THE AFRICA LOW EMISSIONS DEVELOPMENT STRATEGIES (AFRICA-LEDS) PROJECT

Africa LEDS project: achievements & next steps – component 2

Presentation for Cameroon

BY: Michel TAKAM

AFRICA-LEDS PROJECT

UNEP

AFRICA LEDS Partnership
Advancing climate-resilient low emission development in Africa

LEDS GLOBAL PARTNERSHIP

European Commission

Background of modeling actions

Component 2 Objectives

- Establish modeling and analytical capacity to inform the decision making process for NDC implementation
- Develop an integrated modeling framework to assess simultaneously GHG emissions and socio-economic impacts
- Test the integrated modelling framework for the impact assessment of the ground demonstration project (Component 1)

Background of modeling actions

Linkage with the NDC

- 32% Emission reduction compared to BAU by 2035
- Cost of Implementation: 34.6 billion USD
- GHG Coverage: CO_2, CH_4, N_2O
- Sectors: **Agriculture, Energy, Transport, ICT, Waste, Forestry & Other Land Uses**

Background of modeling actions

Assessed Impacts (integrated modelling system capability)

- Climate impacts
  - GHG emissions reduction
- Socio-economic impacts
  - Net job generation potential
  - Gross domestic/regional product
  - Net investments/cost savings

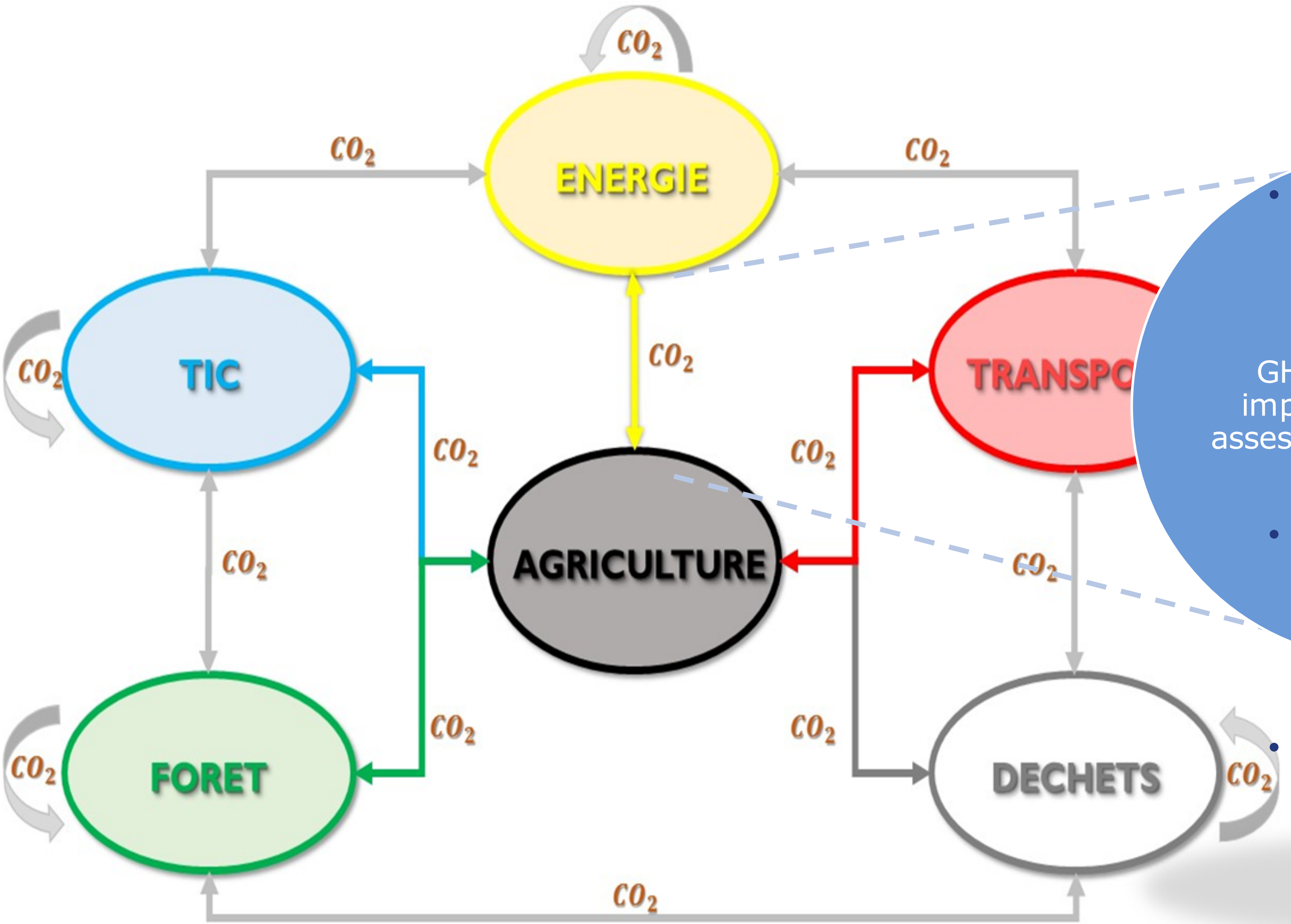
Background of modeling actions

Assessed Impacts (integrated modelling system capability)

- Agro-value chain impacts
  - Agricultural yield
  - Drying capacity
  - Processing capacity
  - Transport cost

Background of modeling actions

Integrated Modeling System



- Each sector has been modelled independently as nodes with clear borders (distinct activities) to prevent double accounting.
- A hybrid approach was used for this model (top-down + buttom-up)
- Each sector comprised of :

Background of modeling actions

Methodology

- State of the art (study of existing models)
- Field data collection
- Analysis and synthesis of field data
- Choosing a modeling approach
- Construction of the model diagram
- Choice of mathematical tools
- Equation setting
- The maximum likelihood for model validation
- Digitization

Background of modeling actions

Choice of models

- Models were chosen by the modelling team with backstopping by technical experts (Center for Climate Strategies) based on:
  - In country, already established capability and expertise
  - Model data input matrix
  - Model availability (free of charge, open source) to ensure adaptability

