



**CSIR – FORESTRY RESEARCH INSTITUTE OF GHANA**

# **PRODUCTION AND MARKETING OF WOODY BIOMASS FOR ENERGY IN GHANA**

**Beatrice Darko Obiri**

**K. Owusu Afriyie & E. Opuni-Frimpong**

## INTRODUCTION

### ❑ HIGH DEMAND FOR WOOD FUEL ON DOMESTIC MARKET & FOR EXPORT

- WOODFEUL 78% of the total national energy consumption.
- **2,522.7** metric tons worth **USD 441,000** exported mainly to Europe (UNCOMTRADE statistics, 2008)

- **Permanent employment for 144,000 people** in charcoal production and marketing



### ● MAIN DRIVERS

- Poor agricultural income
- Major alternative income source in most farming areas
- Expensive alternative energy sources

- **Charcoal Business Booms As LPG Price Soars**

*(The Ghanaian Chronicle: January 27, 2014)*



## FOCUS OF PAPER

# ❑ PAPER DISCUSSES MAJOR ISSUES OF CONCERN IN CHARCOAL AND FIREWOOD PRODUCTION & MARKETING SYSTEM IN GHANA

## ● WOODFUEL END-USE PRODUCTS



Charcoal



Firewood

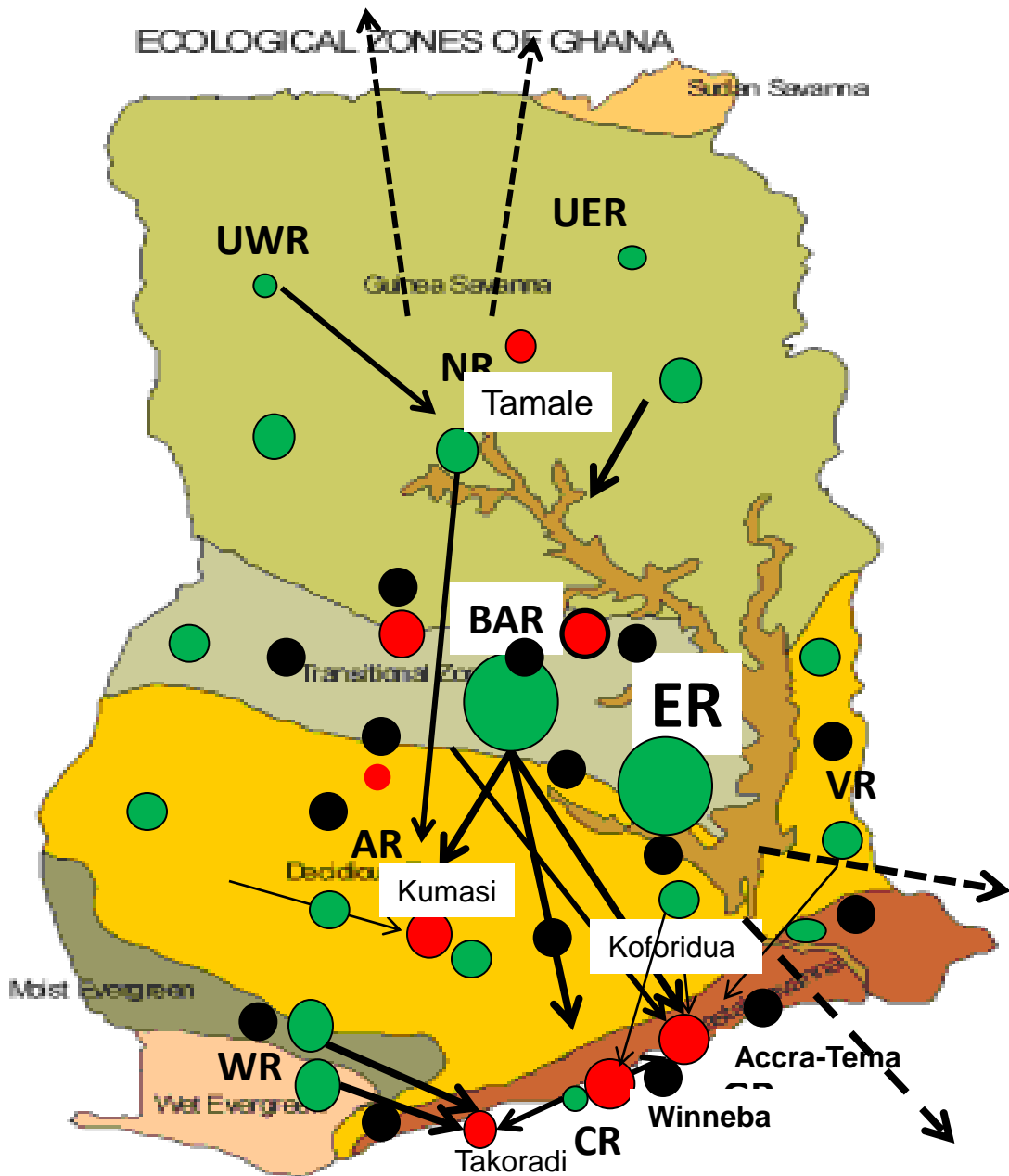


Logging and milling waste



Briquette

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# DATA SOURCES AND ANALYSIS

## □ DATA

- ❖ Desk review: Demand-supply situation, policies and institutions, etc.
- ❖ Cross sectional survey

## ● KI and QUESTIONNAIRES : >1500 Respondents

- Resource owners, Producers
- Charcoal and firewood distributors, transporters, wholesalers & retailers
- Consumers
- District authority, Forestry staff
- Etc.

