



## International Waste Management

International Study mission – Cross learning session





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Founded in 1419 – This year we are celebrating 600 yrs

- It is the oldest and largest university in continental northern Europe and the Baltic Sea area
- 8th oldest in Central Europe
- 5th university established in the Holy Roman Empire

### Department of Waste and Resource Management

#### Research and teaching focuses

- Waste Management and Circular Economy
  - Waste to energy as well as material applications
  - Development of partial masterplans for cities with focus on waste management
  - Development of Waste management models for cities and municipalities
  - Practical implementation of research - close collaborations with Ministries and SMEs
  - etc....
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## DBFZ

Deutsches BiomasseForschungsZentrum gGmbH

- ✓ Federal research centre for bioenergy and material applications
- ✓ Based in Leipzig/Germany
  
- ✓ Founded in 2008
- ✓ 300 employees  
(incl. students, PhDs, administration)
  
- ✓ Four departments
  - ✓ Biochemical conversion
  - ✓ Thermochemical conversion
  - ✓ Biorefineries
  - ✓ Bioenergy systems

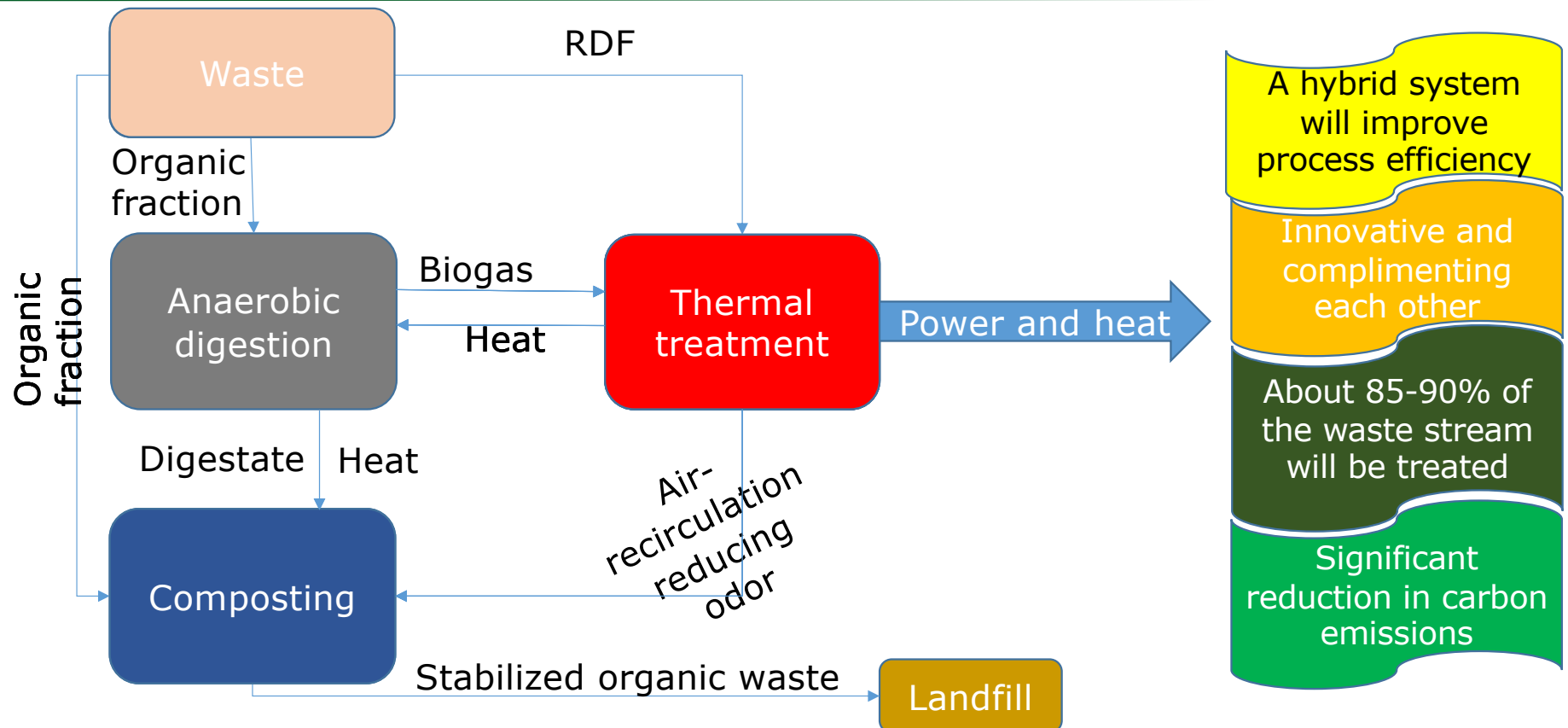


- **Scientifics consulting** in the sustainable waste management and circular economy
- **Support the universities and research** institutes by the development of education and research
- Advice on **sustainable strategies** for sustainable waste management and circular economy
- Short-, medium-, and long-term **trainings** as well as advanced education
- Waste analysis, laboratory control and environmental impact assessment
- Advice on **financing** of waste management and circular economy
- Support of **international networks** between Germany and other countries