Background of modeling actions

- Sample equations (investment/revenue assessment)
  - $A_i = \frac{\sum_{i=1}^{n} A_{ij} * B_{ij}}{\sum_{i=1}^{n} K_{ij}}$
  - $C_i = A_i * Z * e$
- *With* :
  - I: studied function of a project
  - J: Comparison point for each project
  - Aij : relative size of the project compared to the old one for function i
  - Kij : impact of the cost of point j on function i with $1 \leq Kij \leq 5$
  - Ai : analogy coefficient
  - Z : reference cost of the current project
  - Ci: current cost of the function studied
  - e: error quotient

Background of modeling actions

- Sample equations (jobs creation assessment)
  - $Employment = \beta * \left[\frac{DA*FE}{T}\right]^{a} * PIB^{b} * Population^{\Phi} * C$
- *With* :
  - Employment: Impact on employment
  - DA: Activity data
  - FE : Emission factor
  - T: Technology
  - a, b, c: model constants
  - β : coefficient to control the error
  - Φ : Evolution of employment in relation to population

Background of Demonstration Project

- Cassava (Manihot esculanta) is the most consumed vegetable in Cameroon, in a variety of forms
- Domestic production –
  - Current: ~19 million tons of cassava
  - Expected Growth by 2035: significant (50 million tons) with a goal of self-sufficiency
- Common cultivation and processing practices –
  - Absence of agro-forestry
  - Mineral NPK fertilizers
  - Low yield varieties and planting techniques
  - Charcoal/firewood dryers
  - Diesel dryers
  - Fossil fuel-powered engines for irrigation and processing

Background of Demonstration Project

- Cassava flour (cassava end-product chosen) is a by-product of cassava
- Cassava flour makes up ~20% - ~40% by weight of the equivalent raw cassava required to produce it.
- At small rural mills (<2 tonnes/day capacity)

Background of Demonstration Project

- Transportation –
  - Preference for old cars, motorbikes and clandestine transport media
  - Bad roads
- Marketing practices –
  - High carbon foot-print of "*buyam-sellams*" (retailers) due to frequent travels for buying and selling products from local farms/processing units
  - Weak use of e-commerce technologies (face-to-face transactions predominant)

Basic Cassava Flour Value Chain

Planting & Cultivation

- Input - Seed varieties and planting methods
- Input - Synthetic and organic fertilizers
- Input – Labor for planting and cultivation

Harvesting

- Input – Labor for harvest
- Input – Labor for transportation to processing
- Input – Output – Cassava

Milling & Retail Sale

- Input – Raw Cassava
- Input – Energy (electricity or fuel)
- Input – Driers (solar or fuel)
- Input - Output – Cassava flour for sale locally

Scenarios

- Cameroon's Team applied the integrated modelling system to the assessment of 6 scenarios within the cassava value chain:
  1. Cassava production using improved yield plants while replacing mineral fertilizers with organic ones and ICT for automatic follow up
  2. Cassava growing using apiculture and agroforestry techniques
  3. Cassava drying using solar dryers versus fuel/firewood dryers

Scenarios (cont'd)

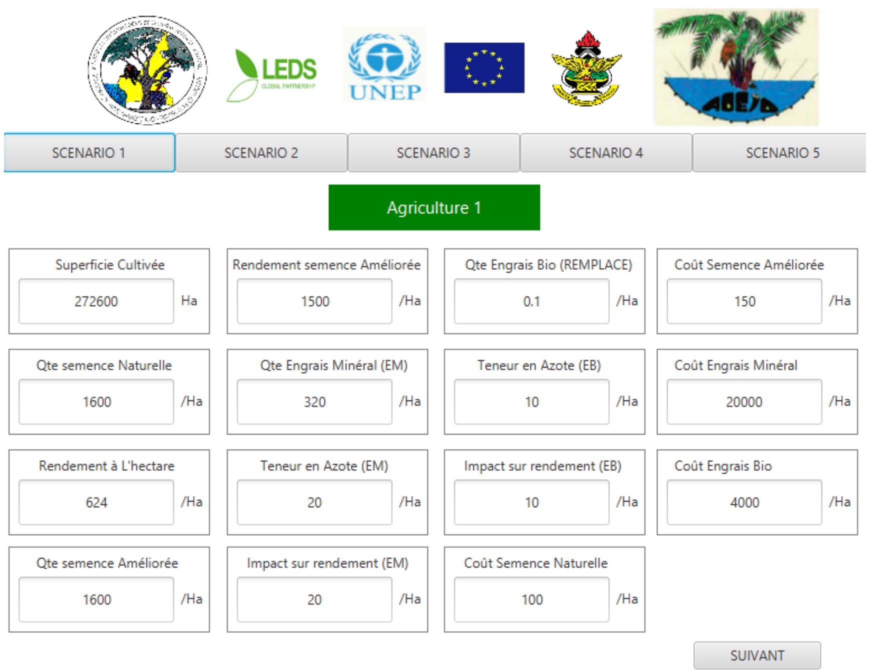
4. Cassava processing into flour using electrical mills in place of fuel-driven inefficient ones
5. Link agro-value chain actors using ICT tools
6. Combination of previous five scenarios

