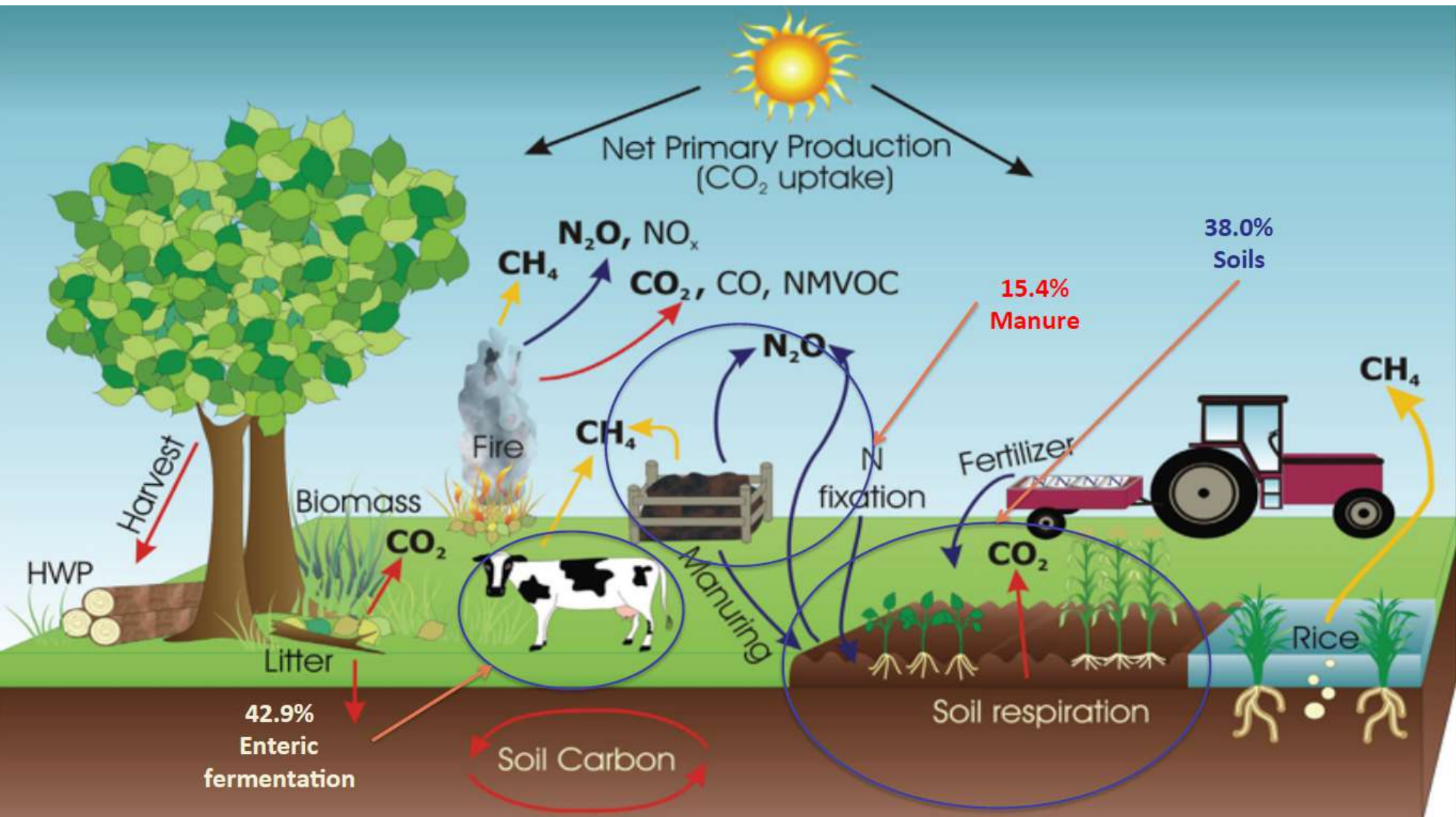
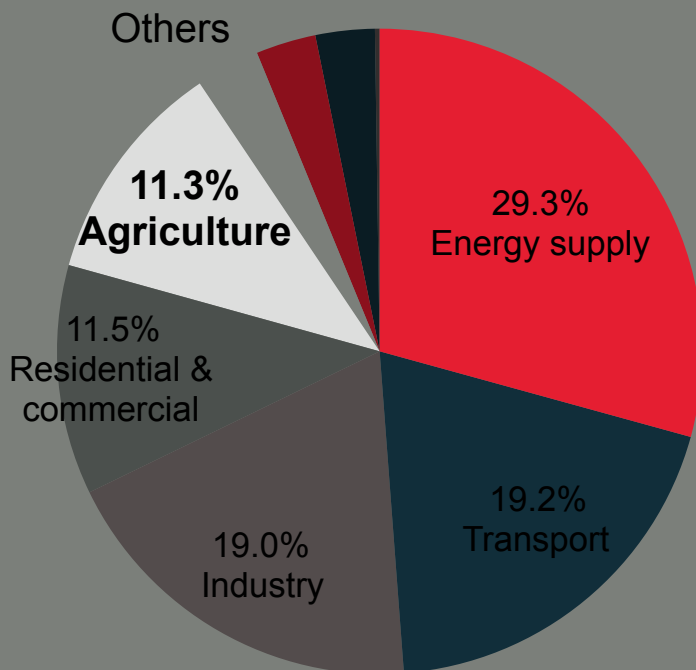


Alimentation et agriculture Quelles transformations pour préserver le climat et la biodiversité ?

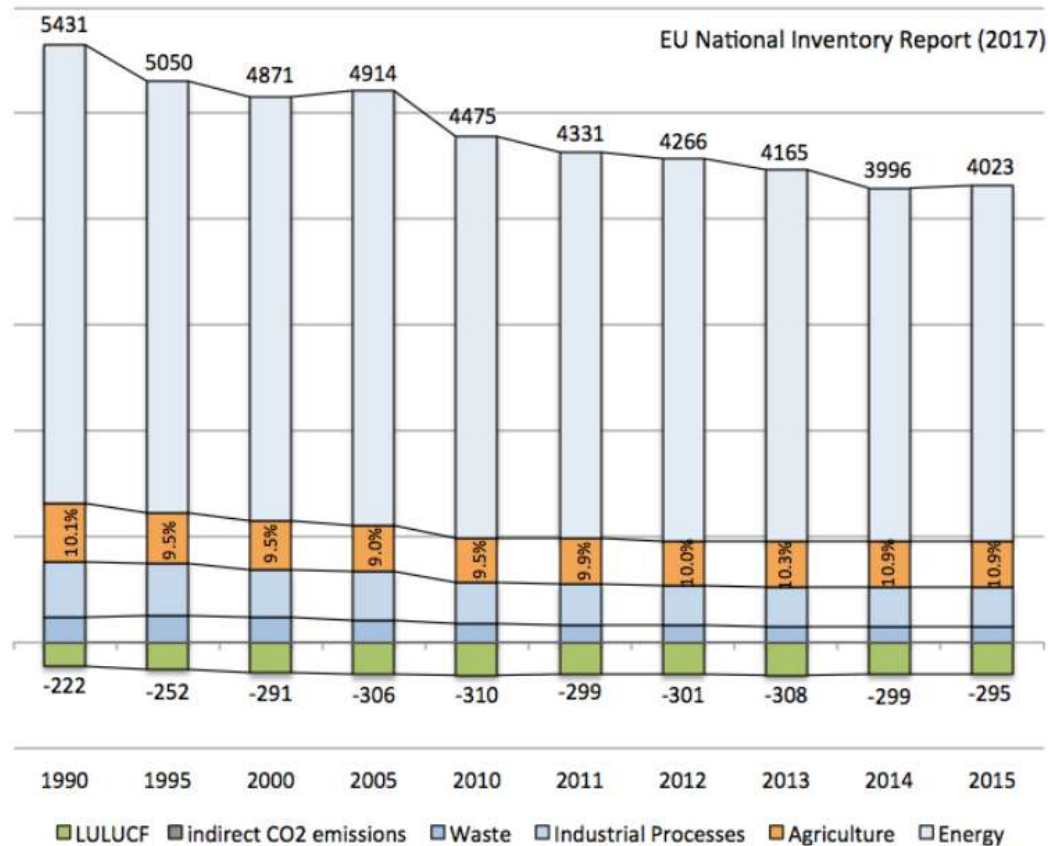
Sébastien Treyer, Directeur général, Iddri



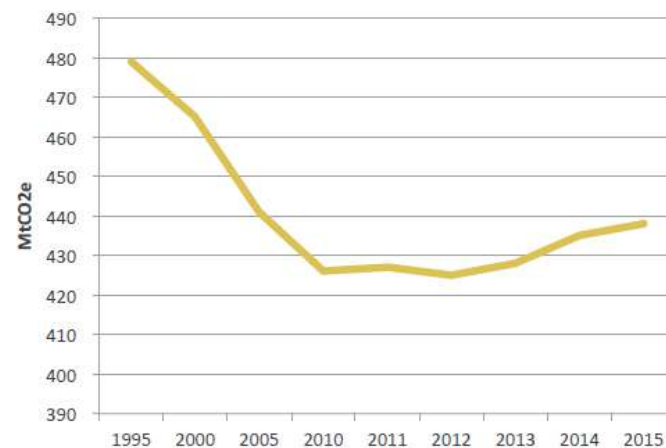


- Significant variation by country
 - Agriculture's contribution will become more significant over time
 - FR
 - DE
 - UK
- =~44% of all agricultural emissions



