

# Wasser Hyacinth- Carbonization- Project



Using the fastest growing plant  
to cool down our climate



Off-set your CO2 emissions with  
water hyacinth carbonization



Regional value creation in rural  
areas which generates jobs,  
income and future



char  
COO

A Project by



In Collaboration with

**EG SOLAR**

# Using the fastest growing plant to cool down our climate

Walter Danner; [w.danner@char2cool.de](mailto:w.danner@char2cool.de)  
[www.char2cool.de](http://www.char2cool.de)

You buy organic. You take the bike. You recycle.

## Sustainability is your motto. So is ours!

For years climate policies have been put off. Empty rhetoric doesn't prevent drought, wildfires and flooding.

At Char2Cool, we turn weeds into biochar; creating a carbon-negative fuel and soil enhancer. Lake Tana in Ethiopia provides the perfect resource: **Water Hyacinths**

So far, the plant poses the greatest problem to the region. It deprives fish and plants of nutrients and poisons the atmosphere with methane. It brings hydroelectric plants and the drinking water supply to a halt.



*Carbonized water hyacinth stems*

Now it becomes a major opportunity! Carbonizing water hyacinths:



### **Prevents methane emissions;**

Water and fish stocks can recover



### **Restores infrastructure;**

Helping people to help themselves



### **Replaces charcoal;**

CO2 emissions are cut and forests are protected

No material cost, 100% added value. Climate protection becomes self-sustaining.

## Crash Course:

# Water Hyacinth-Carbonization



### What are Water Hyacinths?

Water hyacinths (Eichhornia) are floating aquatic plants which are native to the Amazon basin in South Americaa. Manatees feed on the water hyacinths.

Water hyacinths have a beautiful light purple flower. The plant was imported as an ornamental flower to other tropical regions in Africa and Asia. In these regions there are no natural enemies which would control the population size of water hyacinths. The plant started spreading unchecked. The water hyacinths became a highly invasive species.

With an increasing pollution of water bodies (sewage, fertilizer...) there is an increase in nutrient concentration. This is the perfect environment for water hyacinths, the weed experienced an explosive growth. Thus, they became a major problem for the environment, communities around the lake and technology.

More information can be found online e.g. on Wikipedia „Water Hyacinth“.



### What is carbonization?

The widest known product from carbonization is charcoal. Carbonization is the termo-chemical conversion of biomass to char. Carbonization happens at temperatures between 300 – 600 °C. The biomass is put in an environment where it is deprived of oxygen to prevent burning. During carbonization the volatile components are gasified, the carbon structure stays. This is how char is made.

Burning is a reaction with oxygen, the solid product is ash. Carbonization happens without oxygen, the solid product is char. Any type of biomass can be carbonized. The final char product depends on the input: woody biomass turns into charcoal; other biomass turns into biochar.

We carbonize water hyacinths, therefore the product is water hyacinth char.

### Why should water hyacinths be carbonized?

1. As the water hyacinths are removed from the water bodies, the problems caused by the water hyacinths will be reduced.
2. It generates jobs and income, especially for unskilled labor in rural areas.
3. Water hyacinth char is an alternative fuel: Deforestation can be stopped because it replaces firewood and charcoal.
4. Water hyacinth char is a soil enhancer: Crop yields increase and can withstand irregular weather patterns, food security increases.



How one plant is breaking all records:

## 1. The Water Hyacinth as a Biomass

Water hyacinths originate in the Amazon basin. In their natural habitat they do not cause any problems!

Today, the largest population of water hyacinths is found in Africa and South-East Asia. The water hyacinths are a major threat to these regions!

In Ethiopia, the first water hyacinths were spotted 1965 on Lake Koka. Back then they were seen as insignificant. 55 years later, the fight against the water hyacinths has become a national priority.



*Thick cover of water hyacinths on Lake Tana in Ethiopia.  
The water is not visible anymore.*

### What was different back then?

„Back then“ the water hyacinths did not grow and reproduce as fast as today.

Like any plant, the water hyacinths prefer areas with excess nutrients. The nutrient availability in water bodies has been growing exponentially over the last years. So did the water hyacinth.

„Back then“ there were less people around and therefore less sewage.