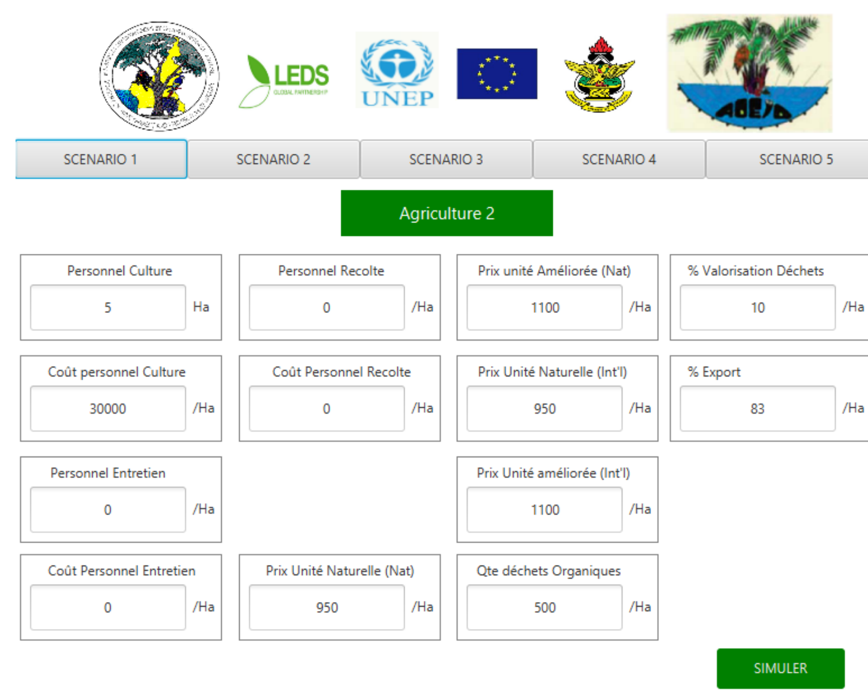
Model Training

Modelling workshop with Task Force

Achievements

Model screenshot



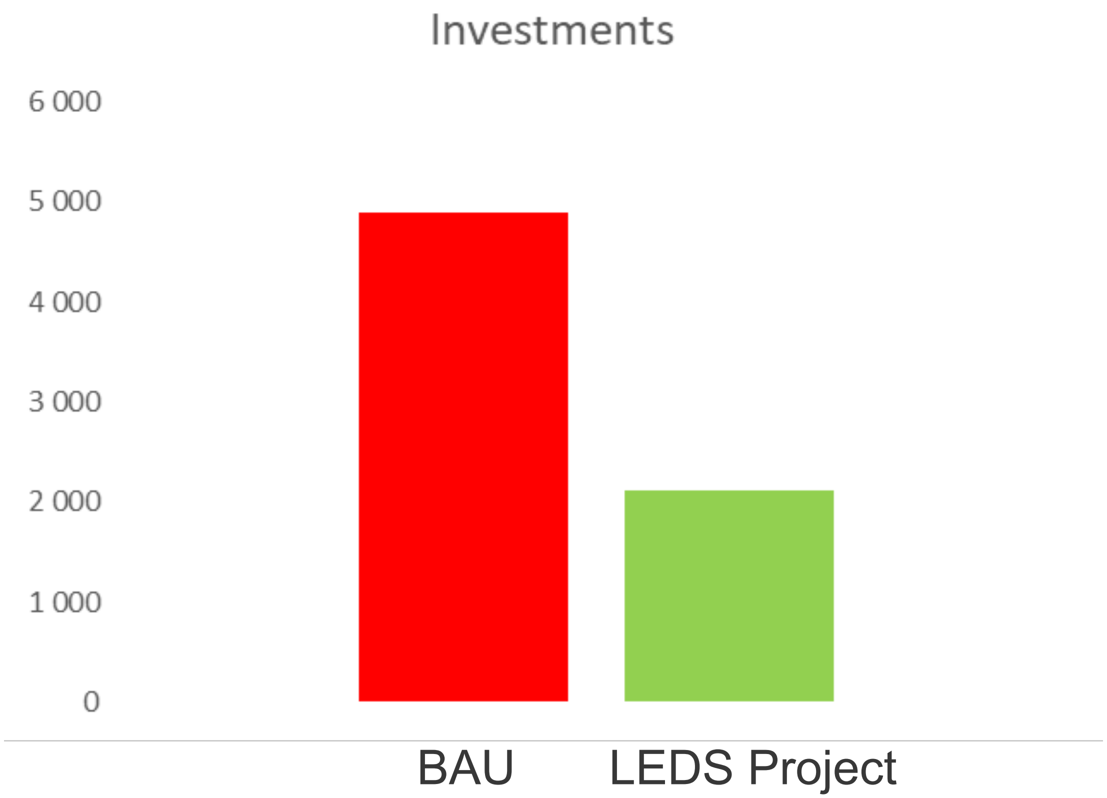


Key Interventions:

a) Using solar dryers versus using fuel/firewood-powered dryers

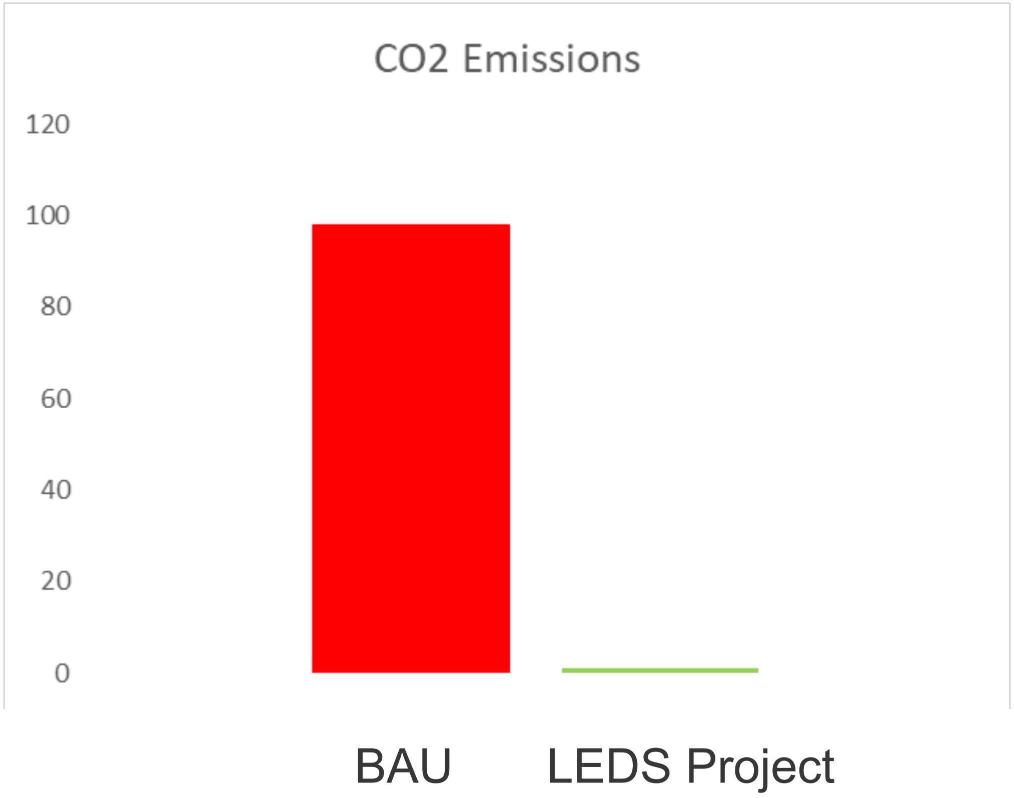
Achievement: Scenario 3

- Investment effort (comprising upgrading flour mills) screenshot



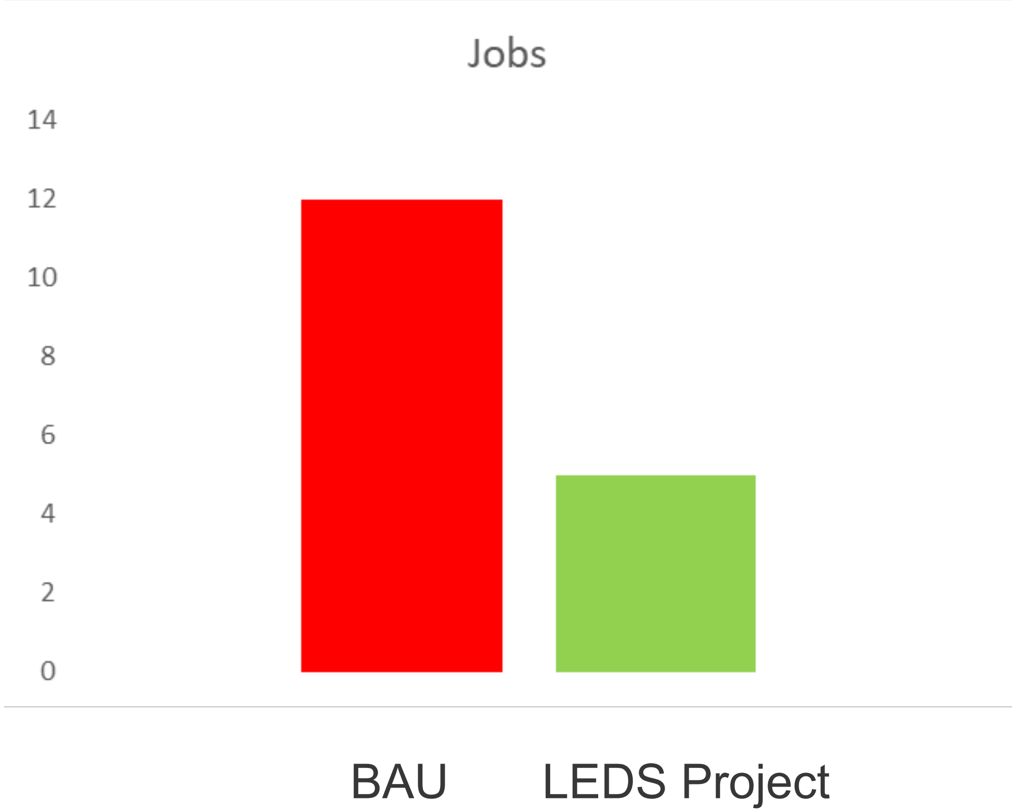
Achievement: Scenario 3

- No GHG emissions with UNEP-EU LEDS project (off-grid hydroelectricity), 98 tCO_2 mitigated



Achievement: Scenario 3

- Employment potential (greater processing capacity with more jobs) screenshot



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Achievement: Scenario 3

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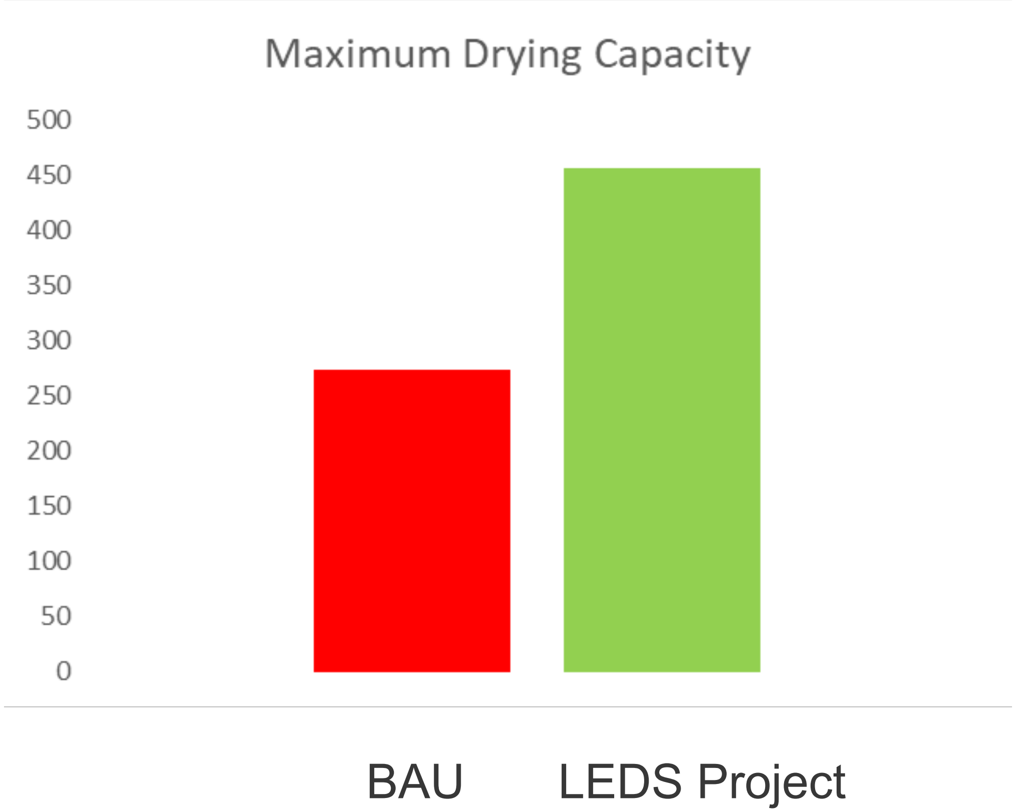
- Drying capacity screenshot (66,67% increase, from 273,75 tons to 456,25 tons)