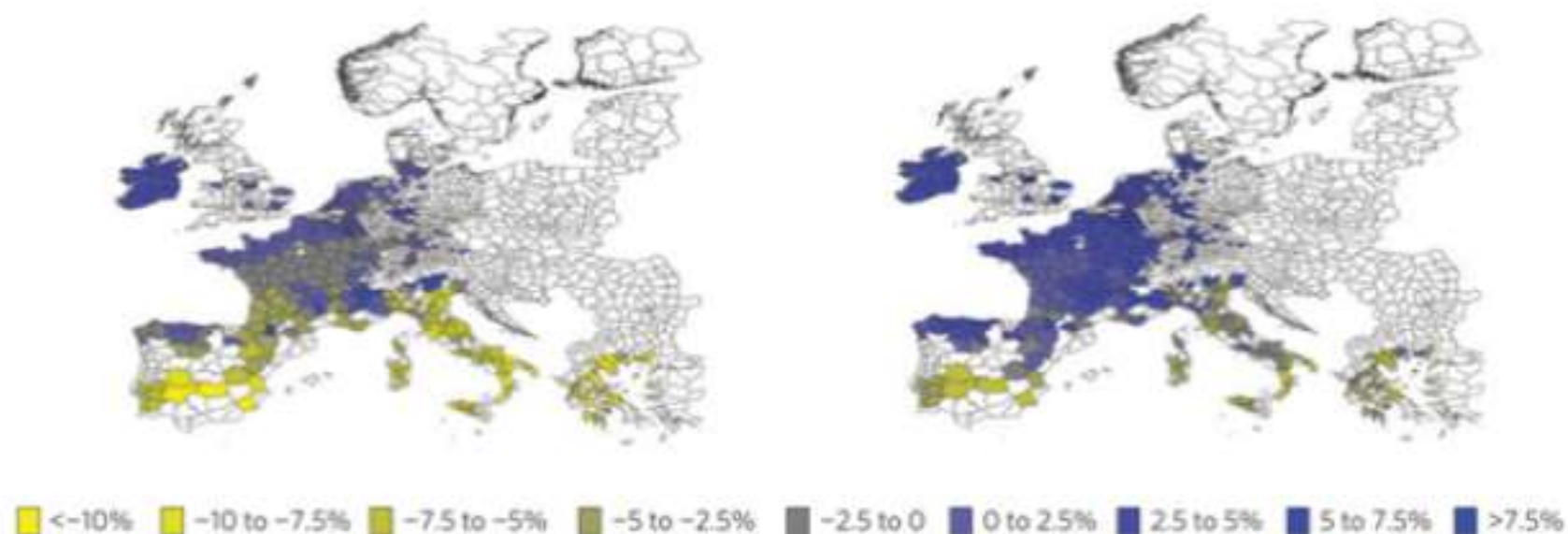


- Reductions in other sectors has been more rapid and sustained than in agriculture.



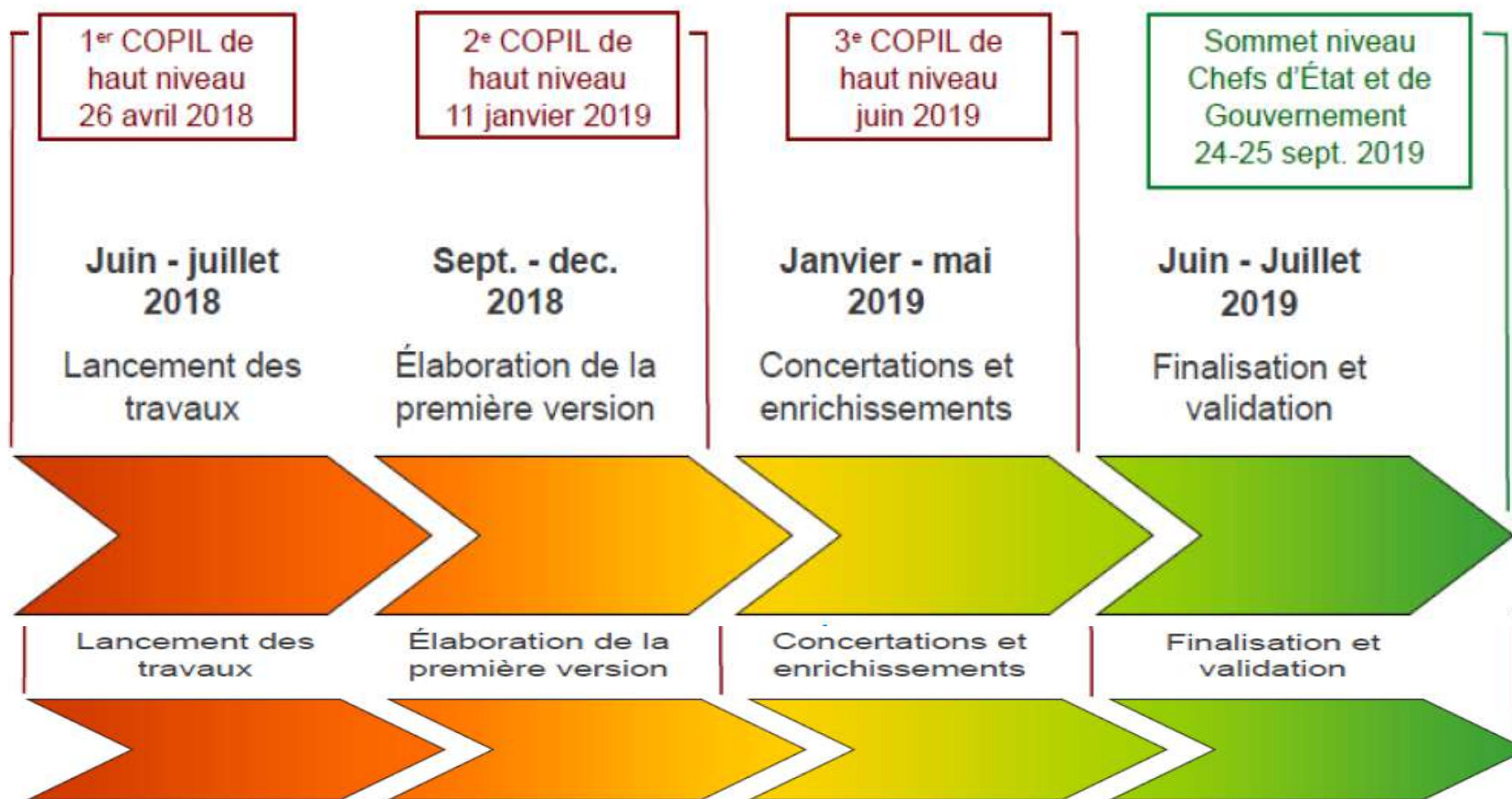
- Emission levels have seen sustained increases since 2012
- Relative share expected to reach 30% by 2050

Effects of climate change on farm profits by 2040 with and without adaptation



Source: Moore & Lobell (2014)

- Un secteur responsable d'une part importante du total des gaz à effet de serre
- Des émissions en croissance en Europe (en termes absolus et relatifs) et dans le monde
- Le système alimentaire européen a des impacts importants en termes de changement d'usage des sols hors d'Europe



Land use change

- E.g. afforestation, agro-forestry, arable conversion

Crop Production

- E.g. Zero/reduced tillage, cover/catch crops, crop residues

Livestock Production

- E.g. Disease management, breeding, feed additives etc

Nutrient and Soil Management

- E.g. Nitrification inhibitors, improved N fixation etc

Energy

- E.g. Carbon audits, energy efficiency, anaerobic digesters



Reduce emissions

- **Efficiency gains:**
 - reduce GHG emissions per unit of production
- **Reduced/change output:**
 - reduced GHG emissions in absolute terms.



