The measurement of the GBEP Indicators in Paraguay

Activity Group 2 "Raising awareness and sharing of data and experiences from the implementation of the GBEP indicators"

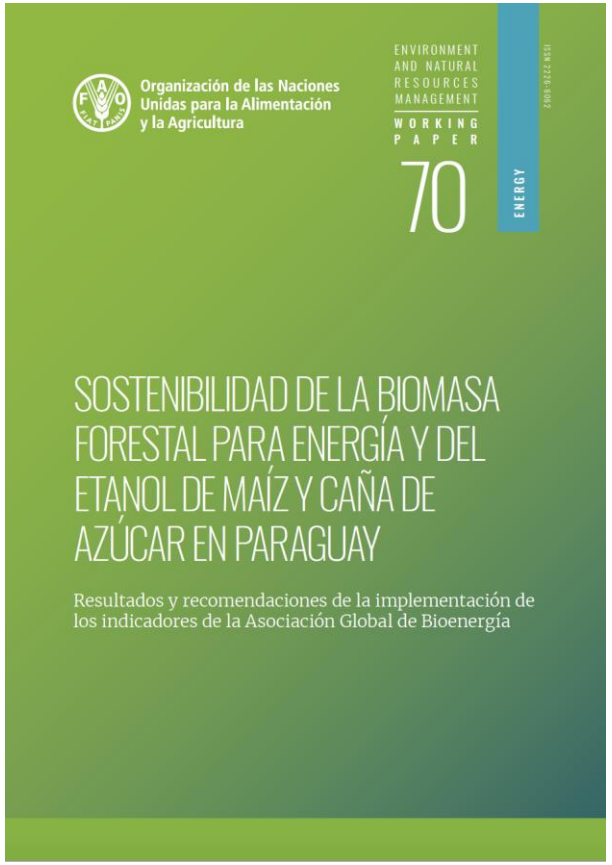
10th meeting of the GBEP Working Group on Capacity Building for Sustainable Bioenergy (WGCB)

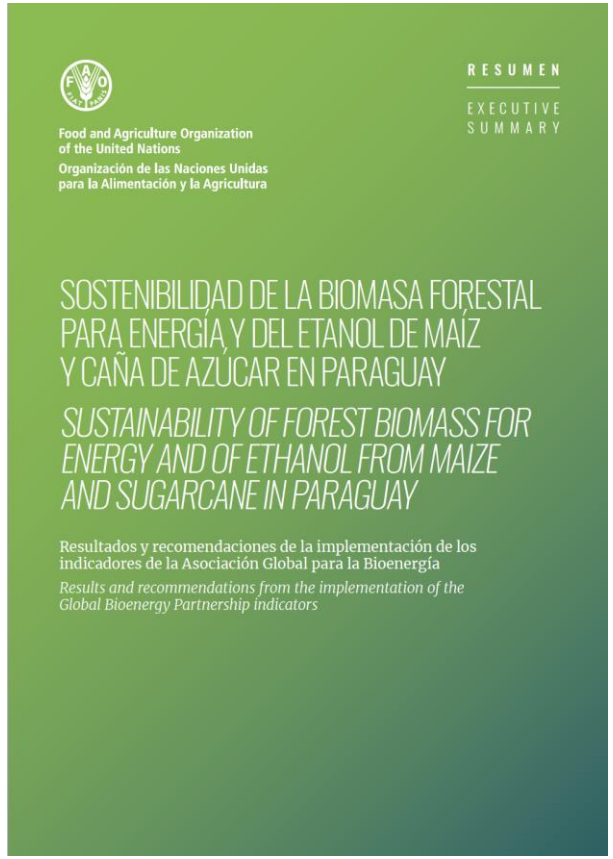
FAO Headquarters

Rome, 27-28 November 2018

The Project

"Building Capacity for enhancing bioenergy sustainability through the use of GBEP indicators (GCP/GLO/554/GER)"





Acknowledgments

- Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety of Germany (BMUB)
- Ministry of Agriculture and Livestock – Justo Vargas, Director of Technical Cooperation and International Relations
- Centres of Excellence : Catholic University of Asuncion, ADIFCA – National University of Asuncion, CEAMSO
- Susanne Koppen - Institute for Energy and Environment , IFEU with the support of the Federal Environment Agency (UBA) of Germany
- Sergio Rene Araujo Enciso and Holger Matthey , FAO
- Constance Miller, Giovanna Pesci and Federica Maffeo, FAO
- FAO Regional Office for Latin America and the Caribbean
- FAO Representative in Paraguay:
  - Rolf Hackbart, Paraguay Representative
  - Cesar Balbuena, Fatima Galvan
- GBEP , Michela Morese, Andrea Rossi and Tiziana Pirelli

Project Overview

Why Paraguay?