Today the population is much larger and the amount of sewage produced is much larger. The sewage is disposed in water bodies which then experience an increase in nutrient concentration. The higher nutrient concentration puts a strain on lakes and rivers. At Lake Tana, in the north of Ethiopia, sewage, erosion and fertilization adds nutrients in the lake.

*“The farmers were ordered to use imported fertilizers to increase the crop yield. Many resisted as they knew that chemical fertilizers harm the soil in the long run. I know farmers who paid for the fertilizers but never picked them up. Many others payed, picked them up and then dumped the fertilizers in the closest river.”*

Water management-Officer of a small town in Ethiopia

The true problem is not the water hyacinth, but human behavior. The consequence of this behavior can be summarized in one number:

**17,5 t per hectare per**

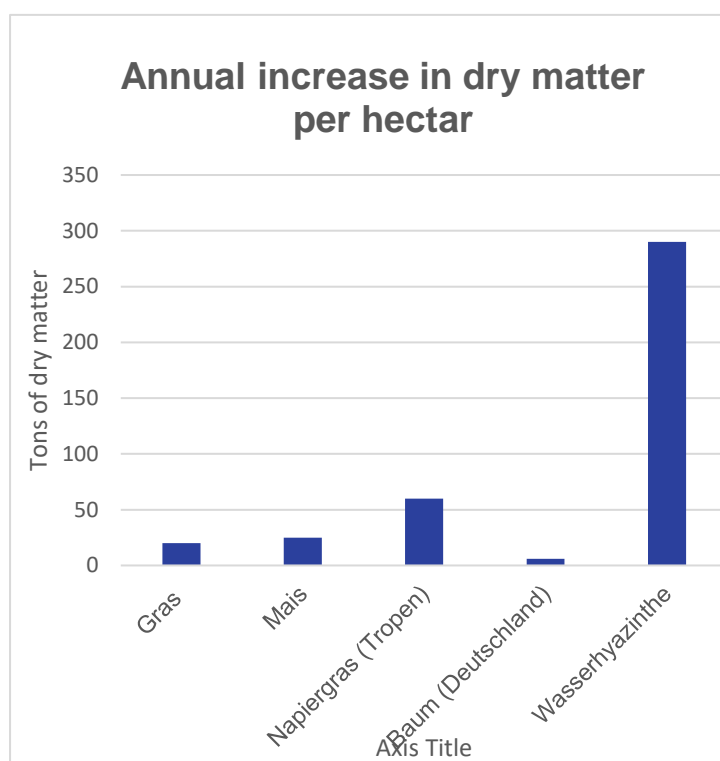
### This is the growth rate of the water hyacinth!<sup>1</sup>

Per hectare, an area equivalent of 1.4 football fields, there is a growth of 17.5t of water hyacinth daily. 17,5 tons is the weight of approximately 12 cars. As a rule of thumb; under optimal conditions a water hyacinth population doubles every two weeks!

Lake Tana, in the north of Ethiopia, is a great example to realize the full extent of this growth rate. In november 2017, 5,000 hectare or 5 square kilometers were covered by water hyacinths. In january 2019 it was already 10,000 hectare or 10 square kilometer. 84 km of shore line are blocked by water hyacinths.<sup>2</sup>

Only the lack of space and weather conditions are stopping the water hyacinths from spreading even faster!

### The growth rate of important crops compared to water hyacinths:



The increase is calculated in dry matter<sup>3</sup>, as different plants have a different water content.

Gras (20t DM), corn (25t DM) and wood (6t DM) are growing much slower than water hyacinths (300t TS). Even the napier grass (50t DM), a tropical grass which grows all year round, has no chance against the growth rate of the water hyacinth.

The water hyacinth generates ten times the amount of dry matter of the most significant crop in Europe, corn.

