**TLUD Stove Biochar Production**

**Background**
- Biochar is charcoal added to the soil as a soil enhancer.
- It is made from the decomposition of biomass in a low oxygen environment.

**Benefits of biochar**
- Increased water retention
- Reduced nutrient leaching
- Increased microbial activity
- Increased pH (liming effect)
- Increased soil carbon

**Biochar quality tests**
- Carbon Hydrogen Nitrogen (CHN) analyser to determine carbon-nitrogen ratio.
- Adsorption capacity test to determine biochar adsorptivity.

**Cow dung biochar quality**
- Carbon content: 45.0 %
- Nitrogen content: 5.3 %
- Carbon-nitrogen ratio (C:N) = 8.5
- Biochar with C:N < 15 make great soil enhancers as they readily mineralise to release nutrients to plant roots to benefit plant health.

<table>
<thead>
<tr>
<th>Adsorption at 100°C (wt%)</th>
<th>Commercial Biochars</th>
<th>Cow dung Biochar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1.8 %</td>
<td>2.4 %</td>
</tr>
<tr>
<td>Maximum</td>
<td>8.6 %</td>
<td>3.1 %</td>
</tr>
</tbody>
</table>

**Adsorption capacity**
- Compared to commercial biochars, cow dung biochar has a reasonable adsorptivity.
- Biochars with good adsorptivity are better able to hold soil organic compounds.
- Soil organic compounds are released to nourish plant roots and benefit plant health.

**Carbon sequestration**
- Biochars with C:N > 30 more stable in the soil and better at sequestering carbon, such as biochars made from woody biomass.
- Dung biochars contain less carbon and mineralise quickly.

**Biochar production in TLUD stoves**
- TLUD stoves ideal temperature for quality biochar.
- Potential for biochar to be sold to farmers.

**In-field Trials**
- Engineers Without Borders (EWB) engineers to conduct field trials in Nepalese Terai region.
- Working with local communities to demonstrate ability of biochar to boost agricultural production.

**Images**
- Biochar 700mm: http://www.geos.ed.ac.uk/facilities/sem/Biochar.html
- Biochar 50mm: http://www.geos.ed.ac.uk/facilities/sem/Biochar.html