# Aquacombine Project


PROJECT COORDINATION:
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# Why green transition?


**Current status (average warming of just 1.1°C)**

- Even the richest countries in the world can’t control widespread fires — they’re even burning in the Arctic.
- Deadly flooding in Germany and Belgium in July 2021 completely washed away buildings and cars, and more than 1,000 people remain missing.
- Hundreds died in flooding in China.
- The U.S. Pacific Northwest, known for its cool climate, hit over 37°C for several days.
- The Arctic lost an area of sea ice equivalent to the size of Florida between June and mid-July 2021.

**The IPCC Working Group I sixth assessment report shows that the world will probably reach or exceed 1.5 °C of warming within just the next two decades.**

Only with ambitious emissions cuts can the world keep global temperature rise to 1.5 °C.

**Under a high-emissions scenario, the IPCC finds the world may warm by 4.4 degrees C by 2100 — with catastrophic results.**

# Major World Challenge in Green Trans

BY 2030 WE WILL NEED...

**50% MORE FOOD**
**40% MORE ENERGY**
**30% MORE WATER**

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# Soil salinity worldwide challenge

Soil salinity has been reported as a major factor in farmland degradation.

About 6.7 million hectares are considered salt-affected and 72 million hectares are considered sodic in the EU.

24% of globally usable land on Earth is degraded at an estimated economic loss of 490 USD billion per year.

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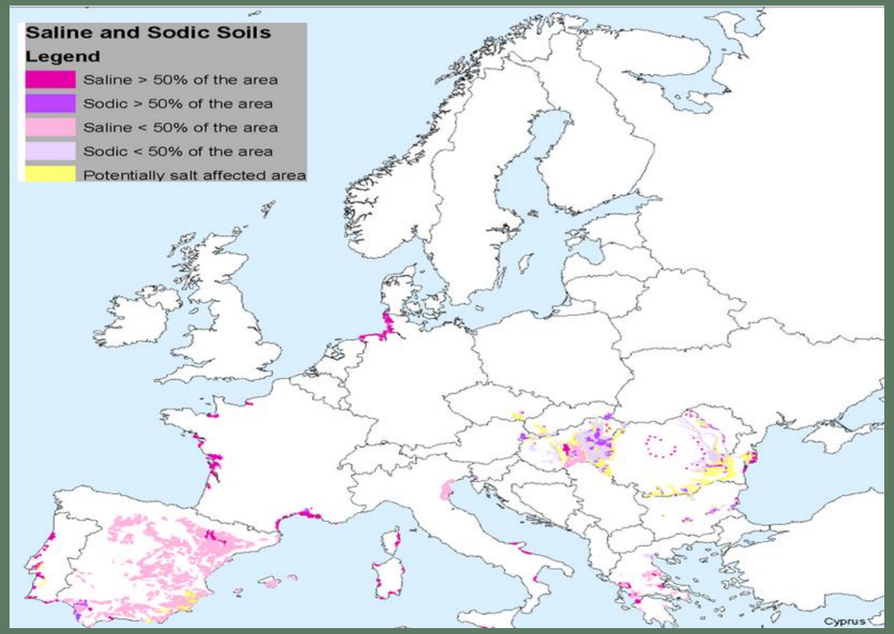
This is a global and European challenge that needs to be addressed and this challenge will become increasingly demanding in order to meet the expected demand of 50% more food, 40% more energy, and 30% more water by 2030.