Most probably we are dealing with the **fastest growing plant in the world!**

<sup>1</sup> Shoeb F, Singh HJ (2002) Kinetic studies of biogas evolved from water hyacinth 2nd International Symposium on New Technologies for Environmental Monitoring and Agro-Applications pp138

<sup>2</sup> <https://www.satenaw.com/why-ethiopia-is-unable-to-control-water-hyacinth-from-lake-tana-and-what-to-do-about-it/>

<sup>3</sup> The dry matter of a biomass contains the carbon which the plant has taken up during its growth. The higher the generation of dry matter, the higher the positive effect for the climate as more CO<sub>2</sub> has been sequestered,

How one plant brings the whole region to a halt:

## 2. The Water Hyacinth as a Problem

Water hyacinths are reproducing extremely fast when space and nutrients are available. They spread through offshoots as well as seeds. Water hyacinths are floating aquatic plants which are moved by the wind. This explains why they are always accumulated in one spot, forming a dense cover. The water hyacinth cover on Lake Tana, Ethiopia, is some 10,000 hectare large, an area larger than Berlin. More than 84 km of the shore line of the lake are blocked by water hyacinths.

The dense water hyacinth cover causes problems in all areas!

### Socio-economic problems:

The main source of income around Lake Tana was fishing. Now, the water hyacinths block the access to the lake. Penetrating the dense plant cover with a boat is impossible. For four years fishing is not profitable anymore. The fishers are left without work or income.



*Fisher boats are unused at the shore while the water hyacinths are taking over the lake.*

*„We used to catch many fish, so many that we could not carry them ourselves. We had donkeys to put our bags of fish on. Today, we can only fish if the wind moves the water hyacinths away from the shore. My family only owns half a hectare of land. It is not enough to earn a livelihood! “*

Mangustu, Fisher from Shea Gomengie

Any transport over water has become nearly impossible. The water hyacinth has a fibrous stem which twists around the ship's propeller and stalls the engine. Furthermore, the water hyacinths obstruct harbors and other infrastructure around the lake. At the Koka reservoir, in the south of Addis Ababa, the inlet filters and generators are regularly broken because water hyacinth parts get into the system. This causes power cuts and production gaps.

### Environmental problems:

Water hyacinths compete for sunlight and oxygen. Other aquatic plants and algae have no chance to survive under the dense water hyacinth covers. Therefore, fish and other aquatic animals are lacking a food source.

When water hyacinths die off and start decomposing on the lake bottom, they are using up the oxygen in the water. This causes fish to die out. There are dead areas in lakes and rivers because of a lack of oxygen. In Lake Tana, the fish caught decreased from 15,000t to 1,000t per year.

How to turn a weed into profit:

### 3. The Water Hyacinth as a Chance

For decades there have been efforts to control the water hyacinths. But considering the reproduction rate and increasing nutrient availability in water bodies, it seems hopeless.

There have been trials for every removal method imaginable:

**Chemical herbicides –**

no lasting effect

**Manual harvest –**

no lasting effect

**HighTech Harvesters –**

...again, no lasting effect



*Water hyacinths are growing around unused and broken harvesters.*

At Lake Tana a total of 350 HighTech harvesters would be needed to keep up with the reproduction rate of the water hyacinths.

The harvest would take three truckloads of fuel to operate the machines, as well as space for 100,000t of water hyacinths DAILY.

**Impossible!**

If even one water hyacinth remains in the lake, it will spread again and the initial water hyacinth cover will be restored in no time.

In Gogora, at Lake Tana, there has been a one-month removal campaign in the spring of 2019. The 5,0000 inhabitants cleaned their lake area from any water hyacinths. Ten months later, the water hyacinths were back. The work was in vain.

**The harvesting of water hyacinths is an uphill battle.**

**A high investment of money, work and time without any results!**

But **WAIT!**

There is one region in Thailand in which the water hyacinths have stopped spreading and are almost removed:

The people have realized the potential of the water hyacinth as a resource. Utilization instead of eradication! Small-scale businesses were founded to harvest, dry and prepare the water hyacinths on site.

