

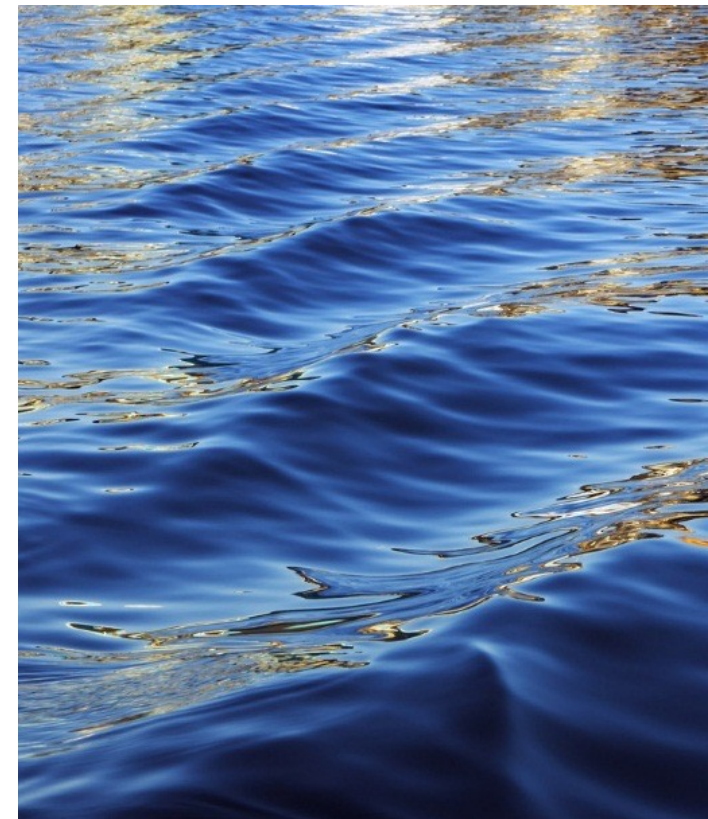


**For a world with clean water.
Because water protection is climate protection.**



C³ Wastewater Treatment

Carbon Capture,
Wastewater Treatment and
Community Development



In order to remain below the global warming limit of 1.5 degrees Celsius until 2050, measures to reduce CO₂ emissions are apparently no longer sufficient.

It is now a question of actively removing CO₂ from the atmosphere, in combination with other suitable measures.



