more intense and distinctive flavor compared to surface-grown plants.

BIOSPHERE SOLUTIONS



Shape your Nemo's Garden

Find out our Biospheres Solutions to create a bespoke, visionary underwater experience that blends innovation, nature, and imagination to elevate your guest's experience.

Nemo's Garden is a unique destination where **sustainability, technology, and natural beauty converge**—captivating visitors with a one-of-a-kind immersion into the future, nature, and purposeful experiences.

Customers who have already chosen our services:

EDISON SIEMENS dsm-firmenich

VESCOVADO GATTEFOSSÉ NEOM VOLVO BAYER

LOCATION SCOUTING 01

The scouting phase focuses on identifying and evaluating the optimal underwater location based on the client's needs and objectives.

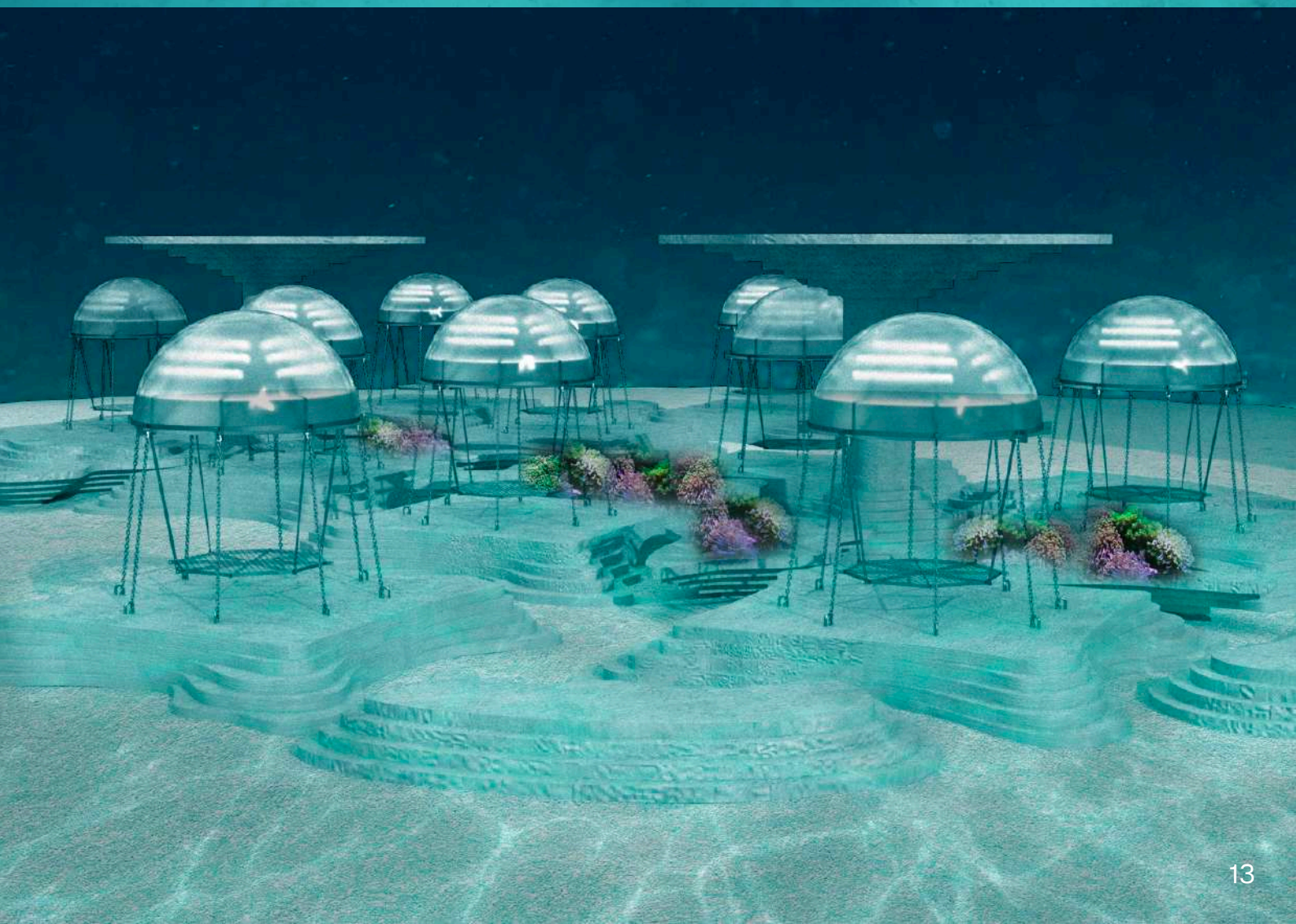
This process involves a comprehensive analysis of key environmental and logistical factors, including water depth, temperature stability, light spectrum availability, marine currents, exposure, local flora and fauna, and accessibility. We aim to ensure the site safely and efficiently supports both the biospheres and the agronauts—laying the groundwork for a successful, sustainable installation that harmoniously integrates with its surrounding environment.

