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MINISTRY OF ECOLOGY SUSTAINABLE DEVELOPMENT AND ENERGY
MINISTRY OF HIGHER EDUCATION AND RESEARCH

Green economy and agriculture tools to fight against climate change

RIO+20
United Nations Conference on Sustainable Development

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10:50 a.m. **Welcome**

11:00 a.m. **Opening**
François Loos (CEO - ADEME)
Bernard Dreyfus (Deputy General Director for Science - IRD)
José Graziano da Silva (General Director - FAO)

Moderator: ***Sébastien Treyer*** (Director of Programmes at Institut for Sustainable Development and International Relations– IDDRI SciencesPo)

11:25 a.m. **Challenges of Agriculture and climate change**
Martial Bernoux (IRD)

11:35 a.m. **Carbon assessment of agricultural and forestry projects and policies**
Louis Bockel (FAO) and ***Dipti Tapa*** (World Bank)

11:45 a.m. **Application of EX-ACT tool to a development project**
Helga Restum Hissa (Coordinator of Rio Rural programme, Brazilian Agricultural Research Corporation - Embrapa Solos)

11:55 a.m. **Tools to involve the stakeholders: the French case study**
François Loos (CEO - ADEME)

12:05 p.m. **Review of landscape based greenhouse gas calculators, a report by ADEME-IRD-FAO**
Vincent Colomb (IRD, Project AgER)

12:15 p.m. **Question and answer session**

12:30 p.m. **Snacks and drinks**

Green economy and agriculture tools to fight against climate change

Bernard DREYFUS
Deputy General Director for Sciences

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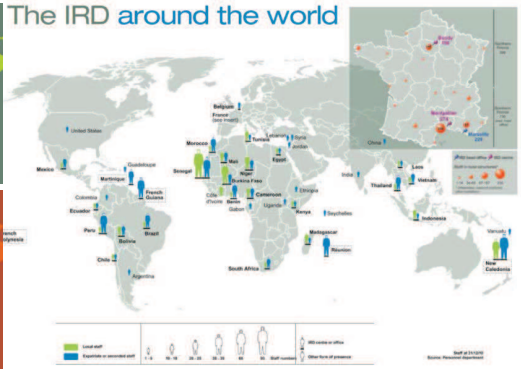
THE IRD IN A NUTSHELL

The **IRD** is a French research institute which, working with **Southern partners**, addresses international **development issues**.



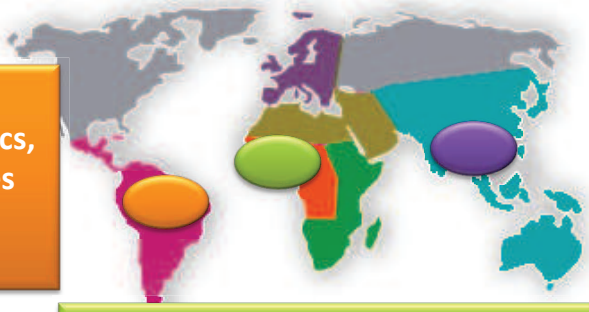
The aims underpinning all its work are to improve **health**, understand how **societies** are changing and protect the **environment and natural resources**, with a view to achieving the global ***Millennium Development Goals***.

Institut de recherche pour le développement

agriculture & climate change

Two major priorities for IRD, studied with a interdisciplinary vision combining all scientific fields of the **environment** (Soils, Plants, Waters, Atmosphere, Ecosystems, Biodiversity…) but in link with **socio-economic** aspect (Development, Rural dynamics, Economy, Health and environment relationships, Migration, Urbanisation)

An illustration through three Regional Programs combining different Research Units



AMAZ
Environmental dynamics, Resources and Societies in the Amazon

SELTAR
Soils, Waters, Coastal Zones and Societies facing Risks in Southern and Southeast Asia

SREC
srec PROGRAMME PILOTE RÉGIONAL
Interactions between Rural Societies, Environment and Climate in West Africa

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agriculture & climate change

Two major priorities for IRD, studied with a interdisciplinary vision combining all scientific fields of the **environment** (Soils, Plants, Waters, Atmosphere, Ecosystems, Biodiversity…) but in link with **socio-economic** aspect (Development, Rural dynamics, Economy, Health and environment relationships, Migration, Urbanisation)

A natural partnership with **FAO** and **ADEME** on these two subjects "Agriculture" and "Climatic Change", combining **research** and **developement**

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Yesterday, IRD Launch of the 1st scientific tripartite cooperation program **Africa-Brazil-France to fight desertification in Africa**

IRD researchers contribute to scientific discussions, by organizing a dozen side-events during the Conference…and just after this Side Event you are invited to "Climate sustainability and development in drylands" (Barra Arena Ambassador - UN2, 13h15-14h15)


Thank you for the attention
www.ird.fr

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Green economy and agriculture tools to fight against climate change

