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SUR L'ENVIRONNEMENT
ET LE DÉVELOPPEMENT

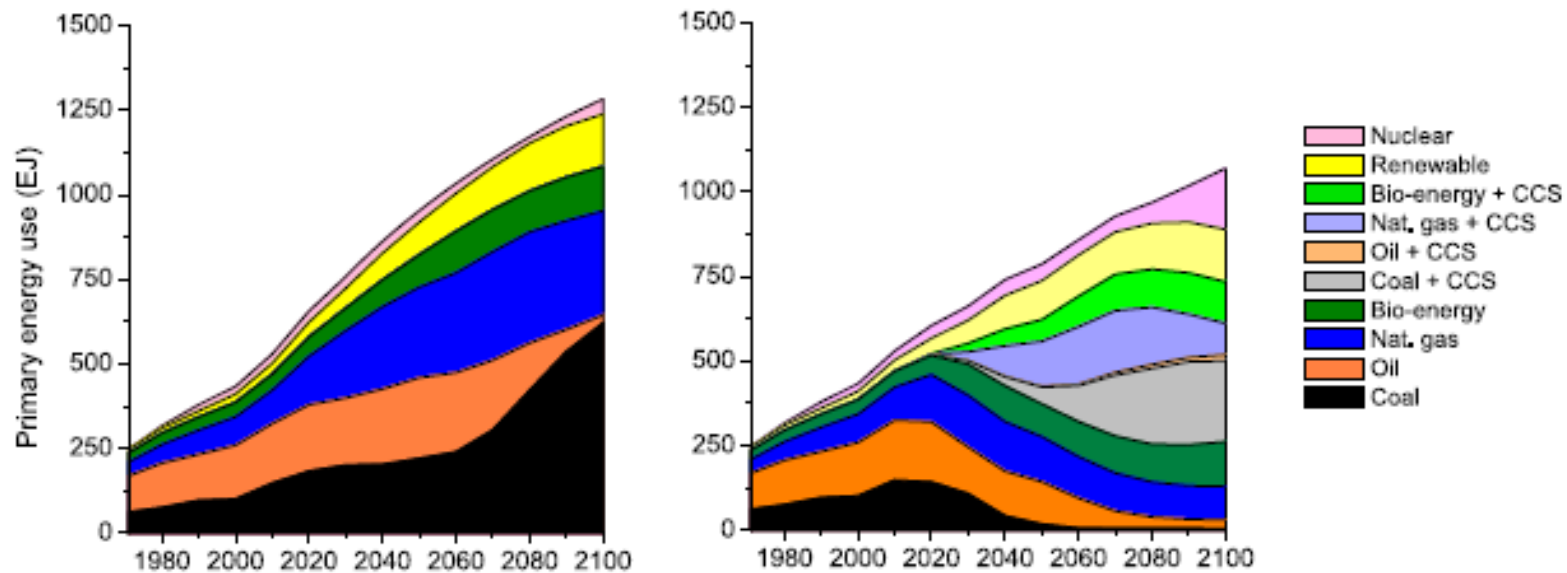


Land versus Energy: The new Gordian Knot of low carbon strategies

Thierry Brunelle
Oxford, 18 september 2012

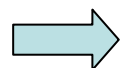
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Trends in global energy use



