

The CHITOFU family

invented in Malawi



is now in 7 countries

And has gone beyond
greening the blue economy to
climate-friendly food-processing



Presented in January 2024 by Christa Roth, Food and Fuel Consultants (Germany)



Starting point was Greening the blue economy – cross-cutting topic

- value addition through climate friendly processing of fish
- reduction of post-harvest losses to preserve resources and biodiversity in water and on land
- user-centred innovations for better working conditions
- empowerment of processors, mostly women
- Job-creation (as alternative to migration)
- positive impact on nutrition, food security – end hunger
- climate change mitigation and adaptation

For details on the technology design process see previous ETHOS presentations



Parboiling and frying – 80% firewood



Baseline

- Fish in several small bamboo baskets
- Single bath basin on unsheltered fire
- Wind on beach blows flames away from pot
- Slow and wasteful, high wood consumption
- High exposure to smoke and heat
- Danger of burns for user



Chitofu 3in1

- Fish in one basket, insulated handles
- Two sunken vessels on sheltered fire
- Fire directly hitting bottom of vessel
- 80% less firewood than open fire
- Fast, two vessels at the same time
- No exposure of user to smoke or heat



Staged Smoking – flame without smoke and smoke without flame



Baseline

- Smoke-drying, no separate curing and smoking
- Fire outside of smoker to avoid overheating
- Creation of 'smoke' by incomplete combustion
- Up to 4 layers of fish on bicycle rims
- No enclosure for smoke to condense on fish
- Fat dripping in embers (danger of PAH)



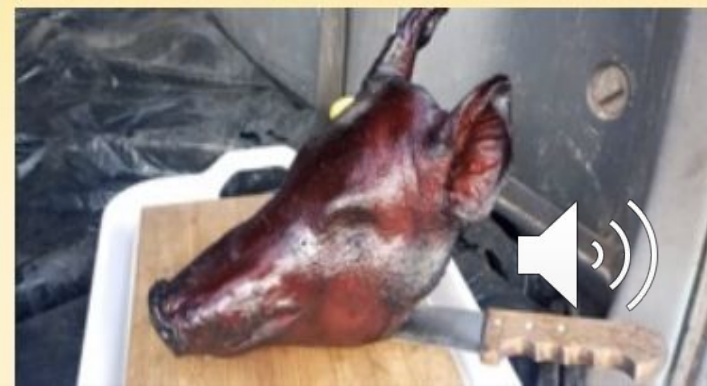
Grease pan

Chitofu 3in1

- Curing and smoking in separated phases, makes thick white smoke on demand after curing
- Full control of heat through firewood control
- Full control of smoke through air supply control
- Up to 8 layers of trays in enclosed cupboard
- Smoke has enough time to condense on fish
- Flavouring with smoke can be extended to meet the level of intensity preferred by customers
- Sand-filled grease pan to avoid burning of fat



We have expanded the product range beyond fish - the latest addition is smoked ChitofuTofu
And we have a professional chef who does event catering with the mobile Chitofu



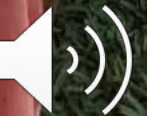
Mobile Chitofu = still a game changer

- Now insulated with plywood
- Portable, can be shared between users or moved to a better location if not in use
- Popular with aquaculture farming groups
- Cheaper and faster to build in larger numbers than a fixed stove
- Easy to transport, dismantlable to L-shapes or flat packs (e.g. 2x23 kg flight luggage without the bricks in the firechamber !)
- Easy to demonstrate the Chitofu principle anywhere
- Ideal for event catering and awareness creation



Malawi - Creating awareness

- At public events e.g. a farmer's market in Lilongwe, conferences etc.
- Catering at trainings on an organic farm and other events for shared fun and participatory edu-tainment



Zambia – Display at an international Aquaculture conference

- Through the colleagues from the GIZ Aquaculture Value Chain Programme and the Global Programme Fish the mobile Chitofu was displayed at a big conference in Lusaka. It subsequently staid in country with an interested fish processor.
- To be followed up in 2024



The Gambia

- Dedicated large smokers
- Replicated locally already 7 times through a GIZ programme



Senegal – Study tour

- Study tour from Malawi to learn about the large smokers for 2 tons of fish and how a really bad baseline looks like



Baseline



Spain – smoking pork in the home of the air-dried ham



Roth - Chitofu family is growing and going places to green the blue economy

Sierra Leone with Westafrica Blue

- Thanks to Nordica McCarthy I could demonstrate the Chitofu to this organisation engaged in restoration of Mangroves which are used as to build the traditional smoking racks and as firewood. The challenge is now to replicate the design with local materials



Mobility is crucial





- In Sierra Leone in December



Outlook for 2024 – similar to 2023

- Laboratory testing for PAH in Senegal and transformation of more FTT to NoFTT
- Scale Chitofu in Malawi with Icelandic support for GIZ EnDEV to one more district on the lakeshore
- Field testing to get more data for the business case
- Diversify technology according to customer feedback and demand
- Expand cooperation with existing partners GIZ AVCP, Global Programme Fish, Westafrica Blue, and find new partners



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economy or food
preparation
in your country?

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Chitofu 3 in 1

Climate Friendly Fish Processing (CFFP)

One device for high-quality Frying – Parboiling – Smoking of fish

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Chitofu 3 in 1

Climate Friendly Fish Processing Technology

One device for high-quality Frying – Parboiling – Smoking of fish

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