National Workshop on Bioenergy in Ghana and Training on the Full Implementation of GBEP Sustainability Indicators for Bioenergy

GBEP Pilot Project in Ghana – 2013: Results, Lessons Learned and Policy Recommendations

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PRESENTATION OUTLINE

• Introduction to Ghana GBEP pilot project
• Implementation of pilot project
• Results
• Lessons learnt
• Recommendations
INTRODUCTION

- Biomass accounts for more 60% of Ghana total annual energy consumption. In most cases the resource is harvested and utilized unsustainably.

- The GBEP has developed a set of 24 sustainability indicators aimed at voluntary use by national governments.

- The government of Ghana decided in 2010 to conduct a pilot project with the GBEP sustainability indicators, in close cooperation with the ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE).

- It was coordinated by the Energy Commission.

- The Dutch government provided funding.

- Partners for Innovation, a Dutch biomass and bioenergy sustainability expert, provided technical assistance.
OBJECTIVES: GHANA GBEP PILOT PROJECT

1. Enhance capacity in Ghana using the GBEP sustainability indicators as a tool to:
   - Assess sustainability of bioenergy sector
   - Develop sustainable bioenergy policies

2. Learn lessons on how to use the indicators:
   - Enhance their practicality for policymakers
   - Spread experiences in ECOWAS region and GBEP
ACTORS

**Steering Group**
- Office of the President of Ghana
- ECOWAS Centre for Renewable Energy and Energy Efficiency
- NL Ministry of Environment:
- NL Agency:

**Policy Stakeholder Group**
- Energy Commission
- Ministry of Energy
- Ministry Food and Agriculture
- Ministry of Environment, Science and Technology
- Ministry of Lands and Natural Resources
- Council Scientific and Industrial Research
- Forestry Commission
- Environmental Protection Agency
- Northern Development Forum
### Process of Selecting the GBEP Sustainability Indicators for the Pilot

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Social</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Life-cycle GHG emissions</td>
<td>9. Allocation and tenure of land for new bioenergy production</td>
<td>17. Productivity</td>
</tr>
<tr>
<td>3. Harvest levels of wood resources</td>
<td>11. Change in income</td>
<td>19. Gross value added</td>
</tr>
<tr>
<td>4. Emissions of non-GHG air pollutants, including air toxics</td>
<td>12. Jobs in the bioenergy sector</td>
<td>20. Change in consumption of fossil fuels and traditional use of biomass</td>
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<tr>
<td>5. Water use and efficiency</td>
<td>13. Change in unpaid time spent by women and children collecting biomass</td>
<td>21. Training and re-qualification of the workforce</td>
</tr>
<tr>
<td>6. Water quality</td>
<td>14. Bioenergy used to expand access to modern energy services</td>
<td>22. Energy diversity</td>
</tr>
<tr>
<td>7. Biological diversity in the landscape</td>
<td>15. Change in mortality and burden of disease attributable to indoor smoke</td>
<td>23. Infrastructure and logistics for distribution of bioenergy</td>
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### SELECTION OF INDICATORS

<table>
<thead>
<tr>
<th>Environmental pillar</th>
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<tbody>
<tr>
<td>1) Lifecycle Green House cases (GHG) emission</td>
<td>10) Price and supply of national food basket</td>
<td>17) Productivity</td>
</tr>
<tr>
<td>2) Soil quality</td>
<td>12) Jobs in the bioenergy Sector</td>
<td>18) Net energy balance</td>
</tr>
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<td>20) Change in consumption of fossil fuels and traditional use of biomass</td>
</tr>
<tr>
<td>8) Land use and land-use change related to bioenergy feed stock production</td>
<td></td>
<td>23) Infrastructure and logistics for distribution of bioenergy</td>
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</tbody>
</table>
SELECTED RESEARCH INSTITUTES

Council for Scientific & Industrial Research – Forest Research Institute (FORIG):
environmental indicators 1, 2, 3 and 8

Council for Scientific & Industrial Research – Institute of Industrial Research (IIR):
economic indicators 17, 18, 20 and 23

University of Ghana – Institute of Statistical, Social & Economic Research (ISSER):
social indicators 10, 12 and 14
OBJECTIVES OF RESEARCH WORK

1. Assess the status of bioenergy data collection.

2. Understand the practicalities of implementing the GBEP indicators in Ghana.

3. Learn lessons on ways to move forward with the GBEP indicators in Ghana.
RESEARCH ASSIGNMENTS

1. Collect the most appropriate (already available) data.

2. Assess the usefulness, availability and quality of data.

3. Provide recommendations for improved data collection and use.

4. Provide baseline values for the selected indicators
METHODOLOGY USED

1. Internet search / desk research; and

2. Interviews with relevant Ministries and Commissions, Ghana Statistical Service, other research institutes, NGOs, industry associations and individual bioenergy/biofuel companies.
## SCOPE OF THE RESEARCH WORK

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<td>CSIR-FORIG</td>
<td>UG-ISSER</td>
<td>CSIR-IIR</td>
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</table>

**Indicators 1, 2 and 8:**
1) Lifecycle Green House cases (GHG) emission
2) Soil quality
8) Land use and land-use change related to bioenergy feed stock production
   - Wood resources
   - Jatropha, sunflower
   - Agricultural residues

**Indicator 3:**
3) Harvest levels of wood resources
   - Wood resources

**Indicators:**
- 1) Lifecycle Green House cases (GHG) emission
- 2) Soil quality
- 8) Land use and land-use change related to bioenergy feed stock production
  - Wood resources
  - Jatropha, sunflower
  - Agricultural residues