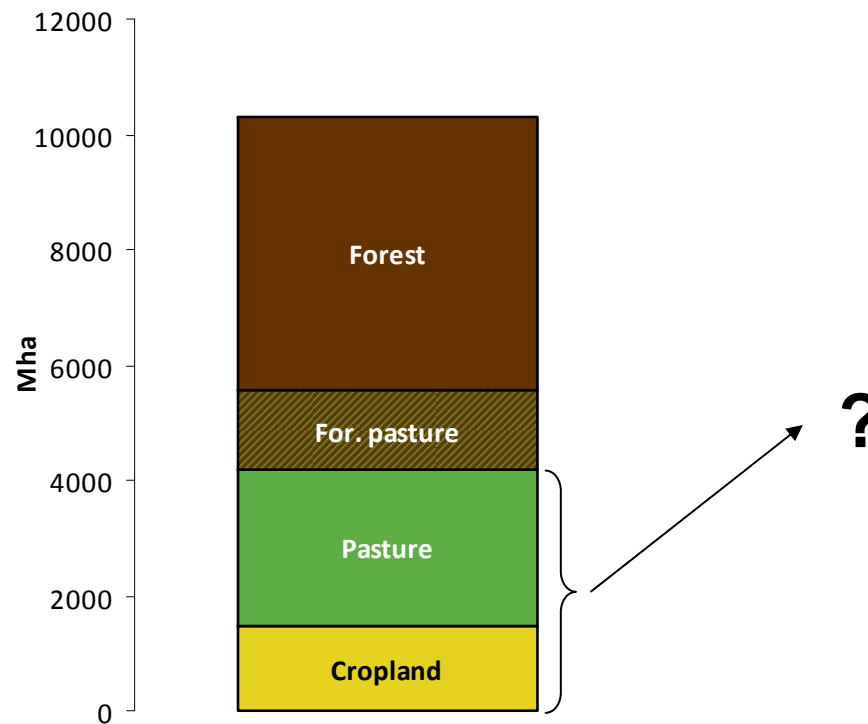
Baseline

RCP 2.6



Bioenergy production in 2100 in the RCP 2.6 = 250 EJ

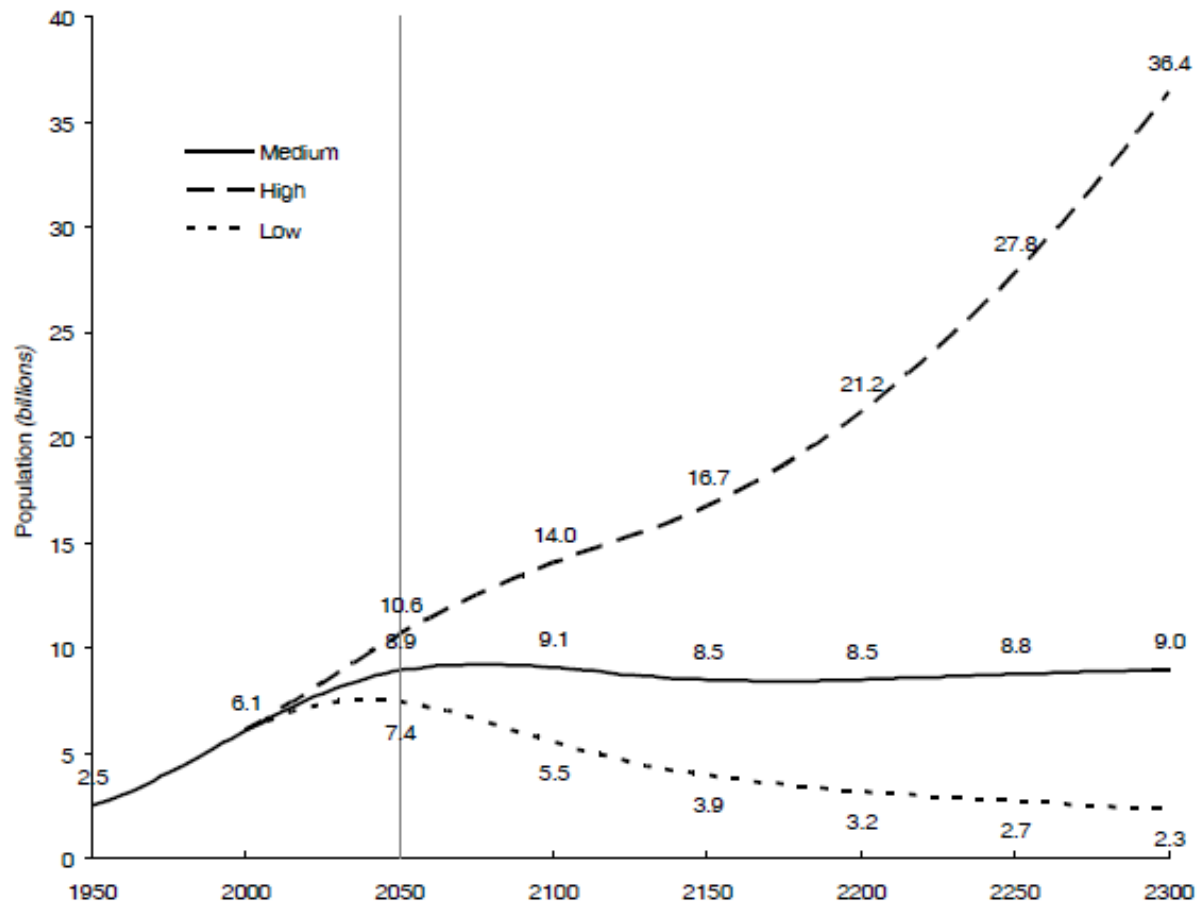
Where to produce 250 EJ of bioenergy ?



