

The Global Artisan C-Sink

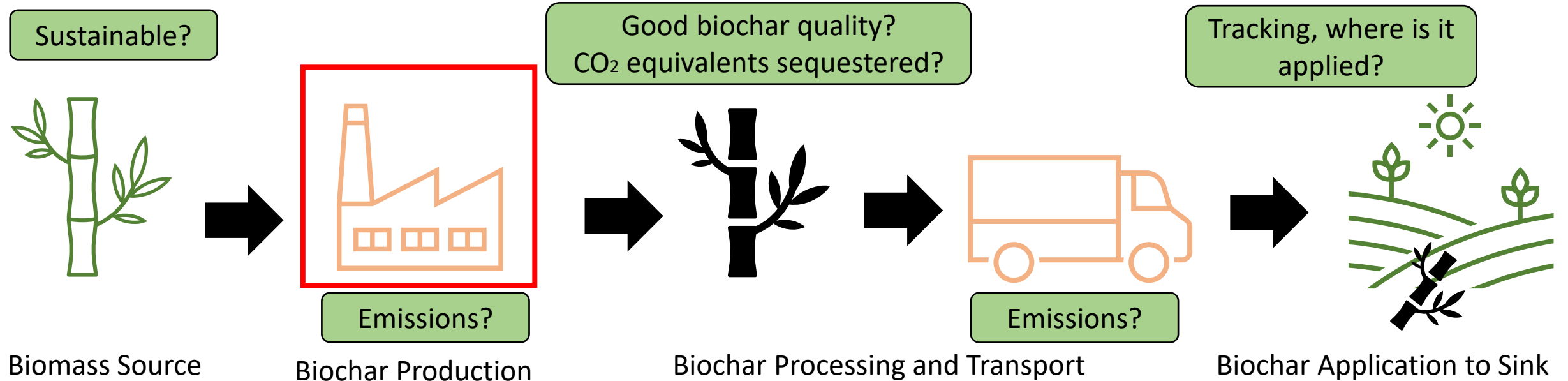


Methodology for the certification of biochar-based C-Sinks, where the biochar is produced with artisanal, non-industrial, methods of flame-cap (Kon-Tiki) pyrolysis.

The geographical scope of the Global Artisan C-Sink is limited to low-income, lower middle income and higher middle-income countries as defined by the World Bank classification of countries

