INTERNATIONAL RENEWABLE ENERGY AGENCY

IRENA

International Renewable Energy Agency

JIRCAS JAPAN

Japan Research Center for Agricultural Sciences

R&D on Waste to Energy Sources

"Effective Use of Agro-Residues - Renewable Energy Solutions for Forest Conservation and REDD+"

UNFCCC COP23 Side Event

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MAFF Ministry of Agriculture, Forestry and Fisheries JAPAN

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COP23 FIJI UN CLIMATE CHANGE CONFERENCE BONN 2017

CONTENT

1. HOW CAN WE PRODUCE BIOENERGY WITHOUT CAUSING NEGATIVE IMPACTS ?
2. IS BIOENERGY PRODUCTION TO AVOID DEFORESTATION POSSIBLE?

IRENA Member Countries & JIRCAS Cooperation with MAFF-Japan Support

IRENA International Renewable Energy Agency

IRENA International Renewable Energy Agency

IITC in Bonn, Germany

IRENA International Renewable Energy Agency

HQ in Abu Dhabi, UAE

JIRCAS JAPAN

Worldwide Research Network CGAIR, Asia, Africa, Latin America

MAFF Ministry of Agriculture, Forestry and Fisheries JAPAN

Support sustainable bioenergy through IRENA & JIRCAS collaboration

IRENA International Renewable Energy Agency

153 Members

37 States in Accession

http://irena.org/

GENERAL NOTION

BIOENERGY

LAND CONFLICT
SACRIFICE LOCAL FOOD SECURITY
DEFORESTATION

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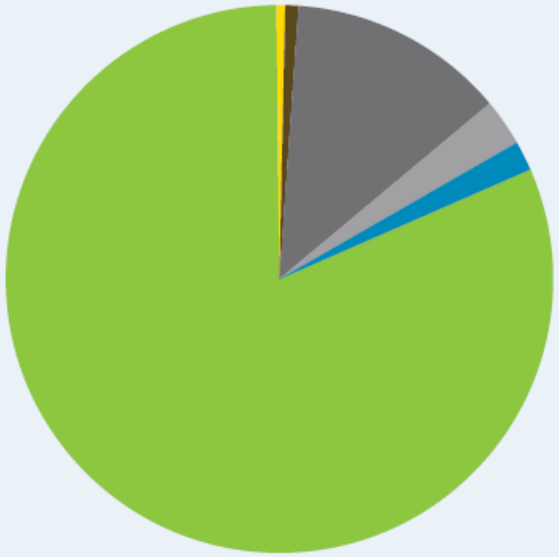
HOWEVER

WE NEED ENERGY

Share of Wood Energy in Sub-Sahara Africa (as of 2009)



C) SUB-SAHARAN AFRICA (excl. SOUTH AFRICA)

Bioenergy	Shares
Solid biofuels	81.2%
Other renewables	0.3%
Coal and peat	1.0%
Oil	13%
Natural Gas	2.7%
Hydro	1.9%

IRENA (2014) based on IEA (2009)

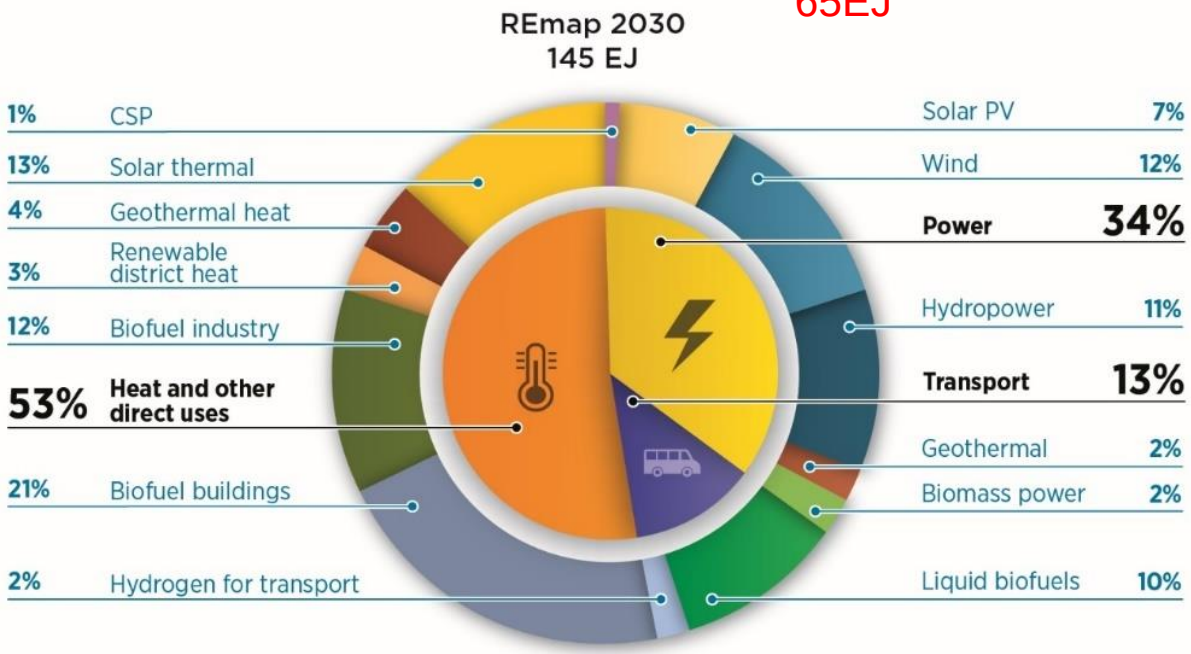
80% of energy was soil biomass – fuel wood & charcoal in 2009