Key Bioenergy pathways

Low carbon development commitment of authorities and policy makers

Strengthen the capacity of the country to monitor bioenergy

Constitution of a national platform for the long-term monitoring of bioenergy sustainability

- Multi-Stakeholder Working Group
- Inter-ministerial Coordination
- Dialogue among policy makers, private sector and academia

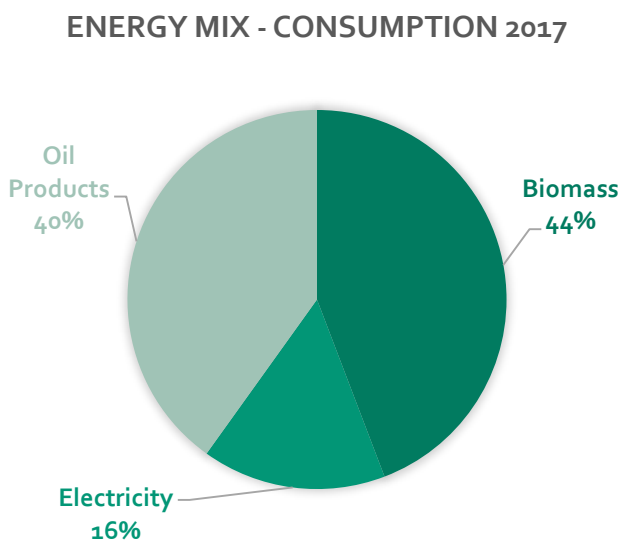
- Eduardo Petta, Minister of Education and Science
- Pedro Mancuello, Vice Minister of Commerce

Project presented to:

- Minister of Industry and Commerce
- Minister of the Technical Secretary of Planification
- President of PETROPAR

Key Bionergy Pathways

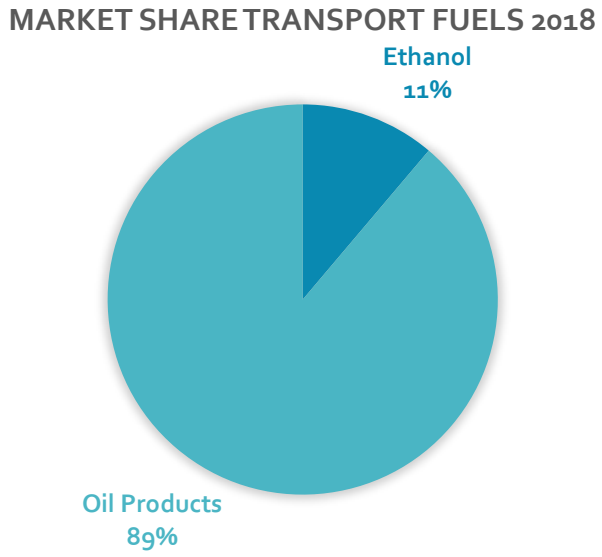
- **Forest Biomass for Energy**



https://www.ssme.gov.py/vmme/pdf/balance2017/BEN2017.pdf

- Household level for heating and cooking
- Industrial level for the production of thermal energy