Background

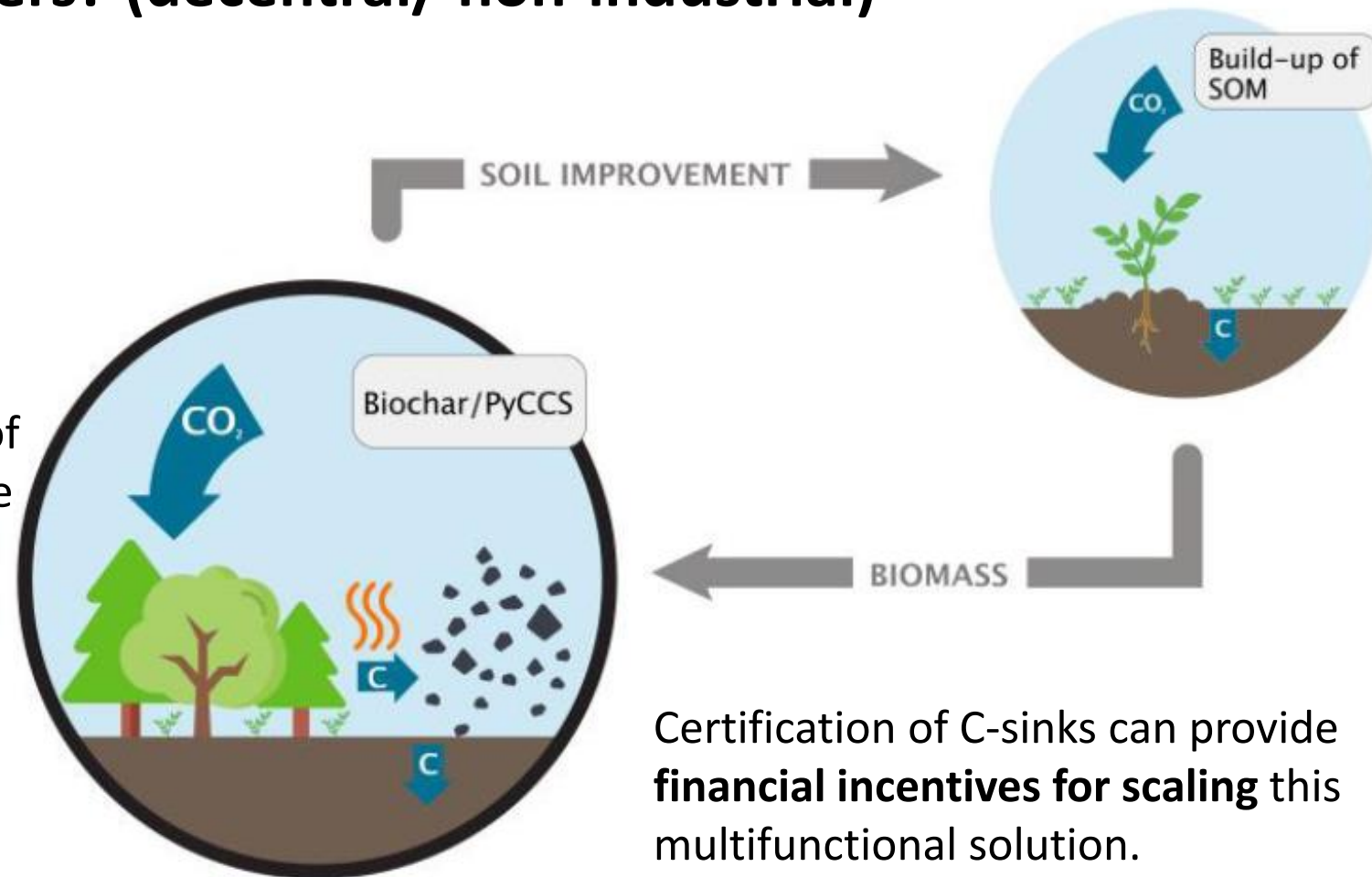
The first third-party certification for biochar-based C-sinks under the European Biochar Certificate is operational since 2020.



→ However, covers only C-sinks from centralized, industrial biochar production.
Direct link between certifier and producer.

Why do we need a certification scheme for biochar-based C-sinks produced by smallholder farmers? (decentral/ non-industrial)

