



**MINISTRY OF MINES AND ENERGY**



# **The Agro-ecological Sugarcane Zoning in Brazil**

**Sustainable feedstock supply for bioenergy and biofuels**  
**IEA – Biofuels Roadmap Workshop**  
**Discussion 3 – Sustainable land use and biomass production**

**MARLON ARRAES J. LEAL**

Coordinator - Renewable Fuels Department

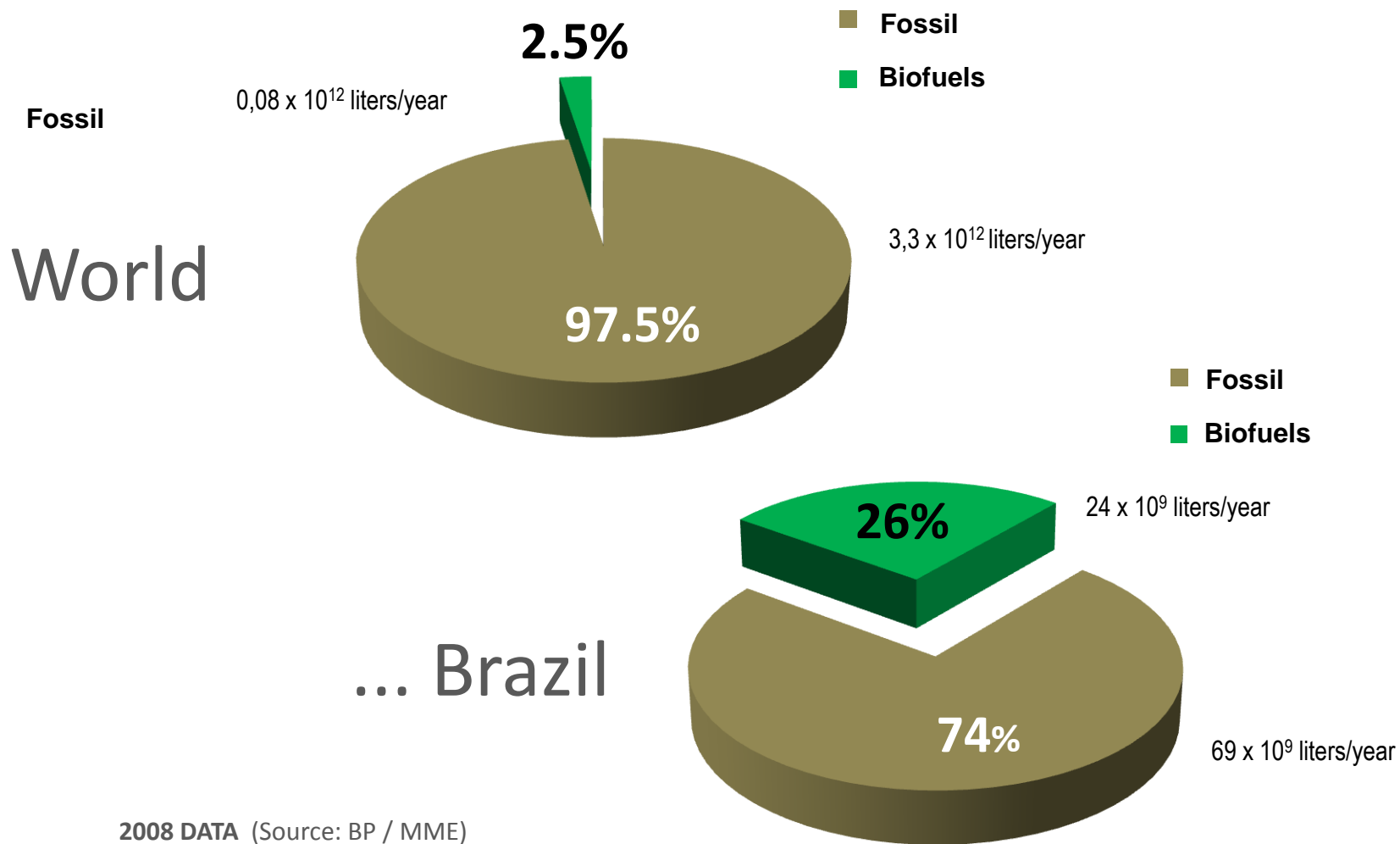
Paris, September 16<sup>th</sup> , 2010



# **Introduction – Biofuels Market in Brazil**



## Biofuels versus Fossil Fuels

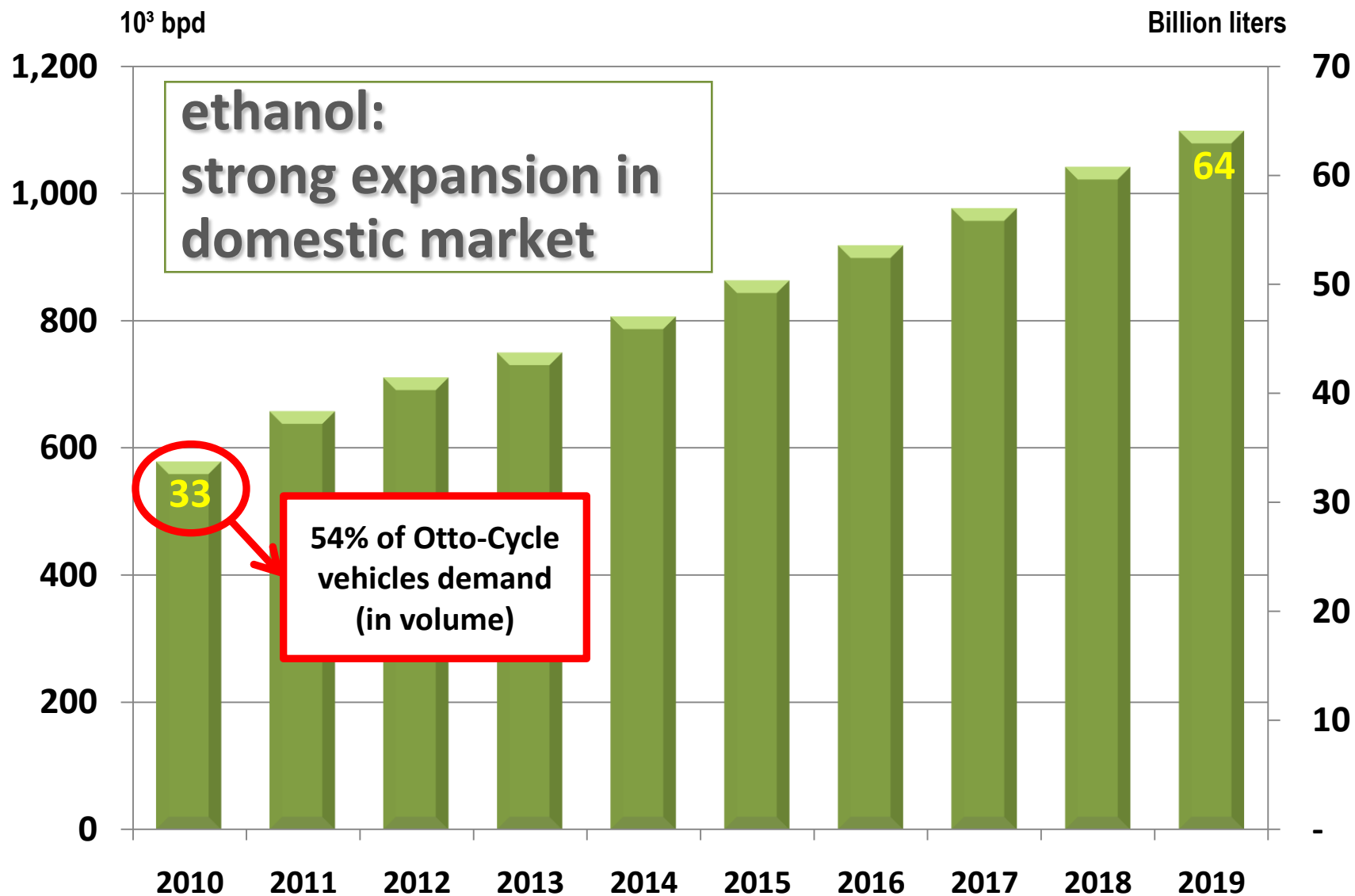


**2008 DATA** (Source: BP / MME)

Medium and light derivatives considered:  
Diesel, Gasoline and Jet Fuel



## Brazilian Ethanol Production - Ten Year Plan (2010/2019)



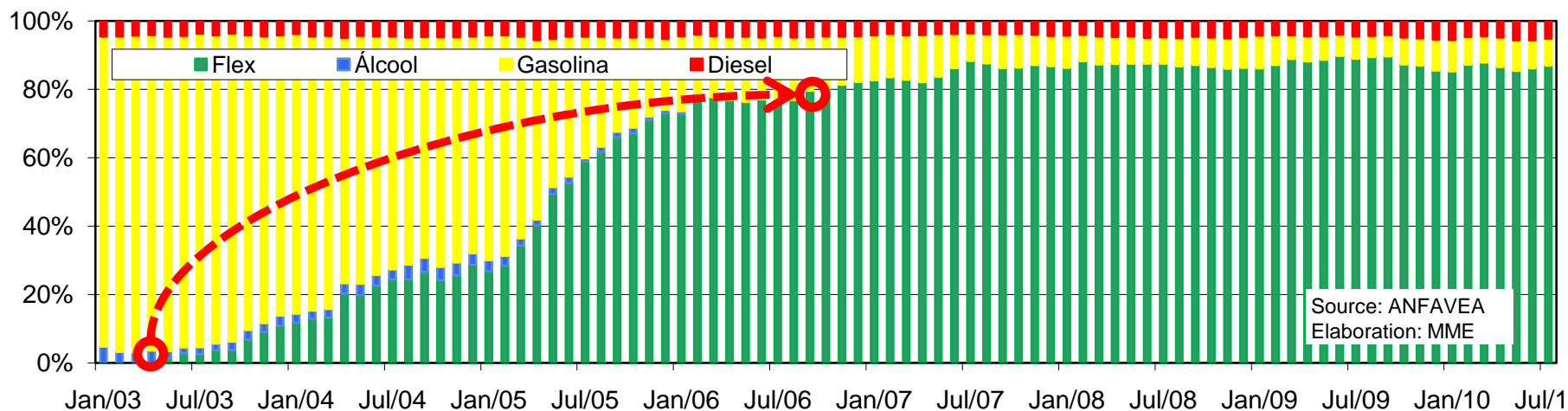


# Flex Fuel Fleet Growth: The main driver for ethanol market expansion



- Allows any mixture of hydrous ethanol and gasoline C (E25 to E100)
- In 2009, vehicle sales registered a growth of 11% in comparison to 2008, and the historical record of 3 million vehicles was reached. Flex-fuel sales represented 88.2% in 2009.
- Since 2003, until June/2010, more than 11 million flex-fuel vehicles were commercialized and its share in total light vehicles fleet is estimated in 37%.