## ❖ Production cost and returns

## ❖ Wood fuel species stocks inventory

## ● ANALYSIS

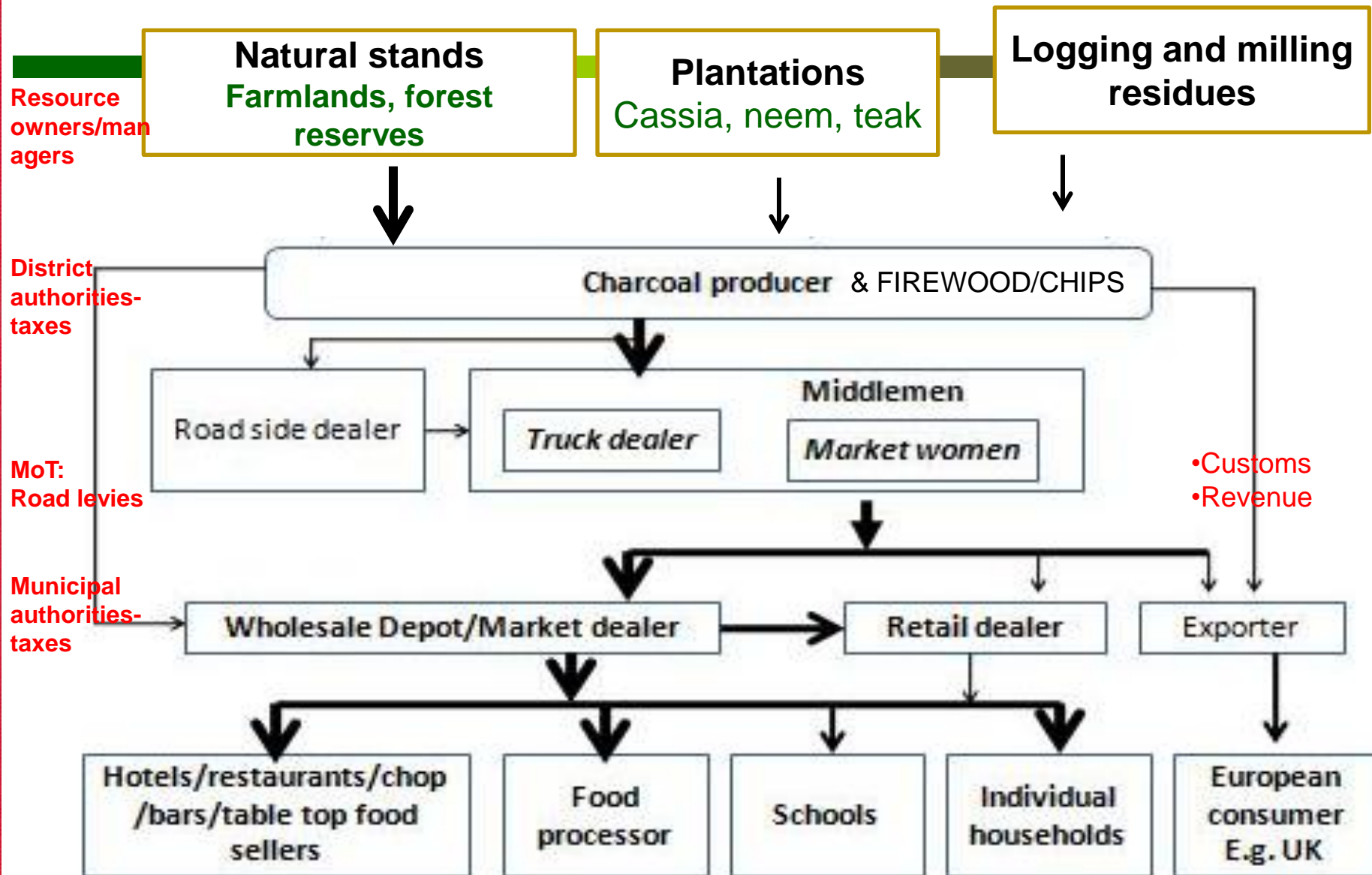
## □ Quantitative and descriptive





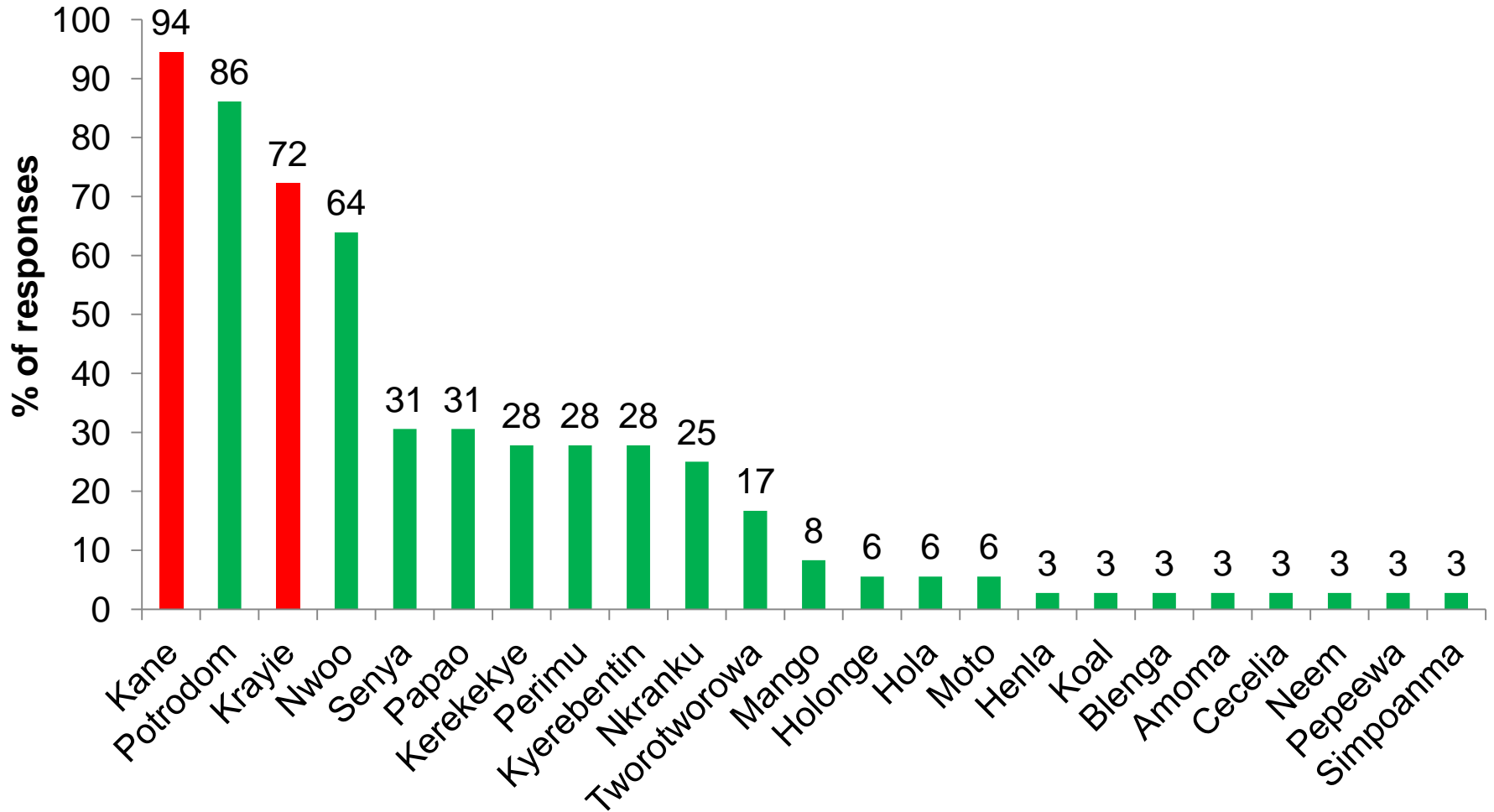
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## Supply chain in Ghana



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50 woodfuel species documented (some not identified)