Ethanol from Sugar Cane and Maize



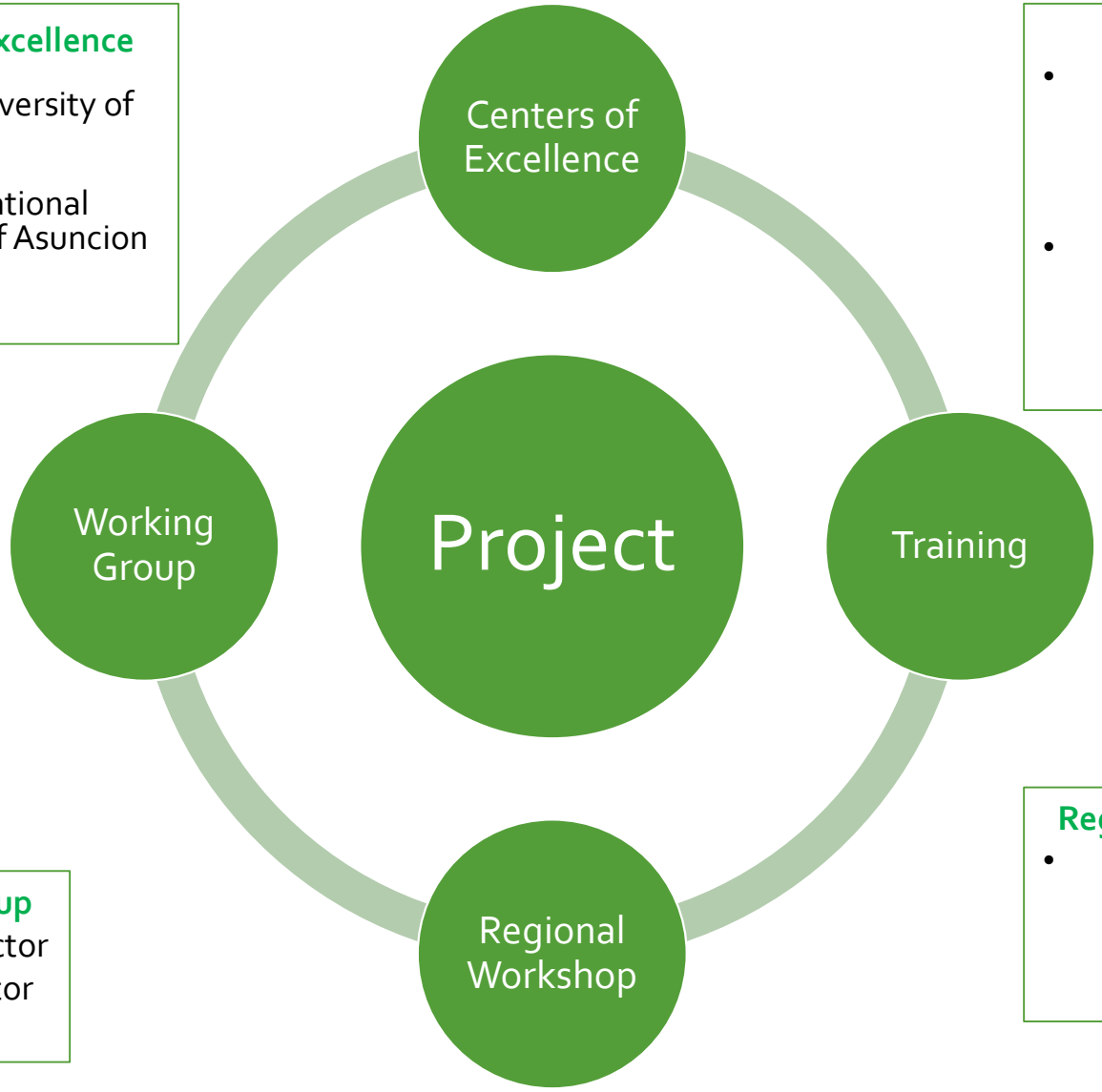
Source : DICAPAR – Nov 2018

- Record 350.000.000 Litres/year
- Key component in Gasoline formulation
- Increasing Flex Fuel cars fleet

Building Capacity

Centers of Excellence

- Catholic University of Asuncion
- ADIFCA - National University of Asuncion
- CEAMSO



Training

- Assessment of GHG and non GHG emissions from Biofuels
- Aglink-Cosimo Model for the Measurement of Indicator 10

Working Group

- Private Sector
- Public Sector
- Academia

Regional Workshop

- 12 Countries from Latin America and the Caribbean

Training – MSWG and Centers of Excellences

Training and MSWG Meetings

Regional Workshop, MSWG and Centers of Excellence

GBEP Environmental Indicators

1. Lifecycle GHG emissions
2. Soil Quality
3. Harvest levels of Wood resources
4. Emissions of non-GHG air pollutants, including air toxics
5. Water and use efficiency
6. Water Quality
7. Biological diversity in the landscape
8. Land use and land-use change related to bioenergy feedstock production

Indicators 1,2,4,5,6,7,8

Indicators 1,3,4,5,7,8

GBEP Social Indicators

9. Allocation and tenure of land for new bioenergy production
10. Price and supply of a national food basket
11. Change in income
12. Jobs in the Bioenergy sector
13. Change in unpaid time spent by women and children collecting biomass
14. Bioenergy used to expand Access to modern energy services
15. Change in mortality and burden disease attributable to indoor smoke
16. Incidence of occupational injury, illness and fatalities

Indicators 9,10,11,12,14,16

Indicators 9,11,12,13,14,15,16

GBEP Economic Indicators

17. Productivity
18. Net Energy Balance
19. Gross value added
20. Change in consumption of fossil fuels and traditional use of biomass
21. Training and requalification of the workforce
22. Energy diversity
23. Infrastructure and logistics for distribution of bioenergy
24. Capacity and flexibility of use of bioenergy

Indicators 17,18,19,20,21,22,23,24

Indicators 17,18,19,21,22,23,24

Indicators Measurement Forest Biomass for Energy

14

- Solid Biomass + Biofuels = 43% of total energy consumption

15

- Indoor air pollution due to fuelwood burnt on an open fire

13

- A lot of time collecting biomass due to loss of forest

3 - 14

- Industry a great consumer of biomass in form of woodchips and charcoal

3

- Negative balance sustainable production and demand 11 MTY

Recommendations

- Incentivize sustainable management
- National Energy Efficiency Plan
- National Reforestation Plan