## Flex-fuel sales: From zero to 80% in 3 years!





# **The Agro-ecological sugarcane zoning in Brazil and, from this example, what can be done in other countries**



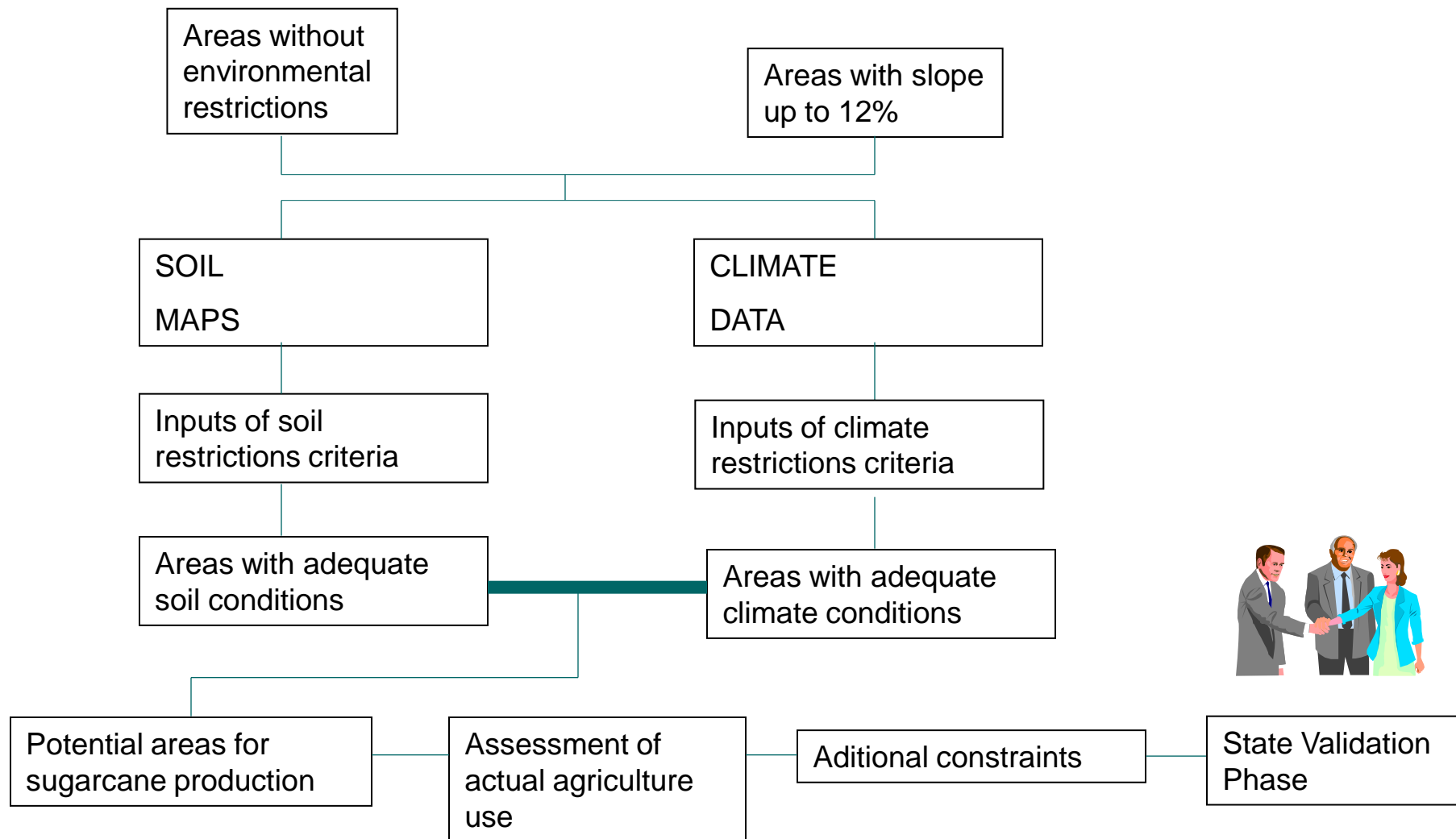
## **Brazilian Agro-ecological zoning: Rules to Guide the Sugarcane Expansion**

- ✓ To indicate the potential areas for sugarcane expansion production without environmental restrictions and that are already used or degraded;
- ✓ To exclude the production of sugarcane in the biomes of Amazon, Pantanal and Upper Paraguay River Basin;
- ✓ To indicate preferably degraded or pasture areas, minimizing any competition with food production;
- ✓ To indicate potential areas with agricultural potential without full irrigation, considering climate, soil conditions and varieties to select areas where sugarcane production uses the least quantity of water possible;
- ✓ To indicate areas with slope up to 12% in order to allow the use of machines at the tilling. This will avoid new induced fire areas for sugarcane manual cut and orient the expansion with mechanical harvesting.