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# IMPORTANT SPECIES

- **CHARCOAL SPECIES**

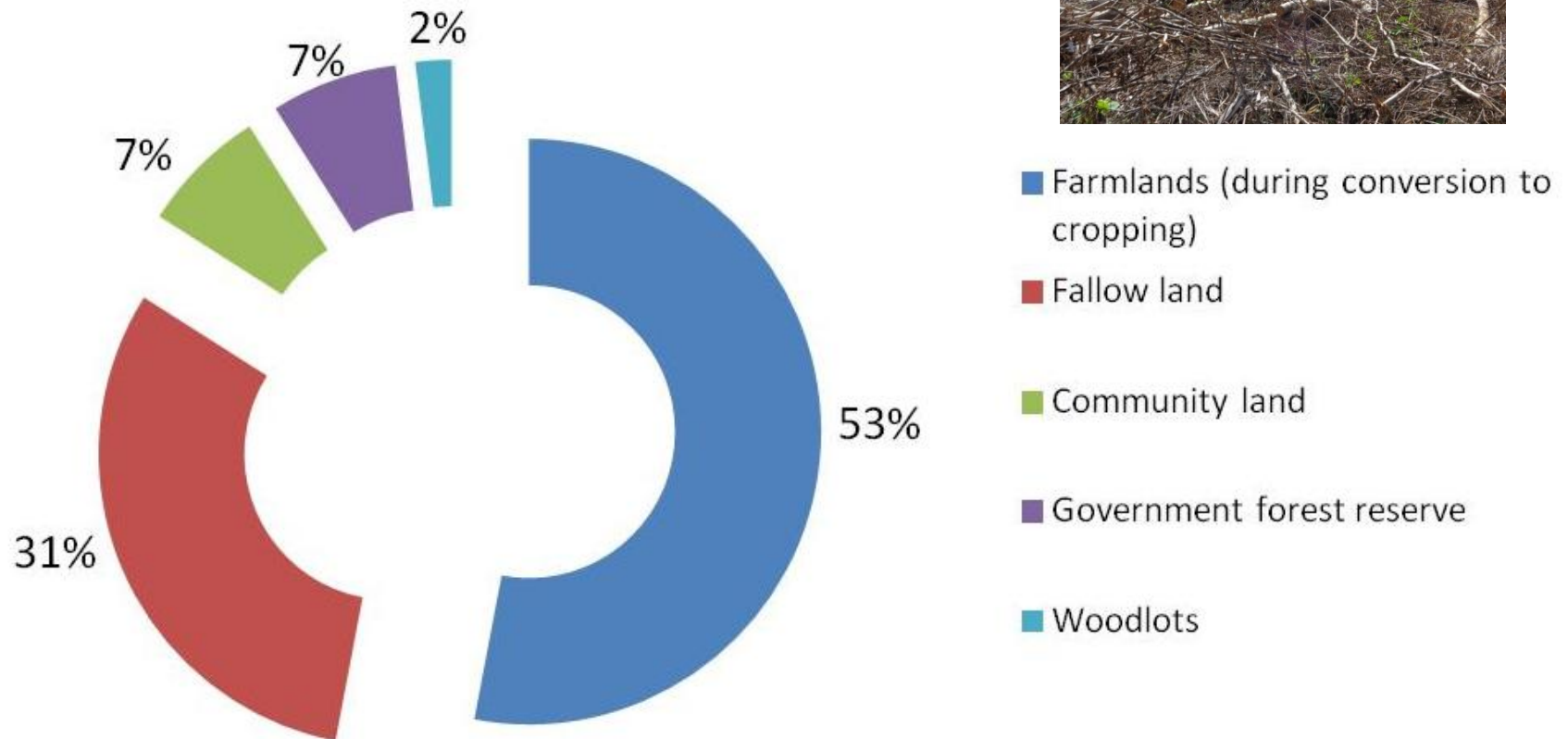
KANE (*Anogeissus leiocarpus*)  
Medicine, construction

Krayie (*Pterocarpus erinaceus*)-rose wood  
Ornamental, forage, firewood,  
timber, medicine





# Major Sources: tenure and land use regimes



# RESOURCE GOVERNANCE

## □ ACCESS

- Government land: **paid permit from FSD**
- Family land: **sharing agreement/ in kind payment**
- Communal land: **fee paid to chief by gangs/ no payment by locals**