Challenges of agriculture and climate change

Martial Bernoux

ECO & SOLS

Functionnal Ecology & Biogeochemistry of Soils & Agro-ecosystems

A French Multi-institute Research group based in Montpellier

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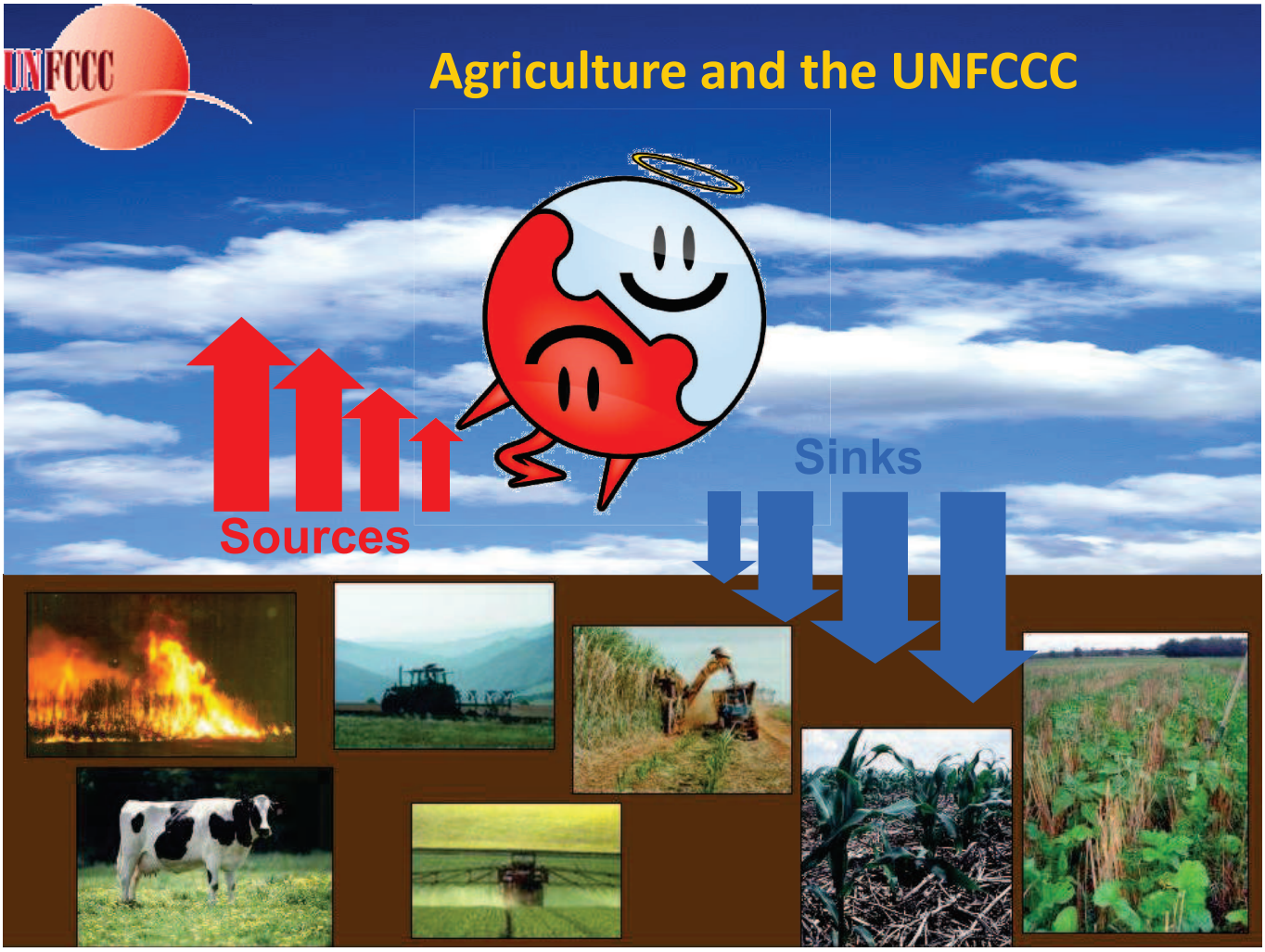
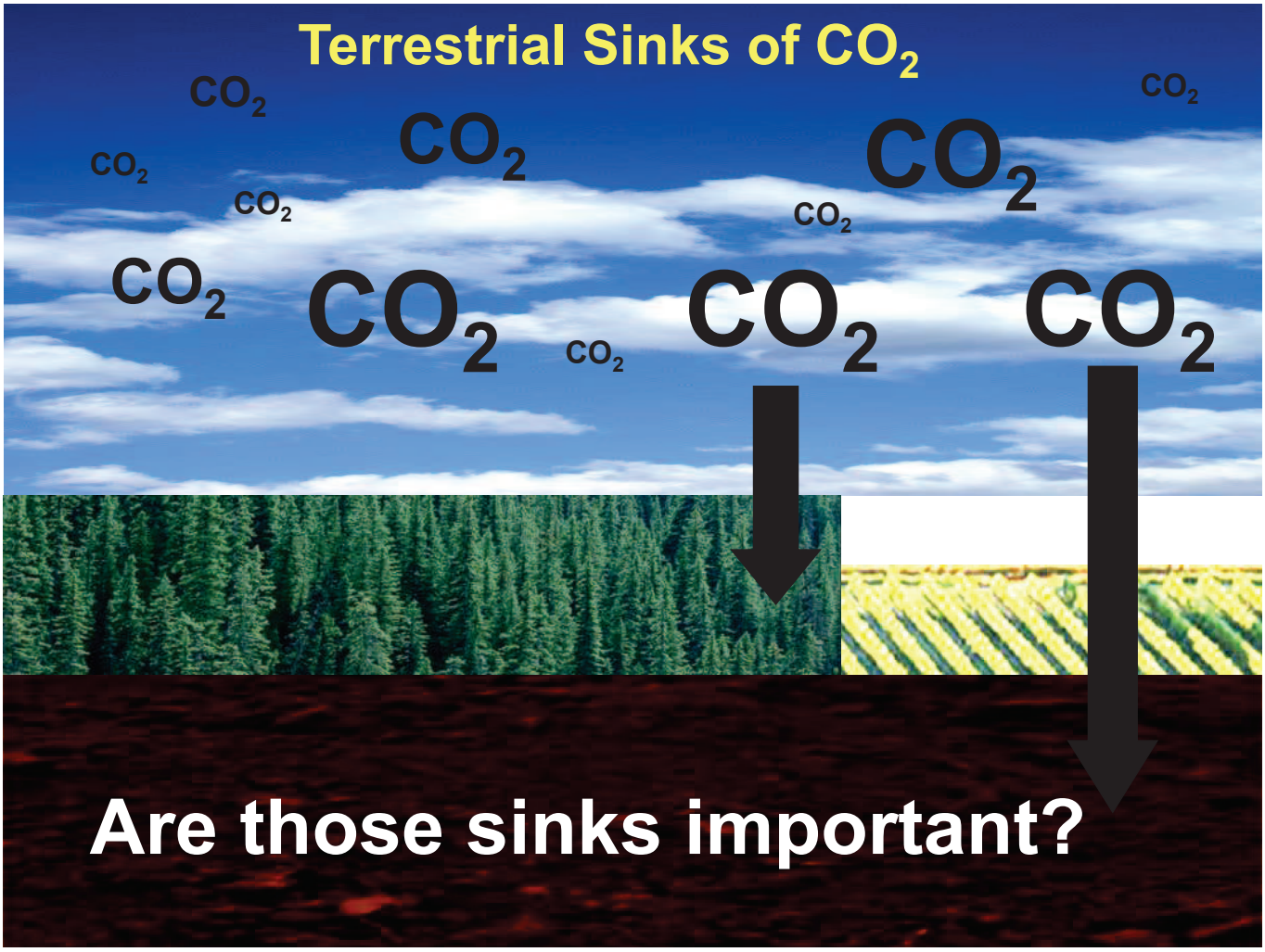

UNFCCC
Agriculture and the UNFCCC
Sources
Sinks


Terrestrial Sinks of CO_2
CO_2
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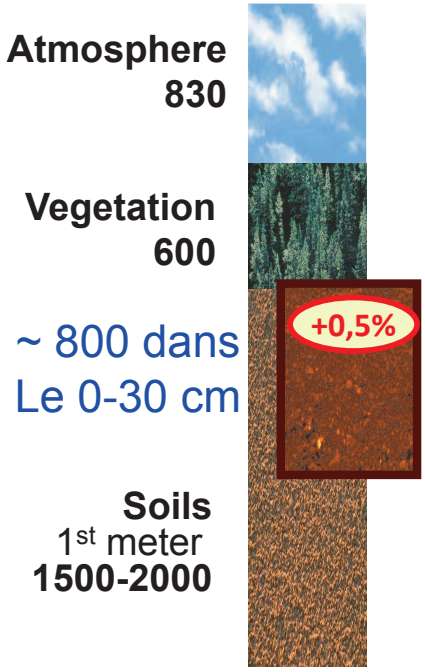
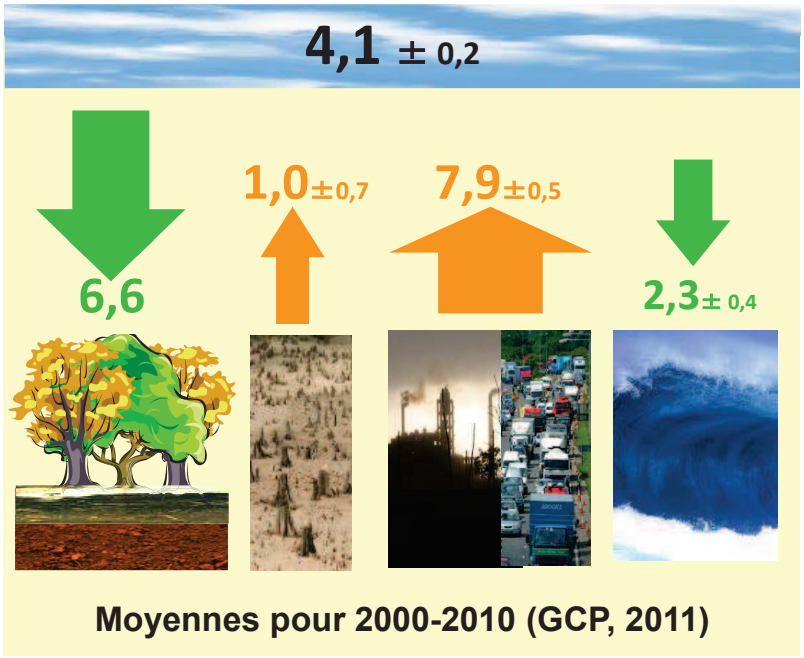
Are those sinks important?

