Transition to Green Economy in Biosphere Reserves

Systemic Analysis and Diagnosis of Livelihoods’ Strategies of Forest Dependent People in the UNESCO Biosphere Reserve of Luki (DRC): the Livelihoods Approach enriched with a Spatial Dimension and Mapping

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DRC Environmental Context (1)
DRC has a huge environmental potential

Tropical Forest
- Congo Basin is the second biggest forest basin in the world (more than 100 million hectares)
- DRC is home to 60% of the forests of the Congo Basin;
- The DRC's forests occupy about 67% of the country (2,345,374Km²).

Congo River (second biggest river of the world)
- Hydroelectricity (LRMC:1ct/Kwh)

Other natural resources (minerals: Diamonds, Gold, Columbium, Copper & Cobalt, Tin, Manganese, Lead & Zinc, etc.)

High potential... but, deep poverty (HDI value for 2014 is 0.433 (rank 176), GNI per capita (2014) in PPP US$ equals 680, Poverty Incidence in 2015 = 71%)
DRC Environmental Context (2)

DRC Biosphere Reserves (BRLuki, BRYangambi and BRLufira)

Transition to Green Economy (1)

From crisis to opportunity....

... for transitioning to a green economy...

... with economic and social justifications...

... and inclusion of the economic value of natural capital.
Transition to Green Economy (2)

The narrow Economy... enlarged to Human society and then to Ecosystems

Source: ten Brink, Russi and Mazzu, 2012 building on ten Brink et al. 2011
Ecosystems’ assets and services

Source: http://biodiversity.europa.eu/maes
Biosphere Reserves are ‘ECOSYSTEMS’

« Ecosystems are capital assets. Like reproducible capital assets... ecosystems depreciate if they are misused or are overused. But they differ from reproducible capital assets in three ways:

• Depreciation of natural capital is frequently irreversible;
• Except in a very limited sense, it isn’t possible to replace a depleted or degraded ecosystem by a new one; and
• Ecosystems can collapse abruptly, without much prior warning ».

The sustainable Livelihoods Approach applied on BR


### Inputs

<table>
<thead>
<tr>
<th>Context, conditions and trends</th>
<th>Spatial Elements</th>
<th>Assets / Livelihoods' resources (capitals)</th>
<th>Institutional Processes and Organisational Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>History, Politics and Institutions</td>
<td>Households and Villages location</td>
<td>Human Capital, Social Capital, Physical Capital, Financial Capital, Natural Capital</td>
<td>Institutions and Organisations</td>
</tr>
<tr>
<td>Economics, Trade, Climate, Agro-ecology, Demography, Socio-cultural differentiation</td>
<td>Accessibility</td>
<td></td>
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<td></td>
<td>Distances to perform activities</td>
<td></td>
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</tbody>
</table>

### Outputs

<table>
<thead>
<tr>
<th>Activities / Livelihoods' Strategies</th>
<th>Sustainable Livelihood Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typologies, Access, Capacities and potentialities</td>
<td>Poverty Reduction, Well-Being and Capacities Improvement, Livelihoods Adaptation, Vulnerability Decrease and Resilience Increase, Natural Resources Protection</td>
</tr>
</tbody>
</table>

### Outcomes

<table>
<thead>
<tr>
<th>Livelihood Strategies and Changes Analyses</th>
<th>Impacts and Equilibrium Analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartography</td>
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</table>
Systemic Analysis and Diagnosis of Livelihoods’ Strategies in the BR of Luki: Data Treatment

330 households multi-disciplinary survey conducted in 14 villages of the BR in June 2013
→ Multi-dimensional data base
→ Factor Analysis of Mixed Data application
→ Capitals and Livelihoods Indicators

Data Treatment Process:
Systemic Analysis and Diagnosis of Livelihoods’ Strategies in the BR of Luki: Data Processing Results

<table>
<thead>
<tr>
<th>Livelihoods</th>
</tr>
</thead>
</table>

**Capitals**

- **Human Capital**
- **Social Capital**
- **Natural Capital**
- **Physical Capital**
- **Financial Capital**

**Principal Components (PC) Explained Variance**

<table>
<thead>
<tr>
<th>PC</th>
<th>PC0</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
<th>PC4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explained variance</td>
<td>0.47</td>
<td>0.31</td>
<td>0.17</td>
<td>0.48</td>
<td>0.43</td>
</tr>
</tbody>
</table>

**Significant Variables**

- Number of members
- Gender ratio
- Average age
- Chief's corrected age
- Social connections count
- Chief's Marital status
- Annual income from annual crops
- Annual income from NTP
- Annual income from industrial crops
- Annual income from agriculture
- Annual income from Perennial crops
- Annual income from livestock
- No vehicle
- Equipment value
- Access to the road
- No electricity
- Credits
- Self consumption
- Incomes
- Transfers
Spatial dimension and Mapping of Data Processing Results

Pie Diagrams representations of the five capitals (Natural, Physical, Financial, Human and Social) aggregated by village and normalized.
Conclusion

• The transition to Green Economy in Biosphere Reserves requires analyzing large multi-dimensional sets of data. It implies assessing assets and services provided by the BR. The Livelihoods Approach offers a relevant Framework for concretely applying Green Economy concepts in BR.

• Moreover, results presented on maps show that intuitively, spatial issues play a role in the analysis. We are convinced that when a relevant and systemic diagnosis is achieved on livelihoods, it would be very promising to enlarge the analysis with an assets’ accessibility analysis.

• To think about sustainability involves including a dynamic dimension in the analysis. The introduction of a spatial dimension is very interesting and brings in another perspective to development sustainability and equity analyses.