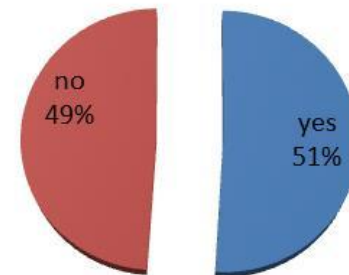
## □ MANAGEMENT & REGULATION

- Unmanaged natural coppicing



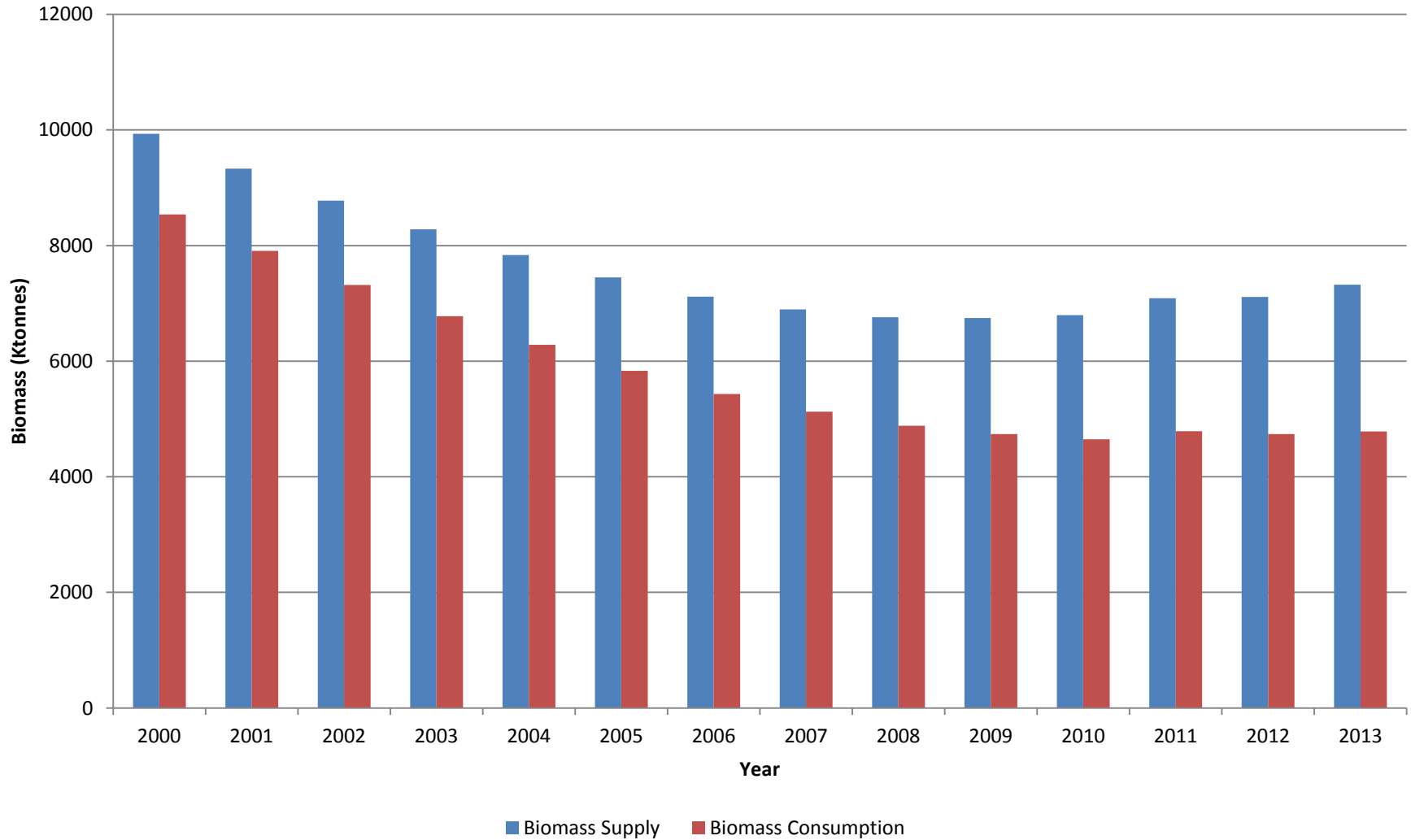
- Erosion of traditional conservation measures

Are there regulation for managing wood fuel resources?