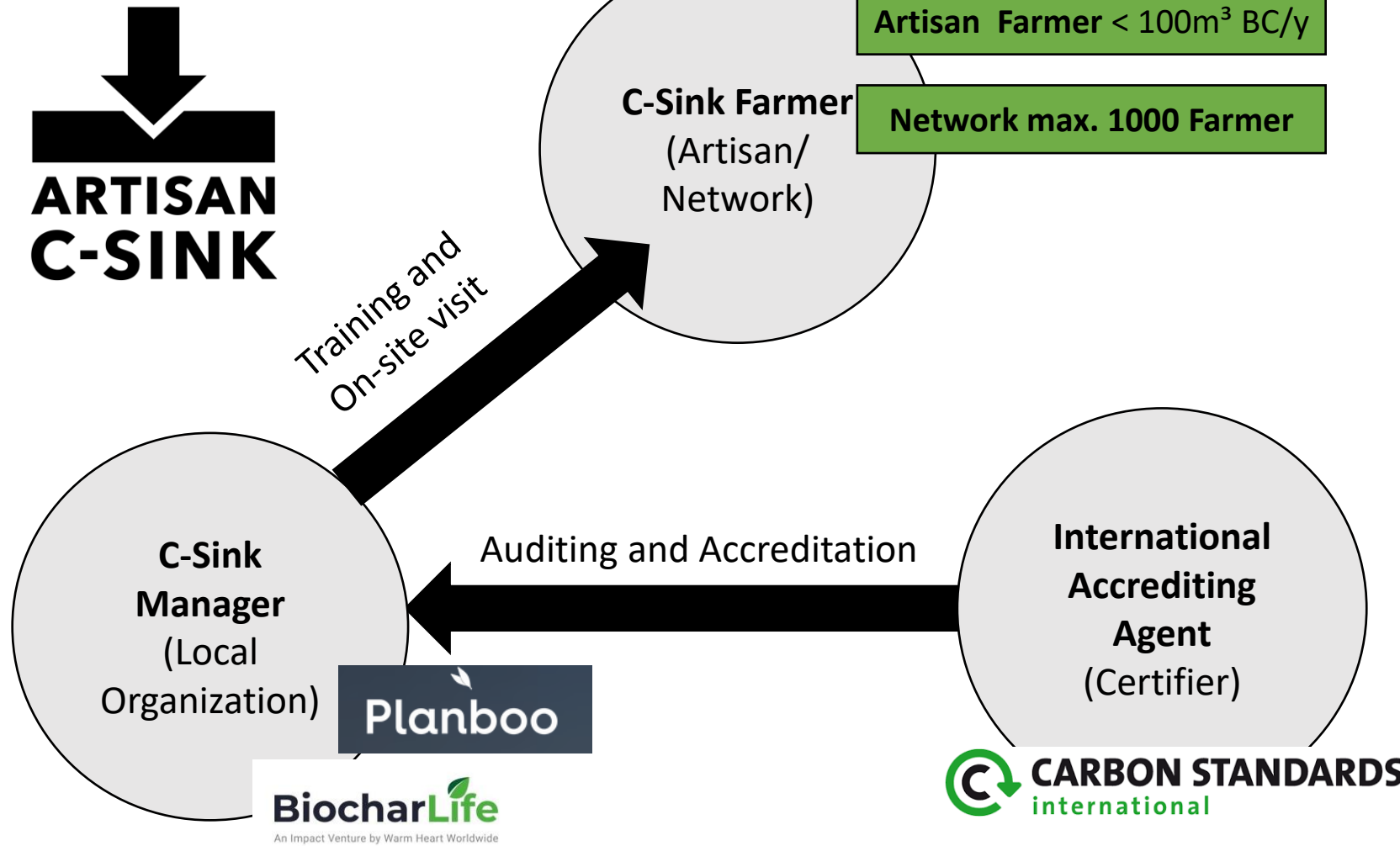
- Readily available and scalable CDR relies on photosynthesis for CO₂ extraction (biomass/land-based solutions). This process is fasted in the tropics.
- Smallholders are in stewardship of most of the agricultural land. Methods to promote and certify decentral biochar production are necessary - otherwise, we lose the largest share of the potential!



Certification of C-sinks can provide **financial incentives for scaling** this multifunctional solution.

Concept and Structure

Triparty Structure

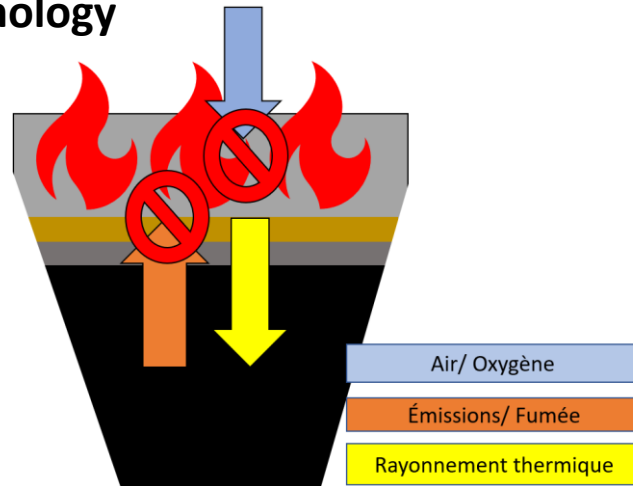


The Guidelines regulate:

- Eligible pyrolysis technology
- Sustainable biochar feedstock
- Training of the biochar artisan
- Smartphone based monitoring (dMRV)
- Methane compensation
- C-Sink calculation
- Transparency of benefit sharing
- Accreditation of monitoring apps and C-sink managers

Pyrolysis Technology and Biochar Feedstock

- Low-technology solutions that combust the pyrolysis gases. **Kon-Tiki** flame curtain pyrolysis (most common) or TLUD.
- **Bridge-technology**



- **Feedstock: sustainably sourced farm residues** (straw, leaves, branches, kernels, pruning material). Food processing residues, fallow crops, dedicated biomass. **Excluded:** Forest biomass.
- Must be **stored dry** and aerated.
- Must be **dry at time of pyrolysis** (max 30% moisture)

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Picture: J. MzD, Ithaka, Ghana

Training of the Artisan

“It is not the Kon-Tiki technology as such that can be certified but only the combination of the technology and the executing artisan – the artisan biochar producer”

Training must cover:

- Principles of feedstock selection
- Biomass drying
- Kon-Tiki operation
- Volume measurements
- Post-pyrolytic treatment
- Agronomic use of biochar
- Use of the Artisan App (Participatory dMRV)

Training must be completed by a successful examen.