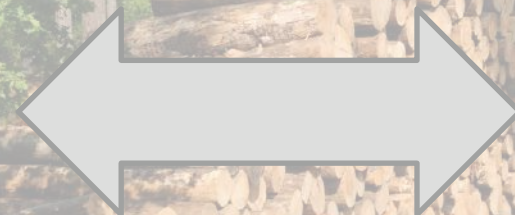
Increase removals



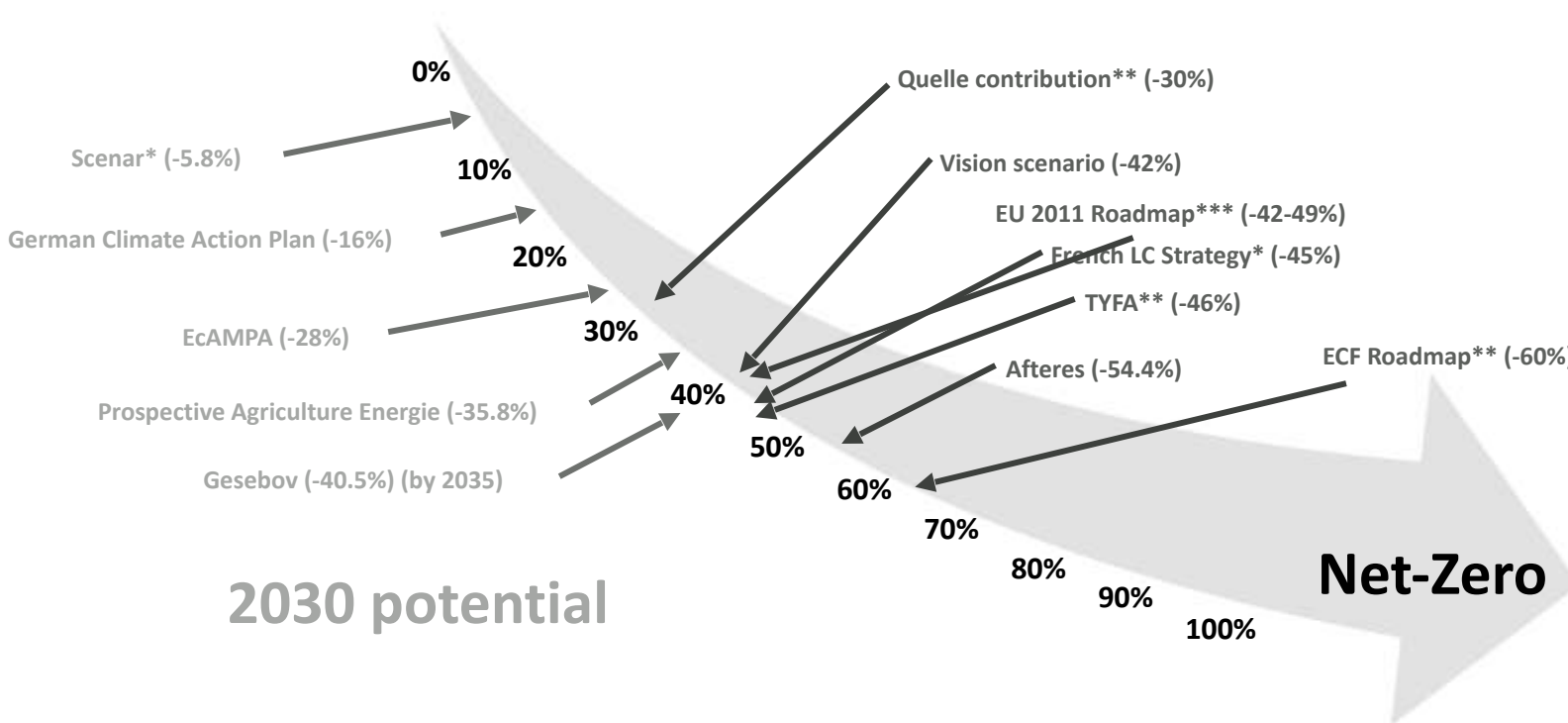
- **Increased removals**
 - land use change;
 - building carbon in soils;
 - Greater vegetation/wood

Support other sectors

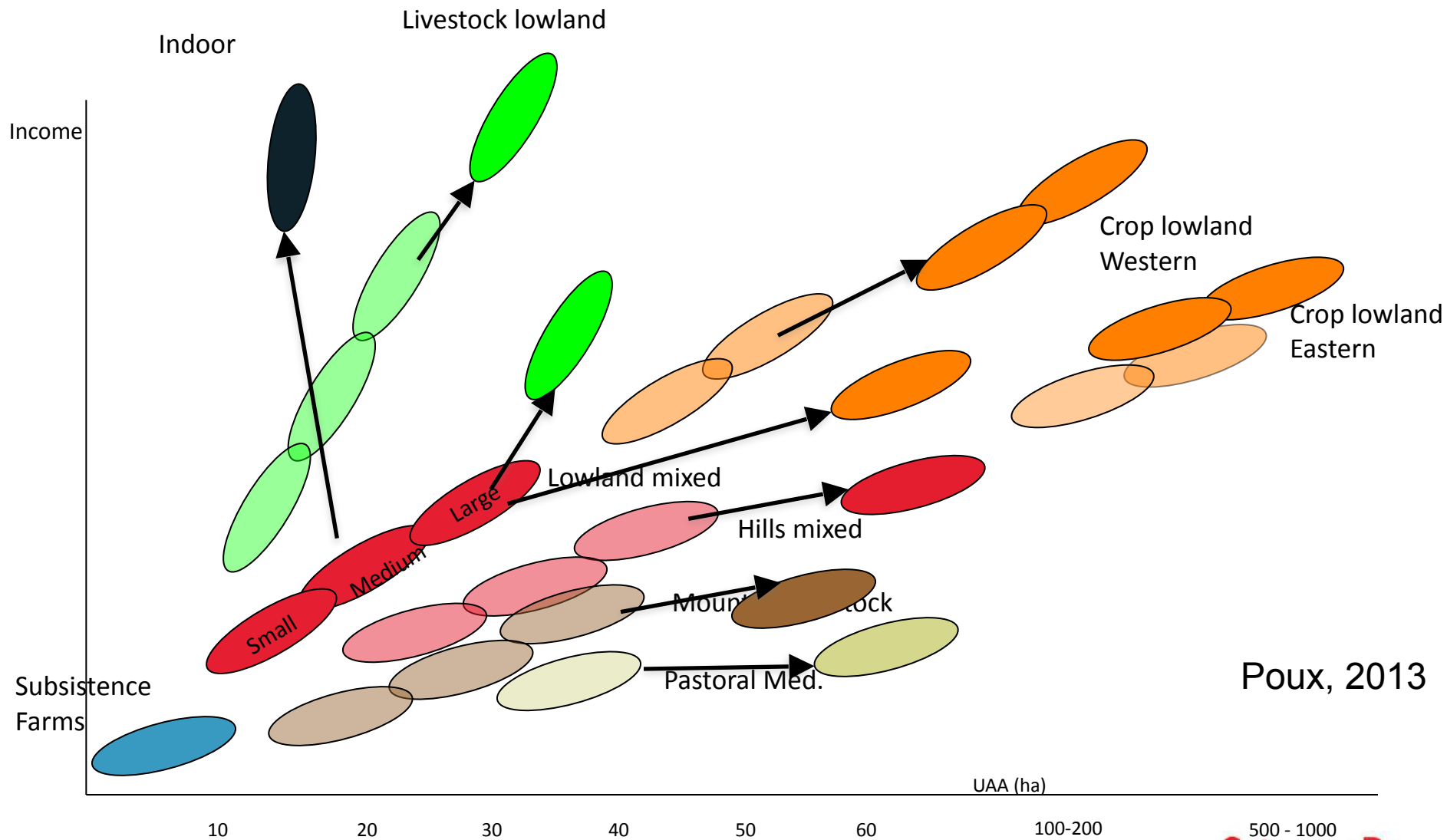
- **Fossil substitution:**
 - Biomass & Biofuels
 - Space for energy infrastructure
 - Materials for construction; packaging, etc.



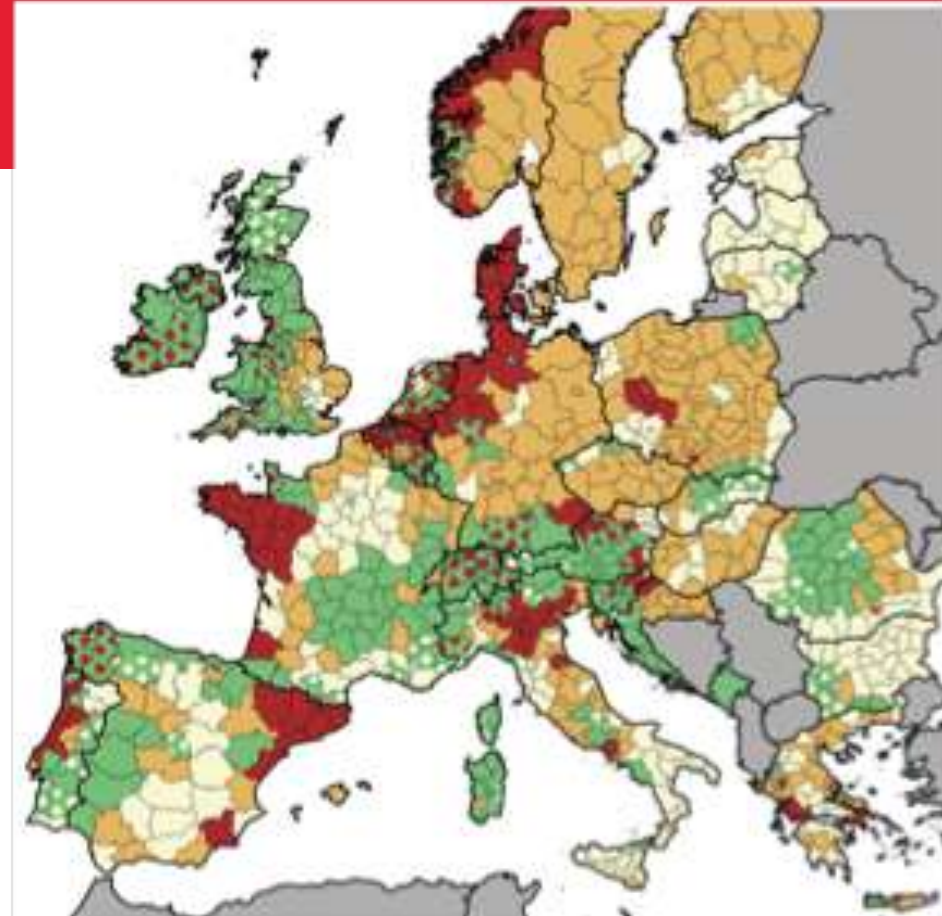
2050 potential



All reductions are in comparison to 2005 figures with the exceptions of: * 2015; ** 2010; ***1990