**The Brazilian sugarcane agro-ecological zoning was coordinated by the Ministry of Agriculture, together with the Ministry of Environment, the Ministry of Mines and Energy and the Ministry of Finance, with technical assistance of EMBRAPA (Public Enterprise of Agriculture Research)**



# Brazilian Agro-ecological zoning: The areas selection



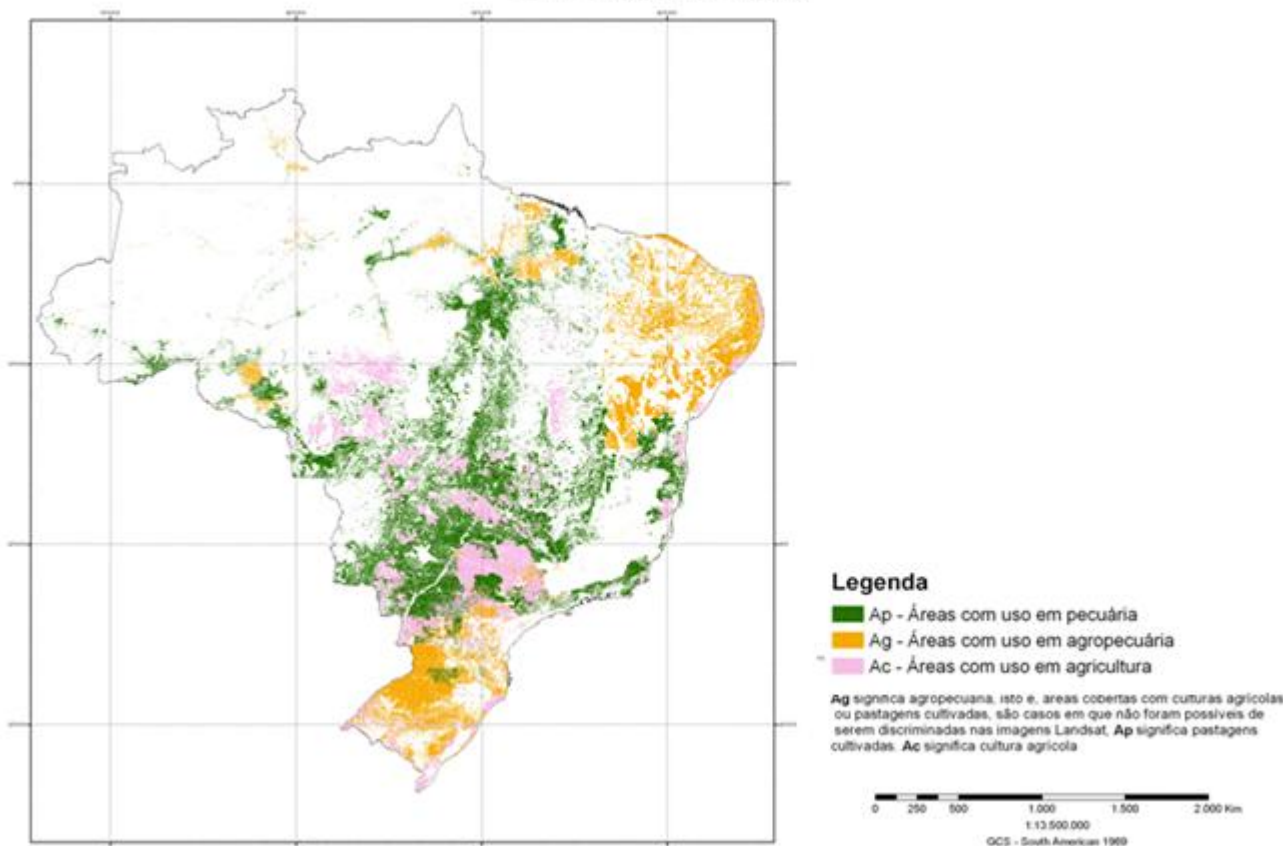




# LAND USE IN BRAZIL

## ...and sugarcane agro-ecologic zoning

BR - Usos da Terra

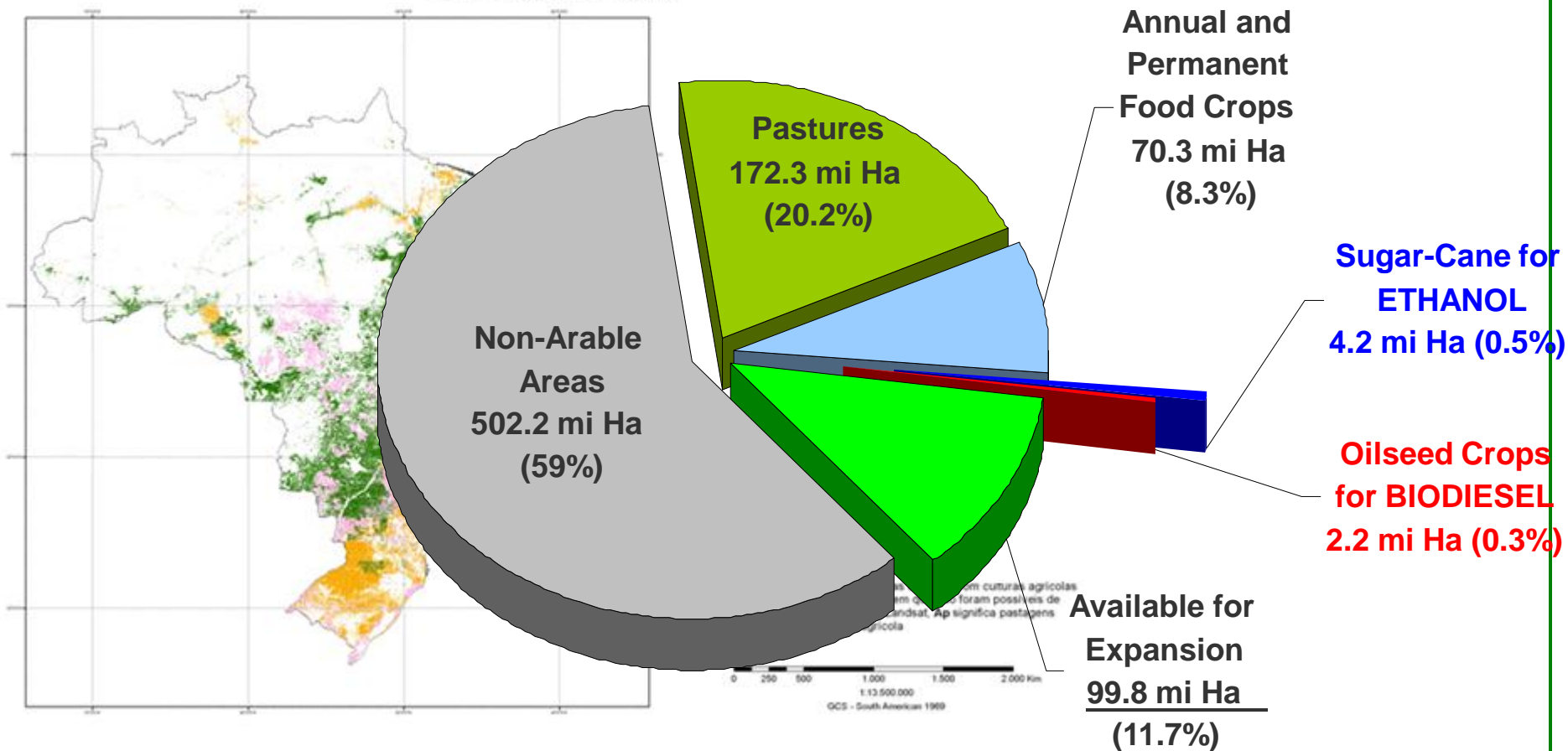


- Suitable areas identified sum up to 64 million hectares (or 7.5% of the territory)
- Currently, sugarcane for ethanol corresponds to 4.2 million hectares or 1% of arable lands.