Monitoring: The Artisan App

- **Data collected by the C-Sink manager → Certifier/C-Sink Registry**
 - Create account for each C-sink farmer
 - Upload training certificate
 - Register available biomass (GPS of farm + crop rotation)
 - Pyrolysis technology
 - Documentation of biochar production
 - **Feedstock** description
 - **Geo- and time referenced pictures** of process and product.
 - **Final volume produced**
 - Documentation of application/mixing of biochar (amount/date/location)
 - (Sale/Transport)
- **Biochar Samples:**
 - **Artisan:** No analytic- and retention samples required.
 - Database on biochar characteristics is available.
 - Analysis only if unknown/novel feedstock.

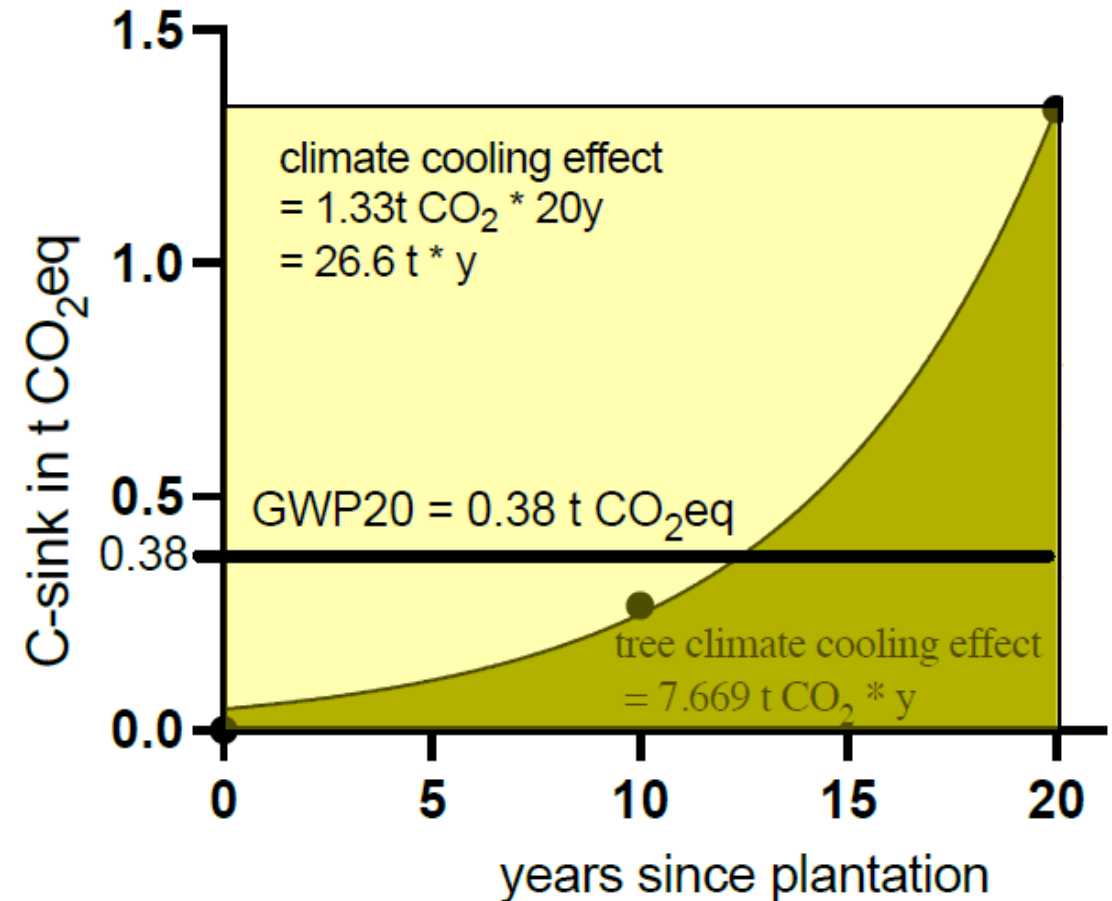


Methane Compensation

- Mean **0.03 t methane emissions per 1 ton biochar** produced via Kon-Tiki pyrolysis (*Cornelissen et al. 2016*).
- Methane **GWP20 = 86 t CO₂ t⁻¹**
- Methane emissions **must be compensated**.
- **Avoidance of uncontrolled decomposition or uncontrolled burning** of biomass in the baseline scenario through controlled pyrolysis in project scenario.
- Compensation by avoidance **only approvable for 10 years** (transition period)
→ **new practice becomes common practice**.
- Active Methane **compensation e.g., through tree planting**.
Trees must be registered by C-sink manager



Michelia Champaca



$$30\text{kg CH}_4 * 86 = 2.58 \text{ t CO}_2$$

$$2.58 \text{ t CO}_2 / 0.38 \text{ t CO}_2 = 7 \text{ M. champaca trees}$$

C-Sink Calculation

- C-Sink farmer (Artisan) document the feedstock type used, and the volume biochar produced and applied. Using biochar bulk densities (t/m^3) and C-contents from the feedstock data base, the gross C-sink is calculated.
- **1000 l coconut-husk biochar * 0.19 t/m^3 * 80% C-content * 44/12 = 0.56 t CO₂ (gross)**
- From the gross C-sink **carbon expenditures** are deducted. If transport is <100 km all expenditures are covered by a **3% security margin**.