## Integrated hybrid thermal and biological treatment of waste potential



Universität  
Rostock



**DBFZ**

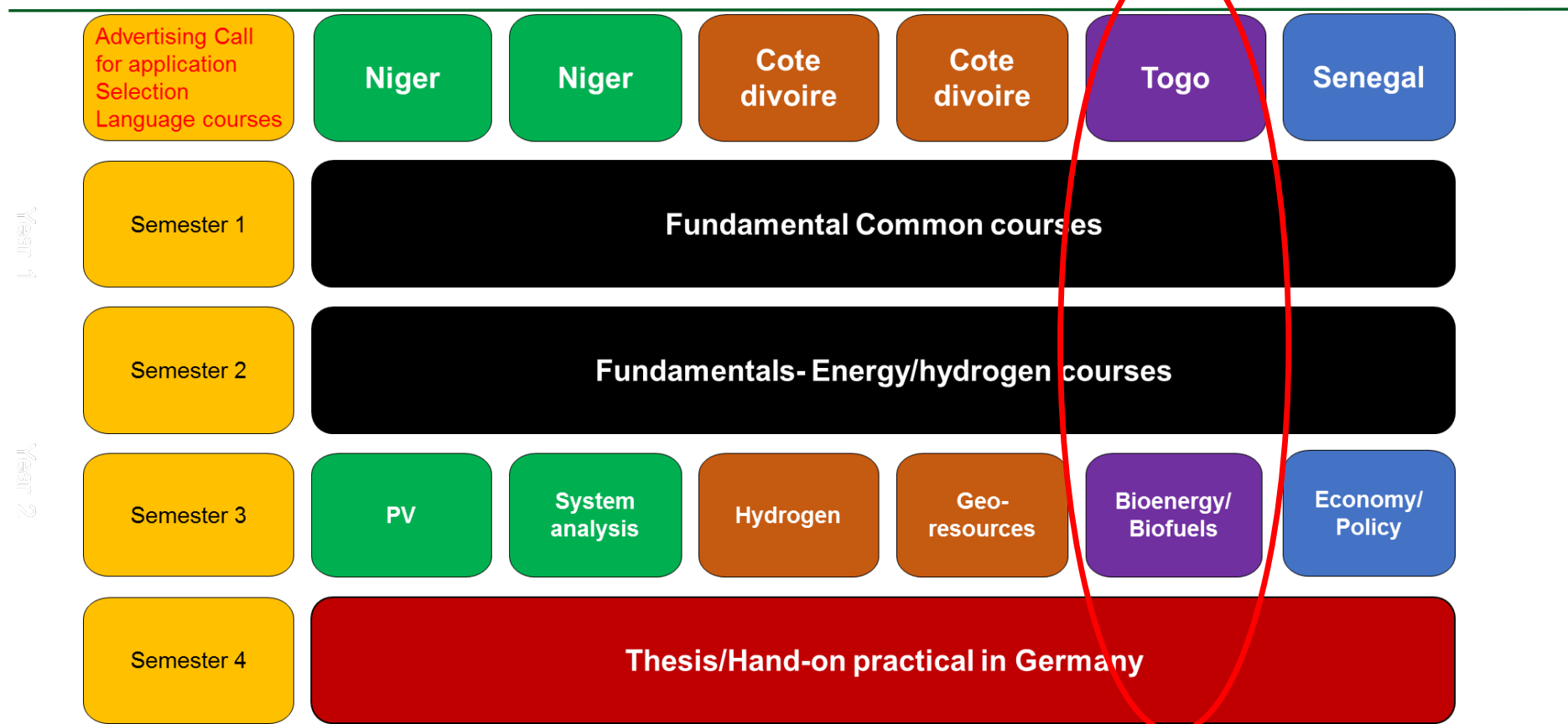


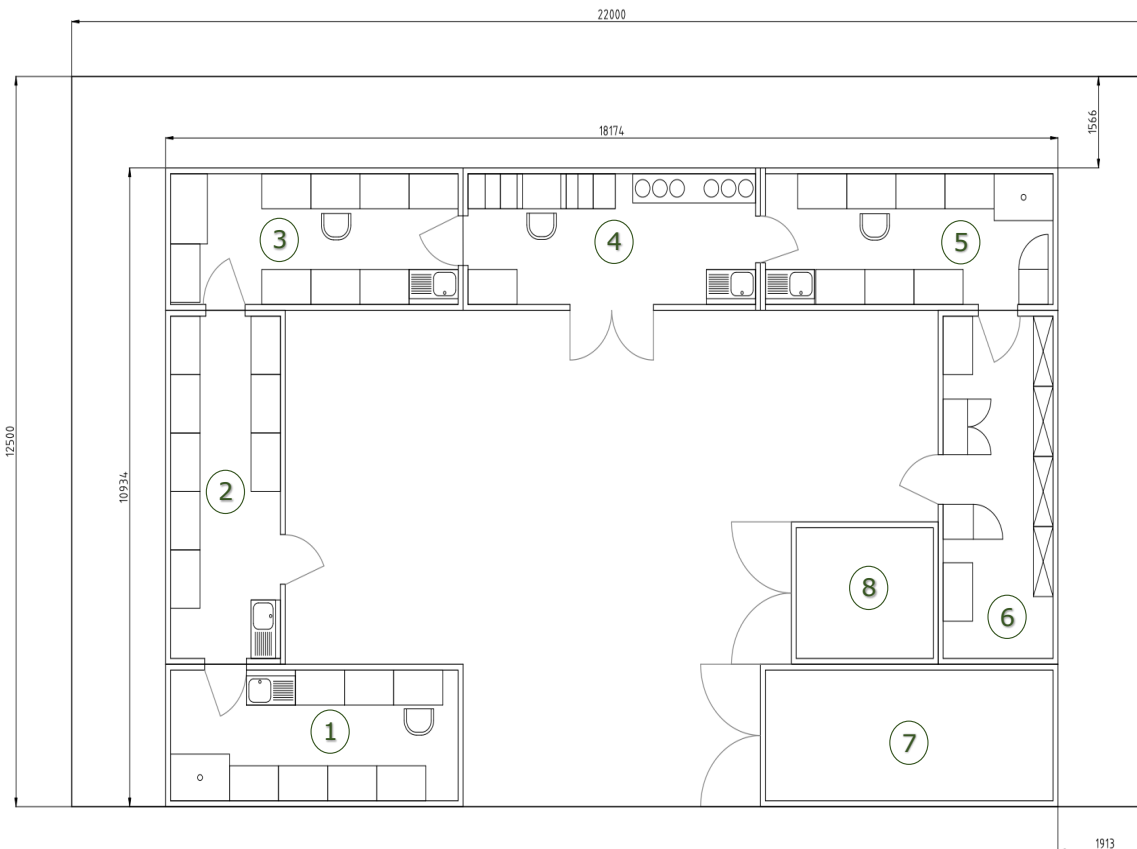
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**West Africa**

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## Green Hydrogen study course in West Africa