# LAND USE IN BRAZIL ...and sugarcane agro-ecologic zoning

BR - Usos da Terra



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# Brazilian Agro-ecological zoning: The results



The Brazilian Government published in September, 17<sup>th</sup> 2009 the Decree N° 6.961/2009 that:

*“Approves the sugarcane agri-ecological zoning and determines the National Monetary Council<sup>1</sup> to establish the rules of financing/credit operations for the sugarcane sector in the terms of the agri-ecological zoning.”*

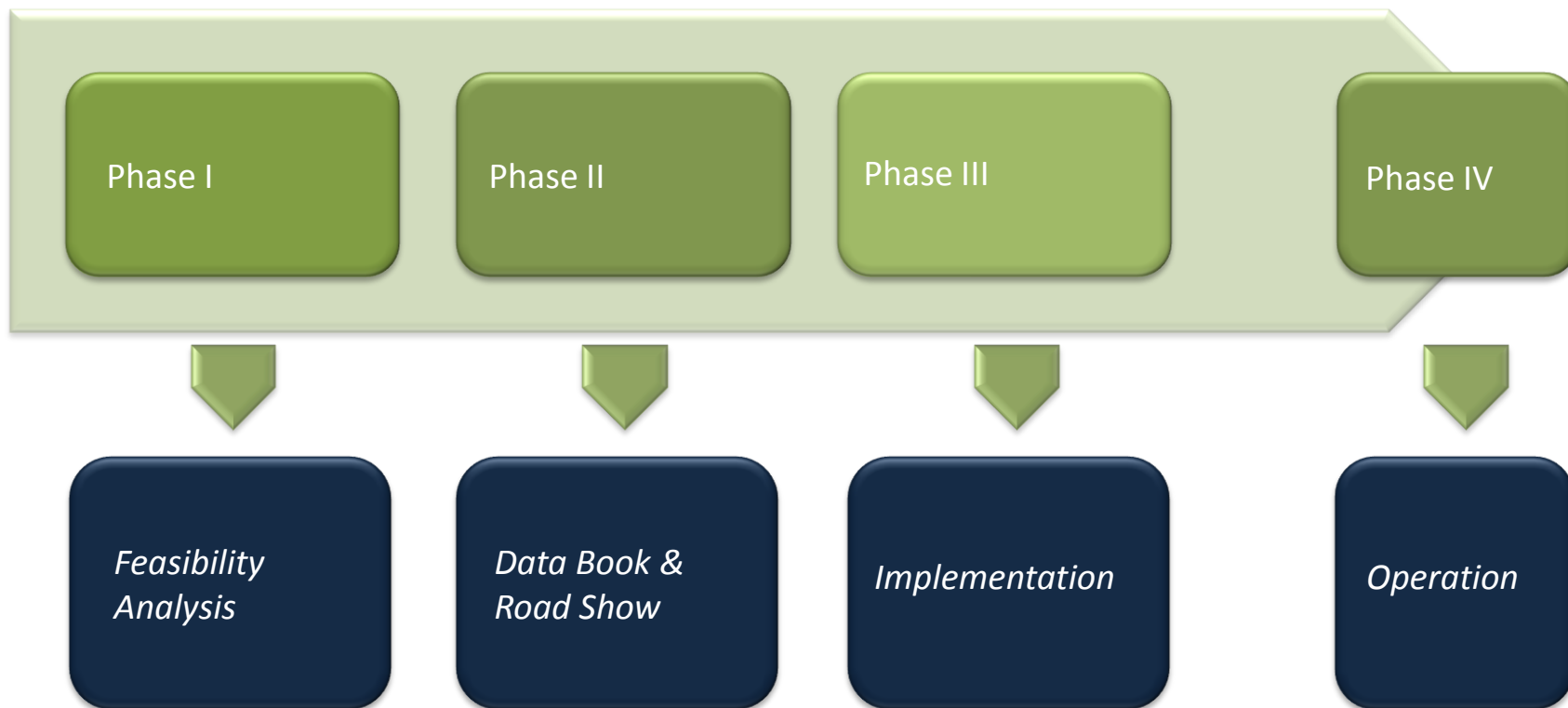
<sup>1</sup> National Monetary Council is the Brazilian higher instance responsible for making the rules of credit and monetary policies. The council is presided by the Ministry of Finance



# **The Agri-ecological zoning methodology as key-instrument for technical cooperation. Brazilian cooperation in other countries.**