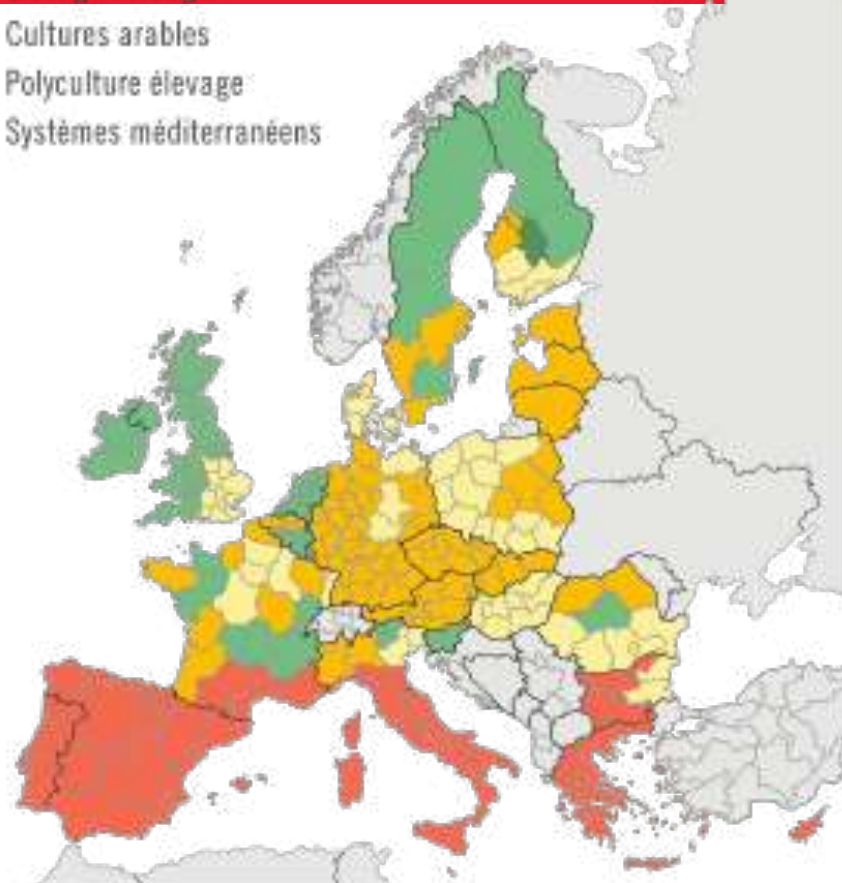
Poux, 2013



- Haute densité animale peu herbager
- Haute densité animale herbager
- Moyenne densité animale herbager
- Faible densité animale herbager
- Faible densité animale peu herbager
- Cohabitation entre cultures et élevages
- Pas de données

Source : Expertise scientifique collective Rôles, impacts et services issus de l'élevage en Europe (Dumont et al., 2016).

- Élevage herbager
- Cultures arables
- Polyculture élevage
- Systèmes méditerranéens



Source : FADN 2012.