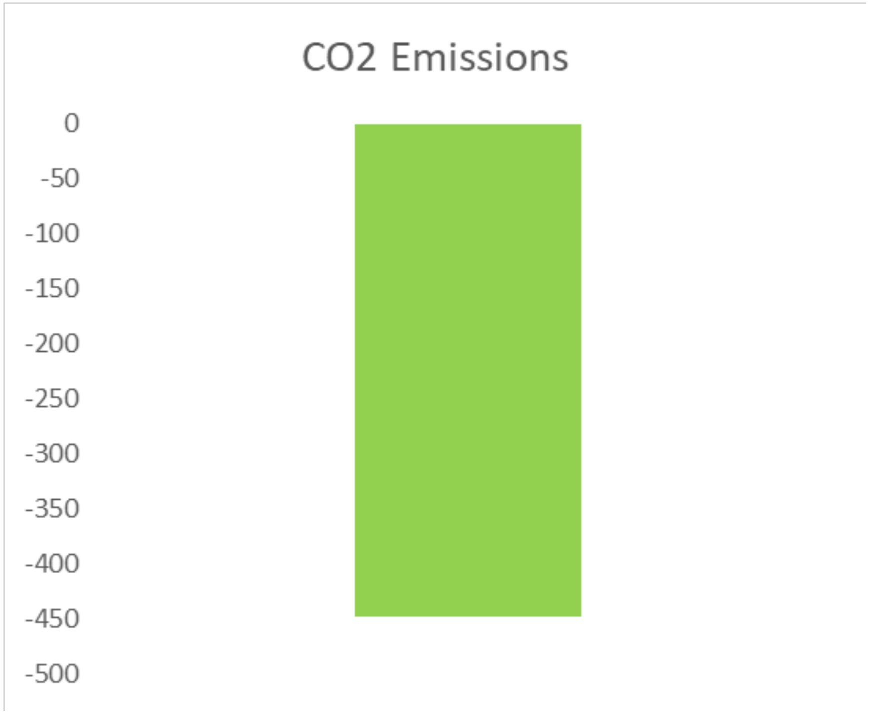
Scenario 5: Link agro-value chain actors using ICT tools

Key Interventions:

a) Formalizing of agro-value chain actors
b) Linking formalized actors via ICT tools
c) Transport means restructure

Achievement: Scenario 5

- No GHG emissions with UNEP-EU LEDS project, 447.47 tCO_2 mitigated



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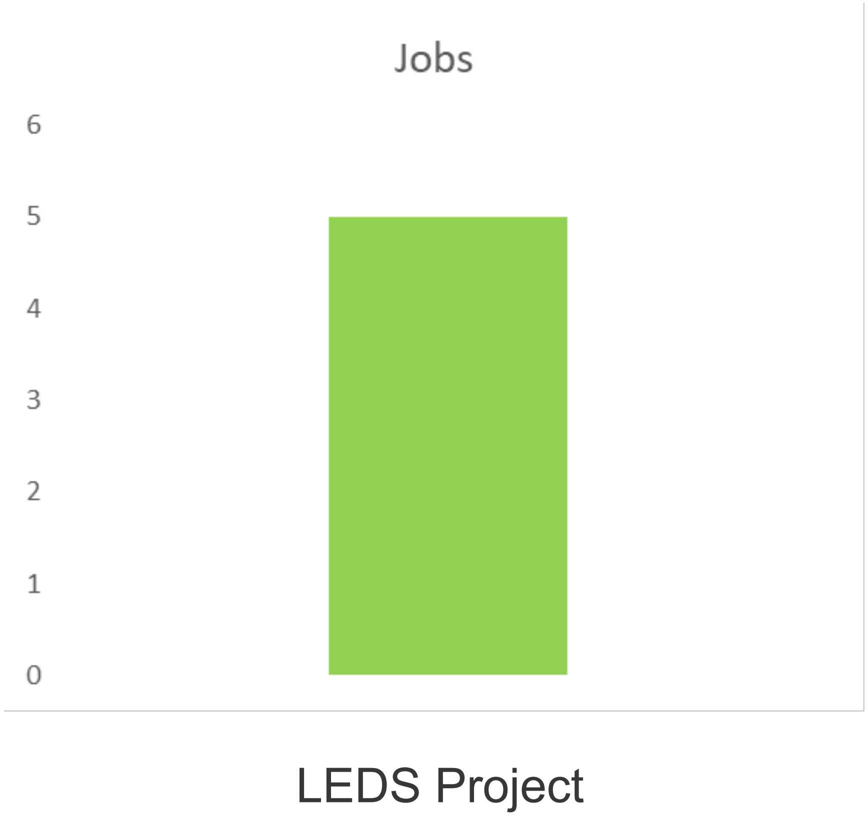
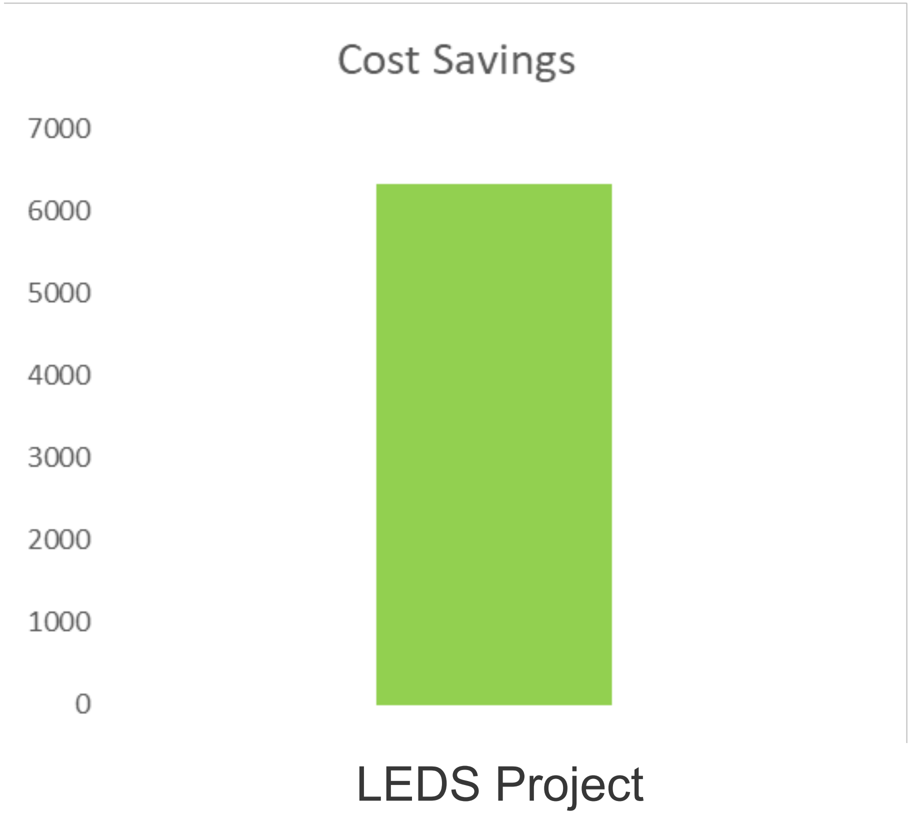
Achievement: Scenario 5