One example for a product is „the WATERHYACINTH chair“, a chair from water hyacinth.<sup>4</sup>

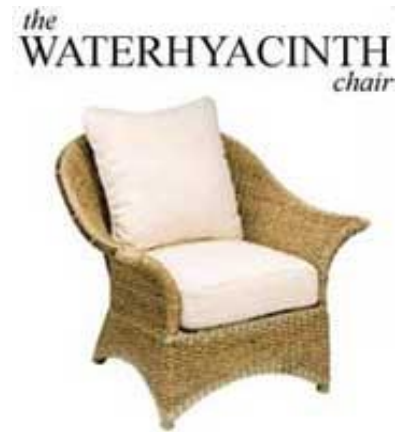


Photo: <https://waterhyacinth.de/>

**Production:** By the local population

**Design:** By Khun Tuk, a designer from Bangkok

**Sales:** By Projektwerkstatt GmbH, a company based in Berlin

Value addition on each level! Everyone involved profits and can earn their livelihood. This is not a charity project for poor farmers in the rural area of Thailand. This is business on equal terms!

What is the secret to a permanent removal of the water hyacinth?

**An economic utilization of the water hyacinth!**

The water hyacinth has to be used for what it is:

Water hyacinths – **The largest and most inexpensive source of biomass in the world!**

Only a small fraction of the water hyacinths can be turned into chairs and baskets. In order to effectively use the huge amount of water hyacinths, a mass product is needed. Something that everyone needs every day... preferably in large quantities!

---

<sup>4</sup> <https://waterhyacinth.de/>



A threat becomes an opportunity:

## 4. Water Hyacinths as Biochar

At Char2Cool, we are turning water hyacinths into biochar. Our water hyacinth biochar is perfect for energy generation and soil enhancement:

### **Briquettes and soil enhancer –**

We produce briquettes from water hyacinth char for cooking. We also use the water hyacinth char for Terra Preta – a natural soil enhancer<sup>5</sup>.

### **Two mass products for daily use!**



### **Briquettes**

95% of the total energy consumption in Africa is covered by biomass, mostly wood and charcoal. The majority of households, even in cities, is using firewood and charcoal for cooking. Deforestation continues to meet the demand for wood and charcoal. In Ethiopia, only 3% of the endemic forests are remaining. The deforestation will continue, regardless of regulations and laws, as the people need to cook.

Briquettes from carbonized water hyacinths can replace charcoal. There are already some examples of successful productions of water hyacinth briquettes. Unfortunately, they are operating locally and on a small-scale. There are no organized efforts to spread the technology yet. Scientists in Africa and Asia have done extensive research on the production of briquettes from carbonized water hyacinths. It does work!

### **Soil enhancer**

Terra Preta is the application of biochar as a permanent soil enhancer. Char has a porous structure and acts like a sponge, attracting water and nutrients. The charged char is applied to the soil. The stored nutrients and water are only accessible to plant roots, which actively extract the nutrients and water. This results in decreased fertilizer demands while the crop yield increases.

The char from water hyacinths is very fine, as aquatic plants do not grow any hardened support structure like trees do. The fine porous structure increases the nutrient and water retention ability of the soil. There are thousands of hectares in Ethiopia which are just waiting to be improved with water hyacinth char.

---

<sup>5</sup> Terra Preta (Portuguese) – Black earth: The black earth is known from the Amazon rainforest. It is manmade and highly fertile. The indigenous population applied biochar to the soil. This led to higher crop yields and made highly developed cultures in South America possible.

### Water hyacinths are a multifunctional resource!

An economic utilization of the water hyacinths does not only combat the infestation itself but also solves several of the problems in the region. Mass products made from water hyacinths are the key to counter the problems caused by the water hyacinth!

Producing water hyacinth char has a positive impact on the local economy, community and environment. To us, the water hyacinth is a chance for sustainable development; climate protection, fight against poverty and more.

That's how we implement it:

### Our process in 5 steps



We organize...

- Harvest
- Drying
- Carbonization

...of the water hyacinths.

Furthermore, we ensure that the produced water hyacinth char is used as fuel or soil enhancer.

## That's how we do it: Harvesting, drying, carbonizing...



### Harvest:

Manual harvesting creates jobs and enhances the development of rural areas around the lake. It does not require any maintenance and prevents unnecessary investment and abandoned equipment. It is the most reliable harvesting method.



### Drying:

The stems are separated from the roots and spread out to dry. Sun drying water hyacinth takes less than one week. Drying is even faster if the water hyacinth stems are turned from time to time. Again, there is no investment or maintenance needed.



