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

Africa LEDS project: achievements & next steps – component 2

Presentation for Zambia

BY: Prof. Francis Yamba

Background of modeling actions

- Modelling has assisted to provide a clear view of the future with regard to the three projects that have been selected under this study
- Models have been used to establish an analytical decision framework which will simultaneously forecast the cumulative socio-economic and climate impact of implementing Zambia's NDC objectives
- Three sectors projects include Energy (off-grid) involving mini hydro and solar PV; AFOLU involving implementation of sustainable agriculture; and AFOLU involving natural forest enhancement and regeneration, and follow under the NDC portifolio

Background of modeling actions

- The LEDS Technical Working Group (TWG) under the Operational level of the project identified the following Tools and Models:

i. Jobs Economic Development Impact (JEDI) model- it estimates the socio-economic impacts of a projects' investment;

ii. Long-range Energy Alternatives Planning System (LEAP) model- is used to track energy consumption, production and resource extraction in all sectors of an economy ;

iii. Development Impact Assessment (DIA) tool- is a process for evaluating the likely economic, social, and/or environmental consequences of a LEDS action or set of actions, or one or more development goal; and

iv. Agriculture, Forest and Land Use (AFOLU)- it aids the reporting requirements and design of climate policy actions for the agriculture, forestry and other land-use sectors

v. Inter-governmental Panel on Climate Change (IPCC) 2006 guidelines

Achievement

- **The International Jobs and Economic Development Impacts model (I-JEDI) the international version of the JEDI, was successfully enhanced or built upon by integrating with the LEAP and AFOLU to simultaneously generate socio-economic impacts and the associated GHG emissions**

- The LEAP and AFOLU models were soft linked to I-JEDI through an Application Programming Interface (API)

- The LEAP and AFOLU were used to project scenarios up to 2030.

Achievement- Energy

- The cookstove scenario under the energy sector will be used to illustrate the achievements of linking the I-JEDI and LEAP
- In I-JEDI, clicking on "View LEAP scenario" leads to the Tab with the cookstove uptake figures that have been projected in the LEAP model
- The LEAP tab has a "Import LEAP" button that leads back to I-JEDI
- Clicking on "View results" leads to the socio-economic impacts given in terms of number of jobs created (by sector), GDP, and outputs during the Implementation and On-going phases.
- The associated baseline and mitigation total GHG emissions (LEAP product) are graphically presented

Achievement-Energy

Cookstove Scenario - Zambia

I-JEDI

			Click for help	?
Country	Zambia			
Dollar Year	2010			
Cookstove Scenario Type	Conventional to efficient			
			Click to view LEAP scenario	
Will this use the LEAP scenario in the "LEAP-Cookstoves" tab?	Yes - Import LEAP Scenario			
What year would you like to import?	2021			
Cumulative or Annual	Annual			

Populate with Defaults

Installation/Single Event		% Manufactured in Zambia	% Purchased or spent in Za
Number of new cookstoves purchased (LEAP)	11		
Cost of new cookstoves ($2010 USD)	$ 1,410	10%	90%
Transportation expenses for cookstoves ($2010 USD)	$ -		0%
Disposal of old cookstoves ($2010 USD)	$ -		0%
Total	$ 1,410		

Ongoing		% spent in Zambia
Annual change in charcoal expenditures ($)	$ (4,375,800)	100%
Change in stove maintenance expenditures	0	100%
Total	$ (4,375,800)	

