

# Economics of Land Degradation (ELD) Initiative

## Tuissong Forest Case study

### Final Project

By Guy Merlin Nguenang  
2014, May

#### Contenu

1. Presentation of the forest .....	1
2. Ecosystem services .....	1
3. Alternative scenario for Tuissong Forest.....	2
4. Valuation methods of ecosystem services .....	2
5. Stakeholders' preference scenario.....	2
6. Cost –benefit analysis .....	3
6.1. Quantities and prices to estimate costs and benefits.....	3
6.2. Economic indicators of the project's worth .....	3
7. Conclusion .....	4

#### 1. Presentation of the forest

- The Tuissong forest is a small land of 1 hectare of a degraded secondary forest located in a Tuissong's village at 15 km from a big town, Yaoundé political capital of Cameroon.
- This land belongs to our Ecological Association and we bought from villagers to promote conservation awareness through ecotourism, environmental education and sensitization.
- In the village that such of forest became more and more scarce, forest are converse to farm.
- A river runs along the site. This small forest is a habitat for insect like butterflies; there are no more large animals.

#### 2. Ecosystem services

- About 500 peoples from Tuisson village and around use to search firewood in that forest for their domestic consumption or for selling. They also collected medicinal plant, natural vegetable and building material...
- Tuisong forest helps to regulate water flow of the Nkolafamba river who runs along. It contributes to regulate the microclimate and to have good air quality for about 1000 in the village and around. The forest is projected to be classified as a protected area and therefore, it is not use for primary production as agriculture production
- That forest is use for cultural purpose in the village and is expected to be used as a sensitized tools for more 500 kids per year.

### 3. **Alternative scenario for Tuisong Forest**

- People of Tuisong village are mainly farmers. Forest is slowly disappearing for the advantage for agricultural land.
- Our project consists to exclude a part of the forest from use, turning it into a preserved forest. The aim of the project is to make in such a way that the forest is maintained and that people continue to benefit from all ecosystem services provided by forest. Also, doing that livelihood of people is improved by diversifying income from forest through ecotourism or payment of environmental service.

### 4. **Valuation methods of ecosystem services**

- For this forest, "choice modelling" a Demand-based stated preference method was choose.
- For the two scenarios, (i) maintained forest or, (ii) convert forest into agricultural zone, attributes of the ecosystem services and different levels of payment was estimated.
- A choice cards structure was shape by selecting combination of scenarios from all the possible scenarios. Each scenario is a bundle of attributes and payment.
- 10 persons in the Tuisong village were interviewed to give their view on different land use scenarios.

### 5. **Stakeholders' preference scenario**

- It appear after interviews that in the first point of view of people, agricultural seem to be the most contributor to household income about 50-70 % of the total annual income. Main forests used are firewood, medicine, and building materials and were estimated to contribute to about 30 – 50 of the total annual income for the household.
- When asked to choose their preferred scenario through cards structure with combination of scenario, 95% of villagers point out forest landscape as the best scenario which supplied the higher cost per year per household (150 \$) compare to agricultural landscape (50 \$). What make the difference is that we try to give and monetary value to some services provided by forest like firewood extracts from the forest per year, money saved per year by treated oneself with medical plant.

## 6. Cost –benefit analysis

### 6.1. Quantities and prices to estimate costs and benefits

Type of land use	Agriculture	Forest landscape
<b>Benefit</b>	<p>Crops yield</p> <ul style="list-style-type: none"> <li>- 500 kg /ha of mays x 1ha x 100 FCF = 50 000 FCFA</li> <li>- 150 kg peanut /ha x 500 = 750000</li> <li>- 1000 kg cassava /ha x 1ha x 150 FCA/kg = 150 0000</li> </ul> <p>Fire wood supply 300 m3/year x 500 = 150 000 FCFA</p>	<p>Number of visitor</p> <p>500 visitors/year x 2000 FCFA/visitor = 1 000 000 FCFA</p> <p>Fire wood supply 700 m3/year x 1000 FCFA/m3 = 700 000 FCFA</p> <p>Medicine supply 30 000 FCFA/year x 100 persons = 300 000</p> <p>Ton of carbon stored /ha (150 tons/ha x 50 000 FCFA /ha = 7 500 000 (4 years after the beginning of the project)</p>
<b>costs</b>	<p>Family labor 3 pers /month x 3 month x 20000 = 90000</p> <p>Seeds 15 000 FCA</p> <p>Agricultural tools (10000 FCFA)</p>	<p>Welcome center (2000000 FCFA)</p> <p>Village watch's committees' (20000 FCA/month x 12 = 240000)</p> <p>Procurement of land 10 000 000 FCA</p>

### 6.2. Economic indicators of the project's worth

- The net present value (NPV) is used to assess whether the project is worth implementing.
- The discount rate chosen is 10 %. This higher discount is explained by the fact that present time has more value to current generation.

<b>With project</b>	Year 1	Year 2	Year 3	Year 4	Year 5
Benefit (FCFCA)	2 000 000	2 500 000	3 000 000	10 000 000	10 000 000
Cost (FCFCA)	11 240 000	1 000 000	240 000	240 000	240 000
Net benefit (FCFCA)	- 9 240 000	1 500 000	2 760 000	9 760 000	9 760 000

<b>Without project</b>	Year 1	Year 2	Year 3	Year 4	Year 5
Benefit (FCFCA)	425 000	340 000	280 000	280 000	280 000
Cost (FCFCA)	115 000	115 000	115 000	115 000	115 000
Net benefit (FCFCA)	310 000	225 000	165 000	165 000	165 000

<b>Incremental net benefit</b>	- 9 550 000	1 275 000	2 595 000	9 595 000	9 595 000
<b>Discount factor</b>	1,00	0,83	0,75	0,68	0,68
<b>Present value of incremental net benefit (10% discount rate)</b>	- 9 550 000	1 053 719	1 949 662	6 553 514	6 553 514
<b>Economic Net present value (10% discount rate)</b>	<b>6 560 409</b>				

## 7. Conclusion

- Considering the NPV at 10% discount rate, the project is worth undertaking. The whole economic value of the forest is certainly higher if we take in to consideration others ecosystem services which are non-marketed like cultural practices, regulation of water flow and microclimate, providing of good air quality.
- Incremental net benefit will be important four year after the beginning of the project. This benefit is strongly linked to the fact that environmental services as “carbon credit” are remunerated.