Terrestrial Ecosystems are (still) a sink…

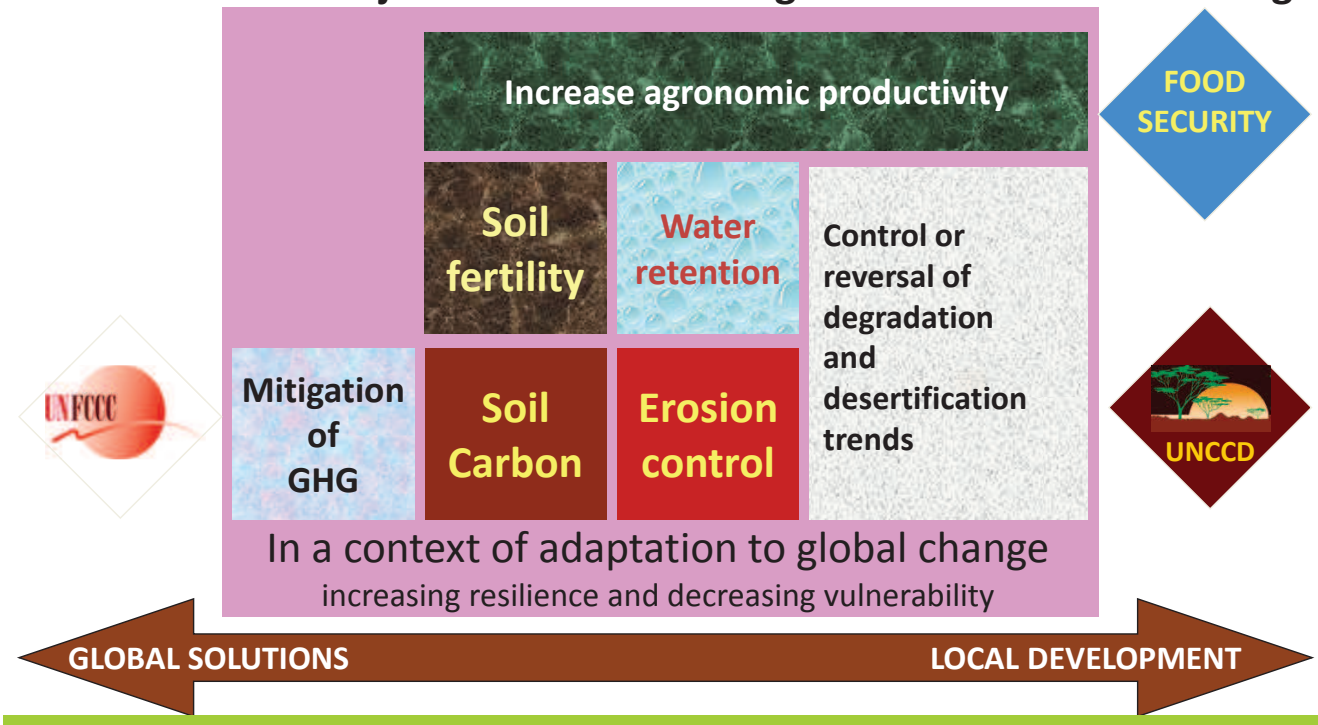




It is thus necessary to implement <u>best management practices</u> in order to promote soil C sequestration

Values Billions tons of C, i.e. Pg C

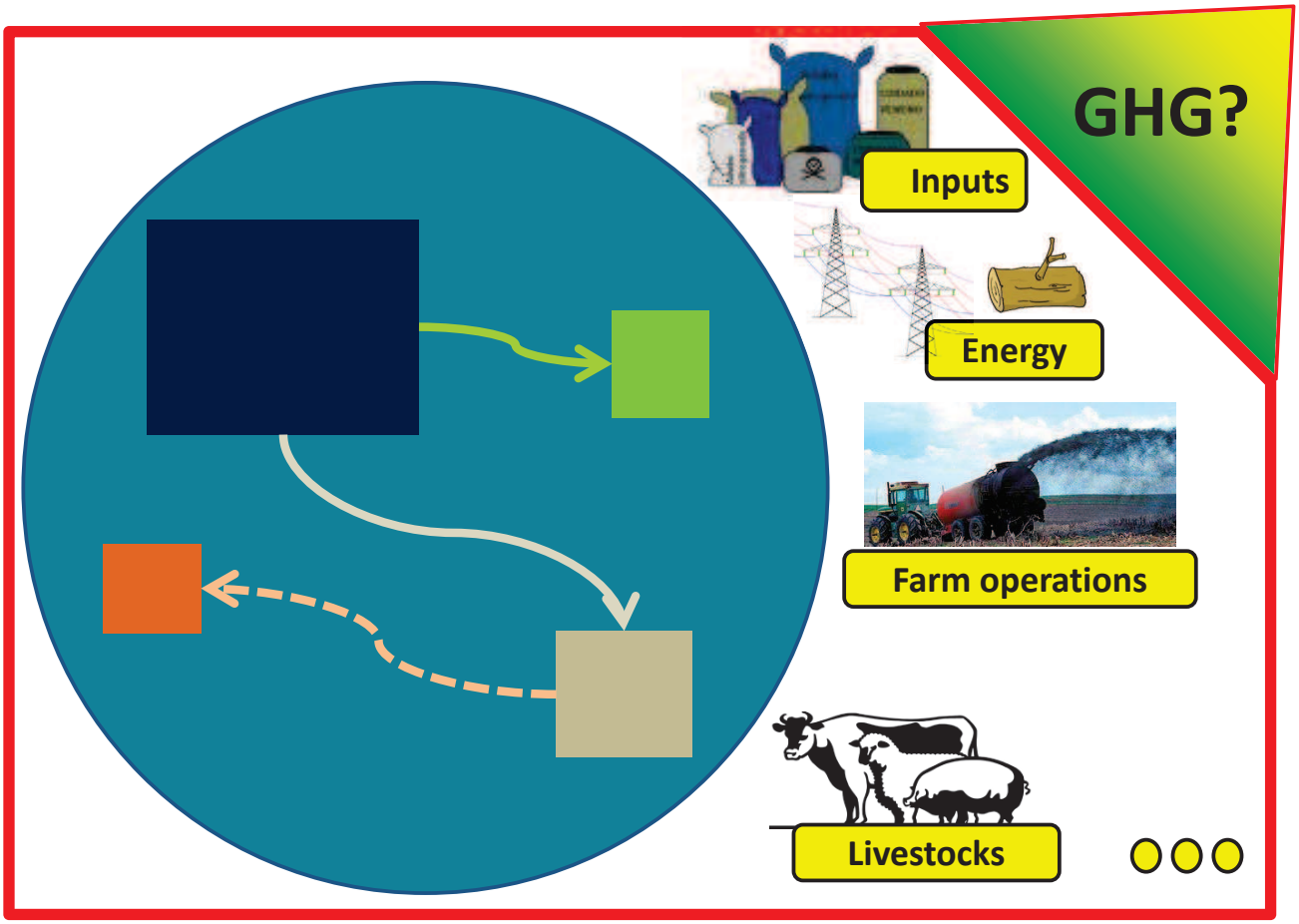
Soil carbon" is not just a matter of "Mitigation" and "Climate Change"



We need Agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHG gases (mitigation), and enhances achievement of national food security and development goals.

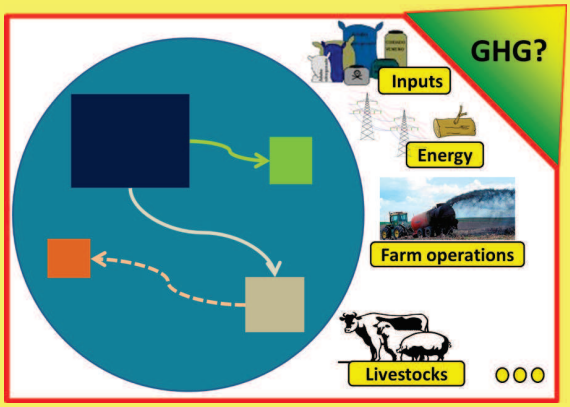
Climate-Smart Agriculture

But how to account for all the consequences?




How to overcome hurdles?
Ex-ante
Ex-post

How to overcome hurdles?



Ex-ante

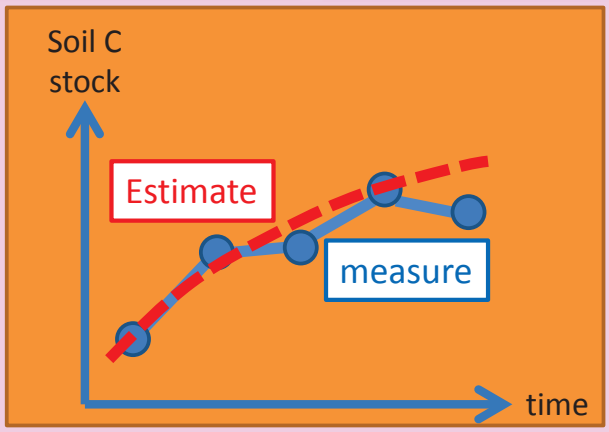
How to overcome hurdles?