### Carbonization:

The C2C-Kiln was developed for carbonizing water hyacinths. It consists of only three parts and is intuitive to use. This is frugal innovation in practice. Write us to get the C2C-Kiln manual! [info@char2cool.de](mailto:info@char2cool.de)



### Storage:

After carbonization, the char needs to cool down. The water hyacinth char can be collected and stored until further processing. The water hyacinths were heated to temperatures above 300°C, there is no more risk of spread through seeds as they have become infertile.



### Terra Preta:

Terra Preta is the application of water hyacinth char as a permanent soil enhancer. The char has a porous structure and functions as a water and nutrient storage. Field trials in Ghana have shown that an increase in crop yield of over 400% is possible!



### Briquettes:

Briquettes from water hyacinth char are a sustainable and inexpensive alternative to firewood and charcoal. The water hyacinth char briquettes can prevent deforestation and reduce overall CO<sub>2</sub> emissions.

Sustainable. Inexpensive. Available.

## 5. Water Hyacinth Char Briquettes

### Charcoal

In Germany, charcoal and firewood are primarily used for BBQ. In Ethiopia they are the most used household fuels used for any type of cooking. In all of Africa, 95% of the energy needs are covered with biomass. Charcoal and firewood being the most common ones. The need for fuel increases steadily as the population size and living standard increases. There is a higher demand in wood than there is regrowth. This results in deforestation.



*Burning briquette*

### Water hyacinth char

Charcoal is carbonized wood. Water hyacinth char is carbonized water hyacinth. Both are carbonized biomasses; they have similar properties. Water hyacinth char has four significant advantages:

1. Wood is often illegally chopped in endemic forests. Water hyacinth char can replace charcoal and firewood. If the demand for wood decreases, deforestation decreases. Reforestation is only possible and sustainable if further deforestation is prevented.
2. Water hyacinths are a widely available, free and never-ending source of biomass. Anyone can start producing. The water hyacinth charcoal production can be started with a minimal investment (<100\$), the production can be extended and scaled up over time.
3. For the legal wood production plantations are needed. Local business people are leasing farm land. The land is populated with fast growing eucalyptus plants. After a few years, the eucalyptus is chopped down. The wood is turned into charcoal. The fallen leaves have destroyed the soil and the roots have emptied out the groundwater reserves. The farmers cannot use the land for agriculture any longer!
4. The decisive advantage of water hyacinth char is its price. Briquettes from water hyacinth char are cheaper than charcoal. They are a competitive product on the local market. Merchants which have been selling charcoal can start selling water hyacinth char. No competition! Anyone working in charcoal production can easily switch to water hyacinth production.



Sustainable. Inexpensive. Fertile.

## 6. Water Hyacinth Char for Terra Preta

### Agriculture in Ethiopia

Agriculture is the main economic sector in Ethiopia. Agricultural production accounts for more than half of the country's GDP and provides jobs to more than 80% of the population.

The main problems in agriculture are the lack of land, dry season and soil degradation. The land management is unsustainable and short-term solutions contribute to the problems. The extensive use of chemical fertilizers enhances soil degradation and pollutes waterbodies in the surrounding area as well as the groundwater. The resulting excess of nutrients in the water contributes to an increased growth of water hyacinth.



*Structure of carbonized water hyacinth stems*

### Terra Preta for sustainable agriculture

Biochar, including water hyacinth char, has a porous structure. One teaspoon of biochar has an inner surface area which is equivalent to a football field. Nutrients and water adhere to this gigantic surface. The application of water hyacinth char as a soil enhancer has four main advantages.