Land use around the year 2000

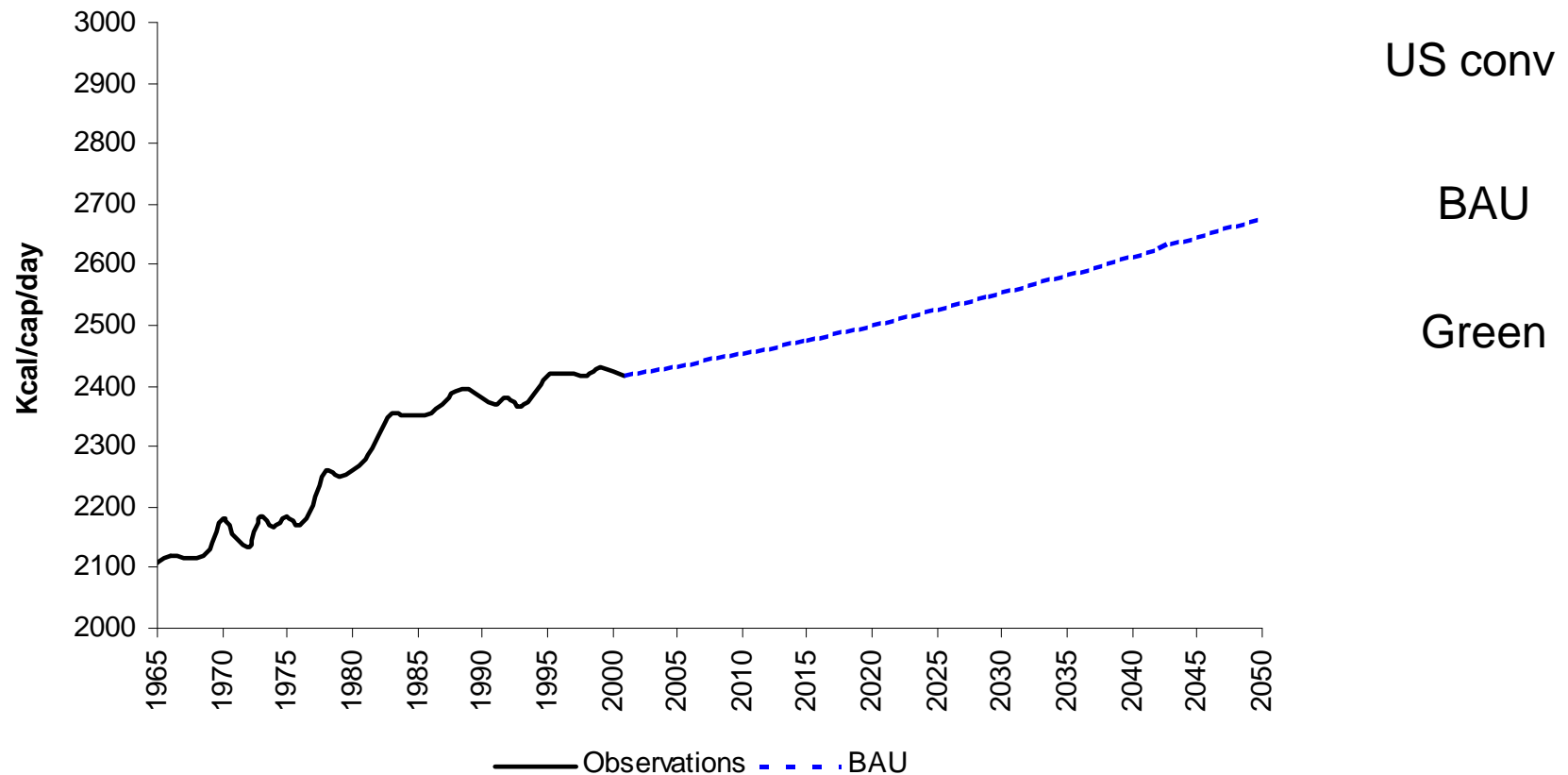
Source: Ramankutty et al. 2008 and own calculations