Market based on adoption of sequestering practices

Adoption of a practice that stores carbon

Market based on the impact of the practice

Estimated results | **Verified result**



Ex-post

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Green economy and agriculture tools to fight against climate change

Thank you for your attention

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United Nations Conference on Sustainable Development

CARBON ASSESSMENT OF AGRICULTURE AND FORESTRY PROJECTS AND POLICIES

By Alexandre MEYBECK and the EX-ACT team
(Bockel, Bernoux, Colomb, Jonsson, Touchemoulin)

RIO +20 Side Event 21 June 2012

A convergence of questions linked with environment and climate impact

- Which indicators for both environment and GHG impact ?
- How to value positive carbon externalities of projects and policies ?
- How to compare and select best investment options ?
- How to mobilize carbon funds and carbon markets in AFOLU sector ?
- How to promote Carbon labeling of products ?
- How to promote low carbon footprint products ?
- How to build carbon based payment of environment services ?
- How to appraise green agriculture policy options ?

A convergence of questions linked with environment and climate impact

Two key performance indicators

- Carbon balance of projects and policies
- Carbon foot print of value chains

To appraise, compare strategic options within policy and project upgrading towards greener climate smart agriculture

A “triple win” with climate-smart agriculture?

Climate Smart Agriculture Definition : agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals (FAO, 2010)

Climate smart agriculture

CARBON MITIGATION OPTIONS

70 % of agriculture mitigation potential → **In developping countries**

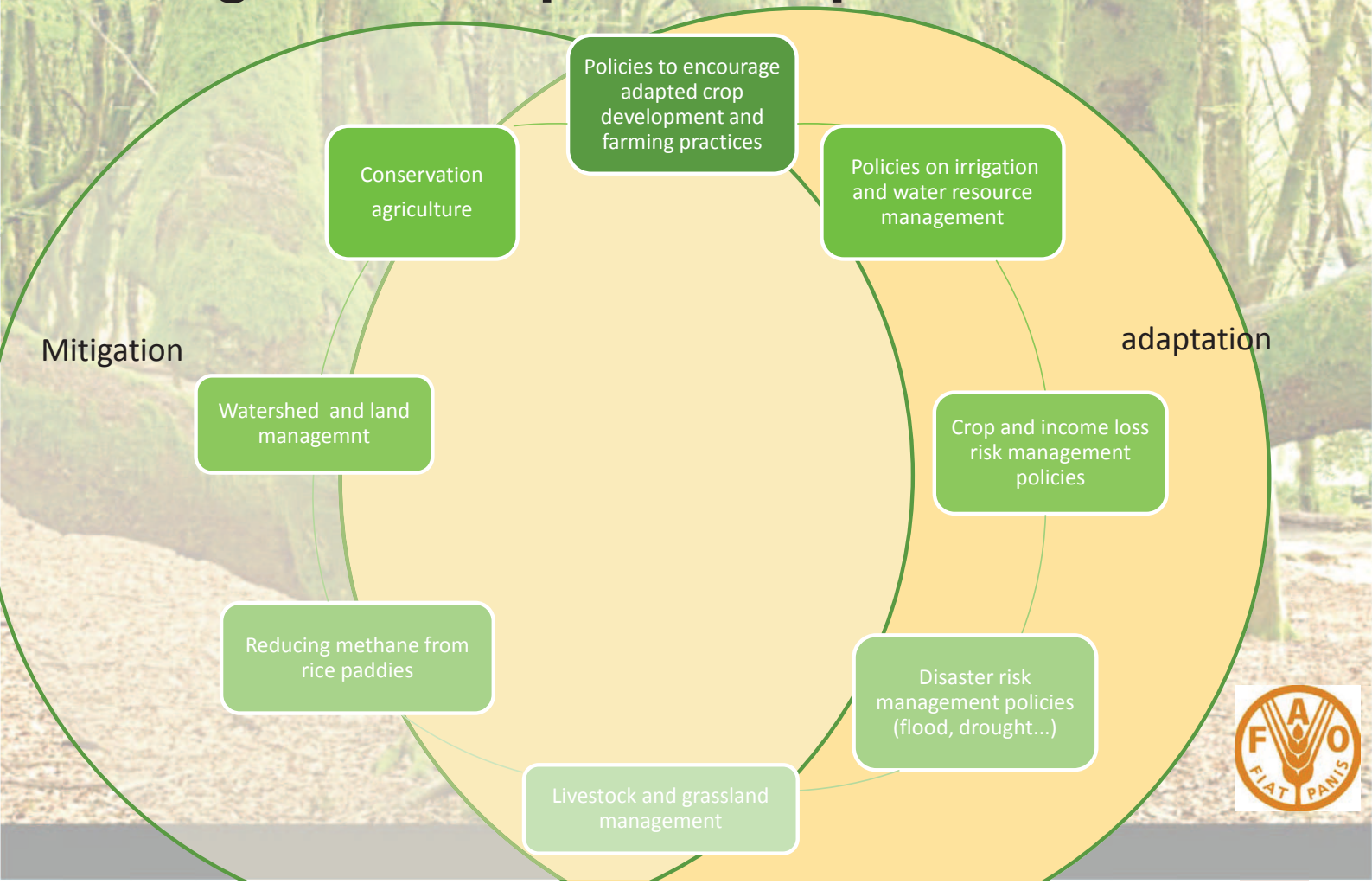
Mitigation possible through changes in agricultural technologies and management practices

↘CO_2	↘CH_4, N_2O	↗Sequestering carbon
↘ rate of deforestation and forest degradation, ↗ adoption of improved cropland management practices *(reduced tillage, integrated nutrient and water management)*	improved animal production and management of livestock waste, more efficient management of irrigation water on rice paddies, improved nutrient management	conservation farming practices, improved forest management practices, afforestation and reforestation, agro-forestry, improved grasslands management, restoration of degraded land

1 ha of avoided deforestation , from tropical rain forest to degraded lands	*1 ha plantation, degraded land to tropical rain plantation*	*1 ha grasslands from severely degraded to improved grasslands*	*1 ha from degraded land to annual crops*
-42,7 t eq-CO_2/ha/year	-18,8 t eq-CO_2/ha/year	-1,7 à -3,8 t eq-CO_2/ha/year	-1,2 t eq-CO_2/ha/year

carbon appraisal 3+17 years

Main agriculture policy options with mitigation -adaptation impact



What Policies to optimize positive carbon externalities

To optimize positive externalities	•Mandatory reforestation •Strengthen smallholder land and water rights •forestry and watershed protection	•Subsidize low tillage equipt •Eco labelling towards better prices • Low Carbon funding facility •Greening the supply chains •Carbon footprint of products
To reduce negative externalities	•Increased water fees and user charges •Switch from energy subsidy to carbon tax •Reduce fertilizer subsidy •Fire control •High deforestation fee	•Subsidize low-energy options •Promote PES for agriculture carbon-fixing •Input Norms and standards •Reduce loss and waste in food systems
Other support	•strengthening governance of land tenure and land zoning	•CSA technology diffusion •RD innovation
	Mandatory measures , laws and taxes	**Incentive and supportive**

EX-Ante Carbon-balance Tool
(EX-ACT)

One tool, several potentials

Helping policy decision-making

Putting forward externalities

Helping to get additional funding

Anticipating GHG and carbon impacts of agriculture and forestry activities in a development context