Forest degradation, respiratory disease, deforestation, time consuming labour

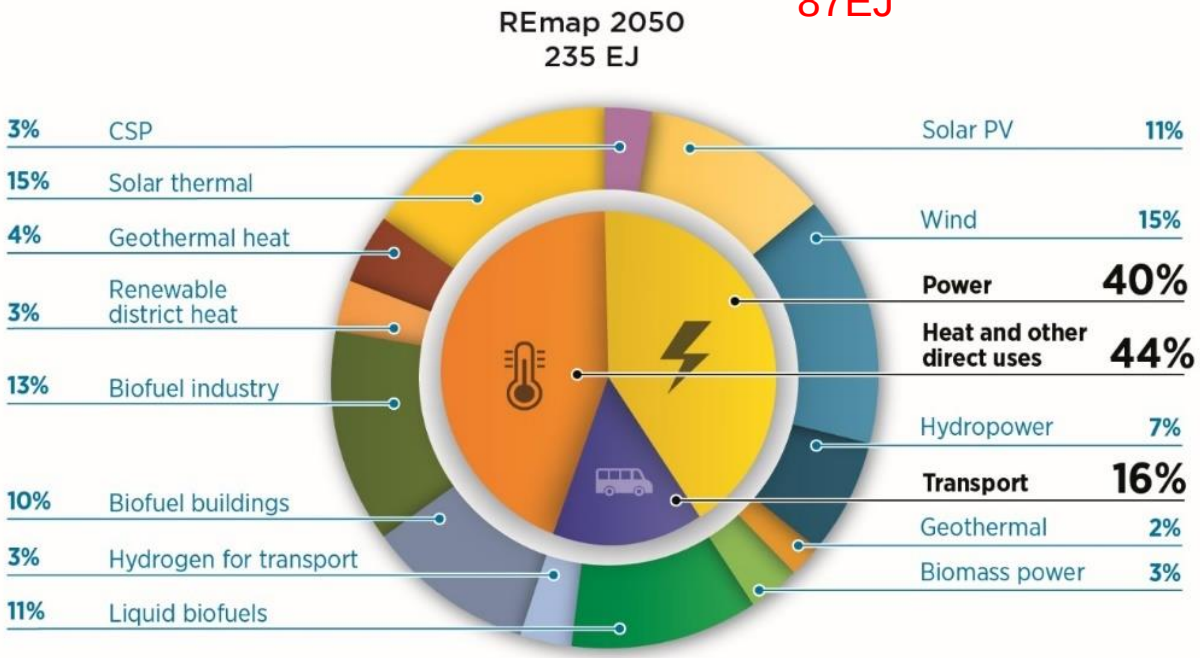
Many countries in Africa are seeking alternative solutions

Remap 2030, 2050

2030 Bioenergy
Share：45%
65EJ



2050 Bioenergy
Share：37%
87EJ



IRENA analyzed that renewable energy will be increased to 4 hold by 2050

Power 40%、Heat 44%、Transport 16%

6

1

HOW CAN WE PRODUCE BIOENERGY WITHOUT CAUSING NEGATIVE IMPACT ?