FARM DESIGN 02

The Farm Design phase of a custom Nemo's Garden involves planning the layout and structure of the underwater site, based on the chosen location and customer desire.

This includes **selecting the model of biospheres**—such as Biosphere 1.1, Biotunnel 2.1, Geosphere 3.0—and deciding how many pods to install. We tailor the design to meet specific cultivation and experience goals, adapt to environmental conditions, and support scalability, ensuring optimal efficiency and sustainability. This may include designing bespoke artificial reef beautification synergic to local coral restoration.


OCEANREEF
underwater, naturally.
KG. 250




FRAGILE

CUSTOM PRODUCTION 03

During the Custom Production phase, we build each biosphere to order, integrating client-specific features and configurations.

Every structure is assembled using durable, marine-grade materials designed to withstand long-term underwater conditions. Inside, we install advanced systems including **hydroponics, lighting, environmental sensors, IoT controls, and communication modules**—each optimized for submerged operation. This phase also includes the development of critical infrastructure such as cabling, anchoring systems, and other seabed stabilization elements.

DEPLOYMENT 04

The Deployment phase involves the coordinated installation of all components at the chosen site.

This includes the positioning and anchoring of the underwater biospheres, the setup of the Land Control Unit (LCU) for real-time monitoring and system control, and the connection of all cabling and infrastructure. Both the land-based and underwater systems undergo thorough testing to ensure full functionality and seamless integration. Following, SaaS systems activation and training of the local selected team on software use and farm manning. Full remote support completes the package together with periodic scheduled maintenance operations.

BioSphere 1.1

Our system works with a “star” layout. One unit is the Master, that features main connection to land. Each master biosphere can welcome up to 5 more “slave” units.

Each unit includes a fully functioning hydroponic system growing 100 plants and 2 nurseries for a total of 100 more newborn plants.
The Master biosphere can include all sensor systems.

All biospheres feature Wifi connectivity (if internet available on land or premise).

Each unit has a further 1.6 m ² of cultivable surface for microgreens. The 1.1 comes standard with internal camera (PTZ, or fixed if preferred). Camera allows for video and voice connectivity to land. Lighting included. Fan, pumps included. Monitoring, scheduling app included for utilities.

2-meter dia. 1-meter internal H.

BioTunnel 2.1

Scaled production. Linear shape.

The tunnel is a much larger, higher yield unit. Hydroponic system features at least 4/www5x as many single plants position, plus significant real estate cultivable area for microgreens. It is **spacious enough for 7-8 operators** simultaneously and well-marinized.

4-meter L x 2-meter W. internal H exceeds 1m.

You can extend the BioTunnel by adding more modules.

GeoSphere 3.0

The future. Architect’s delight.

The Geosphere is a brilliant invention as it can be assembled underwater.
It is a staggering 3m diam (for now...) and, as the BioTunnel, it can be heavily customized.

3-meter dia.
internal H exceeds 1,6-meter.

Just like the BioTunnel it can be increased in size.
The modules can be re-designed to reach the desired diameter.

The Looking Glass 1.0

Introducing The Looking Glass — a new chapter in the evolution of Nemo's Garden. Built upon the familiar structure of the 1.1 biosphere but reimagined for stillness and awe, The Looking Glass is a transparent sanctuary suspended beneath the surface.

