

Benefits: These gasifiers produce little smoke and lower emissions compared to Mayon gasifiers, with cost savings of US\$34 per ton of rice parboiled. They can be easily built by local artisans and are cheaper to operate especially near rice mills. The technology has been piloted in three sites in Côte d'Ivoire in collaboration with CNRA, with support from CGIAR Research Program on Rice Agri-Food System (RICE), African Development Bank-funded TAAT project and West African Economic and Monetary Union (UEMOA).

3. Gasifier for indoor cooking and GEM parboiling operations

This is a new gasifier developed by AfricaRice for indoor cooking and parboiling industry. This new system allows the syngas produced to be captured, channeled and burnt 3 m away from the gasification bed.

Benefits: The stove has longer burning time (90 min) per batch, produces no smoke, lower emissions compared to previously tested TLUD gasifiers, with cost savings of US\$34 per ton of rice parboiled. It can be easily built by local artisans and is cheaper to operate especially near rice mills. The technology is being validated on-station with support from RICE and piloted in one site in Nigeria with support from TRIMING Project.

Way forward for technology adoption and outscaling

Business models: Trained local artisans can produce gasifiers and sell to households and food processors, who are close to mills, where rice husk is freely available. Youth can package rice husk and other biomass and sell to gasifier users far from milling sites.

Funding: AfricaRice is seeking funds for outscaling gasifier cookstoves through training, demonstrations as well as for seed money for small entrepreneurs.



**Biomass Gasifier
Cookstove**
Technology Adapted for SSA

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AfricaRice

AfricaRice is a CGIAR Research Center – part of a global research partnership for a food-secure future. It is also an intergovernmental association of African member countries. For more information visit: www.AfricaRice.org



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Brief description

More than 5 million tons of rice husk (or hull) are produced annually in sub-Saharan Africa (SSA). They are either dumped and/or burnt, polluting the atmosphere. The use of rice husk as fuel for cooking and local artisanal food processing industry can be a suitable alternative to wood fuel and contribute towards reducing deforestation in SSA.

AfricaRice employs top-lit updraft (TLUD) solar or non-solar powered 12-volt fan-assisted gasification process to convert different types of biomass – rice husk, shell of palm kernel, groundnut, cashew, shea, wood chips, cow dung cake or their pellets – into clean, heat energy.

1. Gasifiers for outdoor cooking in rural areas

These gasifiers are the RUA and VIET models that have vent-like burners with an average burning time of 40 min per batch.

Benefits: These gasifiers produce relatively lower thoracic (PM₁₀)

particles (58–69 µg m⁻³ per min) and carbon monoxide (16–18 ppm per min) emissions compared to other TLUD gasifiers. They produce little smoke and can be easily built by local artisans and cheap to operate especially near rice mills. An AfricaRice-SNV-Benin study supported by African Development Bank-funded SARD-SC project and Global Alliance Canada (GAC) showed that these gasifiers were preferred for household cooking.

2. Large capacity gasifier used in the mini GEM parboiling system

This system uses a single or double channel pore-like burner Paul Olivier (PO)-type gasifier with high firepower capacity (18.8 KW min) coupled with an improved parboiling technology called 'Grain quality-enhancer, energy efficient and durable material' (GEM), developed by AfricaRice, for outdoor parboiling. The burning time is about 30 min per batch.