Survey of Biomass Resources in Ghana

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Renewable Energy Agency

BIO-RESIDUE: WASTE OR RESOURCE?

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Murata et al (2016)

Research collaboration with University of Nigeria

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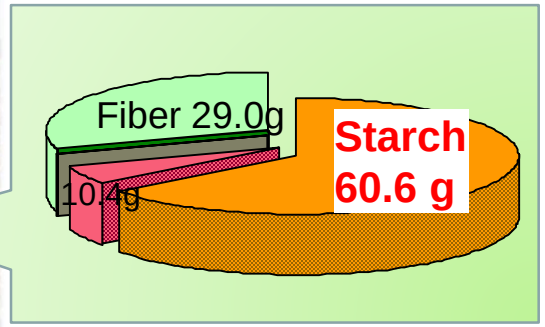
International Renewable Energy Agency

1. Utilization of cassava wastes

<Cassava >

<Cassava pulp from starch factory>



JIRCAS
R&D

60 ton Cassava
↓
20 ton residue
↓
1ML Bioethanol

2. Ethanol fermentation from cassava pulp

Cassava pulp
(8% starch content)

Liquefaction

+Enzymes
+Yeast

Saccharification
Fermentation

Distillation

Anhydrous alcohol

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Ministry of Agriculture, Forestry and Fisheries
JAPAN

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JAPAN

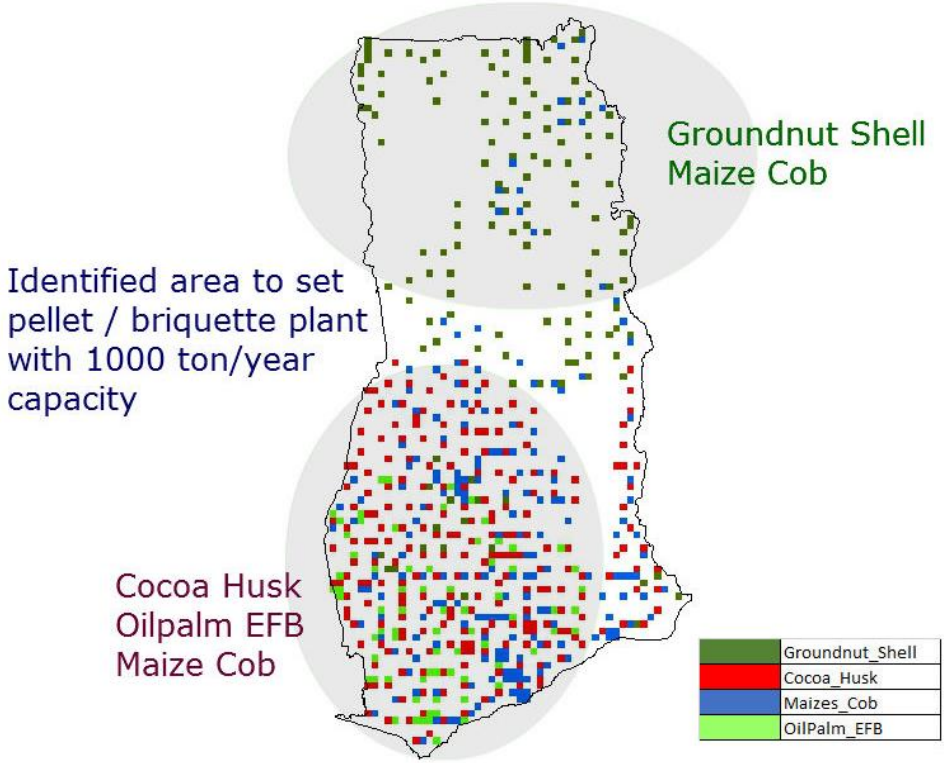
Murata et al (forthcoming)