Strengthening value chains

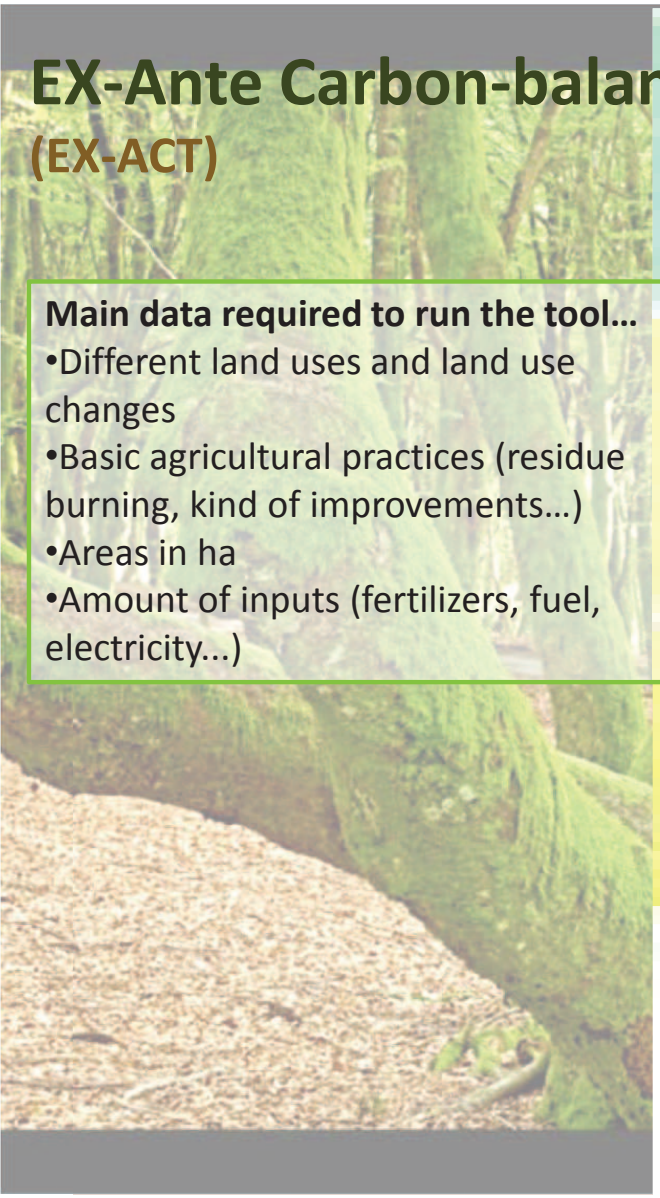
EX-ACT main objective…

Estimating the possible mitigation benefits of an investment project/ programme

EX-ACT in few words…

- Set of linked Microsoft Excel sheets (19)
- Based on land use and management practices
- Using IPCC default values (Tier 1) and/or *ad hoc* coefficients (Tier2)
- Comparing a situation without project and a situation with project
- Upgradable over time
- Possible up-scaling (watershed, national, regional levels)

EX-Ante Carbon-balance Tool
(EX-ACT)



Main data required to run the tool…

- Different land uses and land use changes
- Basic agricultural practices (residue burning, kind of improvements…)
- Areas in ha
- Amount of inputs (fertilizers, fuel, electricity...)

Activities accounted within EX-ACT…

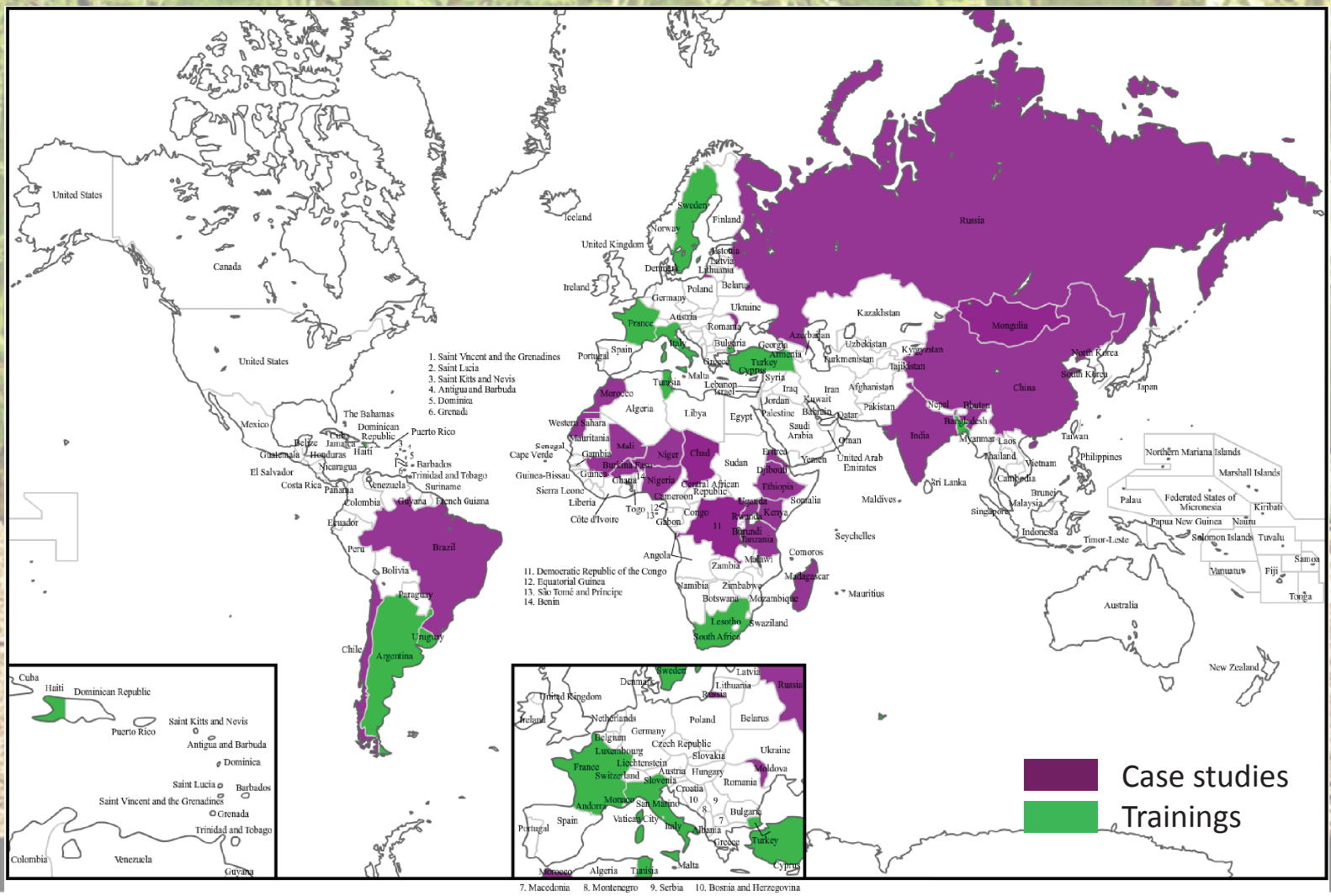
- Deforestation
- Forest degradation
- Afforestation/Reforestation
- Land use change
- Annual crops
- Perennial/tree crops
- Irrigated rice
- Use of organic soils
- Grasslands
- Livestock
- Inputs
- Other investments