Brésil. Argentine
20 000 - 35 000 km² SAU

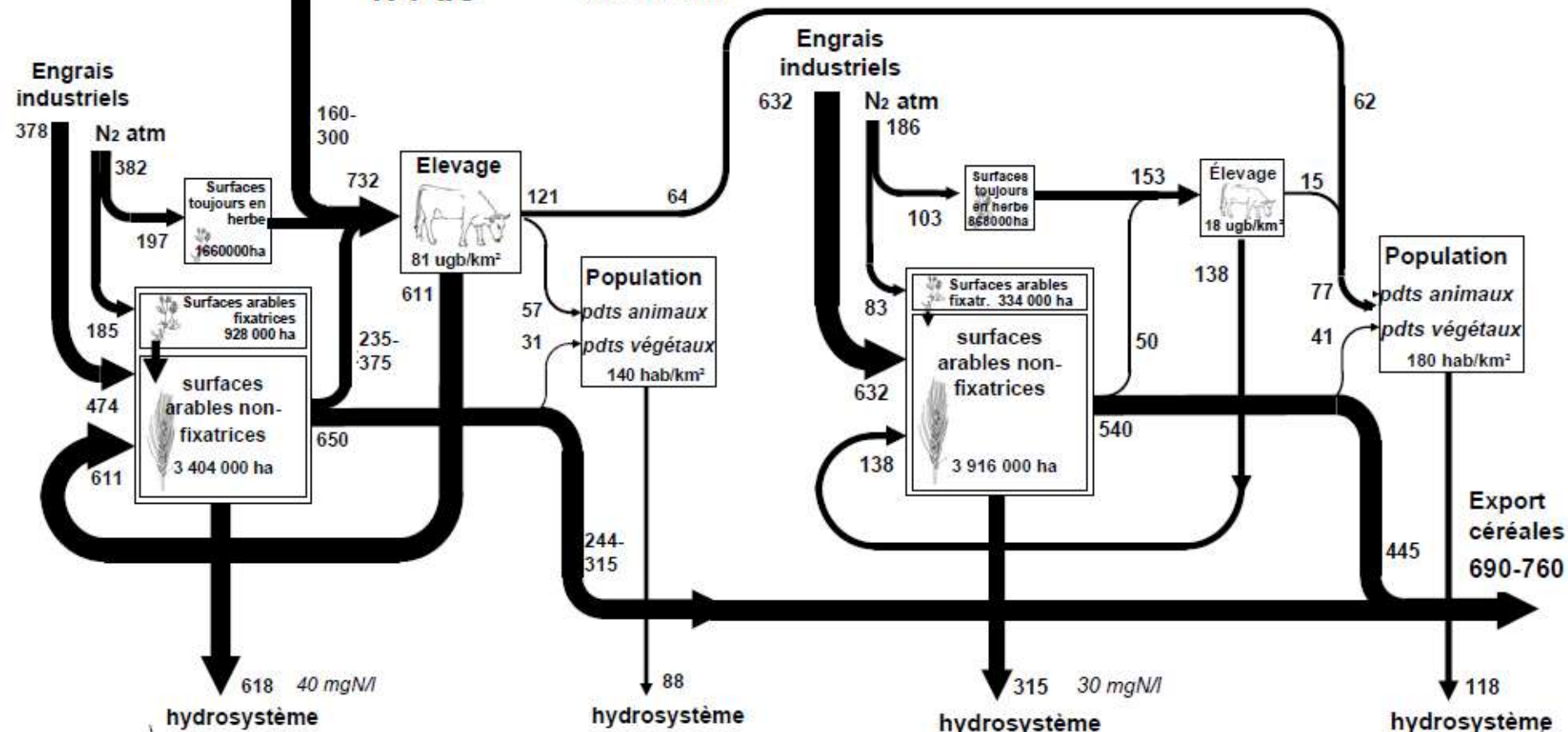
Import
aliments
du bétail



**Bretagne, Normandie,
N-PdC** 88 000 km²

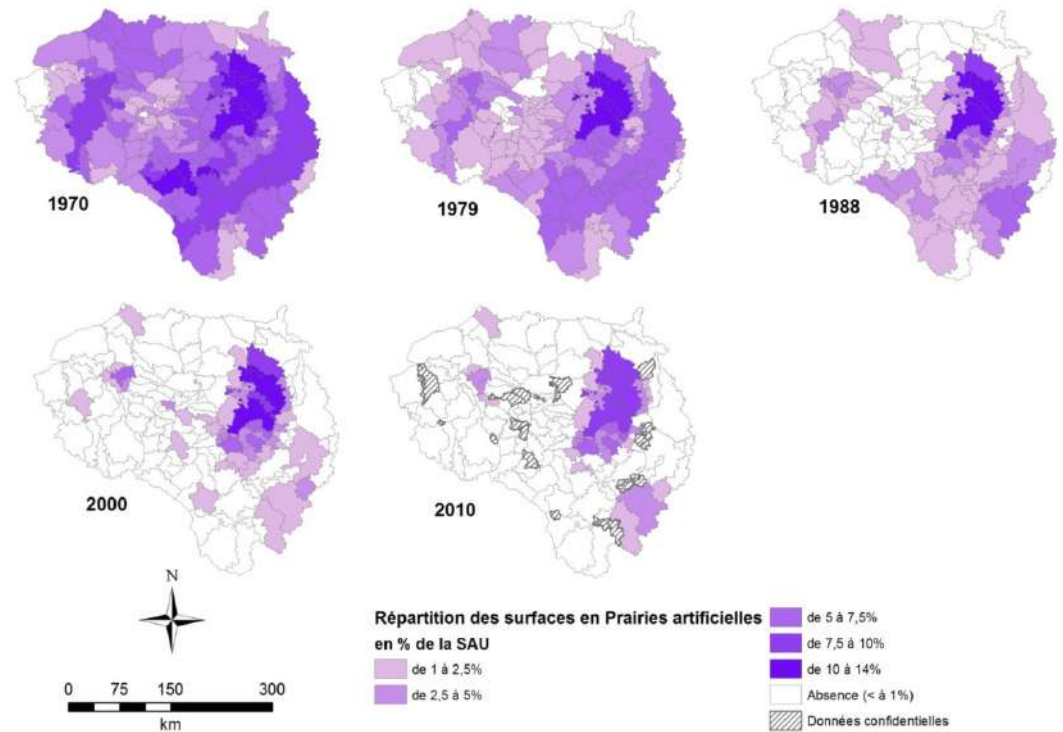


BV Seine 92 000 km²



- Spécialisation régionale
Grandes cultures.
Systèmes d'élevage et
polyculture élevage
disparaissent
- Croissance des surfaces
en blé, maïs, colza;
légumineuses diminuent
- Rotations toujours plus
courtes

Meynard, et al. (2013)

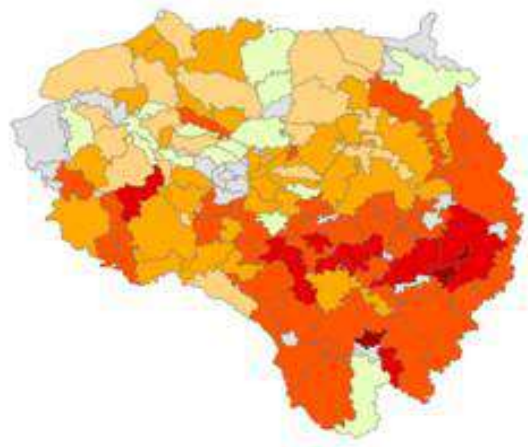


Colza Blé Orge

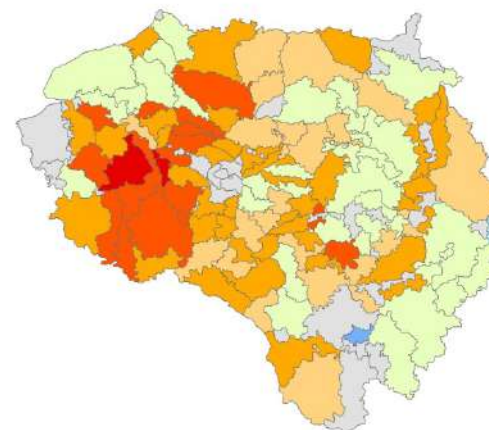
Légende

Evolution des triplets de cultures

Différence entre 2006-09 et 1992-95

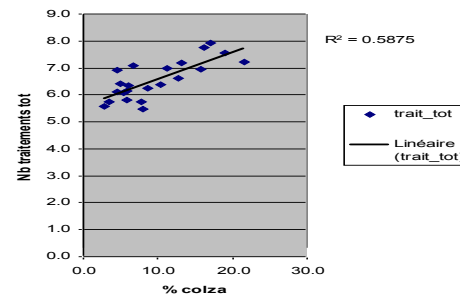


Colza Blé Blé

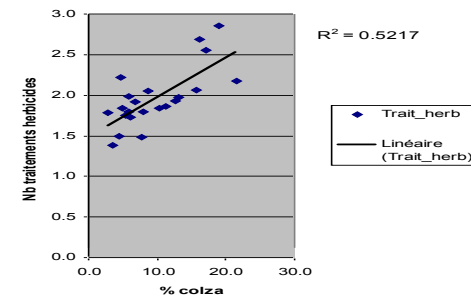


- La spécialisation contribue à l'accroissement de l'utilisation des pesticides, et aux tensions sur l'eau
- Les rotations plus courtes contribuent aussi à la saturation observée des rendements (Jeuffroy et al, 2012, Pinochet et al, 2012, Benett et al 2012)

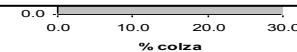
All pesticides



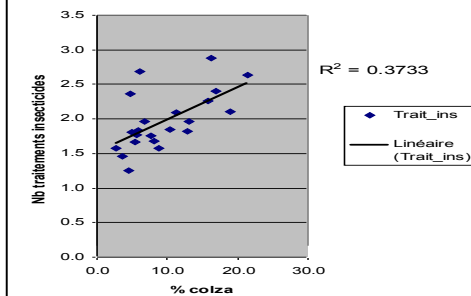
Insecticides



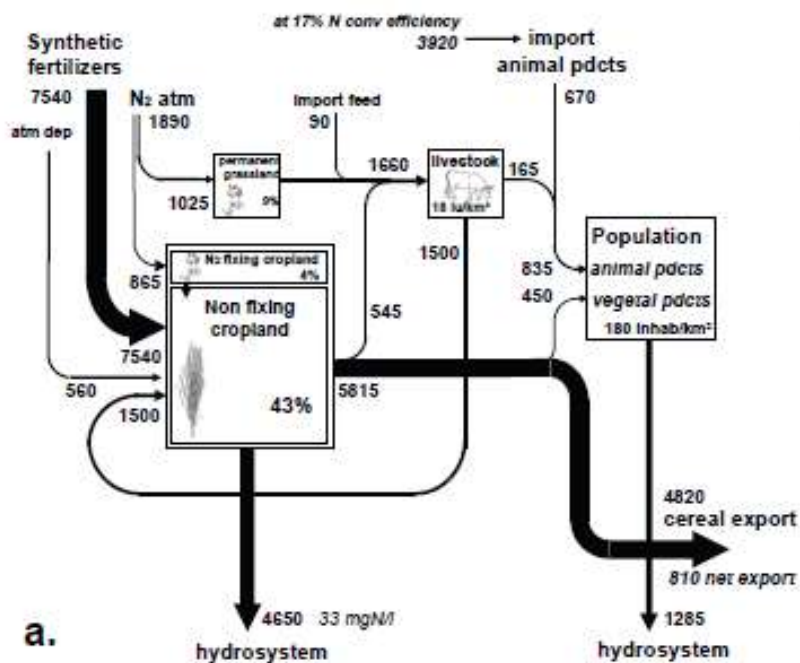
% rapeseed vs. number of pesticide treatments on rapeseed
1 dot = 1 small region in the Seine River Basin, Schott et al, 2010