Population scenarios



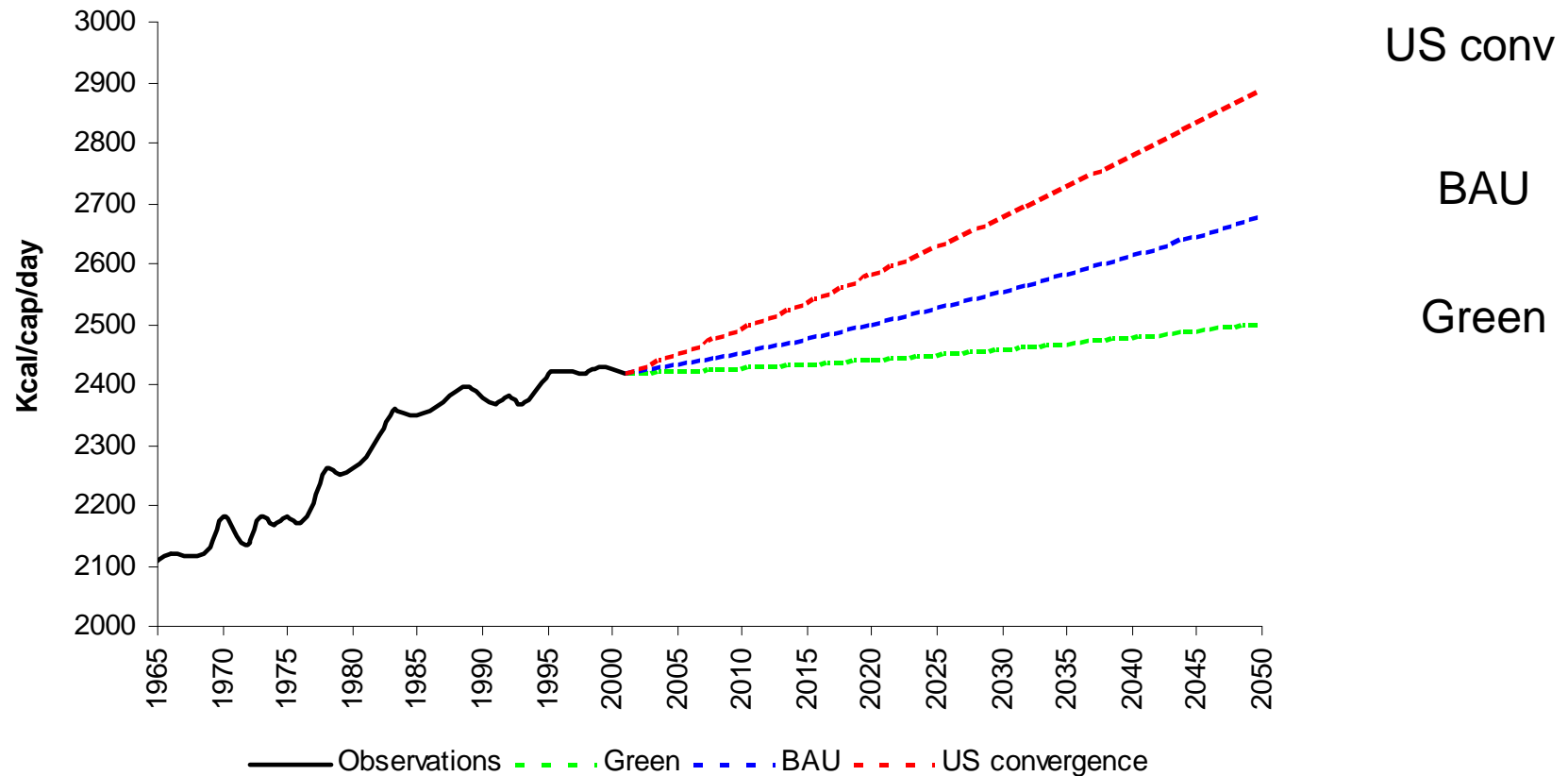
Source: United Nations

Food scenarios: consumption of plant food calories



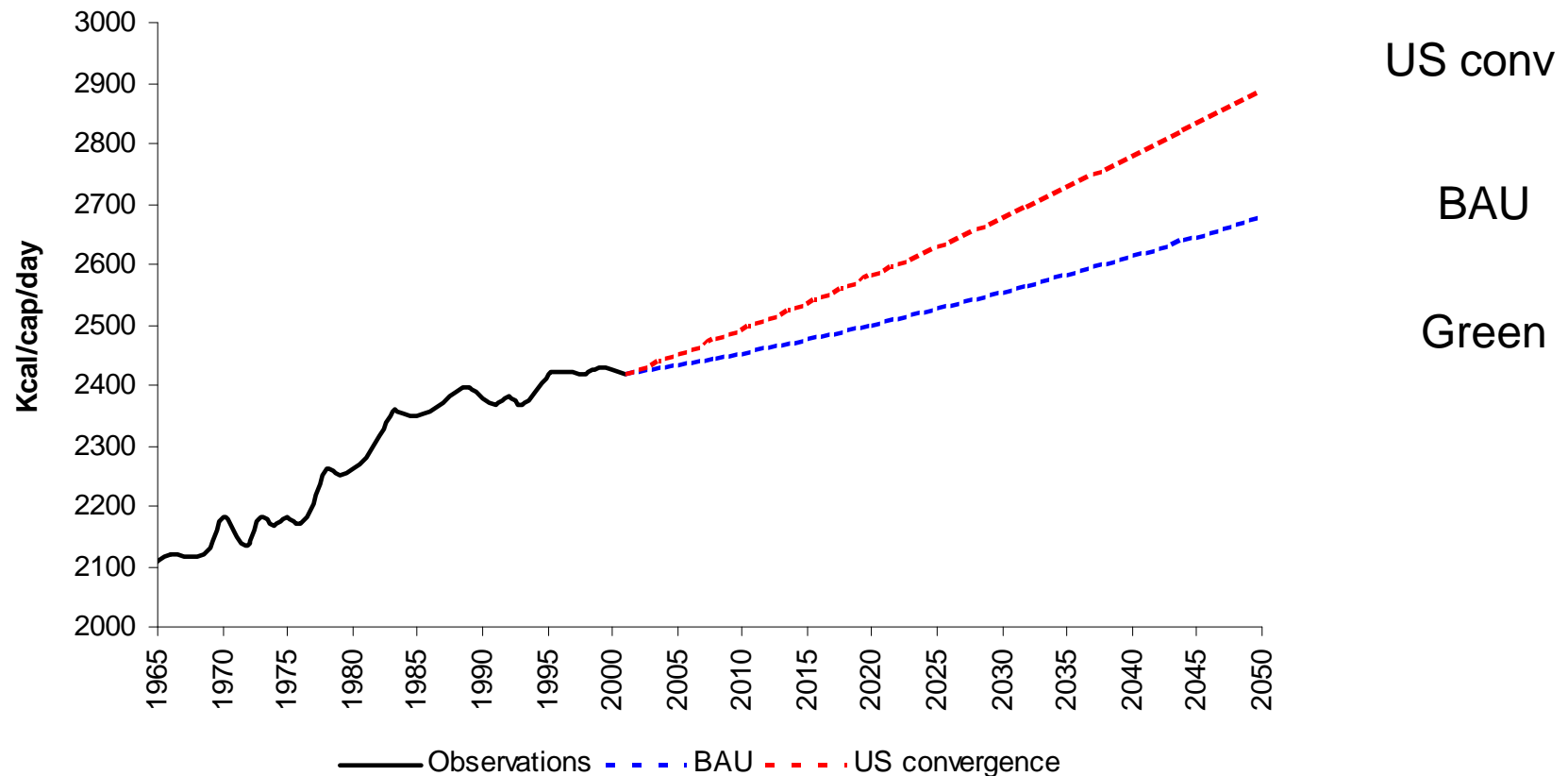
Source: Agribiom and own calculations