THANK YOU

www.fao.org/tc/exact

RIO+20 21 June 2012

Worldwide use of EX-ACT tool



GOVERNMENT OF THE STATE OF RIO DE JANEIRO

SECRETARIAT OF AGRICULTURE AND LIVESTOCK

SUSTAINABLE DEVELOPMENT SUPERINTENDENCE

APPLICATION OF EX-ACT TOOL TO A DEVELOPMENT PROJECT
RIO RURAL case study

Nelson Teixeira – RJ Superintendent of Sustainable Development

Helga Hissa – Technical Coordinator

Marcelo Costa – Knowledge Management Coordinator

RIO+20 SiDE EVENT ON
GREEN ECONOMY AND AGRICULTURE: TOOLS TO FIGHT AGAINST CLIMATE CHANGE
Rio de janeiro, 21/June/2012

RIO RURAL

GOVERNO DO Rio de Janeiro

SECRETARIA DE AGRICULTURA E PECUÁRIA

SUPERINTENDÊNCIA DE DESENVOLVIMENTO SUSTENTÁVEL

RIO DE JANEIRO STATE – BRIEF OVERVIEW

Total Population: 15,989,929

Urban Population: 96,7%

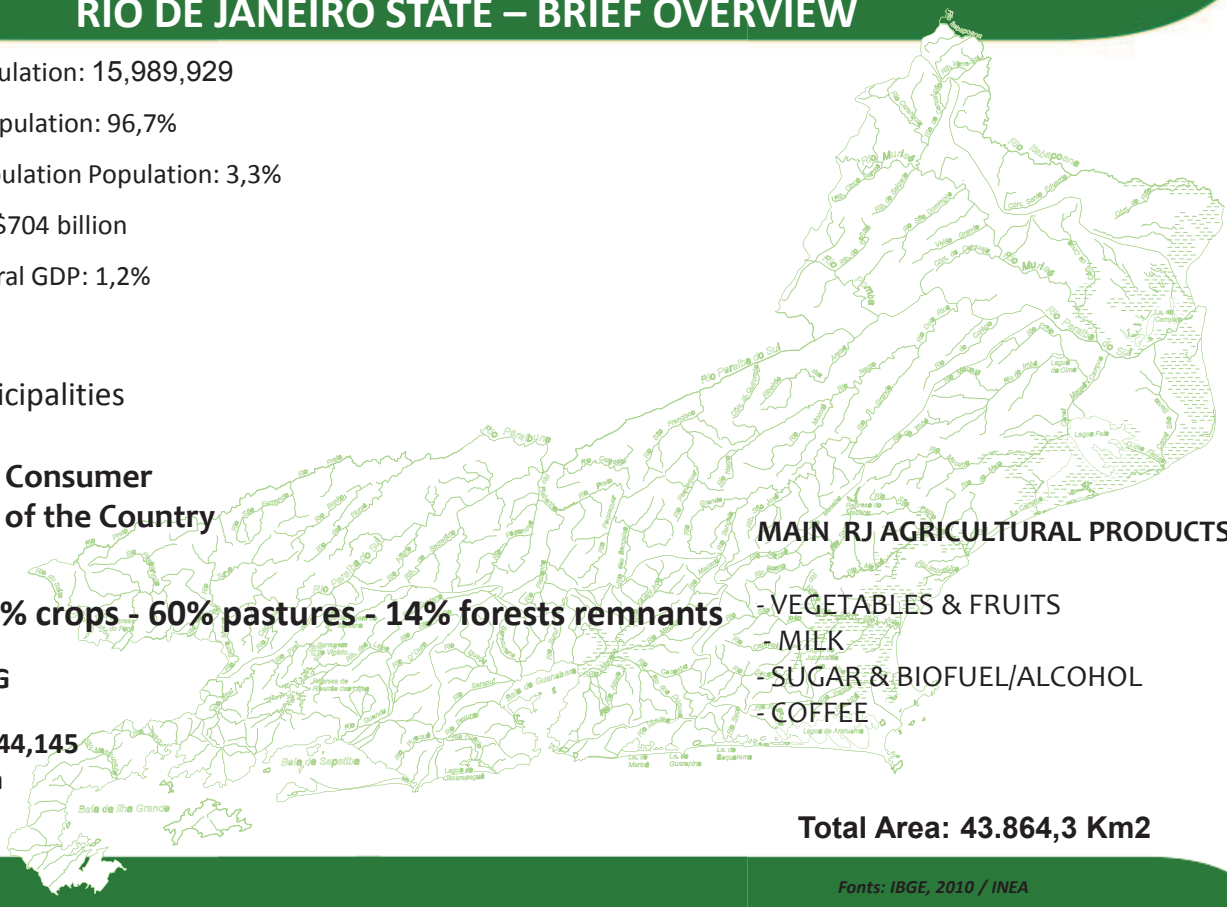
Rural Population Population: 3,3%

GDP: US$704 billion

Agricultural GDP: 1,2%

92 municipalities

Second Consumer Market of the Country



LAND USE: 23% crops - 60% pastures - 14% forests remnants

FAMILY FARMING

Establishments: 44,145
Area: 470,221 ha

MAIN RJ AGRICULTURAL PRODUCTS:

- VEGETABLES & FRUITS
- MILK
- SUGAR & BIOFUEL/ALCOHOL
- COFFEE

Total Area: 43.864,3 Km2

Fonts: IBGE, 2010 / INEA

exchange R$/US$ = 1 p/ 1,99

http://www.ibge.gov.br/home/estatistica/economia/agropecuaria/censoagro/2006/tabela2_3_19.pdf

RIO RURAL PROJECT: PROMOTE SUSTAINABLE RURAL DEVELOPMENT

Objective: to increase small-scale farming productivity and competitiveness through the adoption of integrated and sustainable farming system approaches. The project also promotes social inclusion, community empowerment, conservation of natural resources and access to markets.

MICRO-WATERSHEDS' APPROACH

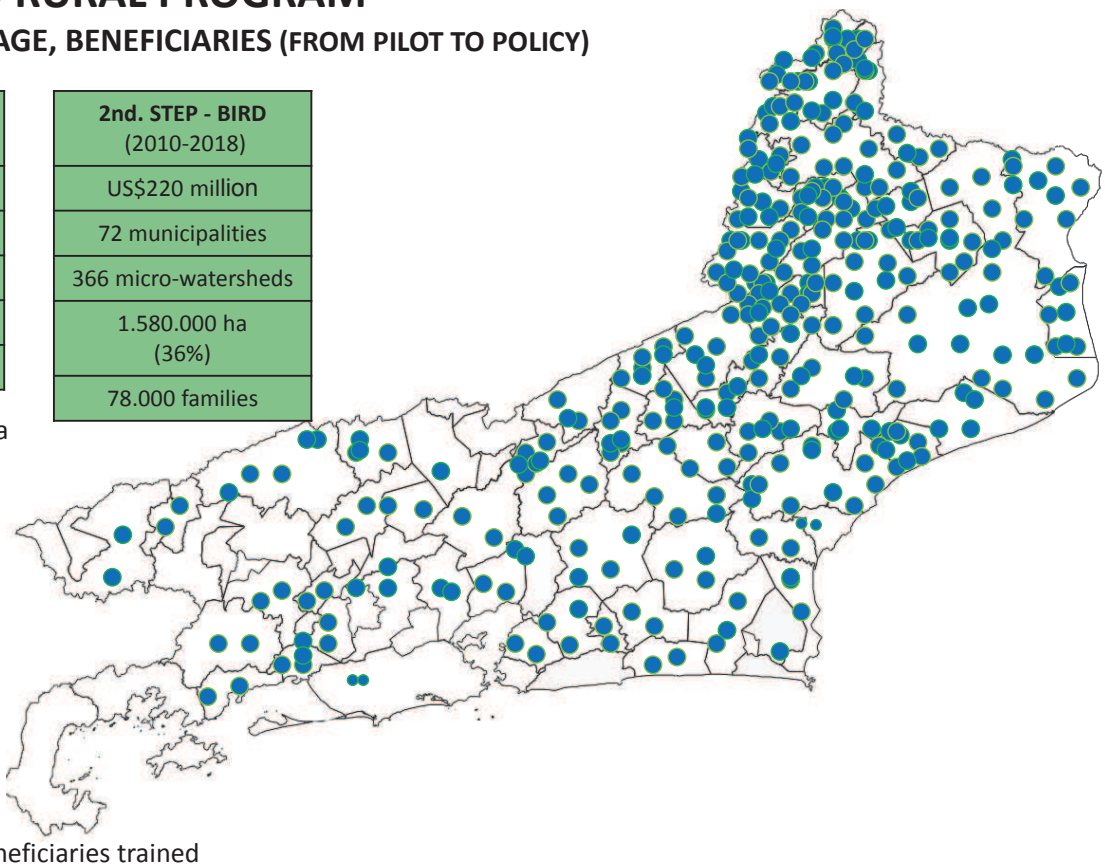
- PARTICIPATORY DIAGNOSIS & PLANNING
- GOVERNANCE IMPROVEMENT
- PAYMENT OF ENVIRONMENT AL SERVICES
- CONSERVATON OF NATURAL RESOURCES
- CLIMATE CHANGE MITIGATION
- INTEGRATION OF PUBLIC AND PRIVATED FUNDS
- RAISE PRODUCTIVITY OF FAMILY FARMING
- TERRITORIAL APPROACH
- EASY MONITORING
- FOOD SECURITY AND SOLIDARITY ECONOMY

UPSCALLING RIO RURAL PROGRAM

INVESTMENTS, COVERAGE, BENEFICIARIES (FROM PILOT TO POLICY)

1st STEP - GEF (2006-2011)
US$14 million
24 municipalities
48 micro-watersheds
386.000 ha (8,8%)
4.000 families

2nd. STEP - BIRD (2010-2018)
US$220 million
72 municipalities
366 micro-watersheds
1.580.000 ha (36%)
78.000 families