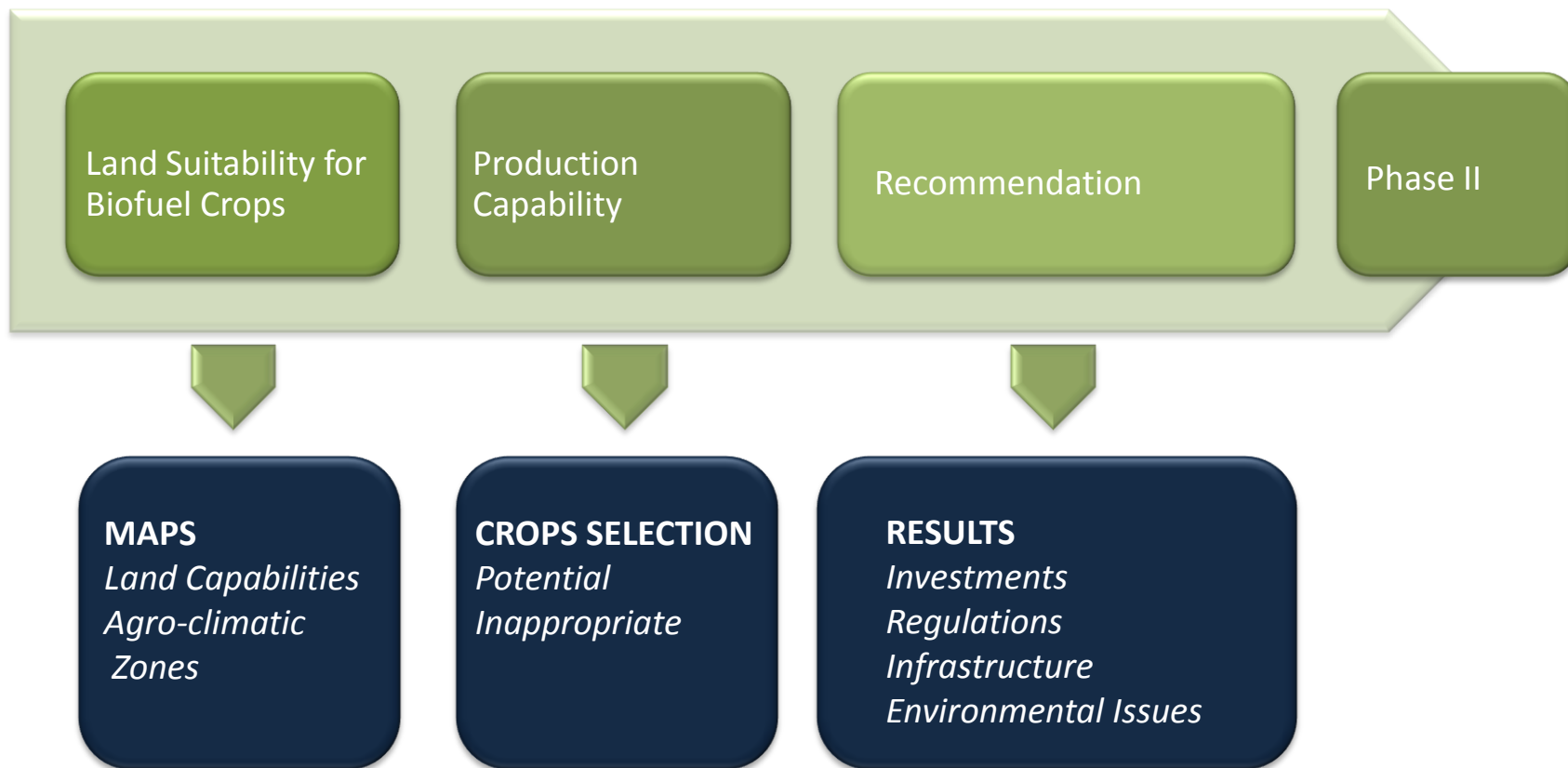


## Biofuel Project



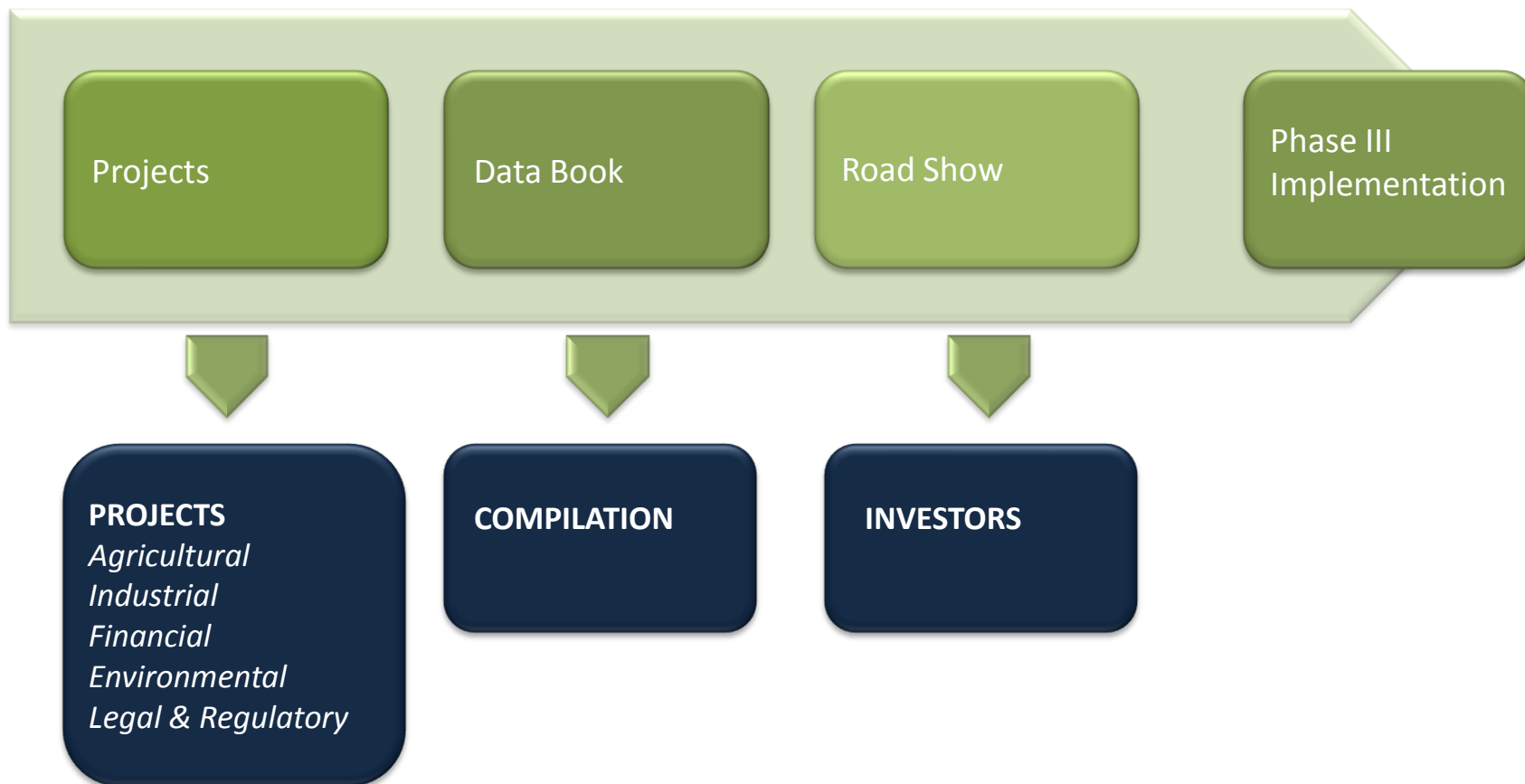


## Phase I – Feasibility