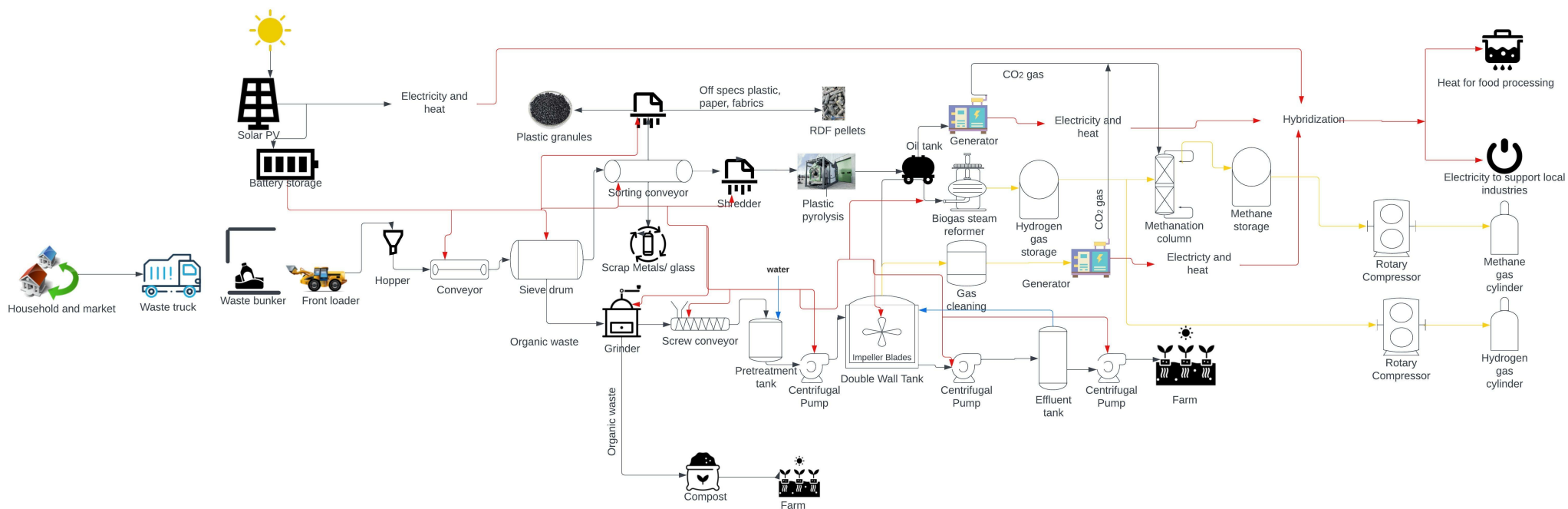


- Design and Equipment is specified
- Procurement and tendering process is completed
- Site preparation in Lomé also completed
- The pre-fit containers have been shipped beginning of October and are expected on 6. November 2022

- 1: Lab for feed analysis
- 2: Sample preparation / milling
- 3: Drying ovens, muffle furnace and general working area
- 4: Biogas lab with CSTR and Batch-Test-Systems
- 5: Analytic lab with GC-FID
- 6: Store for chemicals, samples / water purification unit
- 7: Cold store (refrigerated container)
- 8: Central energy hub



## HYBRID WASTE TO ENERGY PLANT





## Govt keen on renewable energy penetration — President

From Emmanuel Biah, GYANKOBA

**P**RESIDENT Nana Afofi Adofo Akoto Ofori has affirmed the government's commitment to achieve the 10 per cent renewable energy penetration into the energy mix by 2030.

He said the government would continue to engage stakeholders to come up with innovative and sustainable projects towards the realisation of that target.

Inaugurating the hybrid waste-to-energy power treatment plant at Gyankobaa in the Atwima Nwabiga South municipality in the Ashanti Region last Tuesday, the President said that objective was achievable.

In a speech read on his behalf by the Minister of Environment, Science, Technology and Innovation, Dr Kwaku Adugye, the President said the

new plant at Gyankobaa was a manifestation of the government's efforts to pursue reliable and sustainable alternatives to hydro and thermal energy generation for the country.

**Gyankobaa plant**  
With the waste-to-energy plant began in 2020 on a 17-acre land. The 400-kilowatt production facility, known as the Hybrid PV, Biogas-Pyrolysis Plant, will convert 12 tonnes of waste into bio-fertiliser and biogas daily and this will help farmers in the area have access to organic manure for their farms.

The power generated will consist of 200KW from solar, 100KW from biogas and an additional 100KW from the pyrolysis of plastic waste.

When the entire project is completed, it will also serve as a training centre for waste management and solar energy sourcing, provide training for 17 master's degree students and four PhD students at the University of Energy and

Natural Resources (UNEN), the Kwame Ninsinah University of Science and Technology (KUNST) and the Kumasi Technical University (KTU), all supporting partners of the project.