Without the presence of hydroponic systems, its sole purpose is contemplation, connection, and wonder. Inside, four sleek metal stools surround a crystal-clear plexiglass table, inviting guests to remove their gear and sit immersed in the blue silence.

Like an inverted aquarium, it offers a surreal inversion of roles — humans watching marine life drift past, unseen yet utterly present. Whether enjoying a quiet drink, sharing a conversation, or simply surrendering to the gentle rhythm of the sea, visitors are granted a once-in-a-lifetime encounter with the underwater world.

Equipped optionally with a surface-connected camera or Wi-Fi links for live chats, The Looking Glass can be both a serene escape and a connected node to the surface — a meditative, immersive experience like no other

SCALE UP

Capex/Cultivable area

Vertical Farm	Greenhouse	Nemo's Garden
4.305,60 €/Sqm	1.291,68 €/Sqm	1.132,77 €/Sqm

comparison of average investments : Nemo's vs other agritech methods.*

THE PILOT PLANT

Location

Located in Noli on the stunning Italian Riviera, our Pilot Plant is the heart of Nemo's Garden—a unique research and demonstration site where innovation meets the sea.

Just 48 km west of Genova and 106 km northeast of Nice, France, 190 km south of Milan. This is **where the concept of underwater cultivation was first brought to life,** and where we continue to test, refine, and evolve our technology today.

The Biospheres

From the first simple, transparent, lift-bags turned into test pods, to the large biosphere “n3”, finally to the rigid modules, GeoSphere and BioTunnel, the Pilot has been our home.

In 2025, visitors can explore **nine biospheres floating at depths between 6 and 11 meters below the surface. Among them are an observatory biosphere—**the first of its kind—a dedicated microgreens cultivation biosphere, and several others equipped with various hydroponic systems.

The Tree of Life

At the heart of Nemo’s Garden stands the Tree of Life—**a striking metal sculpture rising from the seabed, symbolizing evolution, interconnectedness, and the harmony between nature and technology.** Michelangelo’s historic design originally inspired us, and the creative director Marco Balich reimagined it for Milano Fiera Rho. With Balich’s permission, we then created Nemo’s version and adapted it for our unique underwater context.

Today, the **Tree of Life serves as a central node of the Pilot Plant, housing and organizing vital infrastructure such as cabling, utility systems, and scenic lighting.** Just as importantly, it has become a living structure—providing shelter for hundreds of marine creatures that now inhabit its vertical surfaces and base platform.

Control Tower

Known as the Control Tower in Noli, technically **the Land Control Unit (LCU) is the technological nerve center of Nemo's Garden.** Positioned onshore, it is the starting point of our cabling systems, where we draw power, internet from. **It enables real-time monitoring and management of the underwater biospheres, controlling key parameters such as temperature, humidity, light, and oxygen levels.**

Through advanced sensors and a dedicated software interface, the **LCU allows remote operation and data collection, seamless coordination between surface and underwater operations** via advanced undwerater communication systems as well as video monitoring and structural air control systems.
It also serves as the primary training and briefing station for our agronauts and support teams as well as the logistic hub of the Pilot and safety and rescue equipment storage.

The Noli Pilot Plant is currently certified via Global GAP as an officially approved site for cultivating quality crops.

HOW TO VISIT

Nemo's Garden is located a few meters offshore and is freely accessible by sea. Everyone is welcome to swim, snorkel, or dive in the surrounding area. You can explore the garden best in two ways:

Snorkeling/freediving:
Swim above the biospheres and enjoy the view from the surface—ideal for all ages and skill levels. Freedive anywhere in the pilot. It offers beginners depth's ranging between 5m and 15m. Swim-troughs under the biospheres, chains and anchoring are strictly forbidden as dangerous for potential entanglement. **If you snorkel/freedive, be mindful of the creatures that inhabit the Garden – do not touch, hang on the structures. It is strictly forbidden to push against any structure to kick back to the surface.**

Diving:
Certified divers can dive around Nemo's Garden. **It's possible to rent diving equipment or book guided tours through local dive centers.**
While access to the sea and the underwater garden area is free, access to and use of the facilities at Bagni Letizia (beach umbrellas, loungers, showers, etc.) is to be paid for – Nemo's Garden does not have a commercial agreement with Bagni Letizia for these services. Nemo's Garden does not organize private or collective tours of the Garden. We only welcome accredited media or Corporate events (special events excluded).