**Indicator 10:**
Price and supply of national food basket
- Maize and sorghum

**Indicator 12:**
Jobs in the bioenergy Sector
- Wood to charcoal and jatropha to biodiesel

**Indicator 14:**
Bioenergy used to expand access to modern energy services
- Baseline year 2010

**Indicators 17, 18, 20 and 23:**
- 17) Productivity
- 18) Net Energy Balance
- 20) Change in consumption of fossil fuels and traditional use of biomass
- 23) Infrastructure and logistics for distribution of bioenergy
- Fuel wood to charcoal
- Vegetable oil to biodiesel
- Waste to biogas
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Main Data Sources Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator 1</td>
<td>Greenhouse gas emissions from bioenergy use were taken from “National Greenhouse Gas Inventory Report – 1990 - 2006” (2011) and Ghana’s Second National Communication to the UNFCCC (2011). Estimates were taken using Derkyi et al. (2011).</td>
</tr>
<tr>
<td>Indicator 2</td>
<td>Wood fuel land data was taken from Ghana’s Second National Communication to UNFCCC (2011). Information of sunflower plantations is based on personal communications. Information from jatropha plantations is based on different sources: Duku et al. (2011), Oduro and Derkyi (2009), Boamah (2010), Poul Wisborg (2012) and Joseph Awetori Yaro.</td>
</tr>
<tr>
<td>Indicator 8</td>
<td>Reports and other information of FAO, World Bank and Energy Commission. Interviews with Forestry Commission and its divisions, Environmental Protection Agency, Ministry of Food and Agriculture and some oil palm plantations in the Western region.</td>
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</tbody>
</table>
DATA COLLECTED BY CSIR-FORIG

• GHG emissions for wood fuel and biodiesel from jatropha;

• Hectares of land used for jatropha and sunflower plantations and wood fuel;

• Carbon stock per hectare for different land-use systems;

• Annual harvested wood and amount used for bioenergy (traditional and modern);

• Total area of land used for bioenergy feedstock production, types of land used and annual conversion rates of land-types
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<tr>
<td>Indicator 12</td>
<td>Data could not be found for any of the sub-indicators.</td>
</tr>
</tbody>
</table>
DATA COLLECTED BY UG - ISSER

• Food prices for maize and sorghum and changes in import, export and agricultural production;

• Number of jobs in woodfuel, charcoal and jatropha sectors in Ghana;

• Number of households using traditional biomass.
DATA COLLECTED BY CSIR - IIR

• Productivity, processing efficiencies and production costs for fire wood, charcoal, jatropha biodiesel, sunflower biofuel and biogas from waste

• Net energy balance for charcoal feedstock production and processing

• Change in consumption of fossil fuels and annual savings due to sunflower oil, jatropha biodiesel, biogas and co-generation with wood

• Number and capacity of critical distribution routes for biogas, charcoal and biodiesel
RESULTS
DATA AVAILABILITY AND QUALITY, AND APPLICABILITY OF THE GBEP INDICATORS

• Many of the data are not sufficiently available to meet the GBEP requirements. (*The pilot clarified which data is already collected in Ghana, with what frequency and by whom.*)

• Available data is judged to be of ‘average’ quality on a scale ranging from ‘very poor’ to ‘outstanding’. (*The pilot identified how data collection methodology and data collection infrastructure can be improved in the Ghanaian situation.*)

• On applicability, 1 indicator match the majority of GBEP requirements, 6 match partly and 4 match could not be established due to a lack of data.
RELEVANCE FOR THE GBEP INDICATORS OF EXISTING DATA COLLECTION AND REPORTING STRUCTURES

• A number of Ghanaian institutions collect relevant data in a structured manner for bioenergy related subjects.
  • Agricultural data – Ministry of Food and Agriculture - SRID
  • Energy statistics – Ministry of Energy - Energy Commission
  • Ghana Living Standards Statistics – Ghana Statistical Service

• At present there are no dedicated bioenergy data collection and reporting structures and existing structures are not focused on bioenergy.
LESSONS LEARNT
• GBEP Sustainability Indicators are an important tool for bioenergy policy development if applied intelligently and selectively, and in a way that is appropriate and feasible.

• GBEP indicators can be an important instrument to improve the sustainability of bioenergy.

• Implementing the GBEP Sustainability Indicators provides the possibility of monitoring the actual developments in the bioenergy sector and to take action if needed.

• Implementation of the indicators in Ghana provides the opportunity to assess the different bioenergy technologies and sectors and take supportive or restrictive measures.

• Making all data available for full GBEP requirements would require a huge effort.
A full-fledged implementation of the GBEP methodology will be difficult in Ghana due to several challenges

- The non-availability of a lot of data needed to calculate/construct the indicators
- For a number of indicators the data collection methodology is too complex, looking at the early stage of modern bioenergy in Ghana
- For a number of indicators there are too many sub-indicators, looking at the early stage of modern bioenergy in Ghana
RECOMENDATIONS
The follow-up project to cover all the 24 GBEP indicators for Ghana should use the GBEP methodology but with:

– A limited number of sub-indicators
– A selective scope
– Simplified data collection methodologies
– Support from all key stakeholders
– Synergies with other Ghanaian data collection, monitoring and reporting initiatives
– Sufficient human and financial resources
THANK YOU