The inauguration ceremony attracted a number of dignitaries, including the Ghana Education Service (GES) Director, Atwimawakwa Kwaku Ofori; Deputy Minister of Energy, William Oware; Ambassador to Ghana, Daniel Krull; and the Atwima Nwabiga South Municipal Chief Executive, Michael Awuku.

**Sustainable alternative for waste**

President Afofi Adofo said the project, the first of its kind in West Africa, would help close the communal carbon cycle by developing the value chain of the process with the production and utilisation of compost.

"The hybrid waste-to-energy project has come at a time when major cities like Accra and Kumasi are facing fire challenges in finding final dump sites. Indeed, the highlight of this project, for me, is the utilisation of municipal waste for the generation of power which could be the sustainable alternative for curbing the waste management challenges facing metropolitan, municipalities and districts (MMDAs) in Ghana," he stressed.

The President said the manufacture of compost, which would be sold to farmers to boost agriculture, would help cut down on mineral fertiliser while improving the soil structure and also contributing to Ghana's climate change mitigation strategy.

**German government's commitment**

Mr Krull said the German government was committed to

**"The Gyankobaa energy plant is expected to generate a total of 400KW, comprising 200KW from solar, 100KW from biogas and an additional 100KW from the pyrolysis of plastic waste."**

partnering Ghana to realise its set out goals on generating the energy mix through renewable energy by 2030.

He said Germany would continue to train high-level local experts in waste management and waste treatment technologies.

**Background**

Funded by the German government through the Federal Ministry of Education and Research, the hybrid waste-to-energy power plant is estimated at 6.2 million.

A four-year contract period signed between the two countries will see it being extended across the country in the near future.

This is in fulfilment of a promise made in July 2019 by the German Minister for Education and Research, Ms Anja Karliczek, who announced at a West Africa Science Centre in Climate Change and Adapted Land (WASCAL) Ministerial Conference in Accra that the German government would support Ghana to convert over 12,000 tonnes of the waste generated daily into energy and fertilizer to help protect the people from excessive pollution, health hazards and climate change.



A worker working on the newly installed waste-to-energy power plant at Gyankobaa. Picture: EMMANUEL BIAH

## Study discovers organic fertiliser for high yields

Continued from page 16

farmers for yield enhancement, in combination with NPK or on its own," they said.

"The research also observes that irrespective of the frequency of application of OFA to maize, either two or three times, the highest economic returns were achieved when 100 per cent OFA plus 50 per cent NPK was applied.

"However, for the best economic returns, applying 100 per cent OFA plus 50 per cent

NPK two times to maize could be recommended," the findings said.

**Experiments on maize**  
The trial involved three fields, namely: a control plot that did not receive any fertilizer or OFA, an OFA-only recommended field, an NPK-only recommended field, a field for equal application of OFA and NPK and a 100 per cent OFA + 50 per cent NPK field.

To check farmer perceptions of the treatment results, the researchers invited local farmers to view the trials one and two times before harvest, to say which treatment

results they preferred from visual inspection.

"In trial one, 28 farmers preferred the OFA plus 50 per cent NPK, while 22 preferred the 100 per cent NPK; and for trial two, 28 farmers preferred the OFA plus 50 per cent NPK, with 18 preferring the 100 per cent NPK.

"Overall, these results showed both OFA and 100 per cent NPK increasing maize yields, 100 per cent NPK by a larger amount, but adding OFA to 50 per cent NPK generally performed similarly to NPK 100 per cent, both in terms of yield and farmer

perception," it said.

**Farmers' preference**

Another experiment was carried out to determine the effect of OFA on aflatoxin concentration and the productivity of groundnuts, as well as another experiment to determine the effect of different rates of OFA and synthetic insecticide on cowpea pests and productivity.

From the farmer field days carried out, the study said majority of farmers selected plots treated with 100 per cent OFA plus 50 per cent NPK.