- To account for **potential decay** of the labile biochar fraction, once applied to soils, a **highly conservative fraction of 26% is deducted**.
- **0.56 tCO₂ * 0.97 * 0.74 = 0.4 t CO₂ (net)**

- Price per tCO₂ ~ 100-150€
- Direct money transfer to farmers (mobile money)
- Benefit sharing ratio must be transparent.



Artisan Pro

- Annual production of 100-1500m³ biochar per year.
- Tighter MRV (Analytical sample and retention samples must be provided; annual on-site visits; check of feedstock supply chain)
- If >1500m³ a roadmap towards industrial solutions must be provided. → Kon-Tikis serve only at bridge technology!

Biochar Sale

- Sale/transport in a 100km range is possible.
- For longer distances a tracking system must be provided
- No sale to a different country (except cross border regions)

Additionality and Exclusivity

- Biochar application is no common practice.
- Occurs only at scale after active training and monetary incentive
- The creation of biochar-based C-sinks is thus clearly additional.
- No Artisan certification on areas included in certified SOC programs! This would cause a double-counting of C-sinks.

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Reference Project: Artisan Biochar Life (C-Sink Manager)

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- Impact venture of Warm Heart Foundation targeting biochar production at small-holder farm scale
- Improved **food security, farm income, better livelihood, climate change mitigation.**
- Operating in **Kenya, Malawi, Thailand, Tanzania and Indonesia**
- **Currently ~734 farmer engaged and ~ 5000 t CO2 C-sink produced** (*1.900 t CO2 certified as of November 2022*)
- **80% C-revenue returned to farmer**
(Total 2022: 100.000 USD or 140 USD/farmer)
- **Outlook:** Strong momentum in East Africa, **expansion to >100.000 t CO2 in 3 years.** Further projects is SE Asia, strategic partnerships with USAID, UN FAO, NORAD...

07/12/2022



Picture: M. Bier, Solidaridad

Reference Project: Artisan Pro Planboo (C-Sink Manager)