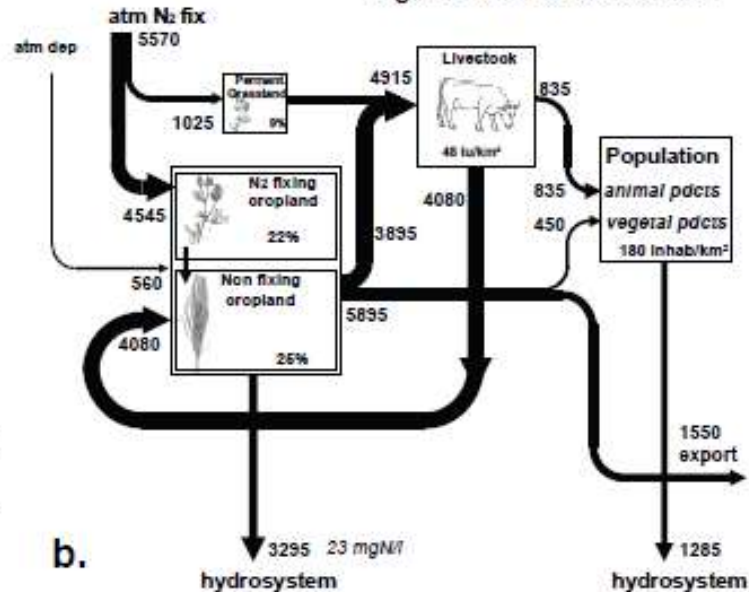
Herbicides



Current (2006) situation



Organic and Local scenario

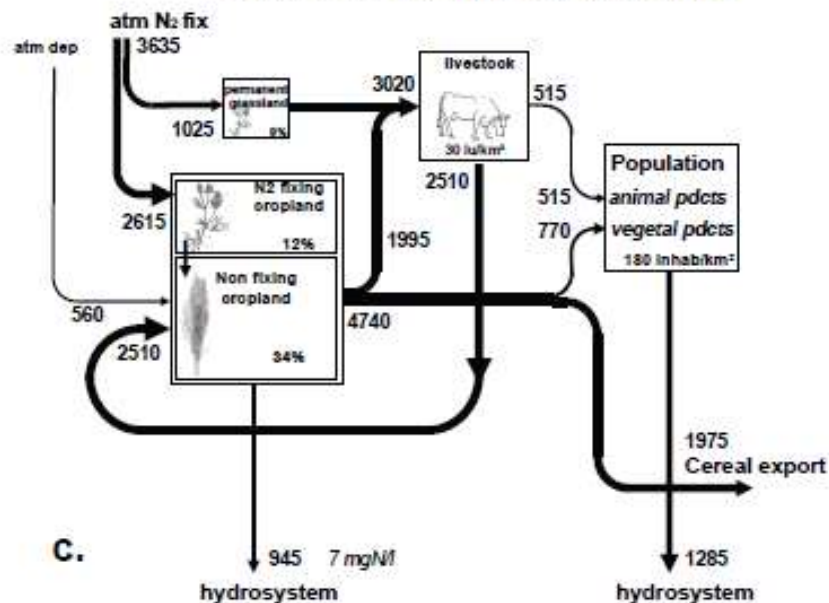


Seine watershed (92000 km²)

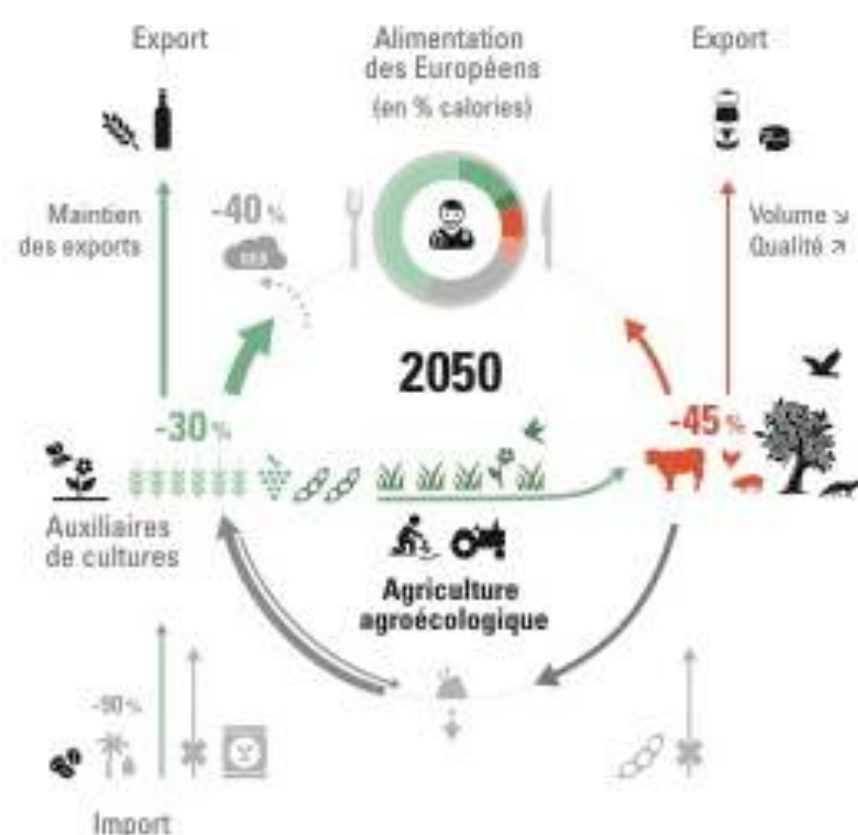
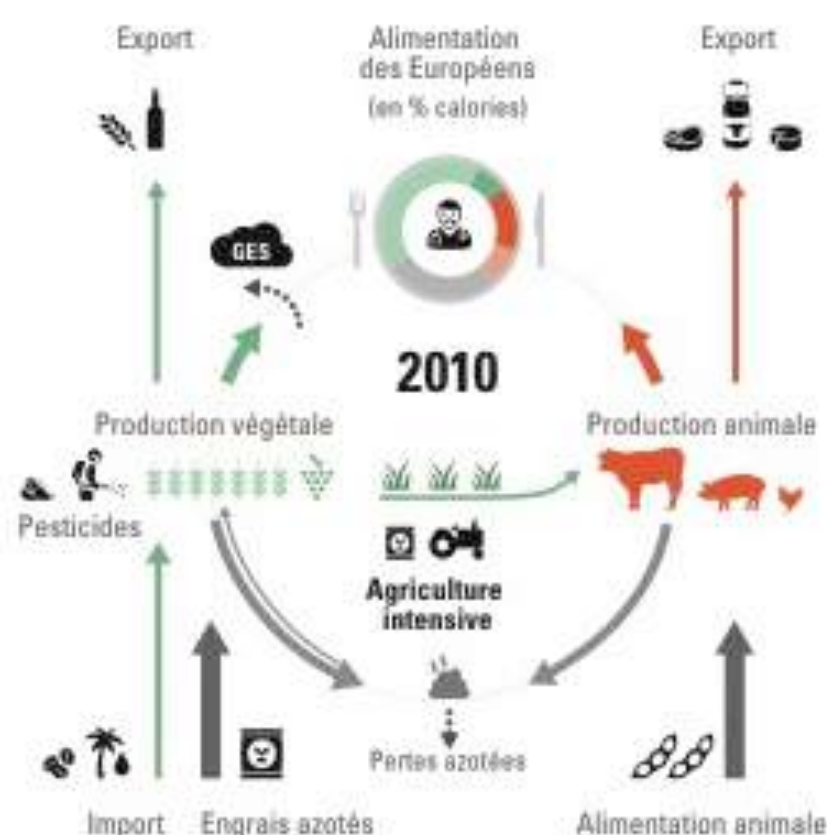
Fluxes in kgN/km²/yr



Organic, Local and Demitarian scenario



Billen, Garnier, Lassaletta, 2013

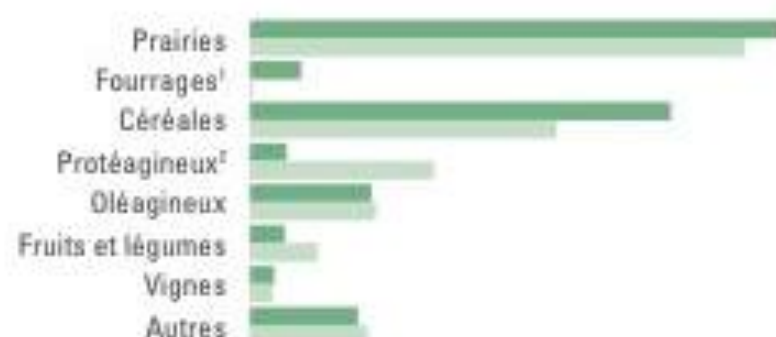


Productions

- Céréales et féculents
- Fruits et légumes
- Protéagineux (pois, lentilles...)
- Viandes, œufs et poissons
- Produits laitiers
- Autres



Usage des sols 2010 2050

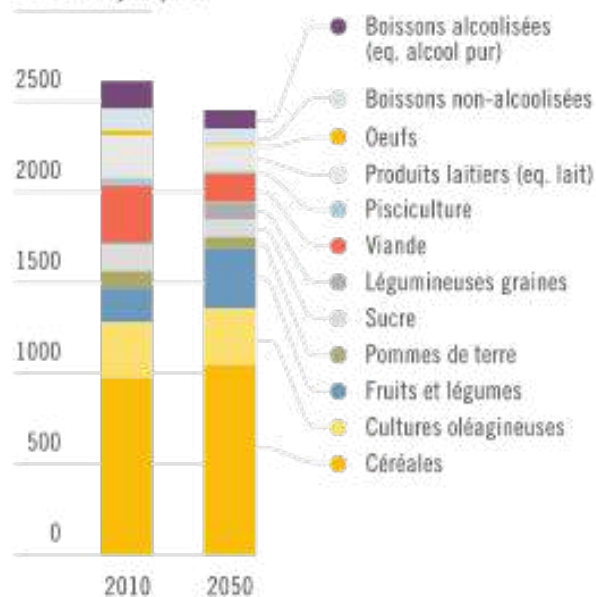


Une Europe agroécologique : le scénario TYFA



Une Europe agroécologique : le scénario TYFA

3000 kcal/jour/pers.