When to Visit

The best time to visit Nemo's Garden is during the **summer season, from May to September.**

The weather is sunny, the sea is calm and warm, and the biospheres are fully active—perfect for snorkeling and diving. Most of the facilities, in Noli, that are present in the summer months are not existing during the autumn-winter months, that is a partial reason for our avoiding welcoming guests during those months.

How to Behave

Let's work together to keep this space safe, sustainable, and welcoming for everyone:

Do not enter the biospheres – they are sealed research environments. Avoid disrupting maintenance work or ongoing scientific operations. Respect marine life and underwater structures – please look, but don't touch.

It is unsafe, forbidden to enter or stick hands or cameras in the biospheres – violators will be prosecuted as the Pilot is monitored and footages recorded 24/7.

SUPER FOODS

This pioneering plant growth system can be applied to grow food and/or spice plants, as well as for species of pharmaceutical interest, whose useful secondary metabolites could increment/change in a desirable direction due to the various stress conditions they are subjected to.

Plants grown in Nemo's Garden, for example basil, showed a higher concentration of essential oils, over **31.5%** higher antioxidant activity and specifically, **13.3%** increase of polyphenols content than plant grew on soil, in traditional hydroponic or open field.

Scientific Evidence

The essential oil levels in the analysis are higher than in conventional land-based cultivation. Underwater, the atmospheric pressure is greater, and the light spectrum is different.

+ **ESSENTIAL OIL**
+ **ANTIOXIDANT PROPERTIES**
+ **POLYPHENOL CONTENT**


nemo's
garden
AROMA OF THE SEA

nemo's garden

AROMA OF THE SEA

Derivative product/market application example

Chocolate Pralines

The first creation from Aroma of the Sea is a limited-edition box of aromatic herb–infused chocolate pralines. Developed in collaboration with master chocolatiers, these pralines harness the distinctive traits of herbs grown beneath the surface—where the marine environment subtly enhances aroma, concentration, and flavor.

Each piece invites you to taste the potential of a new frontier: one where **innovation, nature, and sensory pleasure meet beneath the sea.**

Microgreens

Microgreens, the latest addition to Nemo's Garden's crops, are the ultimate superfood. These are young shoots harvested between 5 and 20 days after germination, just after developing their first leaves. Grown on selected substrates, they develop intense flavors and a crisp texture.

The unique habitat of Nemo's Garden not only provides ideal conditions for their growth but — as already proven with other crops — enhances their nutritional and aromatic properties. In this controlled environment, microgreens reach exceptional concentrations of vitamins (A, C, K, E), minerals, and antioxidants, becoming a true concentrate of health and flavor.

It's no surprise that **our microgreens have already been selected as ingredients by Michelin-starred kitchens, which value their quality, purity, and intensity of taste.**

ABOUT US

Started as a personal challenge, by Sergio Gamberini owner of the Oean Reef Group, Nemo's Garden is now part of the OCEAN REEF Innovation Centre.

OCEAN REEF is a family owned group. Of **Vista** , California, and **Genova**, Italy. Born more than 75 years ago we are **specialized in scuba gear production** – sold under the brand OCEAN REEF (which powers our underwater operations); protection equipment under the name of SAFETY protection equipment.

Due to our OEM origin we are trained to cooperate as a Service and Production supplier with different companies on a professional base.

Challenges are what we thrive for and this particular one has a value that we can feel deeply inside as something for the future generations and for many countries where climate conditions make cultivating impossible – giving us a real push to succeed.

Over the years, Nemo's Garden has had the privilege of being featured by some of the world's most influential media outlets.

From major international newspapers like The Washington Post to industry-leading magazines such as National Geographic, the project has captured widespread attention.

Top television networks — including CNN, RAI, and many others across different countries — have dedicated coverage and in-depth features to our work, recognizing its uniqueness and potential.

OCEANREEF® underwater, naturally.

SAFETY protection equipment

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Keep in Touch With Nemo's

Stay tuned. Follow us:

For any further information, research papers, scientific relevance documents on the project and our professional services, please contact:

nemosgarden@oceanreefgroup.com


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