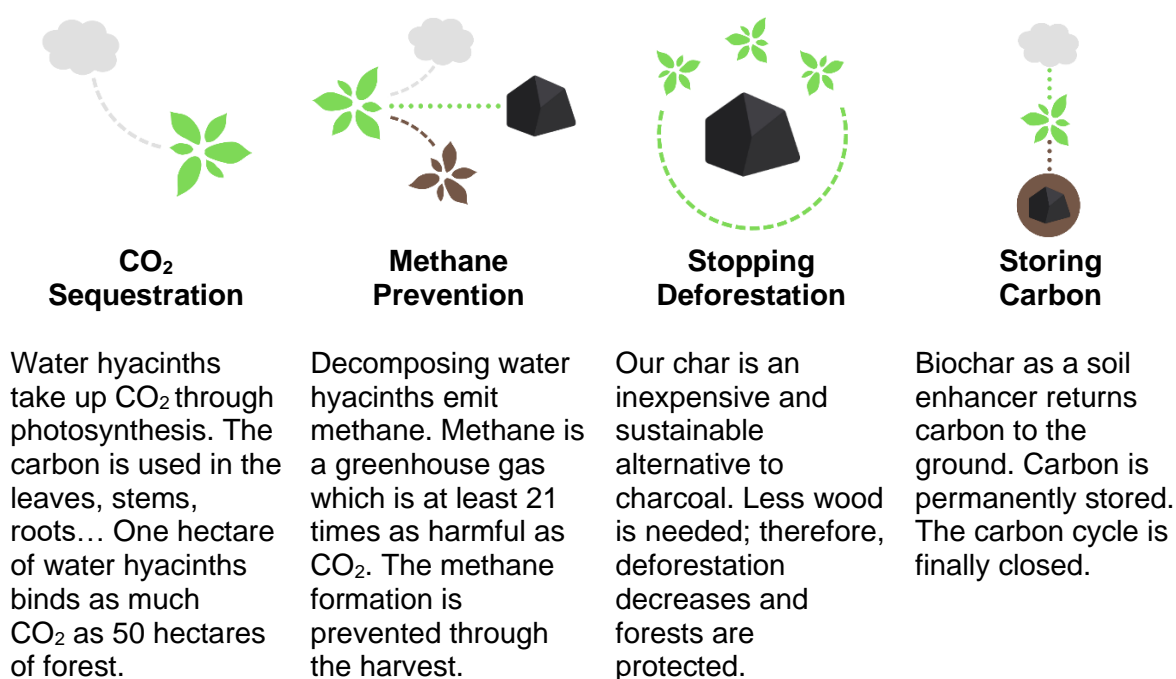
1. Less fertilizer is needed. The nutrients which are stored in the biochar can only be extracted by plant roots and are therefore no longer washed away into water bodies. Less fertilizer means less spending and more profit for farmers. Following, biochar can counteract poverty in rural areas.
2. Less irrigation is needed. Ethiopia, like many other countries in the region, has a rainy and a dry season. During the dry season, agriculture is only possible with extensive irrigation. Terra Preta keeps the water where it is needed; in the topsoil. Terra Preta saves money and valuable water resources.
3. Terra Preta secures the harvest. Crop yields are highly dependent on the weather. Terra Preta can balance out dry periods by storing water and making it available when the plants need it most. Harvest and crop yield are less dependent on the weather. This is especially important now, that farmers feel the effects of climate change!
4. Biochar increases the pH-value of the soil. Crop yields on fields with acidic soils are significantly improved. Experiments in Ghana show that an increase in crop yield of over 400% is possible.

## What is the impact of water hyacinth char production?

# 7. Water Hyacinth Char as a Game Changer

Harvest and utilization of the water hyacinth is solving four major problems of the region; Jobs are created and income is generated. The water hyacinths are removed and the problems caused by them are solved. The water hyacinth char prevents deforestation and increases crop yields which leads to an increase in food security. Reversing climate change and combating poverty!

### Reversing climate change – The single most effective method



We are actively removing CO<sub>2</sub> from the atmosphere! Water hyacinths are the perfect plants to remove large amounts of CO<sub>2</sub> fast.

### Combating poverty – Income for all

Thousands of people around Lake Tana do not have a constant job. The lack of income in the region leads into a spiral of poverty: No work, little education for the next generation, lack of infrastructure.

At Char2Cool, the water hyacinths are harvested, dried and carbonized by hand. The water hyacinths are freely available, jobs in production are open to anyone – women, men, youth and elderly. The more water hyacinth char is produced, the more local jobs are created.

Work and a steady income ensure a brighter future. We are creating value in deprived rural areas. This is sustainable development!

## From project proposal to business model:

# 8.Char2Cool – Biochar from Water Hyacinths

A never-ending source of biomass, a low initial investment and two competitive products. Sounds too good to be true... but it is!

