INRA, key figures

A community of 12,000 persons all over France (permanent and temporary staff, PhD students, post-docs, members of associated organisations, …)

Global scientific profile (researchers)

- 68 % Life sciences
- 12 % Environmental, engineering and material sciences
- 8 % Biotechnical sciences
- 8 % Economic and social sciences
- 4 % Computational sciences

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Scientific and thematic priorities

5 - Seek systemic & territorial consistencies for global food security

4 – Valorization of biomass for chemicals and energy: biotechnology, agro-ecosytems, life cycle analyses

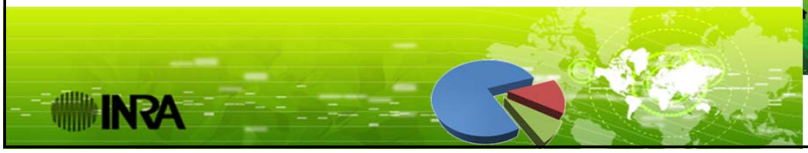
3 – Attenuation of the green house effect and adaptation of agriculture and forest to climate changes

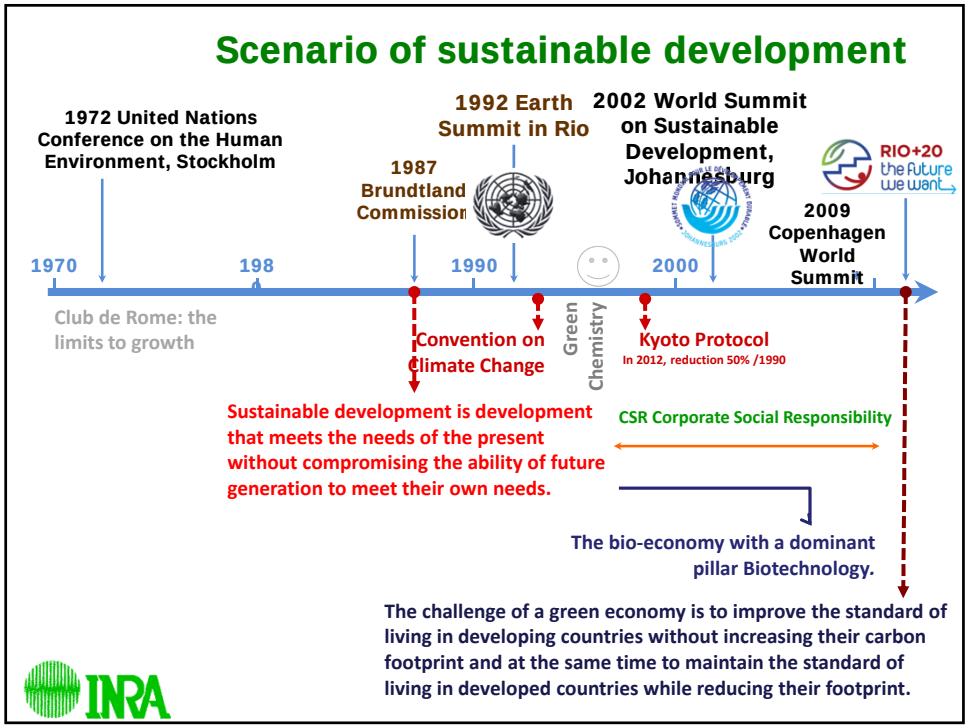
2 – Development of sustainable/Healthy food systems for healthy life (diabetes-obesity, food transitions, …)

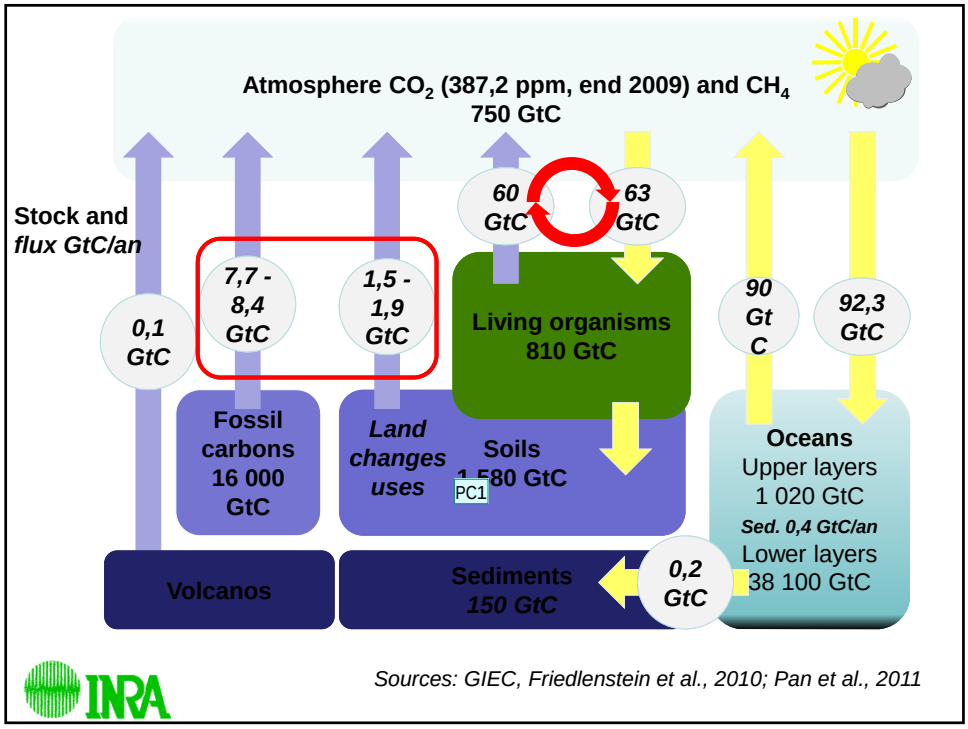
1 – integration of the economic, social & environmental performances of agriculture