- Employment potential



Achievement: Scenario 5

- Cost Savings screenshot (change in transport means structure)



Scenario 6. Combinations of scenarios 1 to 5

Key Interventions:

a) Longterm application of all 5 scenarios

b) Scenarios extrapolated on demand by Task Force, validated by the Cameroon government.

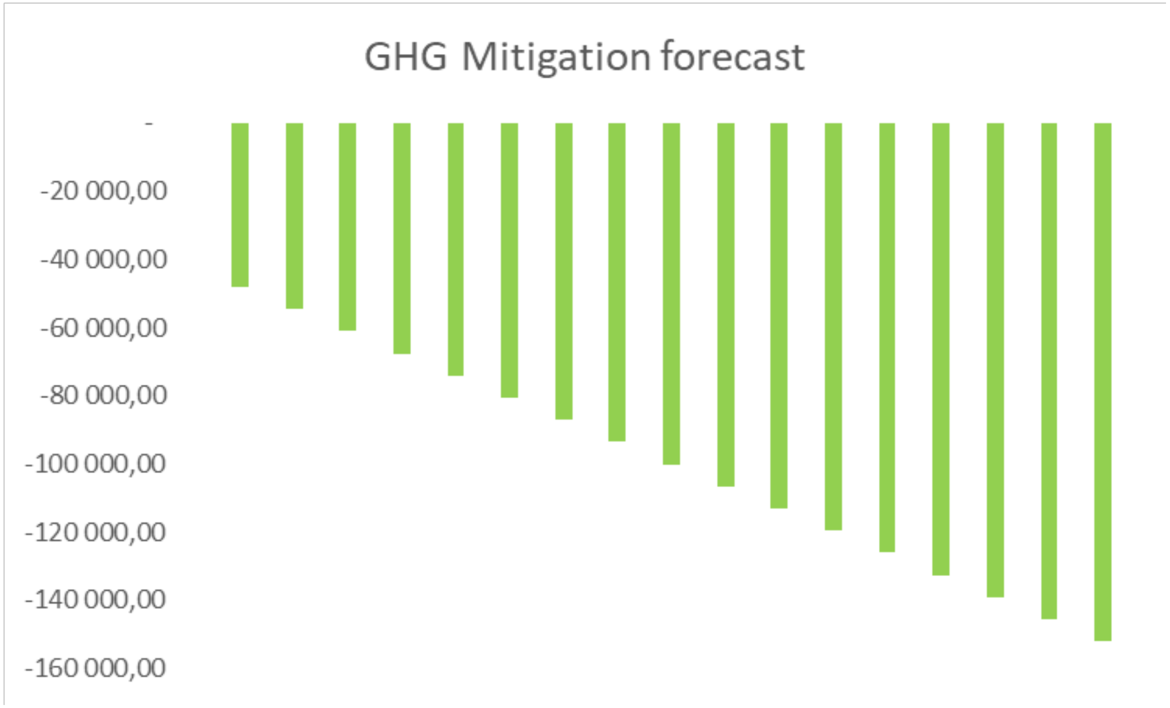
- 130,000 Ha cassava growing and greening
- Resultant produce processed and sold

c) Simulations run through 2035

d) Cumulated socio-economic impacts

Achievement: Scenario 6

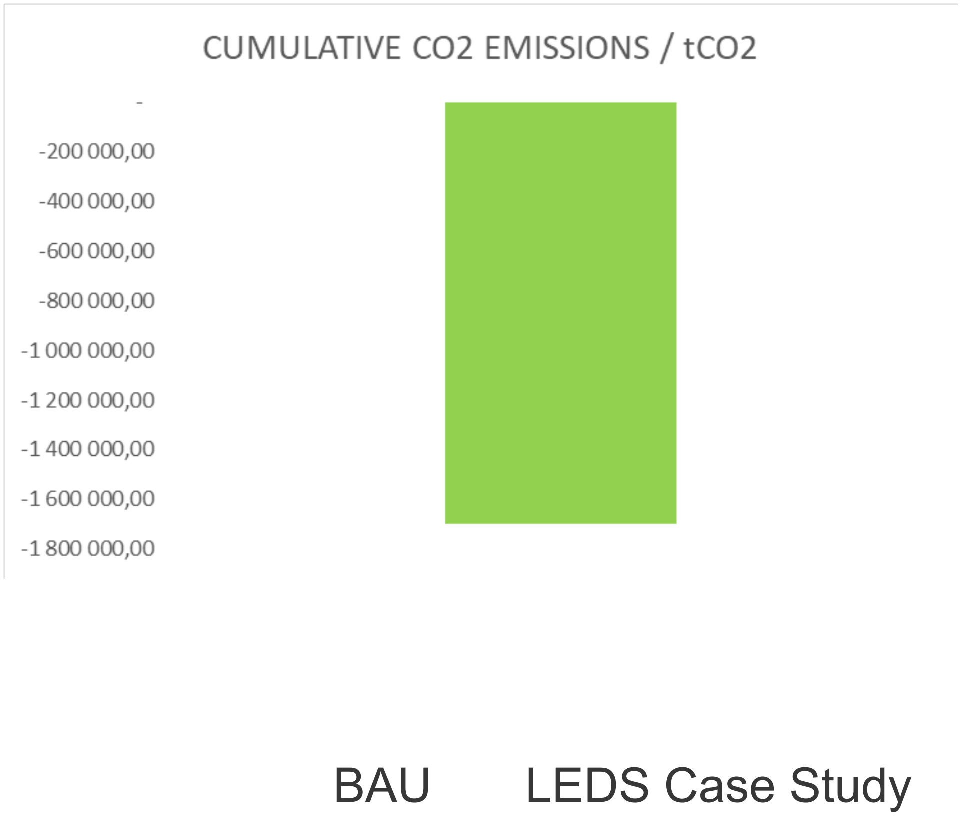
- GHG mitigation 2035 forecast for 130,000 Ha value chain greening (screenshot)