# Supply-demand surplus





# CHARCOAL PROCESSING



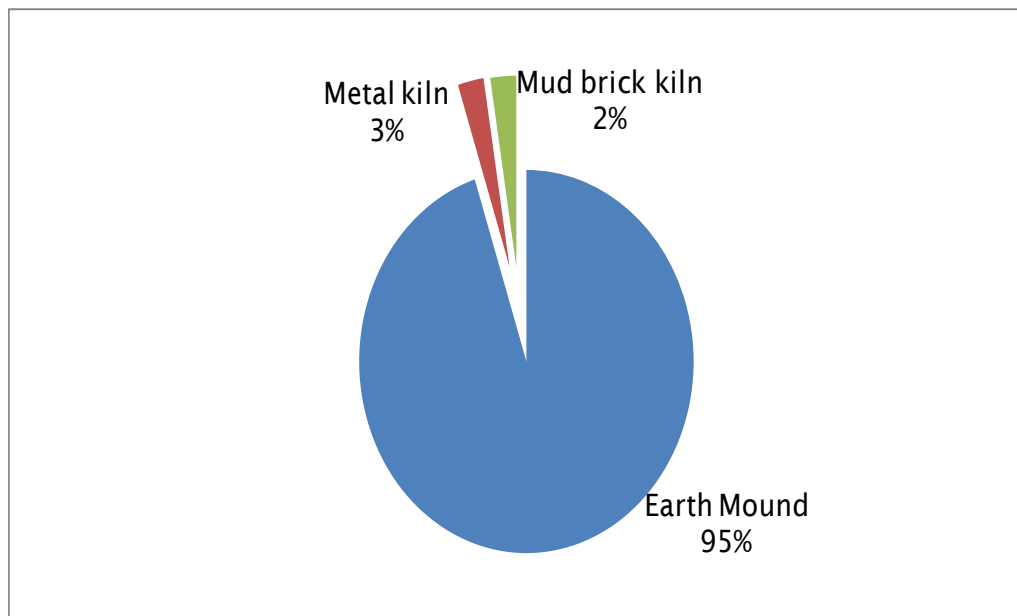
Traditional earth mound



Earth brick kiln



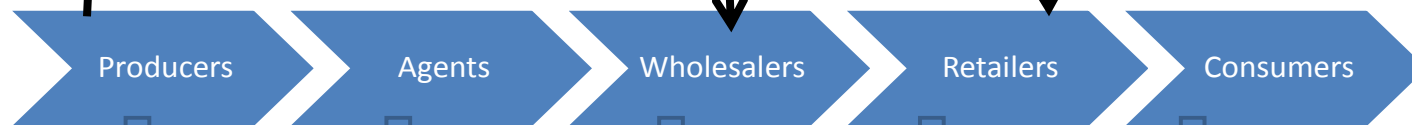
Metal kiln



# PROFITS ALONG THE CHARCOAL VALUE CHAIN



Transport



Cost -4  
Price received-6

Cost-0.5  
Price received-7.5

Cost-3.5  
Price received-13.5

Cost-0.20  
Price received-15

Price received-15

13.2 %

6.7 %

16.7 %

8.7 %

Profit margin

**GHC 2**

**GHC 1**

**GHC 2.50**

**GHC 1.30**

**Less than 1USD PER 45 KG BAG**

## Profits and consequences on environment

- ❑ Marginal profits so several mounds (UP TO 4) worth 40 of 45kg bags each set to burn for one production cycle esp. by charcoal normadic gangs





## MARKETING

- ❑ Packaging and distribution
  - 150- over 300 bags per truck
  - Road accidents common from toppling



- ❑ Market niches and volume flows not well studied
  - Within Ghana market depots in regional and district capitals
  - Overland export to neighbouring West Africa
  - Export to Europe and other international market





# CLIMATE VULNERABILITY & COPING STRATEGIES

## ■ Vulnerability of woodfuel livelihoods

- High temperatures and limited rain slows tree growth
- Wild fire
- Less wood fuel resource available
- Increasing desertification



## ● Adaptation/mitigation strategies suggested by rural communities

- INCREASED DEPENDENCY ON FARMING FOR SURVIVAL
- PLANT TREES
- EDUCATION & AWARENESS CREATION ON TREE CONSERVATION AND PLANTING

# Stakeholders & inter-sectoral issues: who cares?

**Ministry of energy/EC**

- Bio-energy policy
  - Woodfuel Woodlot
- License for exporters
- Clean energys



**Ministry of land, natural resources and mines/FC**

- Permit for wood collection
- Deforestation
- Reforestation
- Forest and wildlife policy
- FIP
- ReDD+