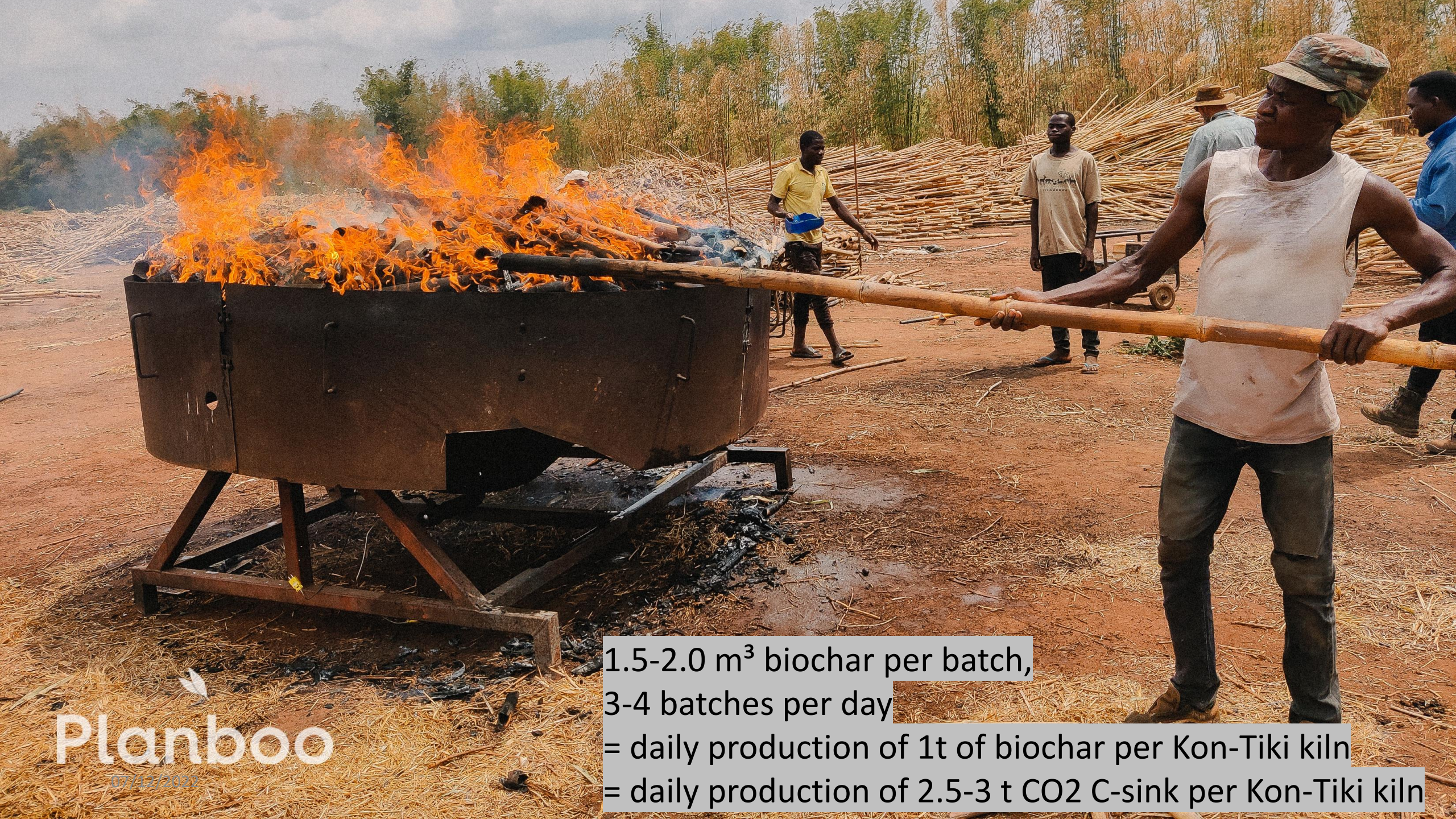
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- Operating in **Sri Lanka** (Cinnamon plantation, rubber plantation), **Malawi** (Bamboo plantation) and **Namibia**.
- Using **scaled Kon-Tiki technology** (round or square Kon-Tikis producing several m³ biochar per batch)
- **Single operations with > 100 m³ biochar / year** (some 100-1000 t biochar/ year)
- **Strong demand** for such C-sink solutions
- Proposals from **11 countries in the pipeline**.

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Picture: Planboo



1.5-2.0 m³ biochar per batch,
3-4 batches per day

= daily production of 1t of biochar per Kon-Tiki kiln

= daily production of 2.5-3 t CO₂ C-sink per Kon-Tiki kiln



Global Artisan C-Sink Guidelines are available here:

EBC C-Sink Guidelines & Documents

<https://www.european-biochar.org/en/ct/139-C-sink-guidelines-documents>

Contact

Carbon Standards International: info@carbon-standards.com

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PDF

For Industrial Biochar Production

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