LEDS Case Study

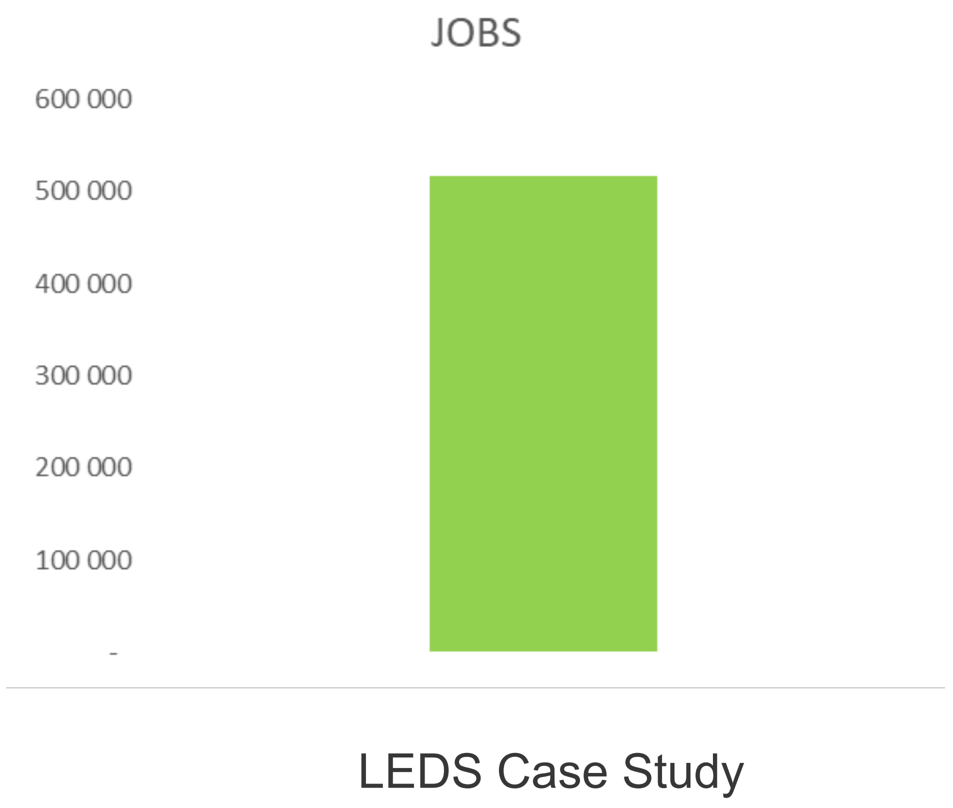
Achievement: Scenario 6

- Cumulative GHG mitigated (screenshot), 1,7 Mt CO_2



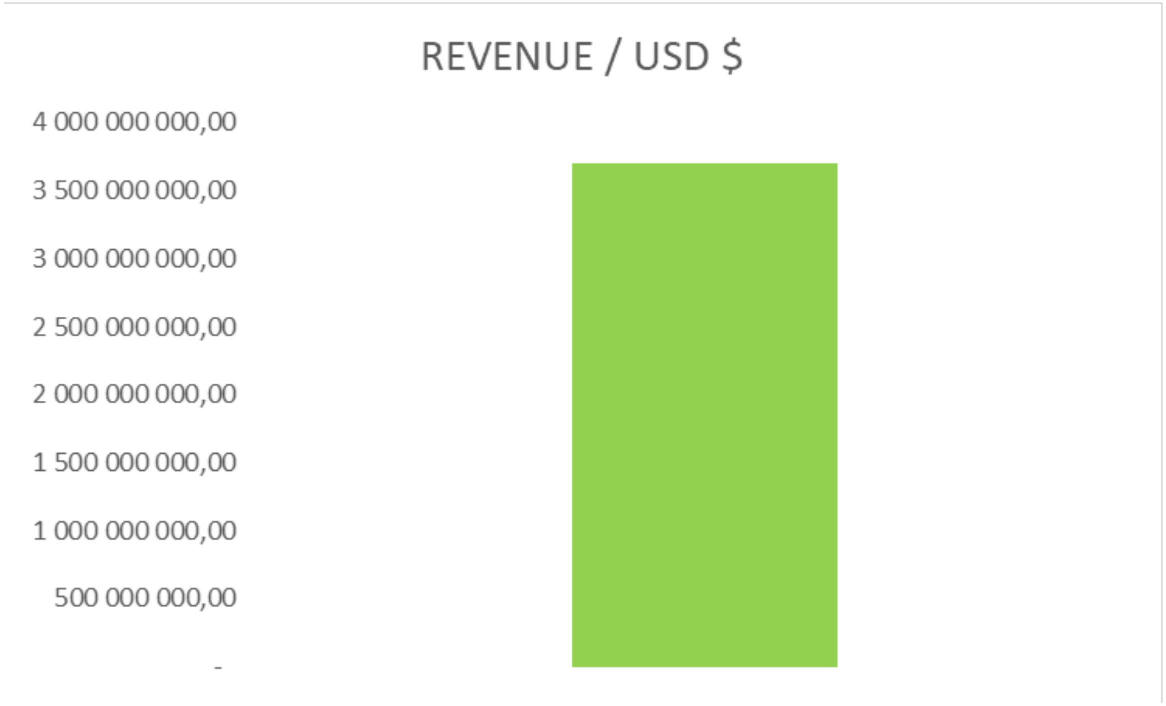
Achievement: Scenario 6

- Cumulative Jobs created screenshot (517k Jobs)