Food scenarios: consumption of plant food calories



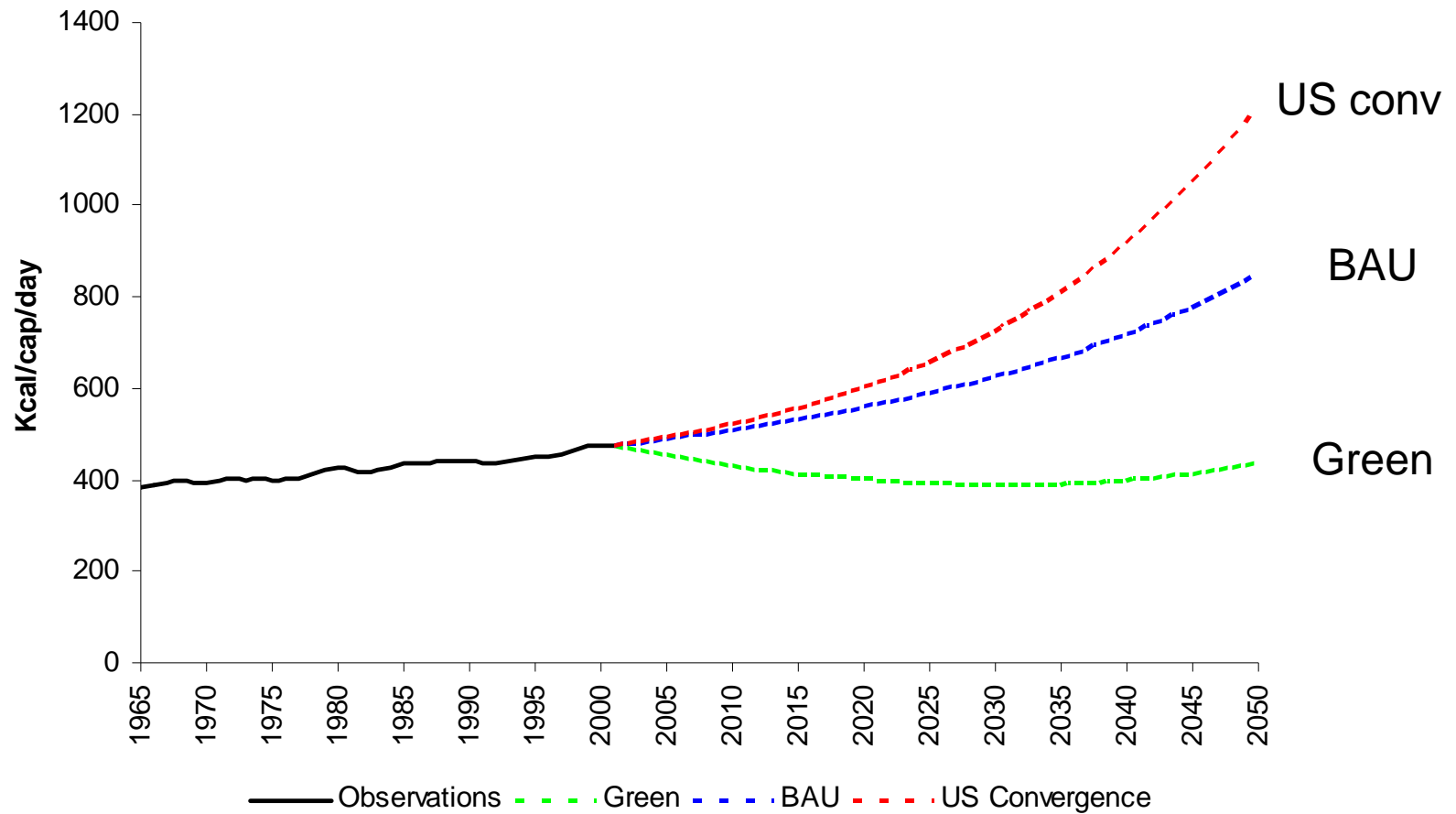
Source: Agribiom and own calculations

Food scenarios: consumption of plant food calories



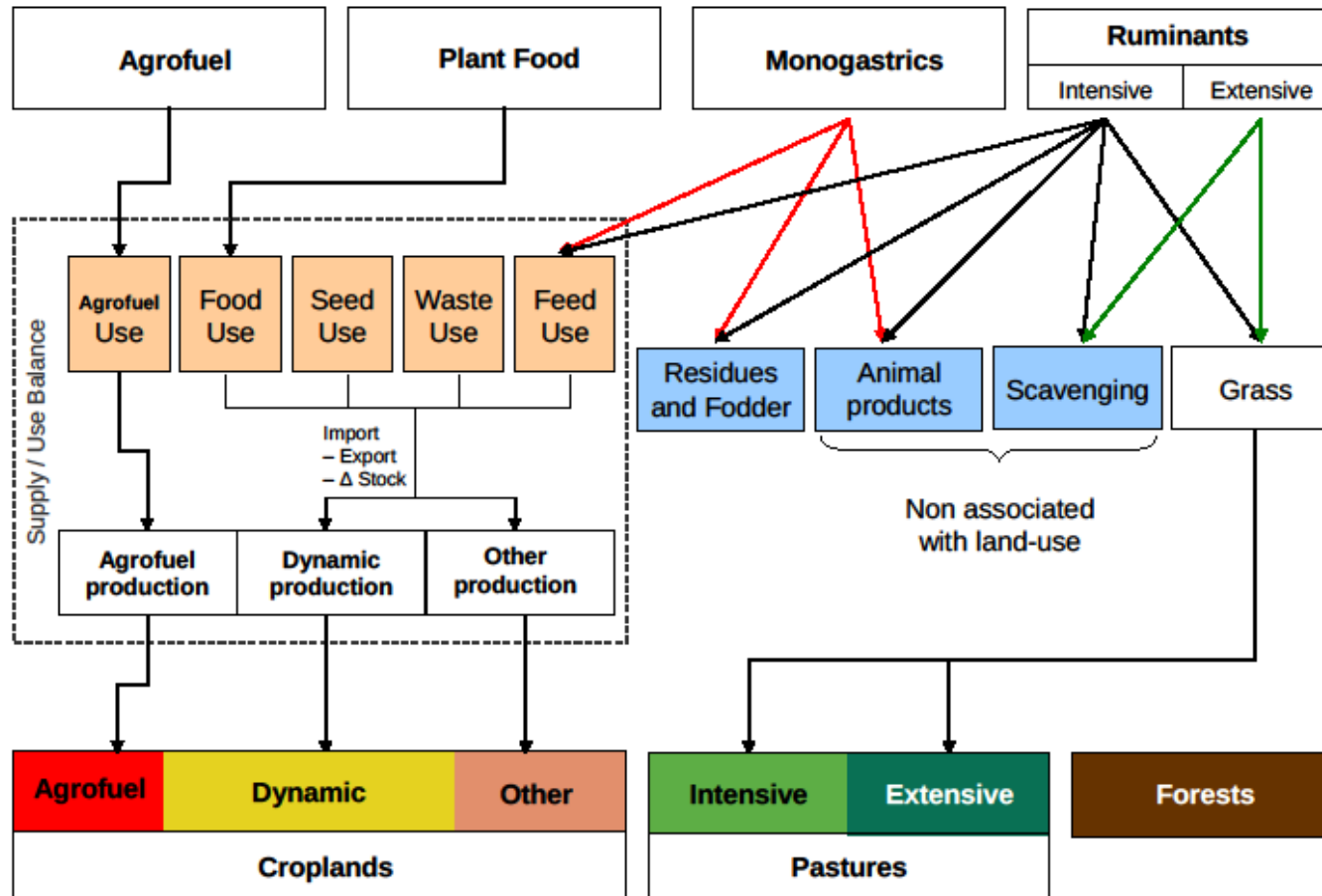