Analysis





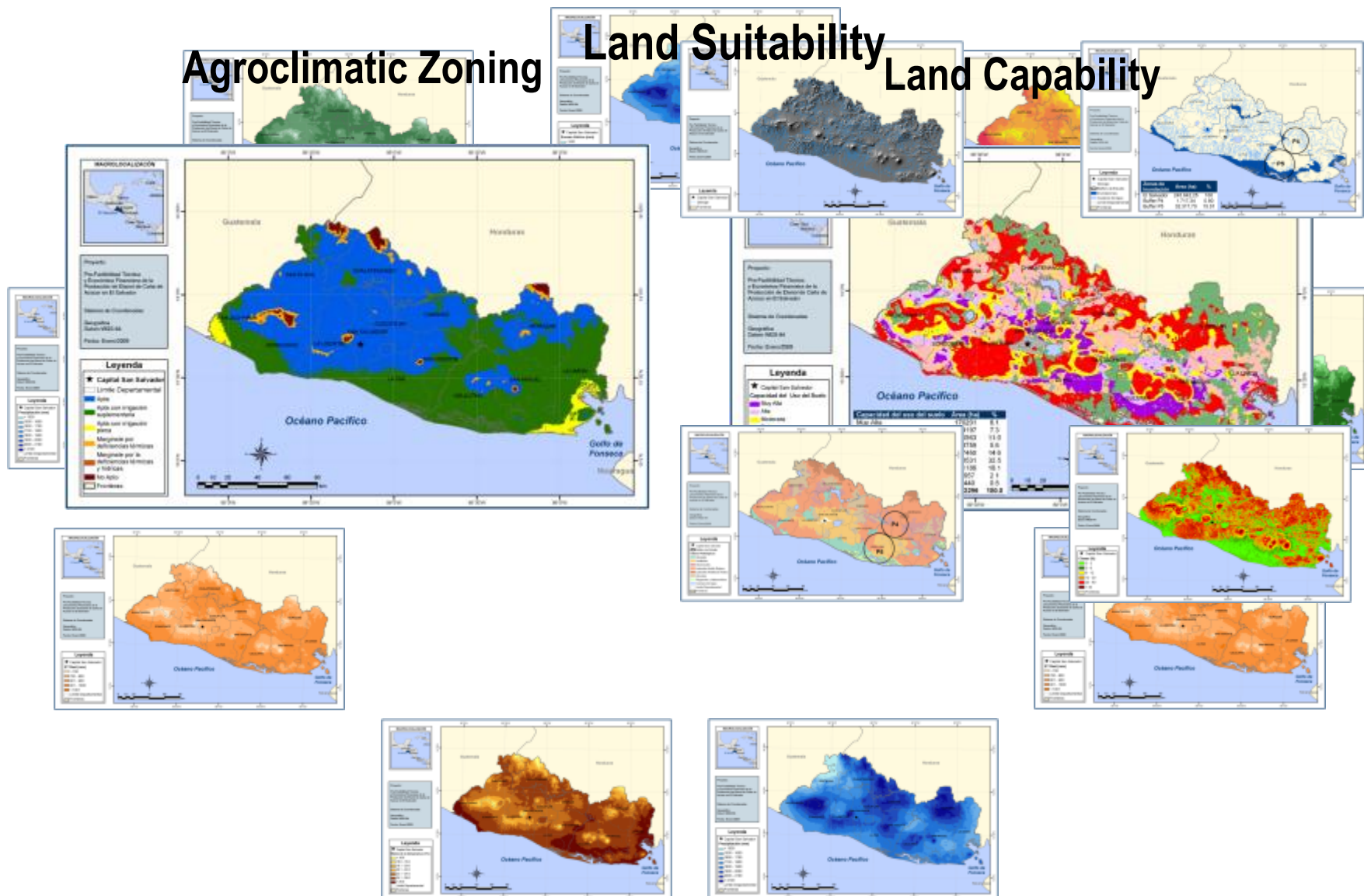
## Phase II – Data Book



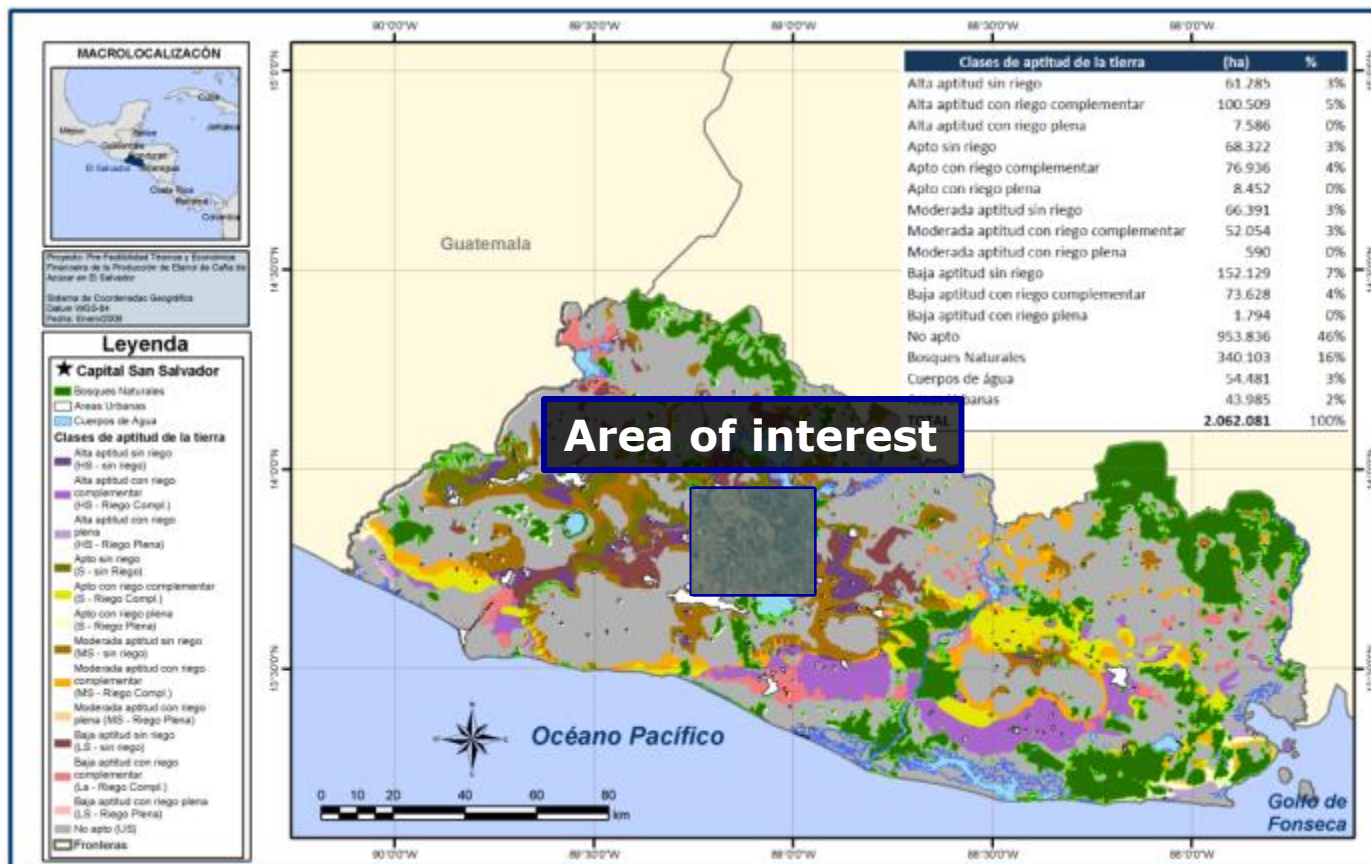


