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Milk performance, energy efficiency and greenhouse gases of dairy farms : case of Reunion Island

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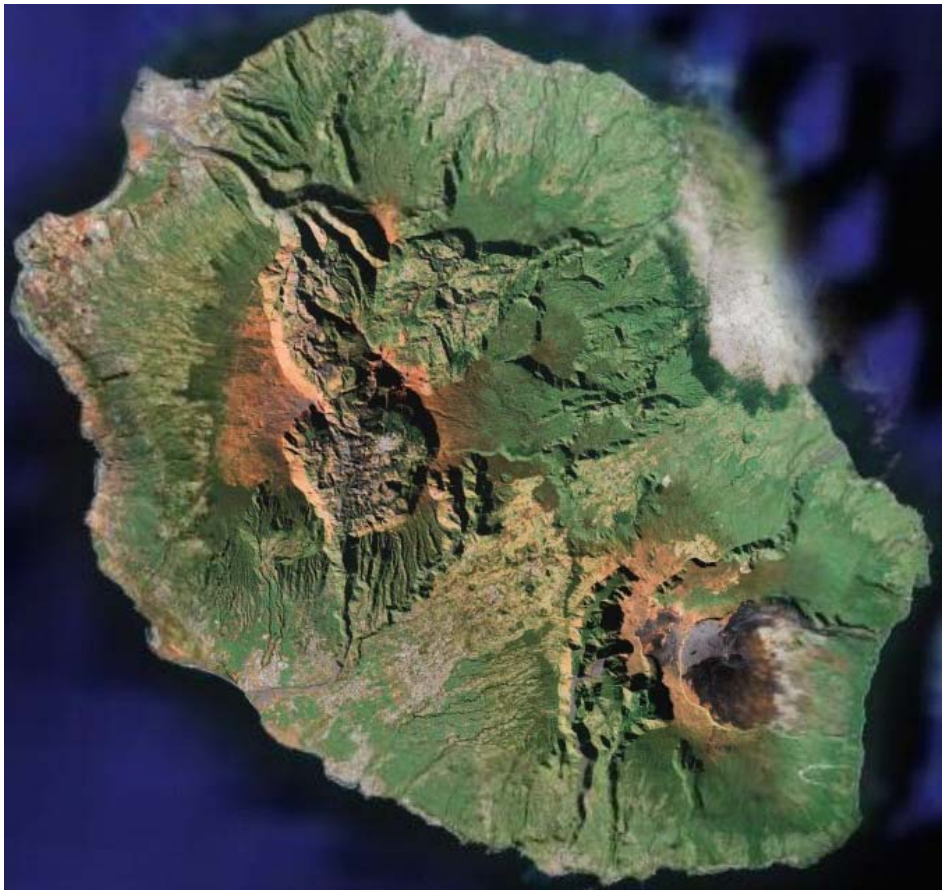
INTRODUCTION : Study area settings

- Situated in Indian Ocean
- 2,500 km²

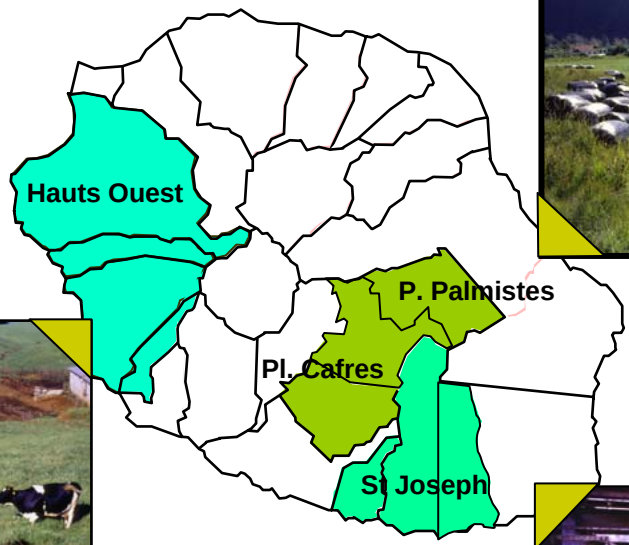


- 800,000 people
- Diversity of climate :
  - *Altitude*
  - *East / West*

INTRODUCTION : Dairy sector context

- Dairy herds located in **upland areas** (> 400 m)
- Feeding systems quite **variable**