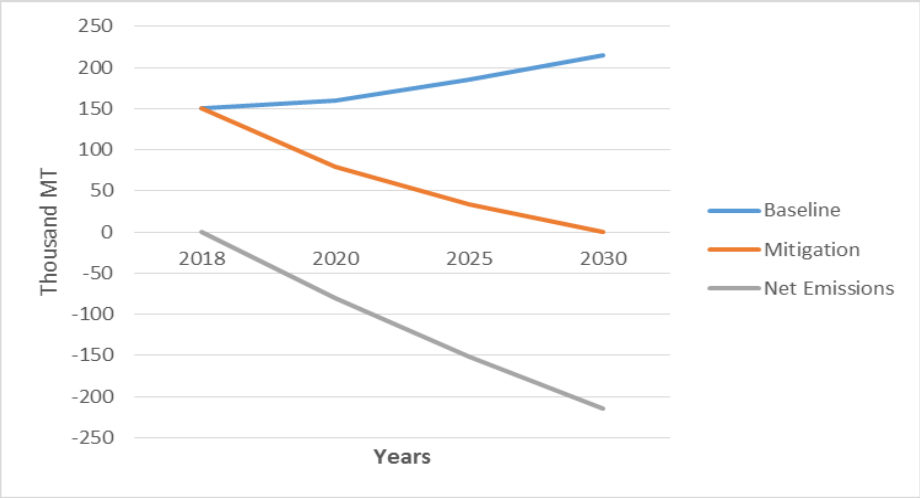
Click to view results

Variable: Indicators: Indicator (Cookstoves)													
Scenario: Mitigation	If dollars are imported from LEAP I need to know where the dollar year would be listed and the format												
Branch: Indicators\Cumulative Efficient Cook Stoves	< - macro detects if word "efficient" is in this cell; otherwise uses the electric scenario												
Region: Region 1													
Branches	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual Added Efficient Cook Stoves	-	23.00	24.00	11.00	12.00	12.00	13.00	14.00	14.00	15.00	16.00	17.00	18.00
Cumulative Efficient Cook Stoves	-	23.00	47.00	58.00	70.00	82.00	95.00	109.00	123.00	138.00	154.00	171.00	189.00

Import LEAP Scenario

LEAP

Achievement- Energy



GHG emissions for implementing all energy sector activities

	Implementation	On-going
FIREWOOD TO EFFICIENT COOKSTOVES (ICS)		
Number of jobs	0	16
Earnings (US$)	-4	-19,656
GDP (US$)	-131	2,394,860
Output (US$)	-4	-19,656

Summary of socio-economic results of firewood to efficient cookstove transition investment

Achievement- Energy

- The overall energy (off-grid) GHG emissions contribution graph shows that without any intervention, GHG emissions will continue to increase from 2018 to 2030 (blue curve). This in turn will lead to adverse climate effects in the form of reduced rainfall, high temperatures, flooding, high disease outbreaks, etc.
- Following the transitioning from baseline fuels to renewable energy and efficient cookstoves, GHG emissions are seen to be decreasing from 2018 to 2030 (red curve). The grey curve is the net emission reduction and will reduce by -85 thousand MT in 2020, -151 and -241 thousand MT in 2025 and 2030, respectively.
- The socio- economic impacts table shows that the transitioning from firewood to efficient cook-stoves will have positive and negative results. During the implementation phase, the number of jobs does not change and is therefore zero. And thereafter, 16 jobs are created in the on-going phase.
- With US$ (-4) in earnings, US$ (-131) in GDP and US$ (-4) in output in the implementation phase, meaning that economic activities were still taking place during this phase (despite zero creation of jobs) but were not significant enough to result in positive results.

Achievement- Energy

- The earnings and output for the on-going phase will be

US$(-19,656), this means that, the earnings made in the support sector (e.g. agriculture, manufacturing, finance, etc.) were more than those within the cook-stove sector thus resulting in a negative total.

- GDP will be US$2, 394,860. It should be noted that the estimated values are sensitive to cost and based on assumption about the local context.

Achievement- Sustainable Agriculture

- AFOLU was soft-linked to I-JEDI in the same way as LEAP
- The project will be implemented in three districts.
- The baseline scenario assumes that there will be a continued inefficient use of inorganic fertilizers and a limited use of organic fertilizers in the absence of the intervention
- The mitigation scenario involves promotion of sustainable agriculture which considers a number of practices to include; (i) development of green manure and cover crops for soil improvements, (ii) conservation tillage, (iii) use of organic manure, (iv) application of lime, (v) control of weed. (iv) Use of improved crop varieties
- Assessment of socio-economic impacts and GHG emissions up to 2030 using AFOLU/I-JEDI gave the following results:

Sector	No. of jobs	GHG reduction	
		2020	2030
AFOLU- Sustainable agriculture	6,824	1.11Gg	0.91Gg

Achievement- Forest enhancement and natural regeneration

- The project promoting Climate Resilient Community based on regeneration of indigenous forests in Zambia's Central Province.
- Without the mitigation project, it can be assumed, that assisted natural regeneration of forest areas which are been exploited by logging operations and charcoal production would not take place.
- Mitigation options involves introduction of improved charcoal production kilns and agro-forestry which in turn enhances assisted natural regeneration (ANR). Assisted natural regeneration (ANR) involves a combination of forest and land use techniques that can be employed to restore degraded and deforested lands to more productive forests.
- The project is expected to cover an area of about 10,000ha.

Sector	No. of jobs		GHG reduction		
	Implementation	O&M	2020	2025	2030
AFOLU- Forest enhancement and assisted natural regeneration	84	Negligible	-353.1 million tonnes	-298.1 million tonnes	-251.7 million tonnes

Achievements (contn'd)

- **Implementation of the NDCs will have the following collective impacts at national level**

- Jobs: 1, 709 will be created during the implementation stage of the NDC. And once established, over 13, 884 jobs will be created with on-going activities

- Increased income: Increased economic activity leading to increase in household income. Economic activities will include sale of agriculture/non-wood forest products, operation of small business enterprises,

- Cost saving: Savings as a result of reduced expenditure or complete transition from candles and dry cells use to electricity

Achievements (contn'd)

- **It is anticipated that once implemented, the projects will assist in carbon mitigation by**
  - Increasing the carbon sink through sequestration in preserved forests and those left to naturally regenerate;
  - adopting more efficient charcoal production techniques, i.e. the Adam Retorts which has a higher recovery efficiency;
  - adopting renewable energy for lighting and cooking, and in cases of solar mini-grid electrified areas, adoption of more efficient cookstoves; and
  - Applying climate smart agriculture



Achievements (contn'd)

- **Climate resilience will be built through empowerment of communities by:**
  - Identifying and developing alternative livelihoods;
  - Capacity building in the technologies introduced so that they are self-sustaining beyond the project lifetime;
  - Access to resources, such as information/awareness/education, inputs and finances;
  - Supportive incentives, for example, tax rebuts on machines, improved fertilizers, value addition along market value chain, etc.

Feedback to policy

- This component of LEDS activities have provided a clear understanding of impacts expected with implementation of the NDC projects
- The integrated models have been welcomed as the country continues to strengthen it's policy structure for low carbon development and climate action.
  - And the project were reporting to the Council of Ministers which is the highest policy level of decision makers on climate change
- The LEDS project enabled local expertise in this field to be harnessed and further inter-ministerial and public-private collaboration.

STATEMENT FROM THE GOVERNMENT OF THE REPUBLIC OF ZAMBIA

Honorable Jean Kapata, M.P

MINISTER OF LANDS AND NATURAL RESOURCES

The results serve as a guide "on what climate mitigation actions can be implemented to support the Zambia Nationally Determined Contribution and where socio-economic benefits can be derived"

Conclusion

- Of the three sector projects selected, the natural regeneration project has began and is in the implementation stage.
- According to the development impacts assessment done, it is expected that the natural regeneration project will have positive impacts on climate, education, and gender equality.
- The project under energy sector is expected to have positive impacts on food security, household income, job opportunities, creation of enterprises, gender equality and education and emission reduction.
- The project under agriculture, sustainable agriculture will impact the communities and neighboring areas in terms of increased incomes and food security.

Next steps

- The gaps identified during modeling include:
  - lack of or restricted access to data or information (to facilitate the making of assumptions for data generation);
  - Lack of expertise to decode results;
  - lack of resources to build upon existing model that will give integrated results.
- Moving forward, there is need to build on the efforts of the modeling team by finding ways to integrate other models to inform policies in the country

AFRICA-LEDS PROJECT

UNEP

Thank You!

BY: (Prof Yamba)

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

LEDS GLOBAL PARTNERSHIP

European Commission