A FRAMEWORK MODEL FOR CARRYING OUT STRATEGIC ENVIRONMENTAL ASSESSMENT FOR RIVER ENGINEERING DEVELOPMENT: CASE STUDY OF NILE BASIN

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Background

- The Nile Basin countries have united in common pursuit of the long-term development and management of Nile waters.

- Shared Vision - aim to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common NB water resources.

- Multi-sectoral nature and multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flat lands management and other activities.
The Problem Statement

- NBI lacks a strategic framework that integrates the three pillars of sustainable development (i.e.) S, E & N into higher levels of decision making, i.e., policy, plan & programme (PPP).
- Though EIA has been widely used at project level, it has a limited scope and cannot be applied at PPP levels.
- The BAU scenario will mean that development continues to suffer since there is less integration of S, E & N issues at strategic planning and decision making levels.
- This research argues that the achievement of SD requires, inter alia, a fair balance of S, E & N factors at PPPs providing for what could usefully be referred to in this research as achieving ‘a Sustainability Equilibrium.’
Methodology

Structural Equations – Set Theory

\[ S = \begin{cases} 1, & \text{if it affects the attitude, orientation or behaviour of people} \\ 0, & \text{otherwise} \end{cases} \]

\[ E = \begin{cases} 1, & \text{if it affects the wellbeing of the people} \\ 0, & \text{otherwise} \end{cases} \]

\[ N = \begin{cases} 1, & \text{if it supports existentiality of living and nonliving} \\ 0, & \text{otherwise} \end{cases} \]

\[ \mathcal{U} = \{S, E, N\} \]

Venn Diagram – Sustainability

Evaluation
Participation
Indicators
Integration
Mitigation
Stakeholders
Screening
Scoping
Monitoring
SEA Influence

An SEA analysis framework for sustainability equilibrium
Summary of Findings

1. One out of the five samples of SEAs undertaken in the NBCs achieved Sustainability Equilibrium Index ≥ 0.8

2. The SEA model is applicable at both at PPP formulation level in which it is inbuilt into the process or it can be used as an assessment tool

3. The model can also be used during post performance stage of the proposed PPP to serve as an evaluation tool as in the case of Irrigation Improvement Program in Egypt.
### Findings: Overall Score of SEA based on SEA Model

<table>
<thead>
<tr>
<th>Sample SEAs Versus the Framework for Sustainability Equilibrium</th>
<th>Sustainability Indicator Variables</th>
<th>Sustainability Equilibrium SEA Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Viable = $E \cap N$</td>
<td>Bearable = $S \cap N$</td>
</tr>
<tr>
<td><strong>SEA 1:</strong> SEA on BecA Research by ILRI- Biosciences East and Central Africa</td>
<td>0.75</td>
<td>1.00</td>
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<tr>
<td><strong>SEA 2:</strong> SEA on Kenya Forest Act, 2005 by the World Bank-Kenya</td>
<td>0.89</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>SEA 3:</strong> Social/Strategic and Environmental Assessment Process for Bujagali Hydropower Project-Uganda</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>SEA 4:</strong> SEA on Irrigation Modernization-Egypt</td>
<td>0.88</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>SEA 5:</strong> Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in the NEL Region</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Interesting finding was that, one can score 1.0 for all the three factors such as in SEA 3, the Social/Strategic and Environmental Assessment Process for Bujagali Hydropower Project-Uganda and in SEA 5, the Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in the NEL Region, but still score a Sustainability Equilibrium Index of 0.7 which is less than acceptable 0.8.

The reason for this scenario was simply because there were some PLs which might have been totally ignored during the undertaking of an SEA exercise.

Reference to the analysis for Social/Strategic and Environmental Assessment Process for Bujagali Hydropower Project-Uganda, three PLs, (scoping, indicators and SEA influence) were not considered;

For the case of Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in the NEL Region, also three PLs (screening, integration and monitoring) were not considered.
Findings... Cont’d

- A more detailed review of the SEA 3, (the Social/Strategic and Environmental Assessment Process for Bujagali Hydropower Project-Uganda) gives another dimension of the model on how SEA influence could help inform if the SEA was intended on informing on policy, plan or programme.

- The sample on Bujagali is indeed not an SEA but a good EIA report. By definition and from reference of the hierarchy that exists amongst PPP and project level EIA, an SEA at **policy level** (the question of why do something addresses the need, objectives and principles); at **plan level** (the questions narrows down to, what to do that addresses methods and capacities); further down at **programme level** (the question is simply on where to do it which addresses issues related to the location).

- The Bujagali SEA does not address any of these questions instead here the question is simply, “**how to do it**” which should address the design, minimization and compensation (that reduces the so called SEA to a project EIA).
The study puts more emphasis on the Sustainability Equilibrium Index than the isolated consideration of S/E, S/N, or N/E relationships which only inform on where biases within and among variables have been experienced rather than giving a wholesome sustainability relationship.

It is very important that once the S/E, S/N, or N/E relationships have been computed, one goes ahead to compute the sustainability equilibrium index. This shall enable one to query the entire process and hence identify PLs with biases on any of the three variables (S, E & N factors).

Biases could arise due to the SEA facilitator considering either one or two of the variables in favour of the other or others at any of the PLs, in this case, the vertical analysis, based on equations 5(a) to 5(c), has a total score of less than 3 (that is), 2, 1, or 0. Analysis at this level can also inform the facilitator that some PLs have not taken into consideration the variables equally.
Conclusion and Recommendations

- The SEA model was applied on sample of five SEAs undertaken within the NBCs to test on their suitability in meeting requirements of sustainability.

- Two assumptions:
  1. That the PLs have got equal weight; and
  2. A sustainable process was achieved when the Sustainability Equilibrium Index was ≥ 0.8;

- Therefore; a score < 0.8 meant that a number of key PLs were ignored in an SEA exercise.

- One out of the five samples of SEAs undertaken in the NBCs achieved Sustainability Equilibrium Index ≥ 0.8.

- The model framework is applicable at both at PPP formulation level in which it is inbuilt into the process or it can be used as an assessment tool.

- The model can also be used during post performance stage of the proposed PPP to serve as an evaluation tool as in the case of Irrigation Improvement Program in Egypt.
What should happen next?

From the findings, the final output and the challenges faced, the study gives the following recommendation:

- The threshold for sustainable utilization of Nile Basin water resources can be investigated and be inbuilt within the framework model. This can be done by application of conditional probability to establish the risks posed by the present activities on the future.

- The framework model can be applied on related PPPs as in the case of BecA research activities and the Kenya Forests Act 2005 as in the samples analysed in this study.

- The framework model can be developed further to be tested on how it performs in situations where the three pillars of sustainable development (social, economic and environment) are represented such that both economy and society are seen to be constrained by environmental limits, (Ott, 2003).
THANK YOU