Indicators Measurement Ethanol from Sugar Cane and Maize

1 - 4

- GHG and GEI emissions better for ethanol from maize "zafrinha"

5

- Water requirement per unit of energy better for ethanol from maize

8

- Extreme low % of agricultural land used for Ethanol production

9

- Better results for land used for maize than for sugar cane

17

- Ethanol from Sugar Cane more than duplicate MJ/Ha/year

18

- Ethanol from Sugar Cane = 5.29 – 6.04
- Ethanol from maize = 1.36

Indicators Measurement Ethanol from Sugar Cane and Maize

22

- Positive contribution of ethanol, woody biomass, etc.

23

- Excellent and precise analysis of every logistical link or step

24

- Results show the key role of flex fuel cars

Recommendations:

- Improve Indicator 1 for sugar cane
- Improve Indicator 6 by introducing vinasse concentration technologies
- Monitor Indicator 9 for sugar cane small producers
- Monitor Indicator 10
- Improve Indicator 12 by requalifying low paid sugar cane workers

Results

Indicator	Sugar Cane Ethanol	Maize Ethanol	Forest biomass for energy
1. Lifecycle GHG emissions	72.82 gCO2eq/MJ EtOH - Small 56.78 gCO2eq/MJ EtOH – Medium , Large	44.23 gCO2eq/MJ EtOH (94 Gasoline)	10.8 gCO2eq/MJ chips eucalyptus (110.92 Carbon)
3. Harvest levels of Wood resources			Negative balance 7.5 – 11 Millions Tonnes / Year Extraction: Native Forest 34-6% , Plantations 36%
4.Emissions of non-GHG air pollutants, including air toxics	Reduction SO2 43,43% small producers and 28,76% large producers	Reduction SO2 51,04%,	
5. Water and use efficiency	5.1 0.097 % 5.2 0,00080 m3/MJ + 0,146 m3/MJ	5. 1 0.071 % 5.2 0,00014 m3/MJ + 0,084 m3/MJ	5.1 0,535% 5.2 0,109 m3/MJ
8. Land use and land-use change related to bioenergy feedstock production	8.2a 0.154 % of agricultural land	8.2a 0.3776 % of agricultural land	8.2a 0.55% of agricultural land

Results

Indicator	Sugar Cane Ethanol	Maize Ethanol	Forest biomass for energy
13. Change in unpaid time spent by women and children collecting biomass			4 hours per week
17. Productivity (*)			
18. Net Energy Balance	18.4 5.29 – 6.04	18.4 1.36	18.4 41.5

(*)

RESUMEN DE RESULTADOS PARA EL INDICADOR 17

	Subindicador	Valor	Unidad de medida
CAÑA DE AZÚCAR	17.1	55,9	t/ha/año
	17.2	65	litros/t
	17.2	1 369,31	MJ/t
	17.3	76 544	MJ/ha/año
	17.4	0,023-0,027	USD/MJ
MAÍZ	17.1	4,22	t/ha/año
	17.2	350	litros/t
	17.2	7 373,21	MJ/t
	17.3	31 115	MJ/ha/año
	17.4	0,023-0,027	USD/MJ
BIOMASA FORESTAL PARA ENERGÍA (BOSQUES PRODUCTIVOS MANEJADOS)	17.1	0,88-2,14	t/ha/año
	17.2	15 000	MJ/t
	17.3	13 200-32 100	MJ/ha/año
	17.4	30-45	USD/t
	17.4	0,002 - 0,003	USD/MJ
BIOMASA FORESTAL PARA ENERGÍA (PLANTACIONES FORESTALES DE *EUCALYPTUS SPP.*)	17.1	6,75 – 8,1	t/ha
	17.2 (CHIPS)	21 000	MJ/t
	17.3 (CHIPS)	141 750-170 100	MJ/ha
	17.4 (CHIPS)	70	USD/t
	17.4 (CHIPS)	0,0021-0,0026	USD/MJ

Recommendations for Future Monitoring

- Institutionalize the MSWG similar to the former Biofuel Multi stakeholder Table at REDIEX
- Link GBEP Indicators utilization to the initiatives related to NDCs and SDGs
- Link GBEP Indicators utilization to PROEZA (Poverty, Reforestation, Energy and Climate Change) Project
- Broad the scope of the analysis to other bioenergy pathways such as Biodiesel
- Improve the collection of Data, primary and secondary
- Exchange of good practice, expertise and lesson learnt is crucial
- Socialize and promote the results among top executives and authorities

Thanks

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