Source: Agribiom and own calculations

Food scenarios: consumption of animal calories



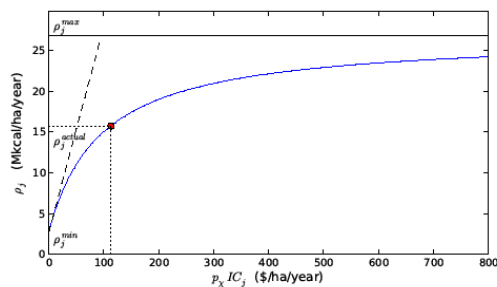
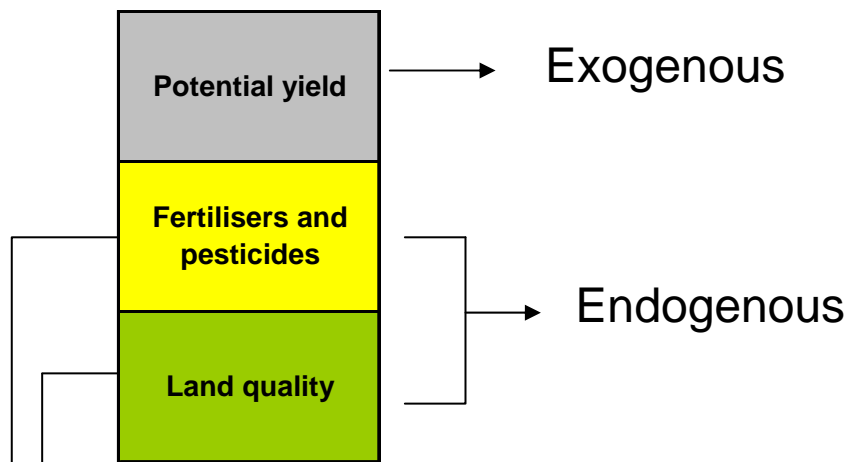
Source: Agribiom and own calculations