Achievement: Scenario 5

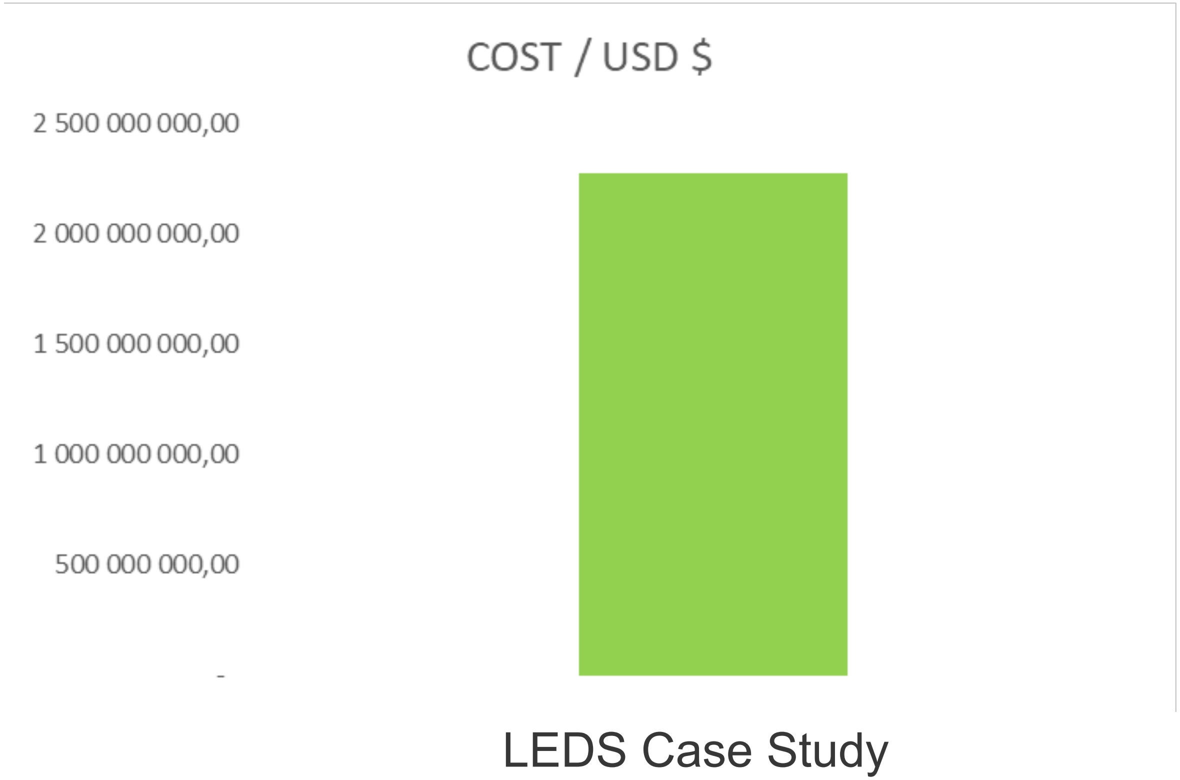
- Cumulative revenue forecast screenshot (3,7 billion USD)



LEDS Case Study

Achievement: Scenario 5

- Cumulative investment needed for the greening LEDS Case Study (sceenshot), 2,275 billion USD.



Testimonials

"MINEPDED will play its full role in ensuring that each sector takes ownership of the results of the UNEP-EU LEDS project, particularly the energy, agriculture, transport and ICT sectors. It is crucial for us to take ownership of LEDS models and modeling tools in order to focus our decisions on facts".

Ing. WAGNOU Valentin,

Inspector N°1 MINEPDED

Testimonials

"The UNEP-EU LEDS project, in its entirety, allowed ONACC to see clearly how the Paris Agreement through the Cameroon NDC could be implemented in a concrete way. The intelligent aspect of the model developed will not only allow to analyze the impacts on GDP, employment, investments and green house gas emissions, but also to make systematic forecasts through the collected data as instrument for decision making. Hence there is a clear need to develop a national strategy for collecting climate sector data that could be one of ONACC's main areas of work".

Prof. AMOUGOU Joseph,

Director of ONACC

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"The UNEP-EU Africa LEDS project was for us an opportunity to concretize Cameroon's commitment through the implementation of its CDN. It made it possible to use concrete examples from the field to illustrate the impacts of a responsible climate policy. It was also the opportunity to set up a task force for low-emission development in Cameroon, with the various ministerial departments and public and private institutions concerned. We sincerely thank this initiative, which leaves the country with a tool for monitoring the greening and digitization of environmental policies".

Mr HELLE Pierre,

Minister of the Environment, Nature Conservation and Sustainable Development

Conclusion

- The UNEP-EU LEDS project has enabled all actors in the climate and development sector to meet from production to processing, to discuss policies and their applications at grassroots level. The project approach consisted in developing two practical cases in the field, collecting data from production and processing of agricultural products, analysing them using the model specifically developed by the project to assess the impacts on CO2, GDP, employment and the necessary investments.

Conclusion (c’td)

- The results obtained allowed decision-makers to have a concrete measure of the impact of a greening and digitization policy. They also provided an opportunity to discuss the prospects for a better mastery of artificial intelligence and big data for a more scientific approach to decision-making.

Next steps

- Conduct the demonstration project on a national scale, for each agro-ecological zone.
- Additional capacity building in artificial intelligence, big data and blockchain for further optimization of the model.
- Apply the integrated modelling system to other CDN policy options to build capacity.
- Apply the model to government planning to strengthen evidence-based decision-making.

Next steps

- Use the LEDS Task Force we have set up as a framework for technical coordination and monitoring of the implementation of the CDN
- Apply LEDS at the level of decentralized local authorities (CTD), with the development of five (05) pilot LEDS territories or "green villages" in each agro-ecological zone of Cameroon, in partnership with municipalities and the private sector, including the Green Climate Fund, the Environment Fund for Nature.

Next steps

- Implement a national data collection strategy through concrete adaptation and mitigation activities on the different priority sectors of the CDN.
- Consider impact analysis based on the assumption that for instance, energy is at the center of national development priorities at the place of agriculture.

Next steps

- At the national level, reduce CO_2 emissions in consumer transport, by opting to import electric motorcycles only within 5 years.
- Enhance the use of ICTs in the production and marketing of agricultural products with the popularization of Afroshop and the development of a digital Agriculture.

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Thank You!

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