

BIOSTAR

Bioenergies for small-scale agrifood
and forestry enterprises in rural parts
of West Africa

▶ An innovative
project for
the energy
transition
in Africa



The **BIOSTAR** project is

- > An ambition: **TO DEVELOP BIOENERGIES** for small-scale agrifood enterprises in rural areas.
- > A **PARTICIPATORY APPROACH** involving all the stakeholders in a supply chain.
- > **IMPLEMENTATION IN FIRMS** in the agrifood and forestry sectors with production capacity and access to residual biomass resources.

- > **USE OF THE LATEST TECHNOLOGIES** available on the market (combustion, gasification, methanization, etc), at power levels in line with the requirements of small-scale firms and the surrounding area in terms of heat, motive power and electricity.
- > **BIOENERGY PRODUCTION PILOTS** in the field, near agrifood and forestry production units.
- > An **INFORMATION SYSTEM** detailing the operations and efficiency of the systems established, in technical, economic, social and environmental terms, to be compiled..

> A favourable situation

Supply and demand in close proximity

> An urgent need in Africa

- > Access to energy services is a priority for sustainable economic development in Africa, particularly in rural areas.
- > There is strong demand for energy from the agricultural product processing industry.
- > Postharvest food losses are vast and could be reduced using preservation techniques.



The share of energy in product processing costs is around **15%**

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> A commitment on the part of West African states to developing renewable energies

- > Aiming for a third renewable energy in the energy mix by 2030
- > Limiting deforestation
- > Reducing greenhouse gas emissions

> A vast source of agricultural and forestry waste materials generated by local supply chains and not currently used in West Africa

945 000 t/year of cashew nut shells



One tonne of **raw cashew nuts** produces **700 kg of shells**, the equivalent of **3200 kWh**.

1 300 000 m³/year of sawmill waste



A 1-m³ **log** produces **0.65m³ of sawdust**. That waste can generate **1666 kWh**.

One tonne of **shea butter** leaves **1.2 tonne of shells**, the equivalent of **6600 kWh**.



810 000 t/year of shea nut shells

1 tonne of **rice (paddy)** generates **220 kg of rice husks**, the equivalent of **150 kWh**.

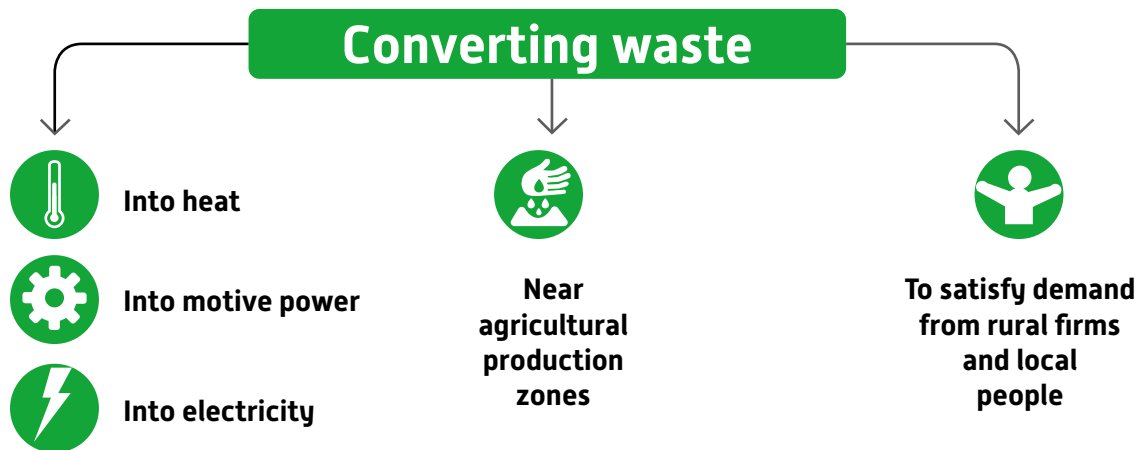


880 000 t/year of rice husks

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> An ambitious objective

For today and for the future, a renewable, fair and viable resource



Agricultural waste can be used to produce renewable energy thanks to regular supplies

This a competitive price per kWh, without relying on fossil fuels, to:

- > supply energy to rural areas
- > process/conservate agricultural products
- > support and develop economic activity in rural areas

> Expected results

An objective assessment with a view to technology transfer

- > A demonstration of the technical feasibility, economic performance, social advantages and positive environmental effects of bioenergy.
- > An estimate, using measurements and surveys, of the quality of the energy service supplied to firms and individuals.
- > A more sustainable agrifood supply chain, thanks to more secure energy supplies, guaranteed outlets for waste, and reduced postharvest losses.



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> Measurable impacts

Benefits for local people and industry

- > Creation of enterprises specializing in energy production from biomass.
- > Development of new agricultural activities linked to biomass production/harvesting for energy purposes.
- > Reduced environmental impacts thanks to agrifood and forestry waste management and recycling.
- > Inclusion of agricultural waste recycling in a circular economy on a territory scale.

> A participatory method

From experience,
the only way to ensure success

- > **Negotiating the involvement in the project of every stakeholder**, in line with their priorities, needs and interests.
- > **Working together** to produce a secure biomass supply plan linked to potential production scenarios, to satisfy the energy requirements of the processing unit or territory concerned.
- > **Associating the various players** to build the organizational and operating tools required to establish a sustainable bioenergy production chain.



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> Means tailored to the local area

Using existing efficient technologies

- > **To produce energy locally**
 - > Using bioenergy production equipment developed by the private sector.
 - > Setting up medium-power installations near or at processing workshops and plants.
 - > Organizing energy complementarity (hybridization) with other renewable energy sources.
 - > Training staff to operate and maintain the technology.
- > **To pass on knowledge and skills**
 - > Compiling data gathered during the project, relying on all the stakeholders involved.
 - > Establishing an information system for use in future projects: methodology, reports, maps, technical data, and environmental, social and economic impacts.

BIOSTAR

AN OPERATIONAL PROJECT WITHIN THE CONTEXT
OF THE ENERGY TRANSITION IN WEST AFRICA

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BIOSTAR is coordinated by CIRAD, the French agricultural research centre for the sustainable development of tropical and Mediterranean regions.

CIRAD's expertise

CIRAD is providing its expertise, notably:

- > detailed knowledge of agrifood supply chains;
- > experience of innovation and development processes within agricultural and food systems;
- > agricultural, technological, environmental and social analysis and diagnostic methods and tools tailored to agri-chains;
- > recognized expertise in terms of energy production from biomass: CIRAD designs research pilots and works in collaboration with equipment manufacturers in both northern and southern countries;
- > an active, broad network of partners in Africa.

THE BIG PROJECTS

Within a specific incubator,
CIRAD's Big Projects

- > **APPLY** the expertise, experience and know-how held by CIRAD and its partners to the challenges set by the Sustainable Development Goals (SDGs) for farming systems in the South.
- > **CO-BUILD** dialogue between development partners and donors and research players.
- > **ENSURE** their own success by using innovative methods centring on impact, monitoring and training.
- > **MOBILIZE** the platforms in partnership for research and training (dPs) set up by CIRAD and its partners in order to act locally, hand-in-hand with the players, communities and institutions that are involved in and benefit from them.

SUSTAINABLE
DEVELOPMENT
GOALS

 **cirad**
AGRICULTURAL RESEARCH
FOR DEVELOPMENT

WORKING TOGETHER FOR
TOMORROW'S AGRICULTURE