Carbon capture through wastewater treatment in bamboo plantations

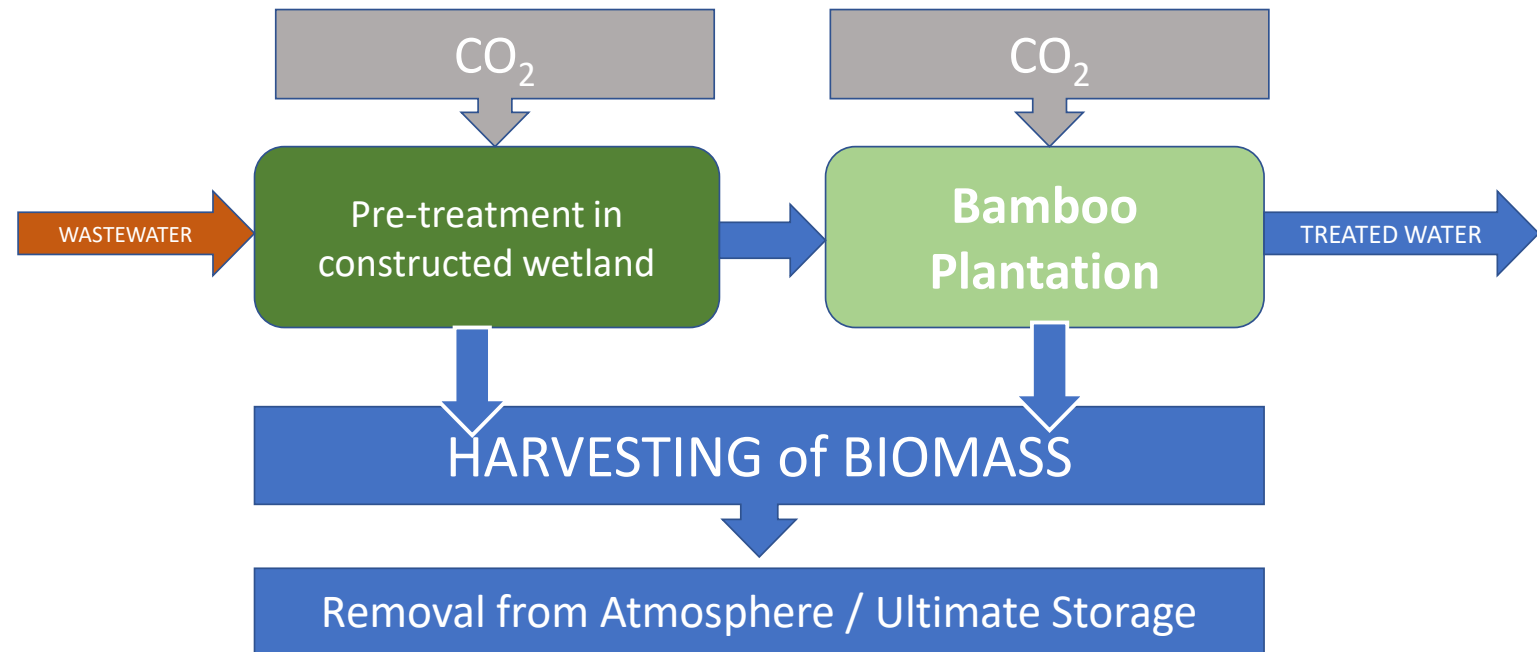


Carbon capture

- The C³ concept features a CO₂ compensation program that invests in plant-based wastewater treatment with subsequent biomass production.
- It uses the mechanisms of CO₂ capture in Bamboo plantations, and hence active CO₂ removal from the atmosphere.
- At the same time, rural communities will be supported in their development.
 - Their wastewater is treated at favorable costs, a major contribution to the Sustainable Development Goals and an important side effect to CO₂ compensation.
 - A valuable product (Terra Preta) will be produced
 - Jobs and income will be generated
- As a result of this approach, wastewater treatment in developing countries will experience a considerable upswing.

We combine wastewater treatment with carbon capture and storage. The wastewater will be treated in a constructed wetland. The effluent will be used for the irrigation of a bamboo plantation, where the carbon capture takes place.

The bamboo will be harvested regularly and removed from the biosphere.



We use constructed wetlands for no-energy wastewater treatment.

Our calculations indicate that treating wastewater from previously unserved communities approximately avoids the emission 200 kg CO₂ equivalents per person and year, provided the treatment system does not require any (electric) energy.

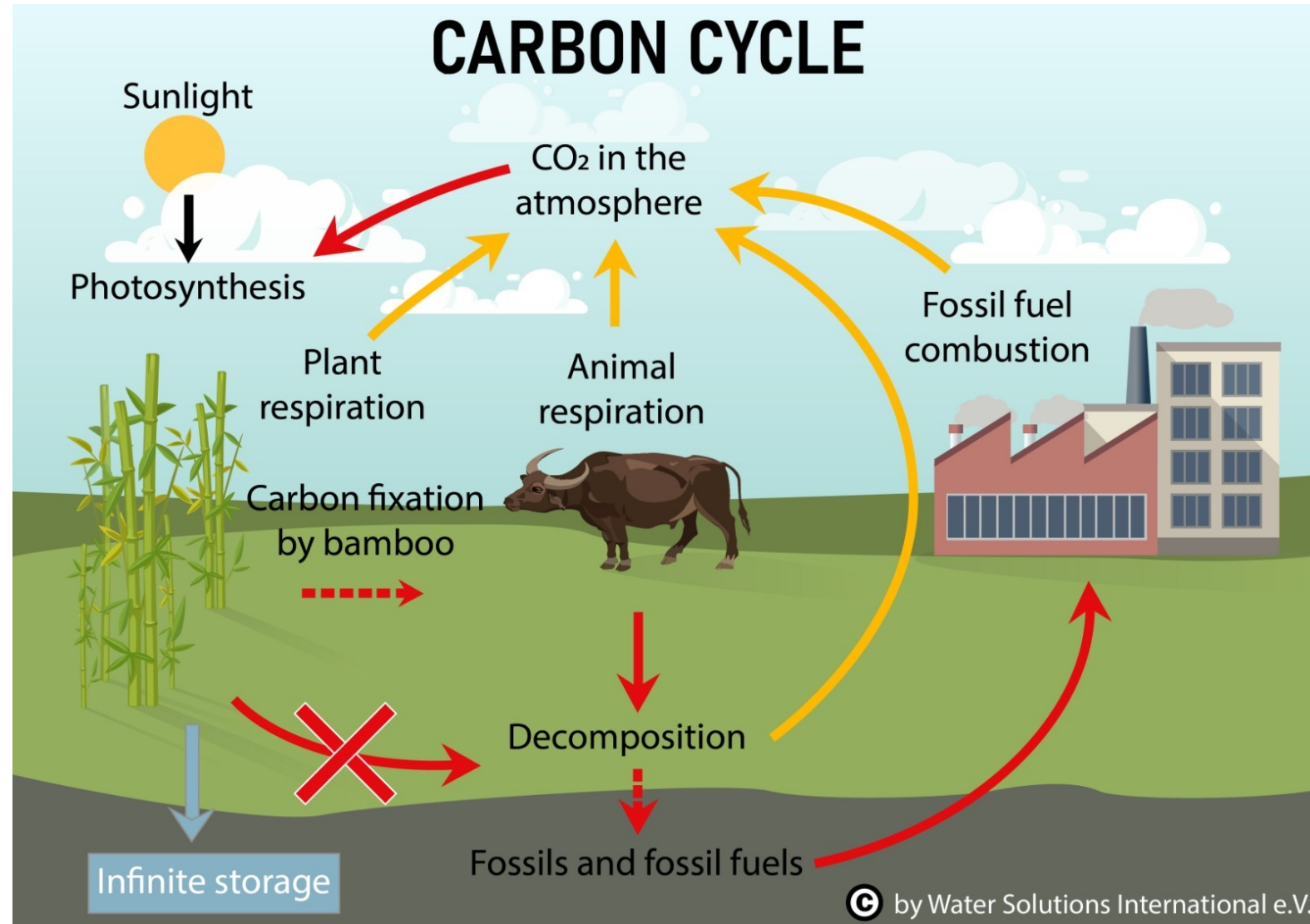
A constructed wetland serving a small community of 5000 pax hence avoids the emission of 1.000 tons of CO₂ equivalents... an important component of our concept of combining CO₂ sequestration in bamboo plantations and wastewater treatment.