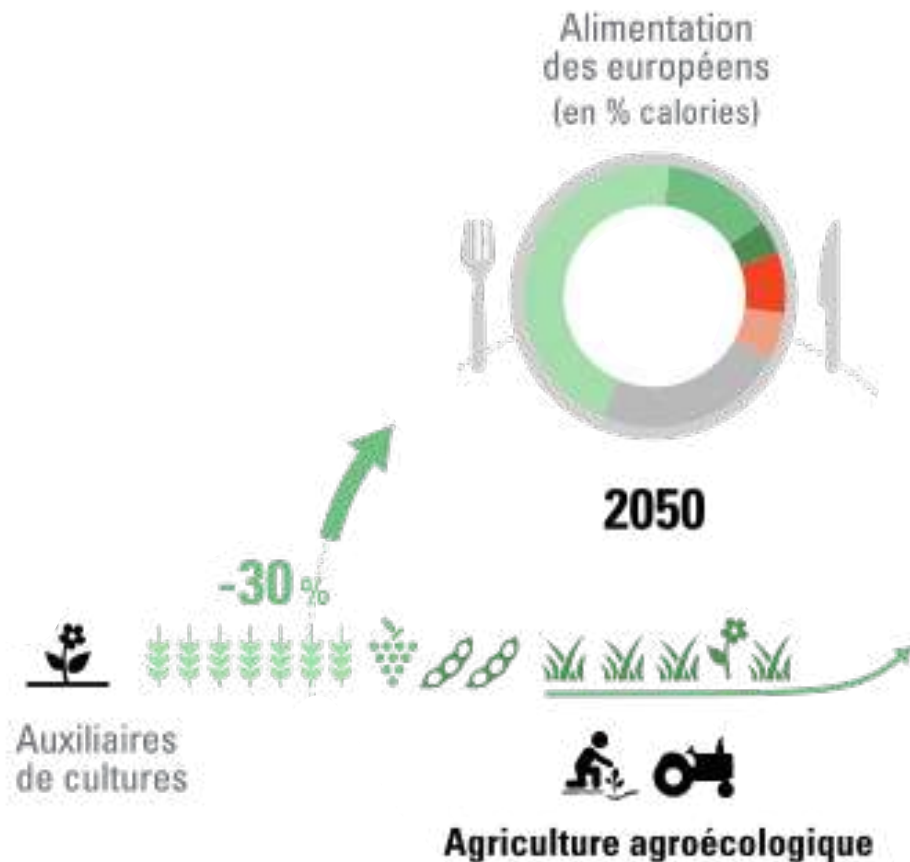
Alimentation
des européens
(en % calories)



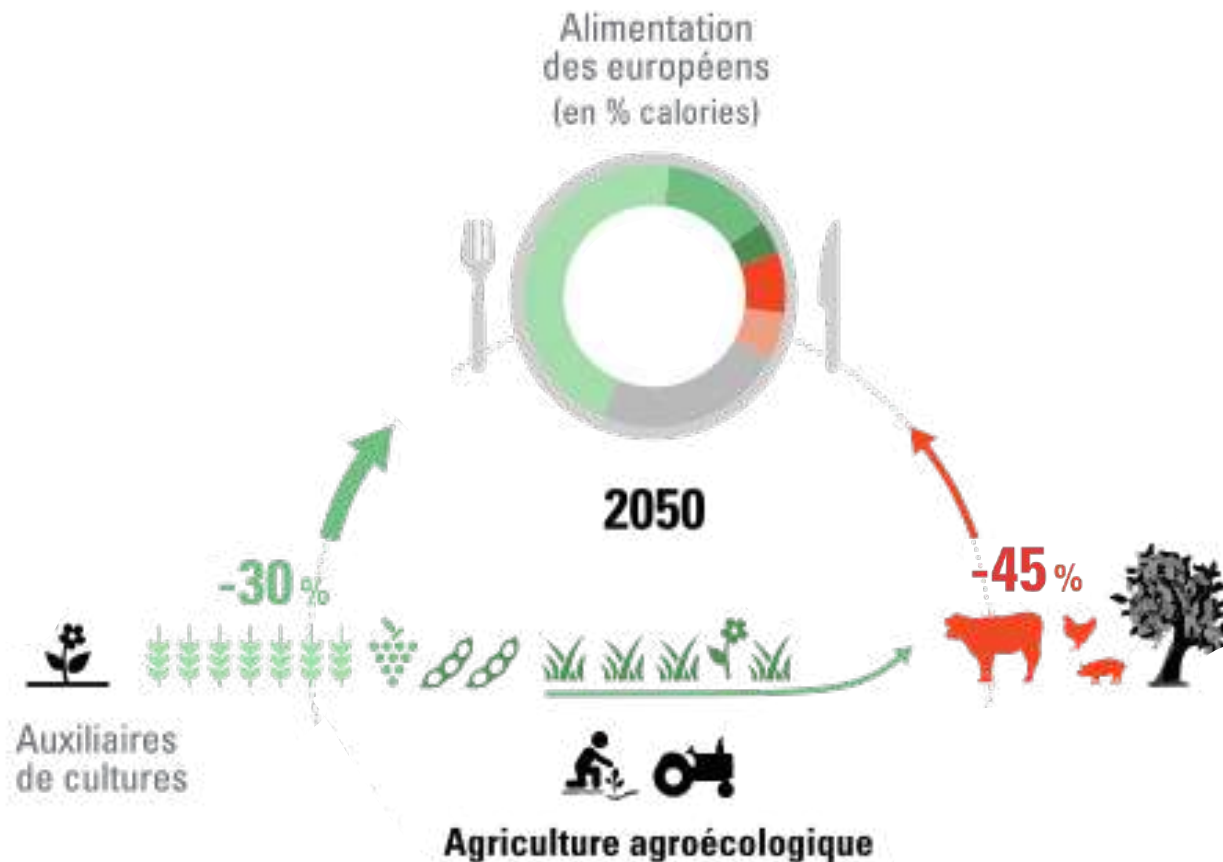
Une Europe agroécologique : le scénario TYFA



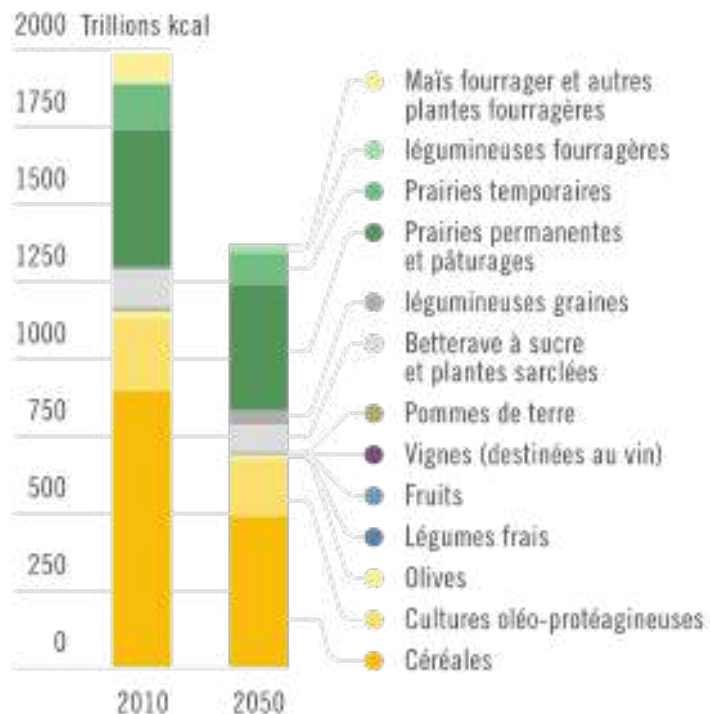
Une Europe agroécologique : le scénario TYFA