**50% MORE FOOD**

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By **2030**,
we will need…

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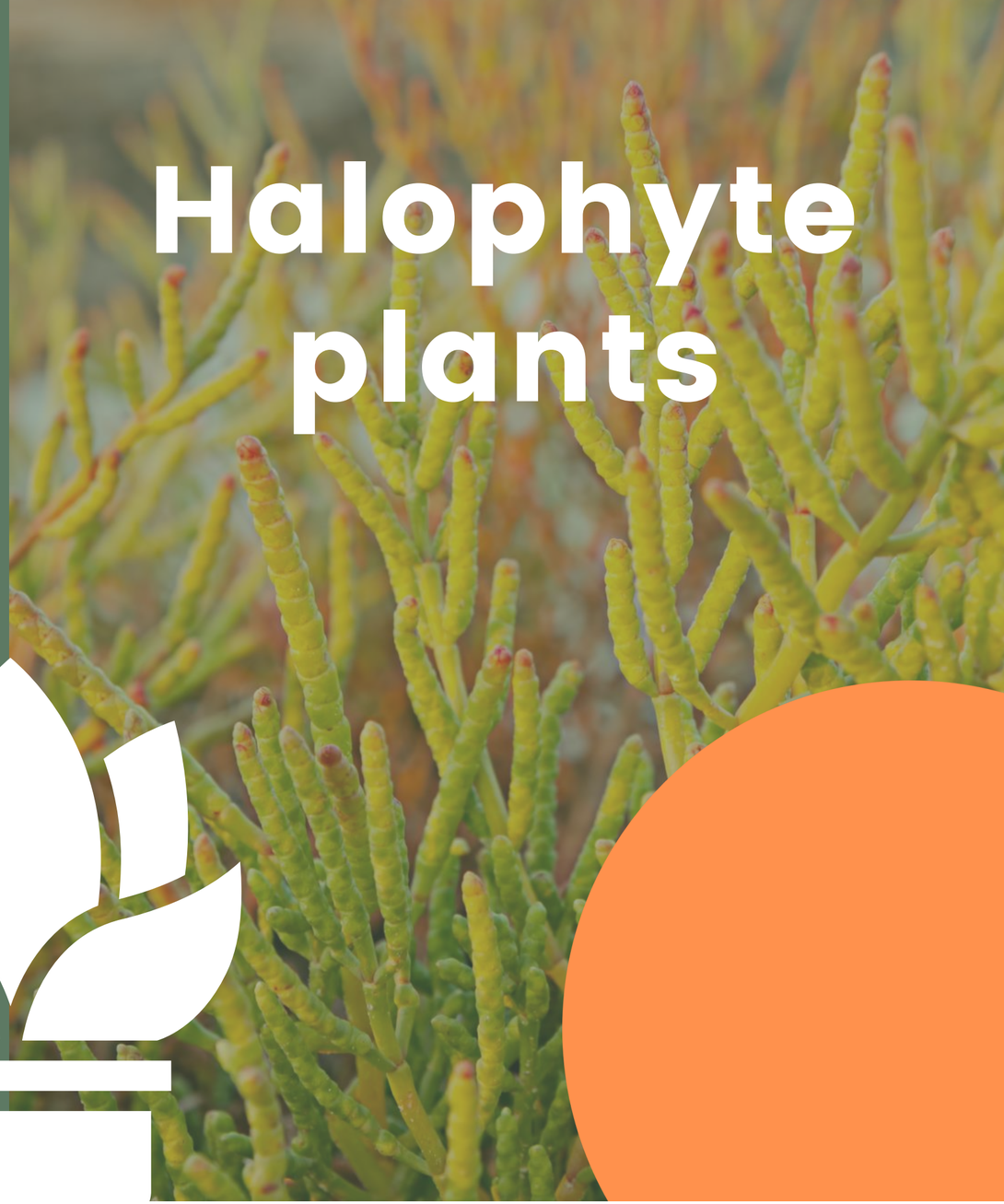
# Halophyte plants



**Halophytes are plants that can grow in saltwater.** Many of them are “old” medicinal plants with health benefits that are highly needed in today’s society, where consumption of purpose bred crops and refined food are causing an epidemic in lifestyle diseases.

Halophyte farming can be done in various scale and for various purpose; **both as a healthy food source and as biomass for biorefining**.

Halophyte technology has great potential to **boost growth and employment** in coastal areas even in areas with low quality soils and arid environments.

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Salicornia plant

Fresh tips for food

Approx. 1/3 of total biomass production

Short season for food production due to lignification of the plant

Large residue at the end of the season (Typically un-used)

Valorisation of the lignified fraction of the biomass will significantly increase feasibility

Lignified plant

Not suitable as forage crop

Not suitable for soil enhancement

Approx. 2/3 of total biomass production

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Dry Halophyte straw

Green succulent halophyte biomass

Extractives fraction

Bioactive compounds

Antioxidants

Anti-inflammatory compound

Antimicrobials

Extractives free fibres

Fibres for biogas

Fibres for feed products (dietary fibres)

Green juice

Protein

Lipids

Carotenoids

Chlorophyll

Green pulp

Fibres for biogas

Fibres for feed products (dietary fibres)

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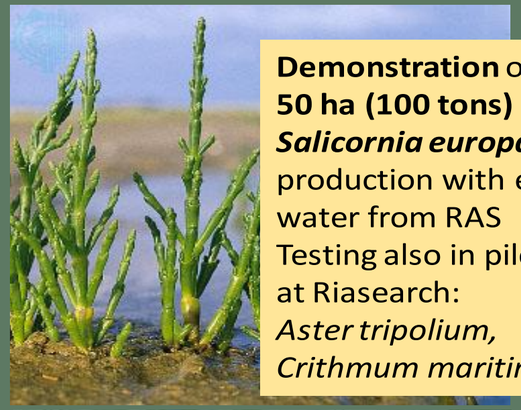

**Demonstration** of **50 ha (100 tons)** ***Salicornia europaea*** production with effluent water from RAS
Testing also in pilot scale at Riasearch:
*Aster tripolium,*
*Crithmum maritimum*




**Demonstration** of FLEXRACK (Alpha-Aqua) Recirculating aquaculture system (RAS) for **125 tons Turbot** production
Testing also in pilot scale:
*Dicentrarchus labrax*
*Litopenaeus vannamei*

Formulating and demonstrating products with the produced bio-compounds:

- **Functional fish feed**
- **Cosmetics**
- **Functional Dairy products**




**Demonstration** of simple and cheap add on processes to produce:
**Botanical extracts**
**Protein**
**Biogas**
from non-food part of *S. europaea*
**(200 tons)**

Testing also isolation and purification of high value compounds from the extracts and fibres

- **Hydroxycinnamic acids**
- **Carotenoids**
- **Char coal**
- **Xylooligosaccharide**

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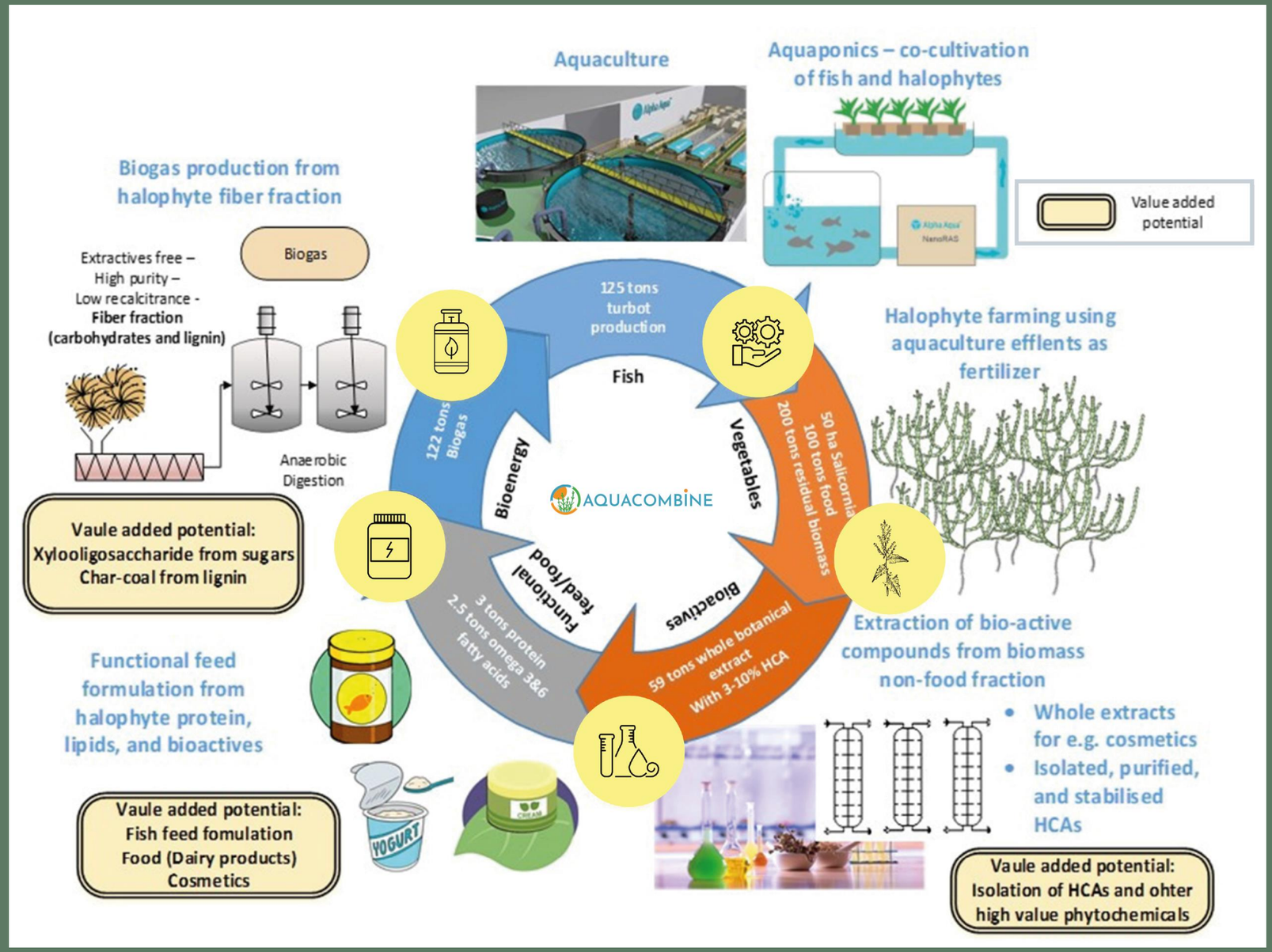


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# Main results so far

- Novel **scaled up (low cost) extraction** process has been developed and is being build
- **Improved extraction** of target phytochemicals (bioactive healthy chemicals)
- First production of **cosmetic cream** and **dairy products** with halophyte extracts
- Test of halophyte cream on humans showed **soothing effect**
- First **productions** of: green protein, fibers for biogas, and lignin for biochar.
- Halophyte in shrimp and fish feed showed **improved animal immunity**
- **Demonstration facilities** in progress

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# Thank you for the attention!

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