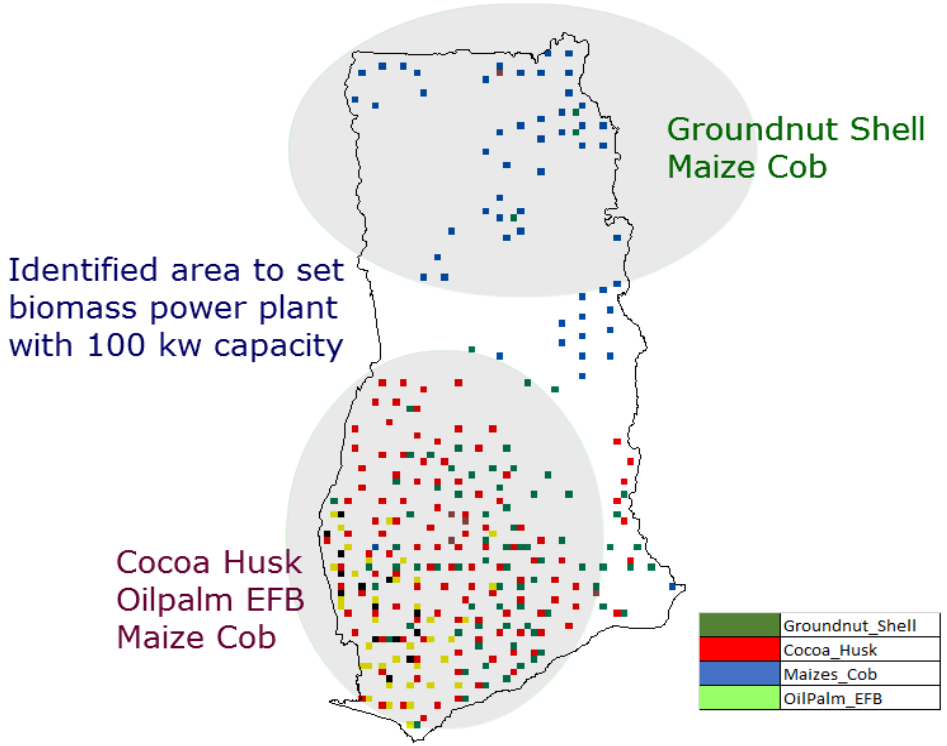
Bioenergy plant potential location identification from supply data

Commodity	No. plant
Cocoa husk	233
Oil palm EFB	123
Maize	298
Groundnut	148

GIS based analysis（Ghana）
(a) 100kW capacity- Small Scale Power Plant
(b) 2500 ton or 1000 ton Pellet factory
Collect biomass from 12 km radius

Commodity	No. plant
Cocoa husk	113
Oil palm EFB	60
Maize	132
Groundnut	70





Nakada et al (2016)

Solid fuel

Power generation

2

BIOENERGY TO AVOID DEFORESTATION

IS POSSIBLE?

YES

R&D CAN MAKE IT HAPPEN

OIL PALM CASE

After 20 years of production

ON THE SOIL AFTER LOGGING, NEW SEEDINGS CAN NOT BE GROWN WELL BECAUSE OF DECAY & PEST FROM THE OLD OIL PALM STEMS

CAUSE BURN NEW FOREST TO OPEN LAND FOR REPLANTING

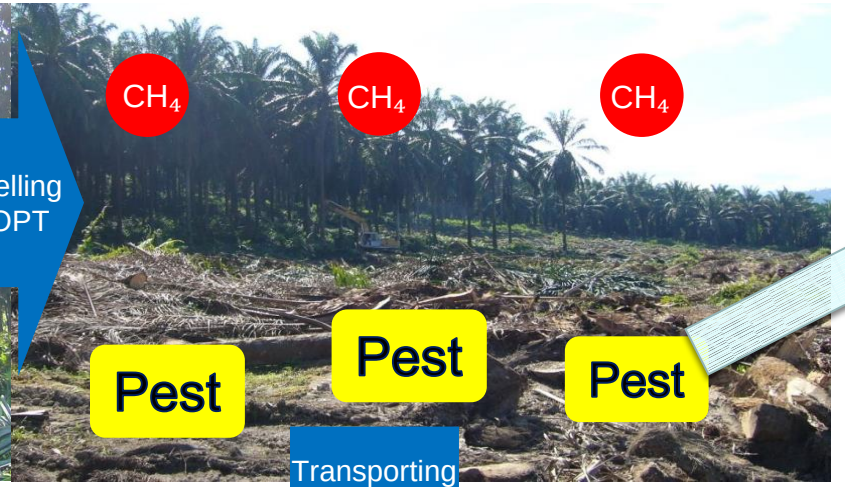
CONTINUOUS DEFORESTATIONS

Old Palm Trunk (OPT) Pellets Manufacturing Solution

Contact: Japan International Research Center for Agricultural Sciences | JIRCAS | https://www.jircas.go.jp

Environmental Issues of Palm Oil Industry in Southeast Asia

Felling OPT



Seedlings cannot grow well
↓
Cut forest

Transporting OPT

Because the water content is high in OPT,
It is difficult to use them as an usable wood,
and they are usually left at a plantation.

