SESSION 1: BIOFUELS IN AFRICA

Role of biomass in Africa and impacts of biofuels consumption on various socio-economic and other sectors: Health, Environment, GDP, Employment, Education, etc

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Is it good or bad? Difficult to say if one does not have the full picture of the situation. And as mentioned earlier, the full picture includes the impacts on many sectors.
The central role of biomass energy policy

Let’s look at some of the main impacts
Impacts of woodfuel

Health

- Indoor pollution from biomass cooking — a task usually carried out by women — will soon kill more people than do malaria and HIV/AIDS combined.

Economic costs

- More than 40 million worker years are used each year on fuelwood gathering and slow biomass cooking. Cooking with traditional fuels and stoves represents a US$32 billion opportunity cost (3 percent of SSA’s GDP).

Forest loss

- According to FAO Forest Resources Assessment 2015, in Africa net annual forest change between 2010–2015 was 2.8 million hectares, however, there is no reliable estimate about how much was due to woodfuel productions.
Figure 3-7: The health impacts of cooking indoors with woodfuels and kerosene

**Health impacts**
- **Respiratory diseases**
  - Acute lower respiratory infections (ALRI) in children (pneumonia)
  - Chronic obstructive pulmonary disease (COPD, breath problems)
  - Lung cancer
  - Asthma

- **Other health effects**
  - Heart diseases/problems
  - Cataract (blindness)
  - Burns from fire/flame
  - Poisoning from ingesting fuels

Source: (UNEP, 2017a)
Central Africa, in particular, shows one the highest rate in the world.
Air pollution remains a major challenge in Africa. About 600,000 deaths every year across the continent are associated with this invisible killer.
According to the HEI report, some 236,000 African newborns die within the first month of life from air pollution exposures, mostly related to household air pollution from biomass and charcoal use.

In 2019, 14% of all deaths in children under the age of 5 across Africa were linked to air pollution, situating air pollution as the third largest risk factor for those deaths after malnutrition, unsafe water, sanitation and hygiene in sub-Saharan African regions.
Some countries have started to collect data on the impact on health. This is the case of Kenya.
Figure 7. Global polluting fuel use in 2014 (for low- and middle-income WHO Member States)
General ambient air pollution impacts other regions than the ones impacted by biomass only.
Forest loss

- According to FAO Forest Resources Assessment 2015, in Africa net annual forest change between 2010–2015 was 2.8 million hectares, however, there is no reliable estimate about how much was due to woodfuel productions.
According to FAO, indigenous forests are being remarkably cut down at 4 million hectares/year. An estimated 90% of wood is removed for fuel purposes. Furthermore, 29% of that wood is converted into charcoal. Consequently, this has led to massive deforestation across the African continent.
Some countries have started to collect data on the impact on desertification. This is the case of Ivory Coast.

The forest cover has decreased from 7.85 million ha in 1986 to 5.09 in 2000 to 3.4 in 2015.

The production of fuelwood has clearly been identified as a cause of the lose of forest coverage.
Bioenergy is a major source of employment in a country (10, 20, 30%???)
And contributes to the GDP (5, 10, 20%???)
Some countries have started to collect data on the employment. This is the case of RDC.

Over 300 000 people work on fuelwood in Kinshasa, this is **20 times** the official total number of people working in the whole country.
Share of biomass in the energy sector employment

Wood Charcoal 92%

Electricity 5%

Hydrocarbon 3%

100 000 jobs

Note: Does not include self wood harvesting (75% of total wood consumption)
Figure 3-1: Basic steps in a typical value chain

**PRODUCTION**
- Source of supply
  - Forests (often combined with creating farmlands)
  - (Planted) trees outside forest
  - Plantations
  - Waste wood of wood processing
- Cutting trees
- Drying
- Chopping
- Carbonisation
- Packing

**PROCESSING**
- Producers
  - Woodcutters
  - Community
  - Producer groups
  - Farmers
- Traditional authorities/Government officials

**TRANSPORT AND TRADE**
- Stocking at village
- Transport (head-load, bicycle, lorry, pick-up, motor cycle, car, large trucks)
- Sales and distribution

**DISTRIBUTION AND RETAIL**
- Rural demand
  - Households
  - Agro-processing
  - Transporters
  - Trader/intermediaries
  - Government officials

**CONSUMPTION**
- Urban demand
  - Household
  - Small-scale industries
  - Businesses
  - Agro-processing
  - Service sector
- Urban market
  - Specialised wood-fuel markets
  - Common markets
  - Roadside sales points
  - Kiosks

Source: (Schure, Dkamela, van der Goes, & McNally, 2014)
Some countries have started to collect data on revenues and GDP. This is the case of RDC.
Figure 3-5: Structures of the charcoal supply chain