Research centre

**Ministry of trade and industry/  
Ghana export promotion authority**

- business opportunities
- export statistics
- SME development

**Traditional land authorities**

- fees from resources extractors

**Farmers-income**  
from on farm wood

**Ministry of local government**

- District & municipal assembly revenues

**Ministry of transport**

- road tolls

**Revenue agencies**

- Way bill, VAT

**Environmental Protection Agency**

- CO<sub>2</sub> emissions from charcoal burning

**Producer and market associations**

- welfare of members, profit maximization

**Ministry of health**

**Security agencies**

- vehicle and goods inspection
- Fire prevention

# MAJOR CHALLENGES

- Increased pressure on the resource:
  - Increasing illusive/nomadic charcoal producers
  - All year round production due to unreliable rains for farming



- Scarcity of suitable hard wood species
  - Species of low calorific wood values being burnt for charcoal
    - Lots of ash and charcoal dust on market



- Inappropriate harvesting techniques
  - Poor coppicing of natural stumps



# CHALLENGES

- Limited information for sustainable management and efficient utilization of resource
- Drudgery and health hazards from traditional earth mound charcoal production
- Expensive improved kilns
- Unregulated domestic market
- Uncoordinated inter-sectoral efforts





# OPPORTUNITIES

- ❑ Production of woodfuel from plantations
  - Rotational woodlot in farming systems is feasible
    - ❑ diversify income sources and reduce vulnerability to climate change
  - Financial analysis of charcoal with cassia species in plantations profitable with improved kiln
  
- ❑ Increase use of logging and milling residues or off-cuts
  
- ❑ Variety of improved end use devices available

**E.G. Gyapa stove**



## Possibility of multi-stakeholder platforms for dialoguing for sustainable management



DRAFT

### MANAGEMENT PLAN FOR SUSTAINABLE WOODFUEL RESOURCES IN GHANA

Kwame A. Oduro<sup>1</sup>, Julius Nkansah-Nyarko<sup>2</sup>, Angella Adjei-Darko<sup>3</sup> and Beatrice Darko Obiri<sup>1</sup>

<sup>1</sup>CSIR-Forestry Research Institute of Ghana

<sup>2</sup>Energy Commission

<sup>3</sup>Faculty of Renewable Natural Resources, KNUST.

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# POLICY IMPLICATIONS: ReDD+

- Deforestation or forest degradation from woodfuel production: who is responsible?
  - Resource tenure and access: traditional leaders & evasive producers
  - Ineffective policies
- **Stakeholder platforms/dialogues ..Capacity building for responsible resource use and management**
- Increased carbonization from charcoal burning increases  $\text{CO}_2$ 
  - Systems to improve conversion efficiencies
- Cheaper gas and intensify promotion of improved end use devices

# RESEARCH NEEDS

- ❑ Coppice management of harvesting from natural stands
- ❑ Appropriate mass propagation methods for suitable traditional highly productive species for plantation development
- ❑ Trials for integration of suitable species into farming systems
- ❑ Efficient use of woody material from farm clearing, logging and milling waste
- ❑ Market research – statistics e.g. volume flows to various niches, etc. for policy planning



# MAJOR HIGHLIGHTS

- **Wood fuel major heat and income source**
  - **key to food and livelihood security in both urban and rural areas**
    - Resources have declined
    - Extraction exceeds consumption
    - Lots of wood and charcoal waste available for conversion into charcoal and briquette especially in forest areas but not well harnessed
    - Threats from fire and climate change
    - Plantation production possible and profitable
    - Improved conversion technologies available but expensive
    - Cross-sectoral policy for resource development and regulation required
    - Policy for market/trade regulation required
    - Woodfuel plantation program for endemic producing areas targeting landowners in agroforestry systems



# FOOD FOR THOUGHTS from an insider

- We have depended on this business as a major livelihood activity for several years
- No one can stop us
- Income from farming alone is not enough
- We need to find a solution to the problem



## ACKNOWLEDGEMENT

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***MANY THANKS***