The Nexus Land-Use: a model articulating biophysical potentials and economic dynamic



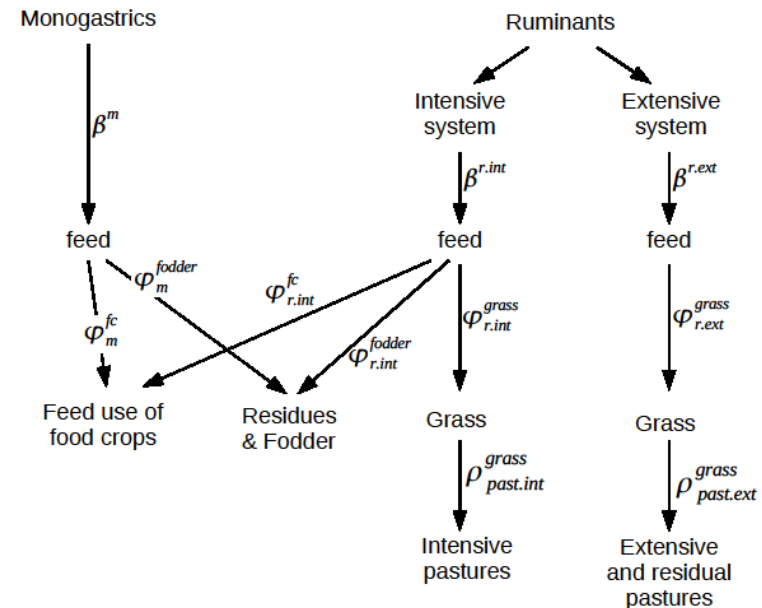
A representation of intensification processes both for plant food and livestock production