We have been asking ourselves over and over again: Why does nobody carbonize water hyacinths yet?

There are some small-scale projects which are successful on a local level.<sup>6</sup>

There has been research for over 20 years now.<sup>7</sup>

It does work!

So far, there just was no high enough demand to find a replacement for charcoal. There was no high enough demand to balance out irregular weather patterns to stabilize agricultural production.

### Now we know that change is needed!

This is beautifully summarized in a quote by Victor Hugo:

*"There is nothing in this world more powerful than an idea whose time has come!"*

### With Char2Cool we can all become part of the solution!

Many projects in developing countries have a good start, but they are lacking in long-term planning. As soon as the initiators leave, the projects stagnate. We have a different plan for our project!

We want more than to be a small, local project. We developed a business model which is economically viable in any region, cultural setting and area, independent of level of development and infrastructure.

### Why do we not hand over the production to the local population?

We have been asked this question a lot. Especially by people who are working in development and aid. This is our answer:

- 1) We stay on site to drive the production. We support locals in founding businesses, spread our knowledge, organize customers and ensure a consistent quality.
- 2) To ensure continuous production and an impact in the long run, there has to be a market for water hyacinth char. We buy any excess char to fill the gap between supply and demand.
- 3) Most importantly: We give a promise to the people who are offsetting their carbon footprint with us. We make sure to keep this promise in any case. Therefore, we stay and ensure the climate effect and success of the project.

---

<sup>6</sup> One example from the Philippines: <https://www.youtube.com/watch?v=7O8yi7y4Fvk>

<sup>7</sup> One example from India: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0207135>

## Our story



### 2017

NABU International reaches out to discuss the possibility of making biogas from water hyacinths. It is possible but not viable, as there is no need for biogas in the local community.



### November 2017

A visit to Lake Tana and a series of harvesting experiments show that harvesting and drying the water hyacinths is simple.



### 2018

An experiment to burn dry water hyacinths shows, that dry water hyacinths are not suitable as a fuel. There is a lot of smoke development. Therefore, we tried to carbonize and briquette them instead. It worked!



### 2019

We are testing various carbonization technologies to determine their efficiency. With the support of experts from EG-Solar from Altöttingen we are developing a Kiln that lives up to our standards. Intuitive to operate, inexpensive and with the highest efficiency.



### September 2019

Our feasibility study exceeds all expectations! NABU International has a project site at Lake Tana, Ethiopia. There, we set up the full production chain in only four weeks. Harvest, drying, carbonization and briquetting. The local community is overjoyed.



### 2020

We will train local groups to produce the water hyacinth char at our permanent project site. The char can be sold on the market or directly to us to generate income for the community.

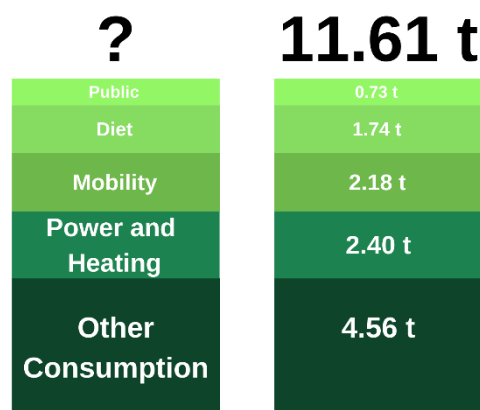


**Keyword: CO<sub>2</sub> Offsets**

## 9. How can I be part of the solution?

Every German produces around 11t CO<sub>2</sub> annually through their lifestyle. This is how each of us contributes to the warming of our planet. Elderly and kids tend to produce less CO<sub>2</sub> while frequent fliers produce more.

In developed countries, one cannot live without CO<sub>2</sub>-emissions. A certain CO<sub>2</sub>-production is part of life but we can make sure that it does not affect our climate.

**Keyword: Off-sets**

You are investing in water hyacinth carbonization. Your investment enables a CO<sub>2</sub> sequestration which is much higher than the emissions caused by your lifestyle.

**Why is CO<sub>2</sub>-offsetting with water hyacinth char that effective?**

The growing water hyacinths take up large amounts of CO<sub>2</sub>. That's good!