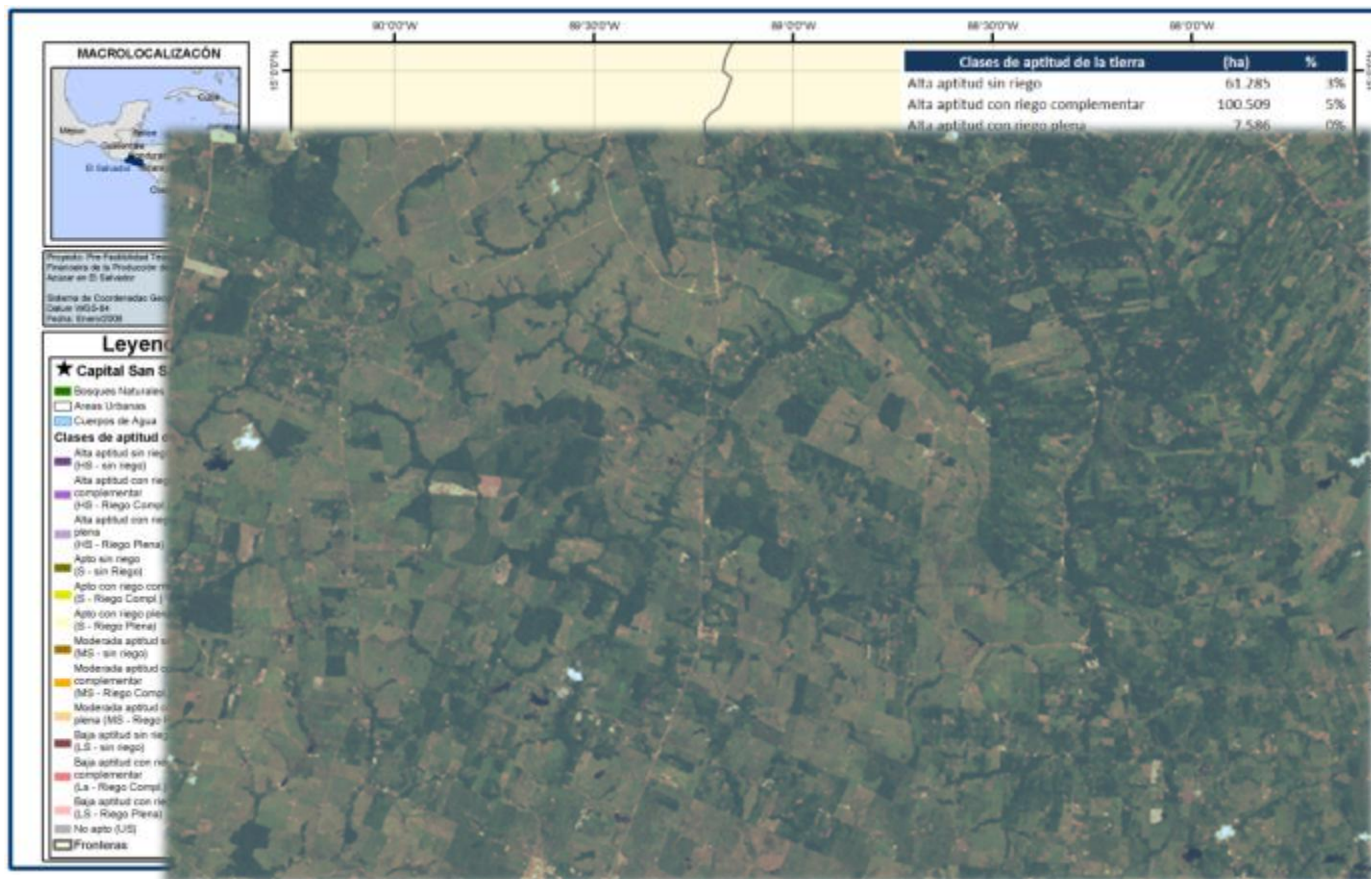


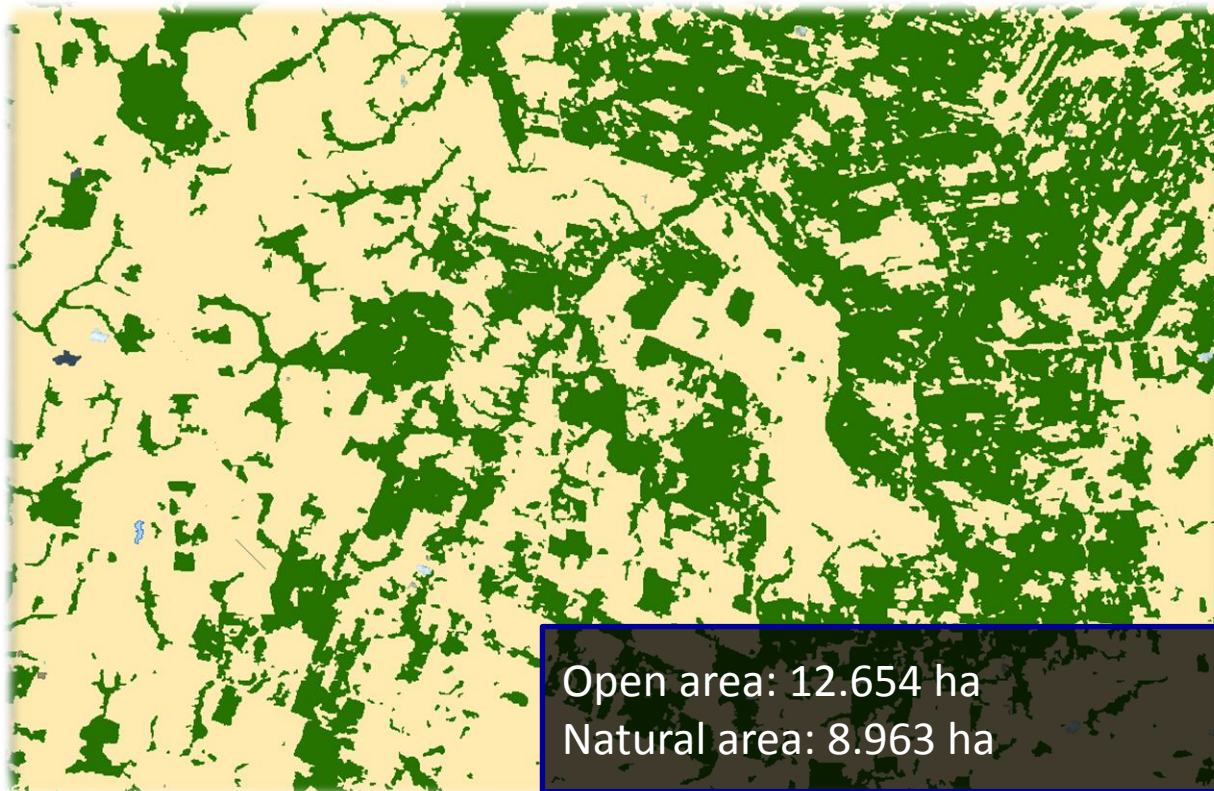
# Agroclimatic Zoning Land Suitability Land Capability