Plant food



Ricardian frontier on regional land distribution of potential yield

Livestock production

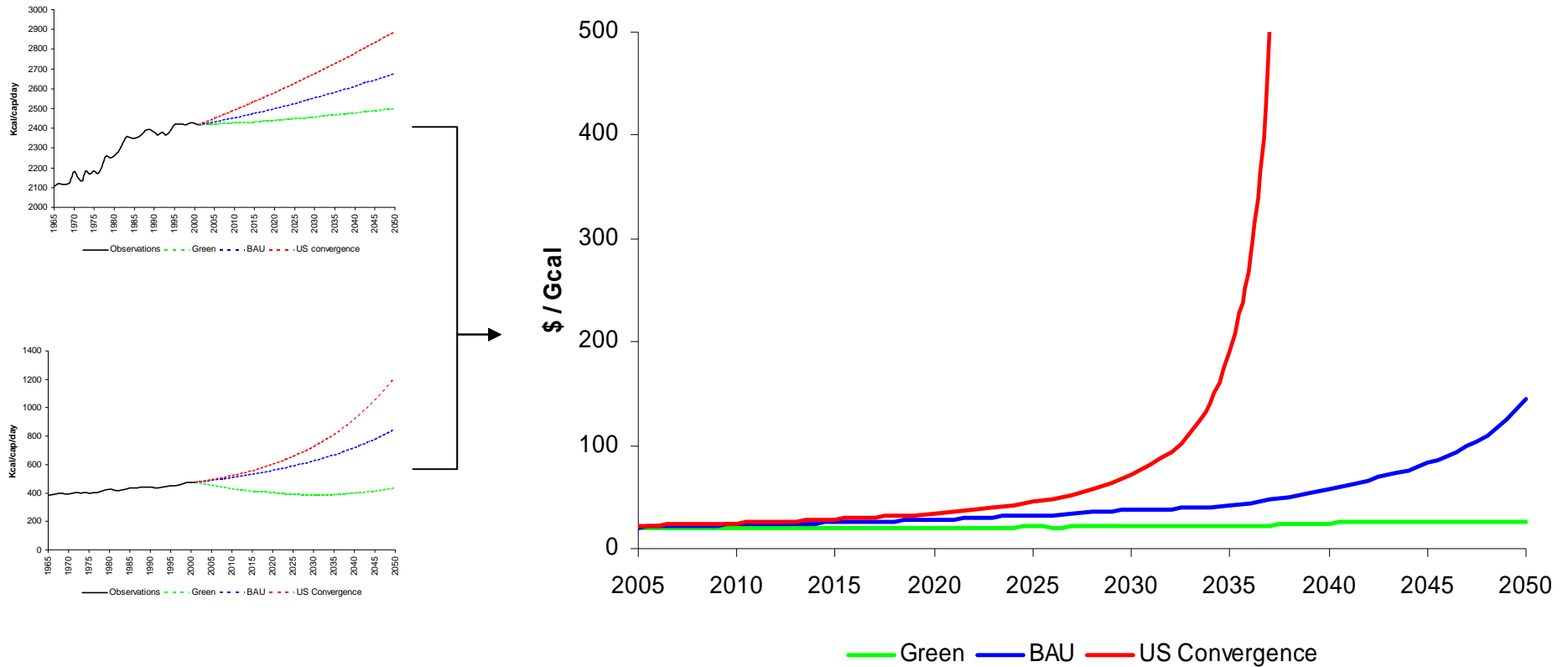


Source : Bouwman et al. (2006)

Scenario

- **Population : 8.9 billions in 2050**
- **Zero deforestation**
- **Potential crop yields are increased by 50% to 2050**
- **No bioenergy in the reference scenario**
- **Input price (pesticides and fertilisers) are calculated according to the future energy price calculated by Imaclim-R**

Calorie price evolution in the three food scenarios



The impact of bioenergy production on agricultural price

Yearly evolution of the world calorie price

	Référence	(1)	(1) + (2)	(1) + (2) + (3)
Green	1.1%	1.8%	1.4%	1.3%
BAU	4.6%	12.4%	5.4%	2.6%
US convergence	-	-	-	16.7%

(1) Production of 50 EJ bioenergy

(2) Potential crop yield are increased by 100% to 2050

(3) Grass yield are increased by 100% to 2050

Concluding remarks

- **Large impact of bioenergy on crop price**
- **Some productivity reservoirs: potential crop yield but also grass yield**
- **« It's the food, stupid »**

Thank you for your attention

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