When the plant dies it sinks to the bottom of the lake and starts decomposing. The decomposition in an environment without oxygen produces large amounts of CH<sub>4</sub> (Methane). That's bad. Very bad for our climate, as CH<sub>4</sub> is at least 21 times more harmful to our climate than CO<sub>2</sub>. By harvesting the water hyacinths, we interrupt this harmful cycle and prevent the formation of methane.

**Double it!**

The growing water hyacinths take up large amounts of CO<sub>2</sub>. The harvest prevents the formation of methane, through carbonization we are producing a permanent carbon storage, biochar. Water hyacinth char provides the most effective climate protection through CO<sub>2</sub> offsets.

**How much CO<sub>2</sub> can be accounted for in water hyacinth carbonization?**

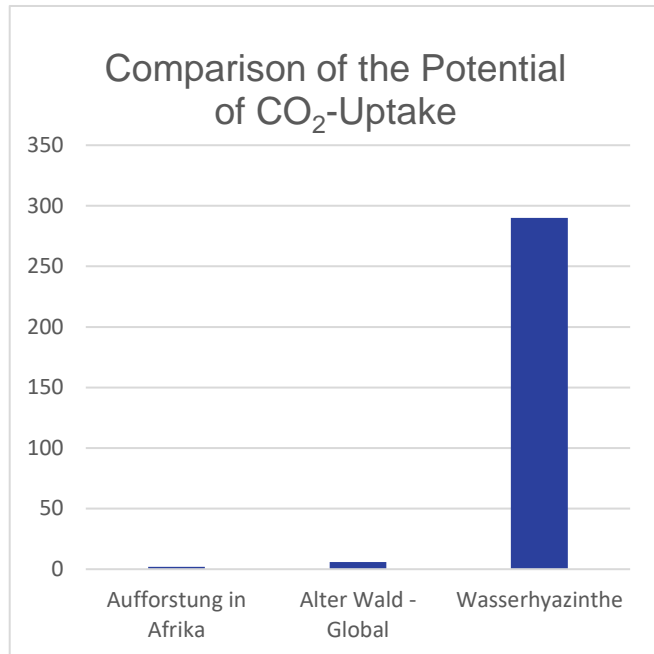
Our first calculations show that 1kg of water hyacinth char can compensate for 70kg CO<sub>2</sub>-equivalents.<sup>8</sup> The 11t CO<sub>2</sub>-footprint of the average German can be offset with 165kg of water hyacinth char.

<sup>8</sup> Detailed calculations can be found on <https://char2cool.de/co2-kompensieren/>

The diagram shows the CO<sub>2</sub>-uptake of forest and water hyacinth:

For the first 20 years, reforestation has an insignificant CO<sub>2</sub> uptake, because the trees are still very small. Old forest has a more efficient CO<sub>2</sub> uptake. Compared to water hyacinths, even an old forest has a seemingly insignificant CO<sub>2</sub> uptake. One hectare of water hyacinths can store 50 times more CO<sub>2</sub> than an old forest!

Reforestation is of course very important. We stand for water hyacinth char AND reforestation.



### Preventing deforestation!

If water hyacinth char, instead of charcoal, is used for cooking, then there is less demand for wood. Less demand for wood means that less trees are chopped down. A harvest of 20t of fresh water hyacinths equals 1t of dry water hyacinths. Through carbonization, 200kg of biochar can be produced and briquetted. The resulting briquettes replace 200kg of charcoal!

### What can you do?

1. Go to [www.char2cool.de](http://www.char2cool.de) and sign up for our newsletter
2. Offset your CO<sub>2</sub> emissions
3. Ask us about the next step!

### Learn more:

Walter Danner; [w.danner@char2cool.de](mailto:w.danner@char2cool.de)  
[www.char2cool.de](http://www.char2cool.de)  
[www.facebook.com/char.to.cool](https://www.facebook.com/char.to.cool)

*Projektbeschreibung, Stand Januar 2020*

*Inhalt: Walter Danner  
Layout: Olivia Thierley*

**Snow Leopard Projects GmbH  
Marktplatz 23  
94419 Reisbach  
+49-8734-93 977 0**