Scientific priorities

- **Reinforce prediction capacities in biology : genomics, HTP pheno-genotyping, modeling, complex systems ,…**
- Imagine Agro-ecology : ecology & biodiversity at dif. scale in agro-ecosystems, forest & anthropic eco-systems







Sources: GIEC, Friedlenstein et al., 2010; Pan et al., 2011

Dias nummer 4

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Paul COLONNA; 07-08-2012

Main issues

- **Four major global issues …**
  - To meet the food needs of a world population of about 9 billion by 2050, some regional populations experiencing strong economic development
  - To control, limit and reduce the emissions of greenhouse gases (GHGs) in the atmosphere (*factor four from 1990 to 2050 in EU*)
  - To develop substitutes to fossil carbon (and its derivatives), whose reserves, for a given cost, will be increasingly scarce and environmentally critical
  - To increase the energy and overall resources efficiencies
- **… and related socio-economic, environmental and geopolitical issues**
  - To promote regional energy independence
  - To initiate carbon neutral development
  - To develop agro-industry
  - **To ensure the global sustainability (food production, global environment, land use being at the crossroads)**

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From Biobased–economy to Bio-economy

- ~~**Greenwashing**~~
- **Extended applications of modern biology,**

the myth of Prometheus, Opportunities: GMO, up to synthetic biology,	***Biologizing*** **agriculture (production) and industry (transformation)**

- Laws of diminishing returns !!

- Systems biology
- Systemic approach: understanding the relationships between technologies, modelling and simulation capacities at different scales
⇒**Integrated value chain approach**

- New and performant products to drive market development

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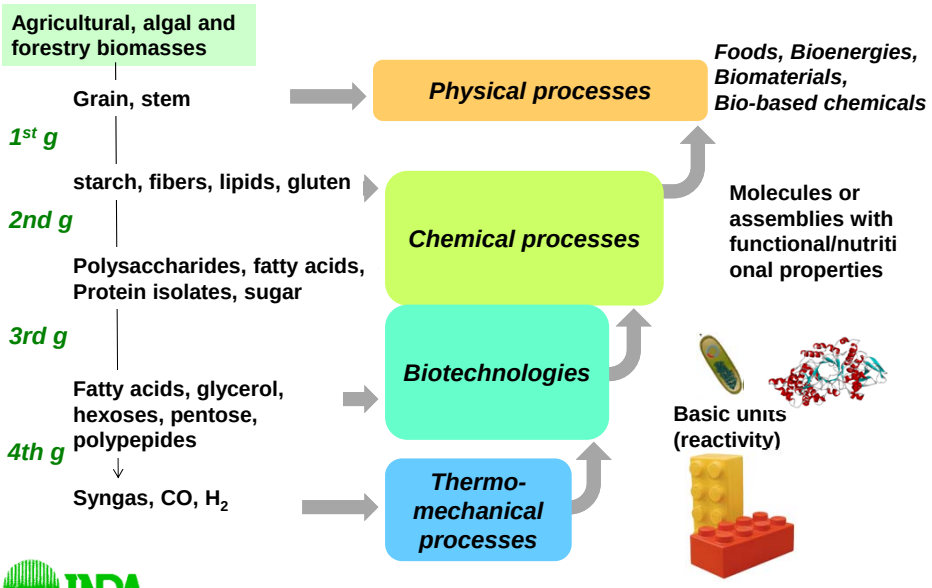
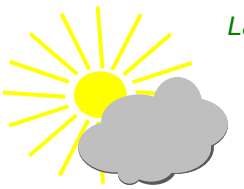
A biorefinery is a facility that integrates biomass conversion processes and equipment to produce foods, fibers, fuels, power and value-added chemicals



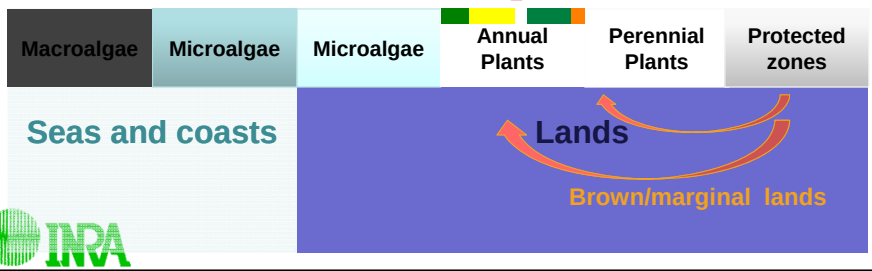
Embedding the different scales of LCA



Land uses changes

Attributional LCA at local scale

Consequential LCA at world scale, Indirect land-use change' (ILUC)



Thank you for your attention