GDP

Employed producer

Wholesaler and truck owner **

Delivers

Sells

Retailer

Consumer

Independent producer (permanent)

Sells or Delivers

Truck owner **

Wholesaler 2

Sells

Retailer

Consumer

Farm producer (occasional)

Sells

Truck owner **

Wholesaler

Sells

Retailer

Transport via Bicycle

Sells

Retailer

Consumer
Figure 3-3: Common structure of a firewood supply chain

Source: [Insert source information here]
Figure 3-2: Price share for actors per sack of charcoal in Kenya

Source: (Sepp, 2014)
Table 3-3: Annual economic losses and opportunity costs (Billion US$) associated with solid-fuel dependence in SSA, 2010

<table>
<thead>
<tr>
<th>Activity</th>
<th>Low (Full adoption of higher-performing biomass stoves)</th>
<th>Mid (Tier 3–4 gasifier biomass stoves at the top of the range)</th>
<th>High (Intermediate Tier 2–3 rocket stoves at the bottom of the range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality from household air pollution</td>
<td>0.3</td>
<td>3.5</td>
<td>6.8</td>
</tr>
<tr>
<td>Morbidity from HAP</td>
<td>0.2</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Other health conditions (burns, eye problems)</td>
<td>0.1</td>
<td>0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Total health</td>
<td>0.6</td>
<td>5.0</td>
<td>9.4</td>
</tr>
<tr>
<td>Spending on solid fuels</td>
<td>0.4</td>
<td>3.8</td>
<td>7.3</td>
</tr>
<tr>
<td>Time wastage (fuel collection)</td>
<td>0.6</td>
<td>6.5</td>
<td>12.4</td>
</tr>
<tr>
<td>Time wastage (cooking)</td>
<td>3.3</td>
<td>10.2</td>
<td>17.2</td>
</tr>
<tr>
<td>Total economic</td>
<td>4.2</td>
<td>20.6</td>
<td>36.9</td>
</tr>
<tr>
<td>GHG emissions (fuel consumption)</td>
<td>0.2</td>
<td>2.1</td>
<td>3.9</td>
</tr>
<tr>
<td>GHG emissions (charcoal production)</td>
<td>0.2</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Deforestation</td>
<td>0.2</td>
<td>3.5</td>
<td>6.7</td>
</tr>
<tr>
<td>Total environment</td>
<td>0.6</td>
<td>6.3</td>
<td>11.9</td>
</tr>
<tr>
<td>Total all categories</td>
<td>5.4</td>
<td>31.8</td>
<td>58.2</td>
</tr>
</tbody>
</table>

Source: (Lambe, 2010)
Energy affordability and poverty alleviation

Table 1-1: Access to electricity and clean cooking

<table>
<thead>
<tr>
<th>Region</th>
<th>Access to electricity (% of population)</th>
<th>Access to clean fuels and technologies for cooking (% of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>North Africa</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>Rest of Africa</td>
<td></td>
<td>23</td>
</tr>
</tbody>
</table>

Source: (World Bank, 2017)

Figure 1-2: Demographic challenges for progress on access to clean cooking

- Africa (excluding North Africa): 25%
  - Annual increase in population with access to clean cooking fuel, 2012 - 14: 4%
  - Annual increase in total population, 2012 - 14: 30%

- Asia-Pacific: 40%
  - Annual increase in population with access to clean cooking fuel, 2012 - 14: 54%
  - Annual increase in total population, 2012 - 14: 54%

Source: (World Bank, 2017)
Figure 2-11: Hours spent collecting fuelwood for cooking, heating and lighting in households across Africa

Source: (UNEP, 2017a)
Figure 3-9: Links between the sustainable woodfuel value chain and food security

Dimensions of food security

Food availability
- Multipurpose trees provide food, fodder, woodfuel production and soil enhancement

Access to food
- Multipurpose trees generate income from food, fodder and woodfuel production

Utilization of food
- Woodfuel trade offers direct cash income, providing a safety net for purchasing food

Food stability
- Forest ecosystem services and integrated forest-agriculture management systems support sustainable food production
- Stable cash income from woodfuel trade provides means to invest in agriculture and a safety net in times of need

Woodfuel serves in cooking, processing and preserving food (household and commercial) and sterilizing water

Source: (EMF, 2017b)
In fact, most of the impacts of biomass consumption can be covered, one way or another, by one sustainable goal or another.
So, as seen, biomass policy is much more than an energy issue.

The problem is that because most of the impact data are not available, policy makers cannot (or do not want) integrate the full picture in their decision making process.

Unfortunatelly, this leads to more desertification and more prematures deaths.

This is why it is more than urgent to start collecting all the impact data for better policies which will save energy, trees and lifes. The Sustainable Development Goals give a great opportunity to do it.