Green house gas to release・
late replantation・pest to well up

Pilot test of the pelletizing technology has been done in Malaysia.

Indonesia and Malaysia in total Stem of Trunks =5,600 ton/year = Same volume with all city waste in Japan

Oil Palm Trunks

Vast Resource

Kosugi, A.et al (2010)

Lifecycle of Oil Palm Plantation

20 years of rotation

1st Yr. 3rd Yr. 5th Yr. 10th Yr. 20th Yr.

Palm Oil Harvest Period: 20 years

Intensive care

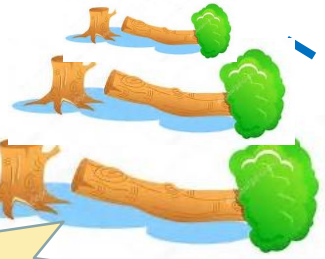
Seedling Planting

Oil Palm Seedlings can be grown

GHG emission reduction ⇄ Energy resource

Sustainable Land Use

Logging



Vast Resource

【New Technology】

Old Palm Trunk（OPT）

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IKE IHI Environment Engineering

Sap Extraction System

Extract juice（Sugar）

Palp（Cellulose）

Palletization

Pellet

4 billion Nm3

IHI-IC Reactor

Energy Use

Power, Heat

Kosugi, A.et al（2010）

【Conventional System】Leave oil palm trunk

Decay and GHG emission and

Diseases outbreak

Seedling cannot be grown on the same land → Deforestation

【Change】: Collect Stem & Use as Energy

Deforestation Avoided

CONCLUSION

R&D GENERATE

NEW BIOENERGY TECH SYSTEM

FOREST CONSERVATION & REDD+

ENSURE FOOD SECURITY

INCREASE NATIONAL INCOME

&

IMPROVE LIVELIHOOD OF LOCAL PEOPLE

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Let's develop bioenergy technology which will contribute to conserve forests and REDD+.

"When we plat trees, we plant the seeds of peace and hope."

Wangari Maathai (1940 - 2011)

Source：Green Belt Movement

Join Us to the International Workshop in FAO African Forestry and Wildlife Commission in March 2018

World Agroforestry Centre

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A Workshop on
Sustainable Rural Biofuel Solution in Africa

[Call for Good Practice]
Please ***share your knowledge and good practices in Africa or applicable in Africa*** on;

- ❖ ***Agro-forestry*** and/or ***Agroecology*** good practice to increase bioenergy availability, improve nutrition and bring about healthy environment
- ❖ ***Innovative Biomass Residues to Energy Technology*** to boost energy access and efficiency.
- ❖ ***Practical Tools to Ensure Positive and Inclusive deployment*** of bioenergy in a wider range of society

- Selected good practices will be invited to present at the workshop and published in our Cookbook style guidebook.
  (Some funding availability)
- **Experiences from Asia, Latin America or other** region applicable to Africa are also welcome!

[A]
Agroforestry or Agroecology practices which increase energy availability of communities while ensuring positive impacts on ecosystem, nutrition and calorie intake (examples: micro-catchment with fruit trees & animals etc)

[C]
Tools for Enhanced Bioenergy Sustainability to ensure positive and inclusive social, economic and environmental impacts in bioenergy development (example: GHG emission impact assessment tool etc)

[B]
Bio to Energy Innovation which enable effective use of 3Rs. (example: efficient bio-ethanol production technology from cassava starch; Biogas for chilling milk at rural market; fuel efficient cook stoves. etc)

Abstract Submission: 31 August 2017
(200 word summary of [A], [B] or [C] above)
Full Paper Submission: 30 September 2017
(Template is on the 2nd Page)

Selected entries: will be invited to prepare a paper and present it at a workshop below. The summaries of the good practices will be included in our publication.

Workshop venue: tbc (in Africa, early 2018)

URL: www.irena.org

Submission/Inquiry to: Ms Yasuko Inoue,
IRENA Innovation Technology Centre
E-mail: Yinoue@Irena.org
Telephone: +49-228-3917-9094

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SEE YOU AGAIN SOON

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Ministry of Agriculture, Forestry and Fisheries
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Thank you very much.

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