Where does the CO₂ go?

Using photosynthesis, plants convert atmospheric CO₂ into biomass. Once the plants die off they will be decomposed through microbiological activities and the captured carbon will be released again as CO₂ (carbon cycle).

The C³ process disrupts this cycle. Instead, the produced biomass is converted into a form that is stable for long-term storage.



What makes us different

CO₂ removal from the
Biosphere –

forever!



- Unlike tree planting or reforestation projects, carbon captured in our bamboo plantations will be removed from the biosphere... forever!
- To this end, the chopped bamboo will be used for mine pit refilling or burying.
- Alternatively, the harvested biomass can be turned into charcoal and subsequently into Terra Preta.

Infinite carbon storage



- Biochar is one of the most efficient ways of storing CO₂ (carbon) long-term. As long as biochar is not incinerated it serves as a stable carbon sink for thousands of years, ensuring that CO₂ will not be released again.
- Terra Preta is a mixture of charcoal, microbial life, soil and organic matter. The combination is preferably used in agriculture. It accumulates nutrients, minerals and microorganisms and withstands leaching. Terra Preta cannot be incinerated and hence acts as a long-term carbon sink
- Carbon Concrete (or Biochar Concrete) is a mixture of cement and biochar, which sequesters carbon in a durable concrete matrix. Biochar concrete has the potential to improve the CO₂ footprint of construction projects.

The process at a glance:

- Biological wastewater treatment plant with SBR system downstream constructed wetland
- Sludge drying bed
- Loading station for trucks with treated effluent for re-use
- Bamboo plantation
- Biochar production by Pyrolysis
- Warehouse/ Stock with biochar



This plant generates additional income through bamboo biomass production and further processing of the harvested biomass, generation of biochar, carbon credits etc.

generating and trading CO₂ Certificates



- A carbon credit (also known as a carbon offset, carbon certificate, etc.) is an intangible product that represents the avoidance, reduction or sequestration of a CO₂ equivalent (CO_{2e}) from the atmosphere.
- Biochar carbon credits are credits representing a permanent sequestration of carbon. This permanent sequestration, also called removal or drawdown, differs from avoidance or reduction credits since it physically traps carbon in a stable form for long periods. In fact, biochars commonly have a half-life of thousands of years in soils.
- We work with industry-recognized organizations, for example Puro.Earth, to ensure the carbon removal is quantified, verified and of high-quality. Respective certificates can be sold to specialized brokers or to interested third parties, hence generating additional income.

Why bamboo?



- Bamboo grows fast and captures CO₂ highly efficient in a short time.
- It can convert degraded and marginal land into commercial plantations of bamboo.
- It can restore canopy cover, connect remnant forest patches and their associated biodiversity, reduce soil erosion and stabilize water tables.
- It can also provide revenue and alternative livelihoods for surrounding communities.
- Selective harvesting focuses on the removal of individual poles or culms from each bamboo plant, ensuring that canopy cover and carbon storage is continuous and avoiding the need to replant.
- Bamboo's complex but shallow root structure restores compacted soils and improves water filtration.
- Bamboo can also provide an alternative fibre to wood in the use of engineered timber products, pulp and paper, charcoal and bioenergy, thereby reducing pressure on natural forests.
- Bamboo forests and plantation feature a high biodiversity.
- Bamboo grows on degraded land so that it does not compete with food production.