Pasture of Kikuyu



grass round baled silage

Sugar can forage

INTRODUCTION : Dairy sector context

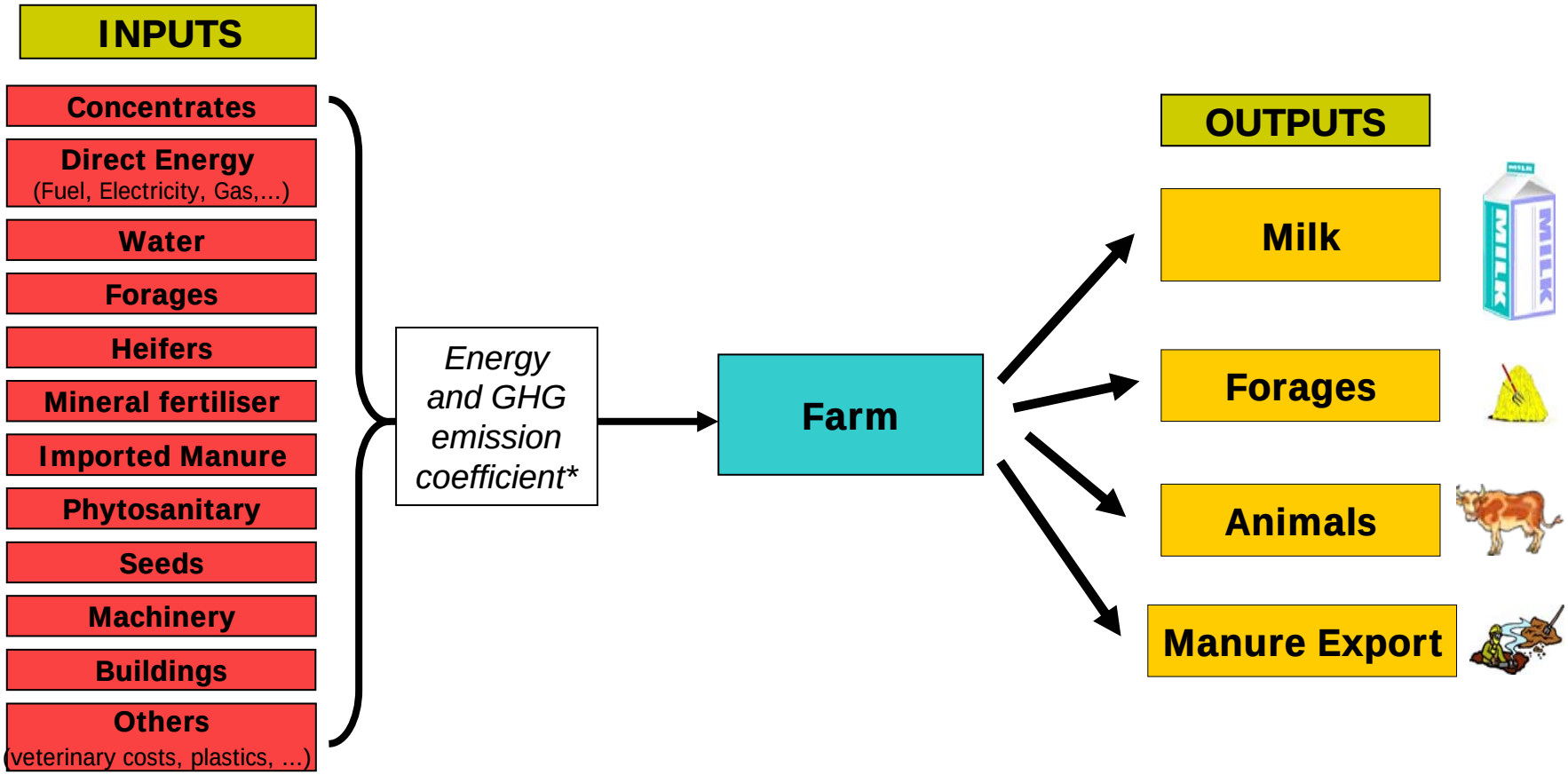
- Dairy herds located in **upland areas** (> 400 m)
- Feeding systems quite **variable**
- 80 % of **Holstein**
- **24 x10^6 liters** of milk *(~ 40 % of total consumption)*
- **Limited land ressource** :
  - ⇒chronic shortage of forage, high proportions of concentrate
    - ⇒ Enhance milk cost
    - ⇒ Environment impact

QUESTIONS

- How to **quantify environmental impact** of dairy production in Reunion Island ?
- How do choosen indicators **evolve** ?
- What are the **factors leading** these evolutions ?

METHODS

- **19** dairy farms
- « **PLANETE** » method in 2000 and 2007



* Energy consumed or GHG emitted to manufacture, transport, package, ...

METHODS

- ***Energy efficiency*** (outputs / inputs)
- ***Energy consumption to produce 100 liters of milk*** in Fuel EQuivalent liter (FEQ)
- ***GHG Emission to produce 1000 liters of milk*** in ton of CO_2 EQuivalent (tCO_2eq)

RESULTS

- Energy consumption

	2000	2007	Variation
Energy efficiency	0.40	0.44	+ 10 %
Energy consumption to produce 100 L of milk (in FEQ)	26.0	21.1	- 19 %
Fuel	6,701 *(13 %)*	7,338 *(10 %)*	+ 10 %
Electricity	2,780 *(6 %)*	4,583 *(6 %)*	+ 65 %
Imported feed	30,152 *(59 %)*	41,423 *(57 %)*	+ 37 %
Chemical fertilizer	5,119 *(10 %)*	4,194 *(6 %)*	- 18 %
Machinery	2,610 *(5 %)*	4,050 *(6 %)*	+ 55 %
Others	3,402 *(7 %)*	10,487 *(15 %)*	+ 208 %
Proportion of transport (%)	20.0	28.1	+ 41 %

RESULTS

- GHG emissions

	2000	2007	2007
GHG emissions to produce 1,000 L of milk (in FEQ)	2.25	1.89	- 16 %
Proportion of each gas :			
CO_2	46.0	51.2	+ 11 %
CH_4	26.9	28.2	+ 4 %
N_2O	27.2	20.6	- 25 %
Proportion of transport (%)	16.2	19.7	+ 22 %

RESULTS

- Improvement of **dairy farms sustainability**

⇒ *Milk production increase from .... to .... l/cow/year*

- Enhancement of **part of transport and imported feeds**

⇒ *+ ... % of concentrates*

- Decrease of **mineral fertilizer**

⇒ *In accordance with local technical support's message (to develop manure as organic fertilisation)*

DISCUSSION & CONCLUSION

- Positive effect of **local support and development policies**
- Interest to **improve quality local ressources** and/or to shift to **closer Indian Ocean regional markets** for inputs
- **Intensification of agricultural production** is not necessarily linked to **negative impact on environment**

THANKS FOR

YOUR ATTENTION