366 microcatchments – 1,500,000 ha

78,000 farmers benefited by the project

41,000 farmers implementing investment proposals and transitioned towards more productive and sustainable farming systems

2,360 ha of riparian forests and springs protected or restored

10,750 farmers included in (or with improved links to) valued chains

400 extension agents and 50,000 beneficiaries trained

5.000 stakeholders participating in development committees across local (micro-watershed), municipal, and regional levels

366 environmental education initiatives implemented

366 microcatchments monitored (4 w/ detailed monitoring including carbon)

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EX-ACT APLICATION TO RIO RURAL PROJECT

1. **Driving forces**
   - Validation of Project´s approaches on CC mitigation
   - FAO TA and support
   - Add value to agricultural products
   - Access to C markets

2. Project data collection and organization

•Organization of relevant data (soil, climate, land cover, land use)

•Screening of Project´s activities relevant to EXACT analysis;

3. Building scenarios

Comparison between current land use (forests, croplands, grasslands) and land use changes expected in the “without project” and “with project” scenarios; considerations of input use, sanitation and other project investments

4. Estimation of project´s Carbon balance, sensivity and economic analysis

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PROJECT´S ACTIVITIES RELEVANT TO C BALANCE

- Protection of springs and streams
- Support to the establishment of Legal Reserves
- Expansion of agro-forestry sytems
- Improved annual crop management
- Improved grassland management
- Improved feeding practices of dairy cattle
- Support to small agro-industry and sanitary devices
- Use of lime and sustainable use of agro-chemicals

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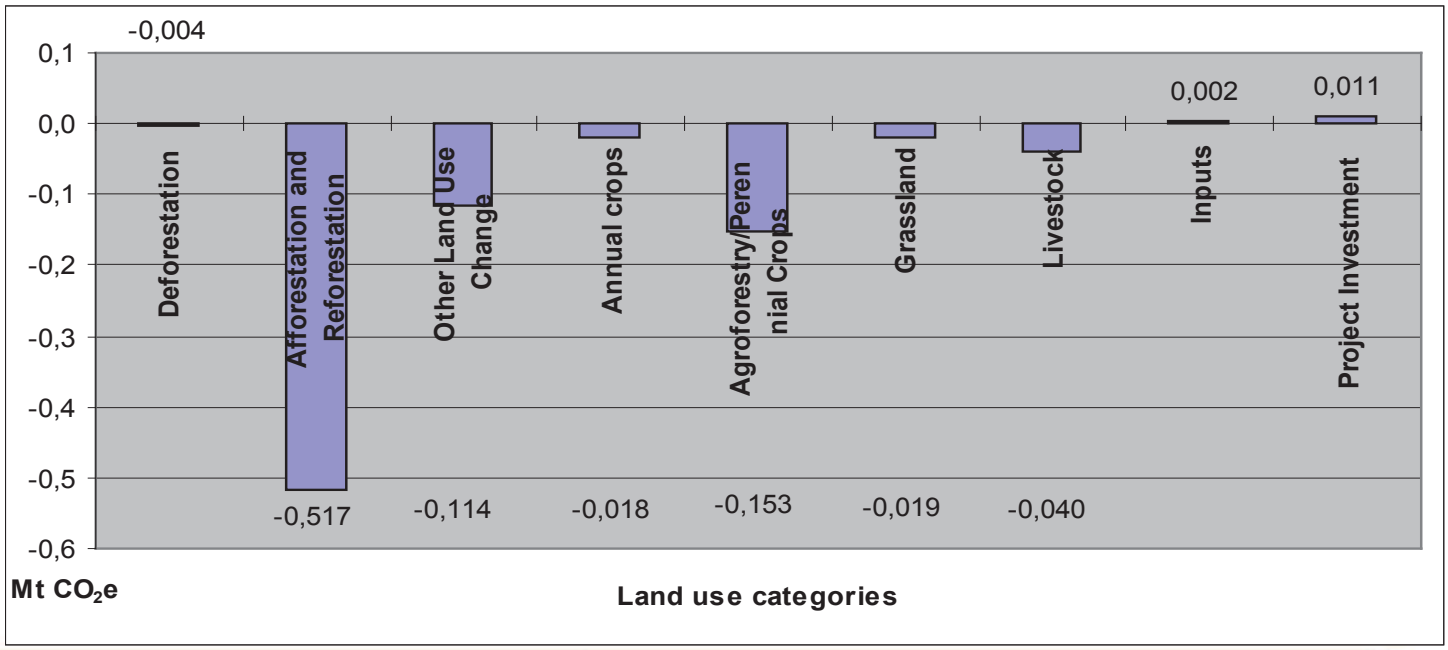
RESULTS

C Balance estimated for different scenarios of land use changes and investments



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RESULTS

C Balance estimated for Project´s activities

Project activities	Mt	% of total GHG mitigated	% of total GHG emitted
Protection of springs and streams and support to the establishment of the Legal Reserves	-0,52	60,6	-
Expansion of agro-forestry systems	-0,27	31,1	-
Improved annual crop management	-0,02	2.1	-
Improved grassland management	-0,02	2.3	-
Improved feeding practices of dairy cattle	-0,04	4,6	-
Total GHG mitigated	**-0,86**	**100**	-
Support to small agro-industry	0,01	-	94,7
Technical assistance for project implementation	0,001	-	5,3
Total GHG emitted	**0,011**	**-**	**100**
Total C-balance	**-0,85**	**-**	**-**

OVERALL BALANCE: It´s a SINK!!!!

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SUPERINTENDÊNCIA DE DESENVOLVIMENTO SUSTENTÁVEL

LESSONS LEARNED

- The tool allows previous decision making on management practices with higher potential of GHG mitigation (eg: springs protection, agroforestry , zero and minimum tillage);

- During evaluation of Carbon balance, the tool warned managers about a potential increasing of Project´s GHG emissions by intensification of rural extension services, which was minimized by the use of ethanol instead of gas;

- Ex-Act demonstrated that sustainable practices could encourage farmers to contribute to carbon sequestration and neutralization;

- Micro-watershed´s methodology allows mitigation of global warm effects, at the same time that it provides income and rural development.

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POTENTIAL TO FUTURE ACTIONS IN PATERNERSHIP

- Raise mitigation potential of GHG by up scalling Project´s activities in order to increase small farmers access to C markets; C Balance estimation for each Project microwatershed;

- Refinement of EX ACT estimations through insertion of local indicators generated by Carbon monitoring and its integration with the microwatershed simulator tool;

- Establishment of goals to the agricultural sector in the State of Rio de Janeiro, contributing to governmental climate change mitigation program;

- Validation of a methodology to evaluate C stocks in pastures that can be replicated in Brazilian biomes, in support to sustainable agricultural programs (Rio Rural, ABC Program, PRONAF Sustentável)


RIO
RURAL
THANK YOU!
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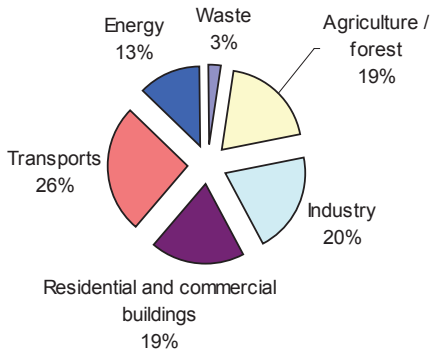
Some tools for stakeholders mobilization : the French case

Virginie SCHWARZ –
Program Executive Director - ADEME

National context and targets

- Agriculture and forest : 20% of national emissions

National emissions (CITEPA, 2006)



- **Climate and energy package (UE)**
  - *3x20 :*
    - Decrease by 20% of GHG emissions, by 20% of energy consumption, and 20% of renewable energy in total consumption
- **« Factor 4 » (France)**
  - *2050 : decrease by factor 4 of national emissions compare to 1990.*

Involve the stakeholders through three complementaries approaches

- Aim:
  - *Integrate energy and GHG issues into agriculture and forestry strategies.*
  - *Participate in knowledge built*
  - *Harmonize methodologies*

Scale	Cadre politique	Démarche / outils
Agri-food sector (chain value)	Environmental labeling	LCA/ Agribalyse
Farm	Energy efficiency program	Dia'terre
Territory	Climate-energy territorial plan	ClimAgri