Safeguarding local businesses



The project will work with local farmers
and grow their businesses !

- Bamboo is a cash crop that ensures local people's income and livelihood. We will hence not interfere with their traditional businesses and not compete for their raw material.
- Instead, we will create additional income by harvesting low-quality bamboo and production waste that is otherwise of little value.
- Furthermore, we will invest into new bamboo plantations dedicated to CO₂ capture only and nurtured by local dwellers.

Our approach in our projects



- Bamboo forests play a fundamental role in the **protection of water resources** by
 - stabilizing the soil and hence avoiding erosion,
 - retarding surface water runoff and hence reduce flooding,
 - filtering and storing water in underground aquifers,
 - increasing evaporation and transpiration and subsequently improve local climate conditions.
- Moreover, bamboo plantations can be used for low-cost, **community-based wastewater treatment**
- All our C³-projects include a **water & sanitation component** (to be defined with the client)

The C³-approach is directly meeting 5 Sustainable Development Goals:

#3 Good Health and Well-Being

#6 Clean Water and Sanitation

#11 Sustainable Cities and Communities

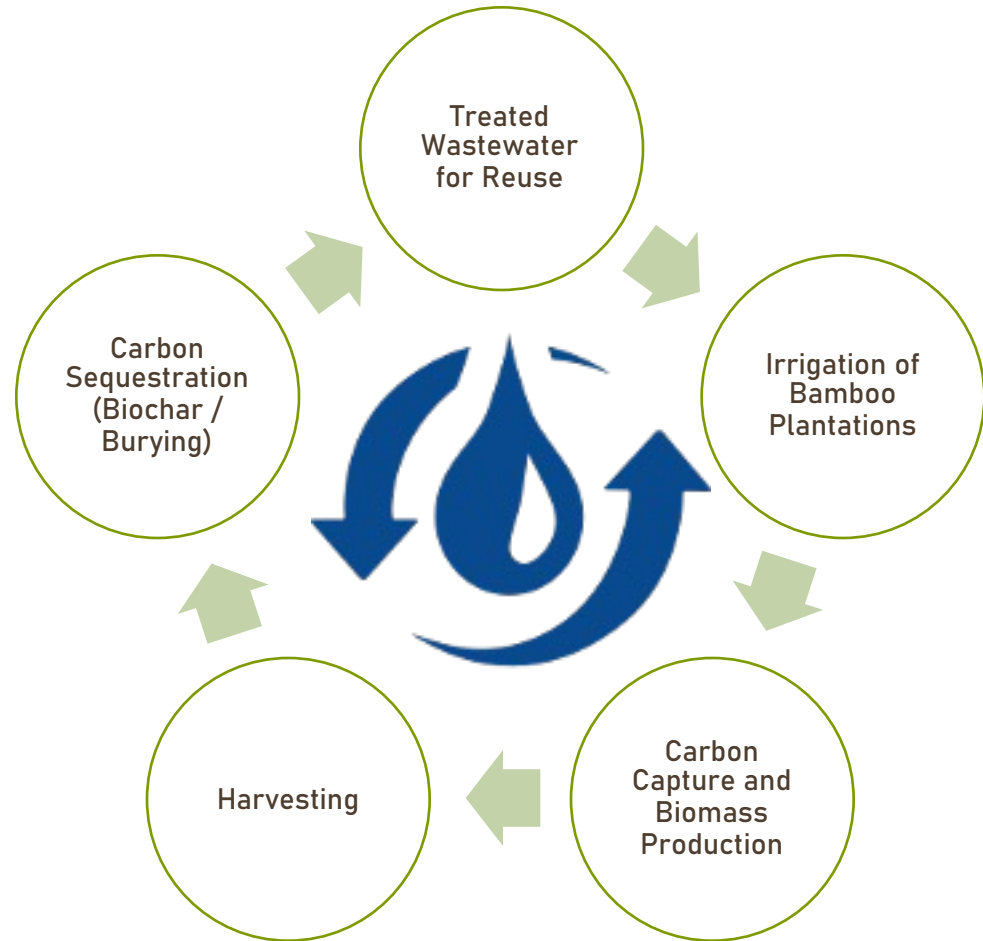
#13 Climate Action

#15 Life on Land (Biodiversity)



One concept – Many advantages

- ✓ Low-Cost Wastewater Treatment
- ✓ Improved Public Health
- ✓ Generation of Carbon Sinks and Carbon Credits
- ✓ Making Sanitation a Business
- ✓ Improving Biodiversity
- ✓ Fighting Desertification
- ✓ Creating Jobs





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