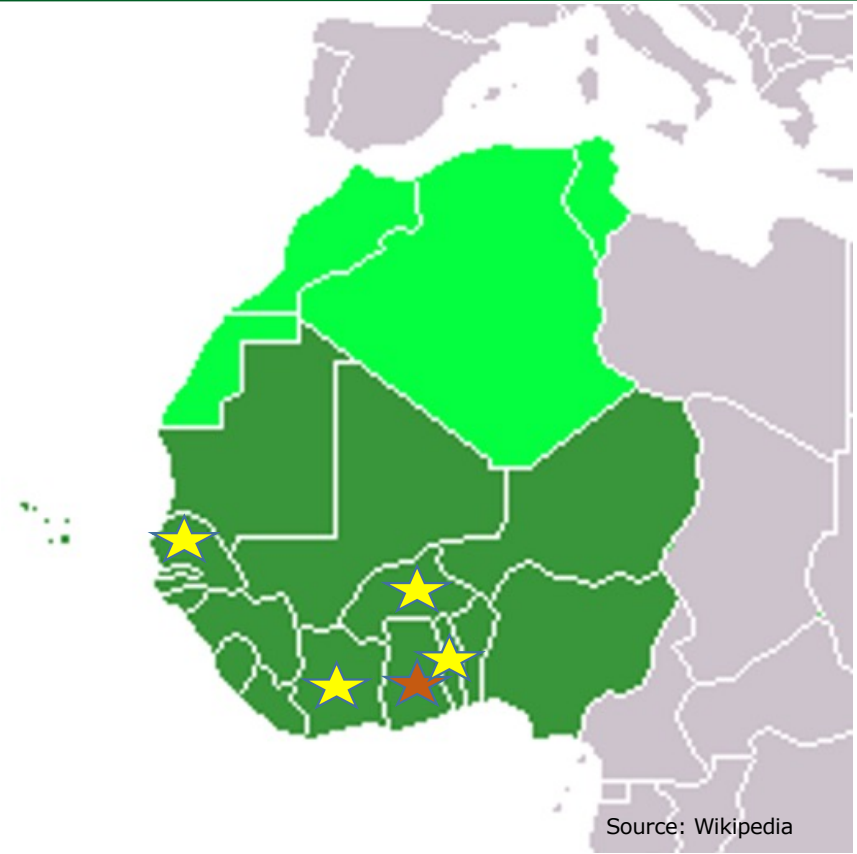




## Hybrid waste2energy plant in West Africa

Extension of the project into  
four west african countries

- Senegal
- Cote d'Ivoire
- Burkina Faso
- Togo

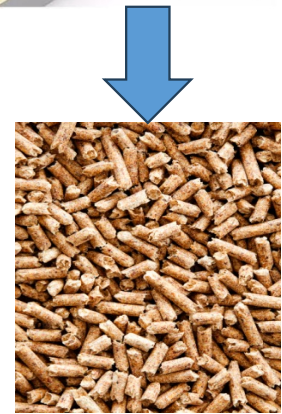
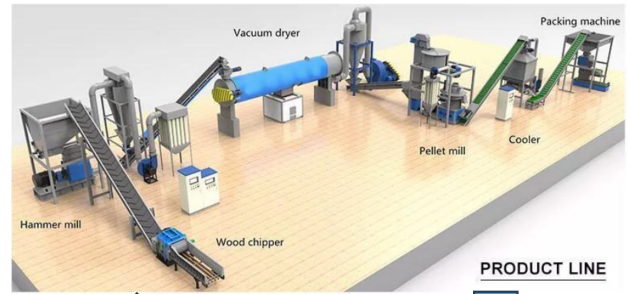


## Waste Sorting at Akepé



Source: Wikipedia

## Biomass pelletization



## Tyre recycling



International Conference  
**“Innovations in Circular Economy, Renewable  
energies and Green Hydrogen in Africa”**

In Planning:  
19-21 September 2023 in Kumasi, Ghana

Website:  
[Icerafrica.com](http://Icerafrica.com)



Source: Researchgate



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- Extensive research into biomass utilization to produce solid, liquid and gaseous fuels – process development and optimization
  - Strong local and intentional industrial collaboration to deliver high quality projects
  - Capacity building for industrial and research institutions (Masters, PhD and postdocs)
  - Consult for local and international bodies on bioenergy related projects
  - Carry out laboratory analysis for local and international companies using international standards
  - Develop bankable projects for our clients



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Thank you