Chain value scale

- General aim
  - *Get supply chain and demand evolve together*
  - *Promote global and multi-criteria approaches*
- Target
  - *Farming sector and food industry*
  - *Consumers*
- Action/tools
  - *Life cycle assesment*
  - *Agribalyse Program*

Farm scale

- General aim
  - *GHG and energy farm assesments to help farmers to reduce their consumtion and emissions.*
  - *Design action plans to help farmers to get solutions into practice*
  - *Get consistent and harmonised reference values*
- Target
  - *Farmers*
  - *Farm advisers*

Action/tools

- *Diaterre®*

Dia'terre
Diagnostic énergie et climat...
pour un avenir à cultiver

Landscape scale

- General aim
  - *Gathering local stakeholders on GHG and energy issue fo agriculture and forest sector.*
  - *Get GHG territorial assesment*
  - *Link impact results (emissions) with productivity indicators (feeding potential indicator)*
  - *Elaborate scenarios and actions plans on short, middle and long run.*
- Target
  - *Local public authorities*
  - *Farm advisers and farming experts*

- Action/tool
  - *ClimAgri®*

Conclusions et main findings

- Common points in all approaches
  - *Involving final users into the design and development of assessment tools.*
  - *Up-stream method harmonization*
  - *Set up of expert networks around each tool.*
- Main findings
  - *Usefulness of the tools for better understanding farming and forestry complexity for GHG emissions.*
  - *Complementarity between all scales :*
    - Improve efficiency and multiply actions
    - Impact on agricultural stakeholders by several sides (consumers, producers, policy makers etc.)

  - *Tools enable stakeholders to*
    - Build middle and long term scenarios
    - Prioritized solutions
    - Think of climate change as a innovation opportunity.

Review of available GHG calculators, focus on landscape assessment

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And the rest of Ager Team

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Principles of carbon calculators (1)

Activity data x emission factor x GWP= « x» t CO_2eq

CO_2

N_2O

CH_4

Ex : Enteric fermentation emissions

- 100 cows x 109kg CH_4/cow/yr=10,9 t CH_4 x GWP

  ➔229 t CO_2eq

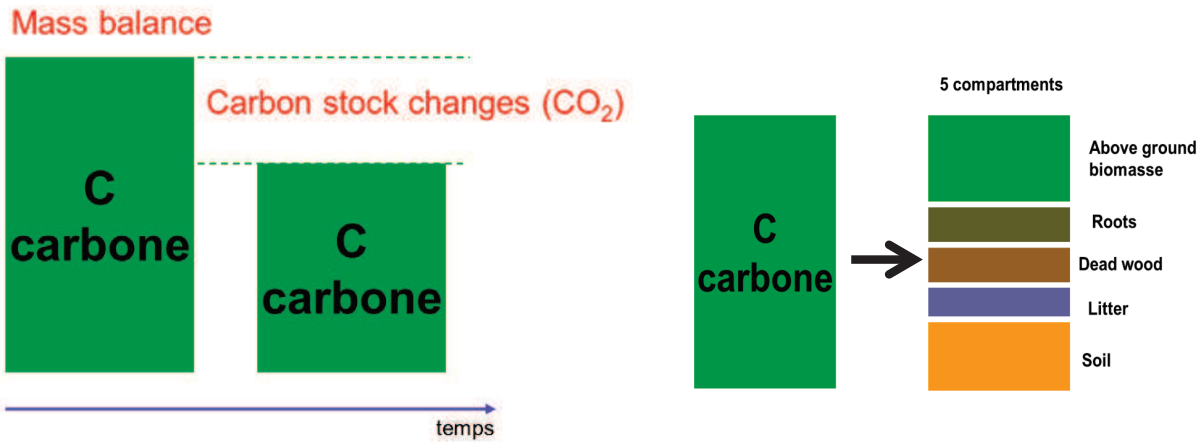
- 10 kg corn, 6 kg grass, 2 kg soybean

100 x (10x $FE_{Ferm.corn}$ + 6x $FE_{Ferm.grass}$ + 2x $FE_{Ferm.soy}$)x 360x 21

➔200 t CO_2eq

Focus on carbon stock (2)

Quantity of C_{t2} - Quantity of C_{t1} = « x» t CO_2eq



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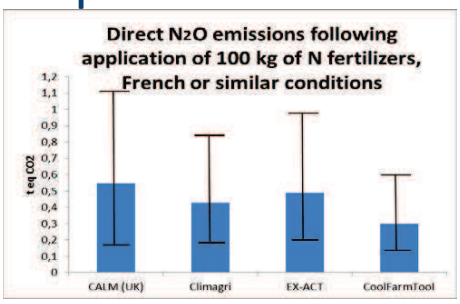
GHG tools are available for « all your needs »

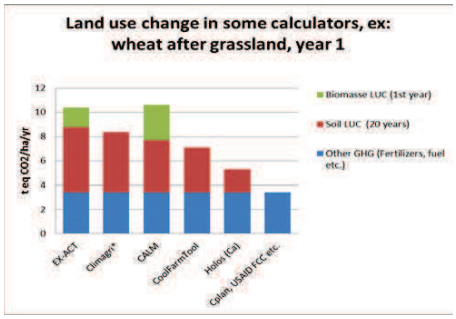
OBJECTIVE OF THE USER		CALCULATORS AND GEOGRAPHICAL ZONE OF APPLICATION
Raising awareness		Carbon Calculator for New Zealand Agriculture and Horticulture (NZ), Cplan v0 (UK); Farming Enterprise GHG Calculator(AUS); US cropland GHG calculator (USA).
Reporting	Landscape tools	ALU (World); Climagri (FR), FullCam (AUS)
	Farm tools	Diaterre(FR); CALM (UK); CFF Carbon Calculator (UK);IFSC (USA)
Project evaluation	Focus on carbon credit schemes	Farmgas (AUS), Carbon Farming tool (NZ);Forest tools : TARAM (world), CO2 fix (world)
	Not focus on carbon credit schemes:	EX-ACT (World);US AID FCC (Developing countries), CBP (World), Holos(CAN), CAR livestock tools(USA)
Market and product oriented tools		Cool farm tool (World); Diaterre (FR), LCA tools and associated database (SimaPro, ecoinvent, LCA food etc: mainly data for developed countries.)

But use them properly, look behind the numbers

- GHG emissions depends on local pedo-climatic conditions➔uncertainties



- Accounting for soil carbon and LUC



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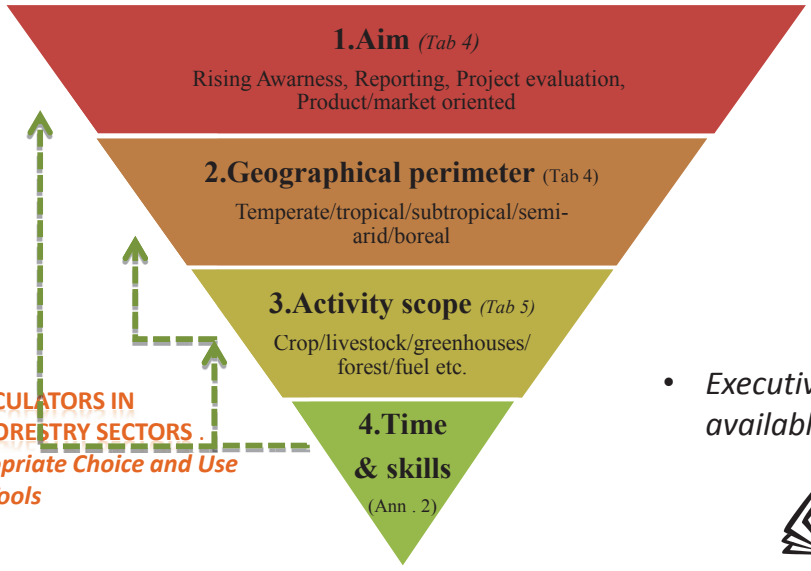
So choose the best calculator for your need and use it wisely !



REVIEW OF GHG CALCULATORS IN AGRICULTURE AND FORESTRY SECTORS .
A Guideline for Appropriate Choice and Use of Landscape Based Tools

- *Executive summary available in the room*

FAO/EX-ACT website:
http://www.fao.org/tc/exact/exact-publications/papers-mentioning-ex-act/en/