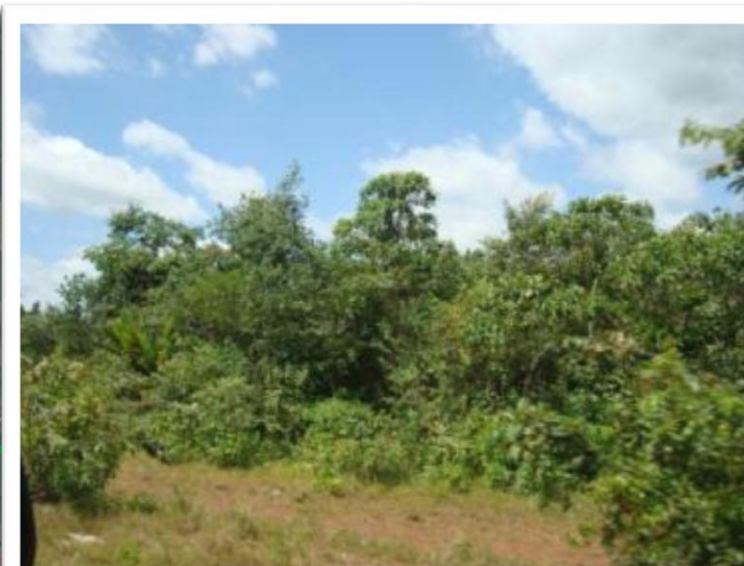








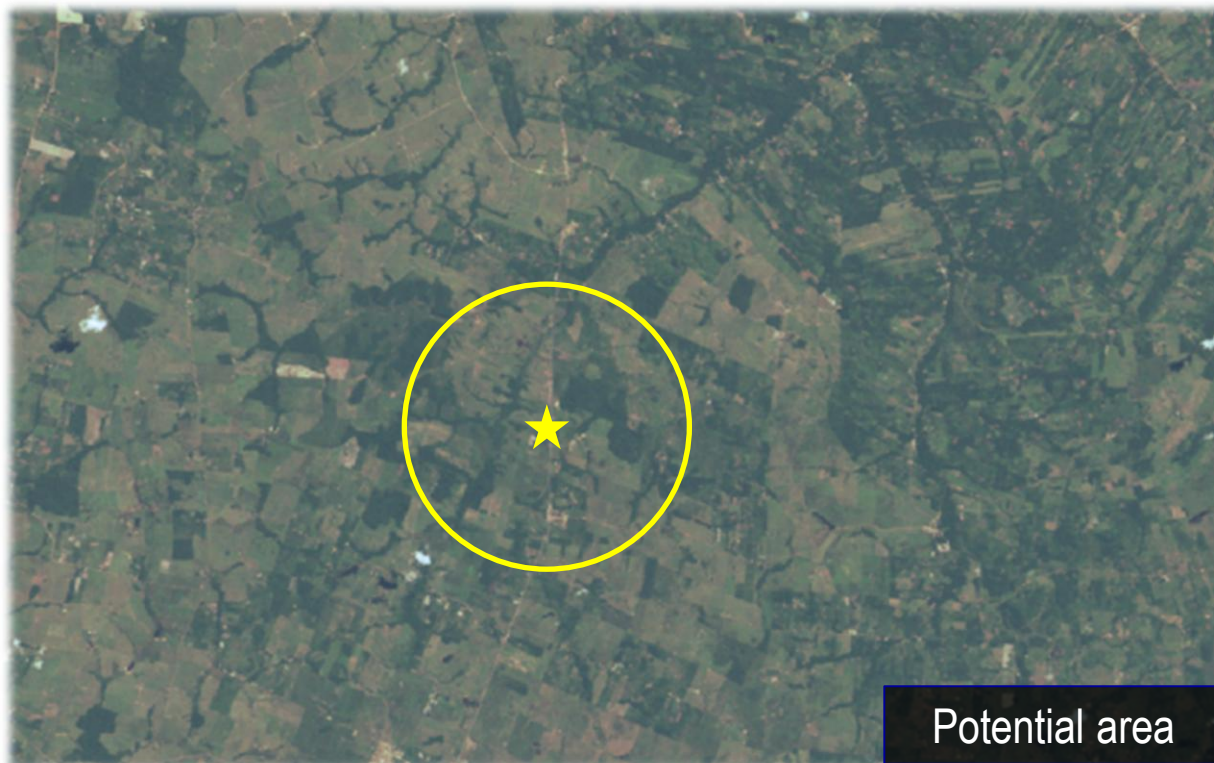




Field validation:

- Actual infrastructure status
- Biodiversity conservation
- Field evidence





Potential area



## General Progress Report

### Phase I – Feasibility Study

#### Partner Country

- Dominican Republic
- El Salvador
- Saint Kitts and Nevis
- Haiti
- Honduras
- Guatemala
- Jamaica
- Senegal

#### Status

Completed.

Completed.

Completed.

Completed.

On Standby.

Completed.

Waiting for Financing.

Completed.





## General Progress Report

### Phase II – Feasibility Study

- Dominican Republic
- El Salvador
- Haiti





## Data Book: El Salvador

### El Salvador

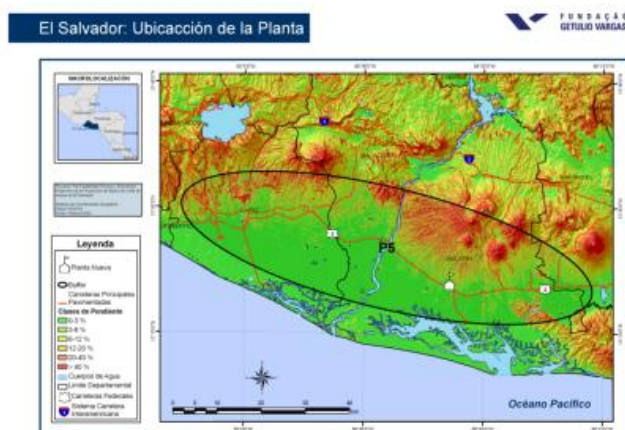


### Ethanol Distillery: Usulután Region

- Feasibility study for El Salvador's potential to produce ethanol. Sponsored by MINEC (Ministry of Economy).
- Presentation of the M.O.U. phase II to MINEC.

### Project

- ✓ Milling: 1.5 million tons per year.
- ✓ Total ethanol production: 135 million liters per year.
- ✓ Electricity co-generation.
- ✓ Agricultural cooperative.
- ✓ Volume of Ethanol: 20% of the country's gasoline consumption.





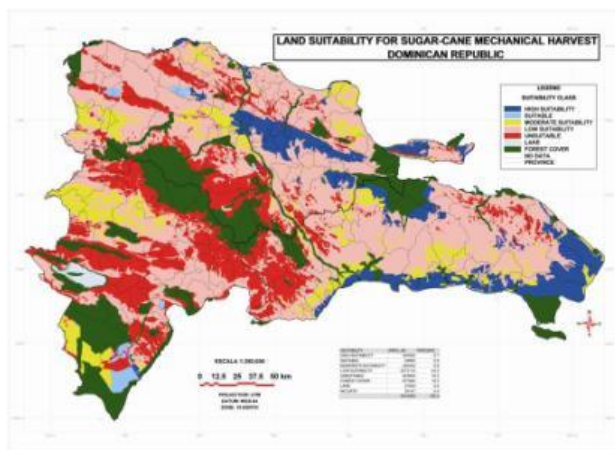
## Data Book: Dominican Republic

### Dominican Republic



### Ethanol Distillery: Monte Plata Region

- Presentation of Phase II T.O.R. of the M.O.U. to the CNE (National Energy Committee).
- Presentation of Phase I and Phase II T.O.R. of the M.O.U. in the International Seminar on biofuels.
- Bioenergy Conference: discuss the future paths of the energy matrix of the Dominican Republic.



### Project

- ✓ Milling: 2.0 million tons per year.
- ✓ Total ethanol production: 170 million liters per year.
- ✓ Electricity co-generation.
- ✓ Agricultural cooperative.
- ✓ Volume of Ethanol: 12% of the country's gasoline consumption.



## Data Book: Dominican Republic

### Haiti

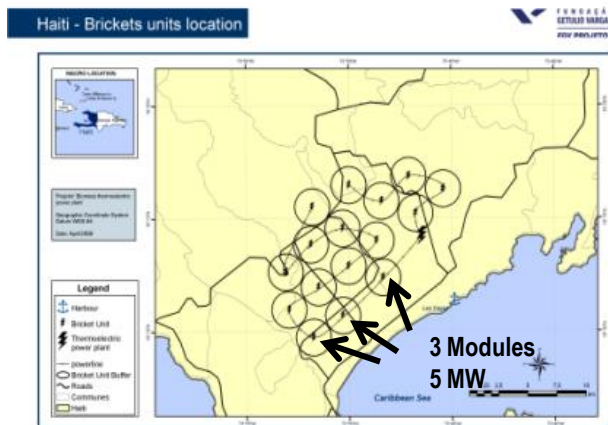


### Thermoelectric Power Plant – Les Cayes Region

- Presentation of phase I to Haiti government on June, 2009.
- Meeting with Fonkose financial services to present the second phase of the M.O.U. Fonkose will be able to finance the agricultural cooperative.

### Project

- ✓ Biomass Production: 28.,000 tons per year.
- ✓ Total electricity production : 5MWh.
- ✓ Agricultural cooperative.
- ✓ Incremental Capacity: 8.25 to 13.25 MWh offer in Les Cayes region.





# MINISTRY OF MINES AND ENERGY



## THANK YOU

**MARLON ARRAES J. LEAL**  
Renewable Fuels Department

[marlon.arraes@mme.gov.br](mailto:marlon.arraes@mme.gov.br)