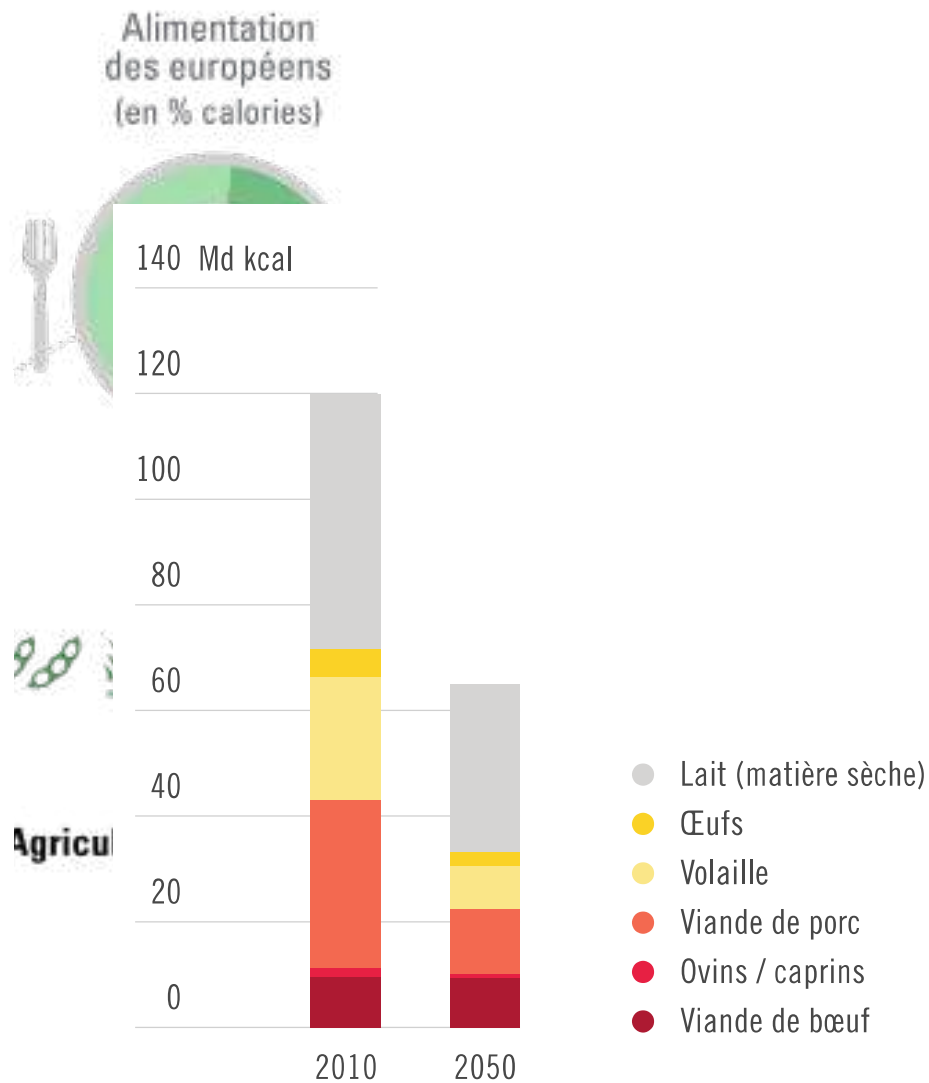
Une Europe agroécologique : le scénario TYFA



Une Europe agroécologique : le scénario TYFA

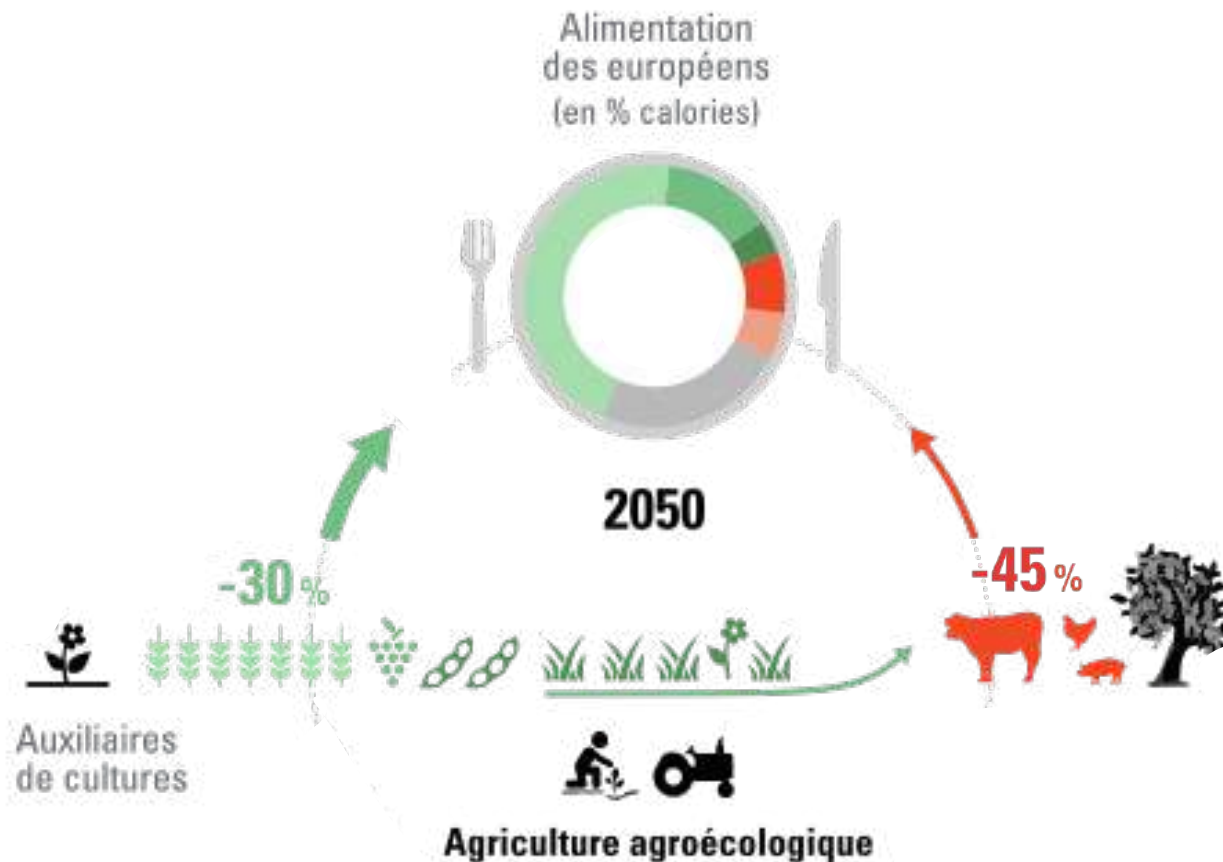


Source : TYFAM.

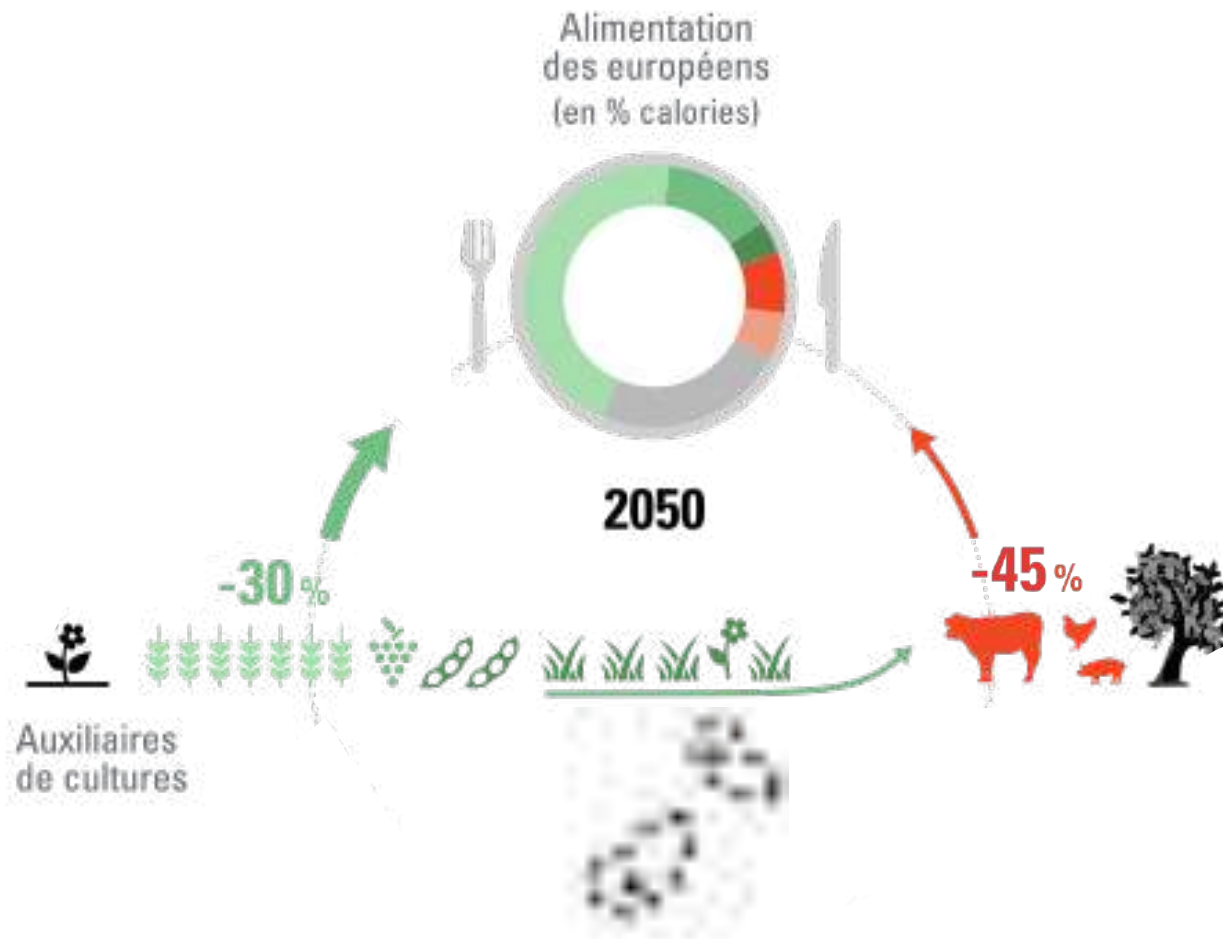


Source : TYFAM.

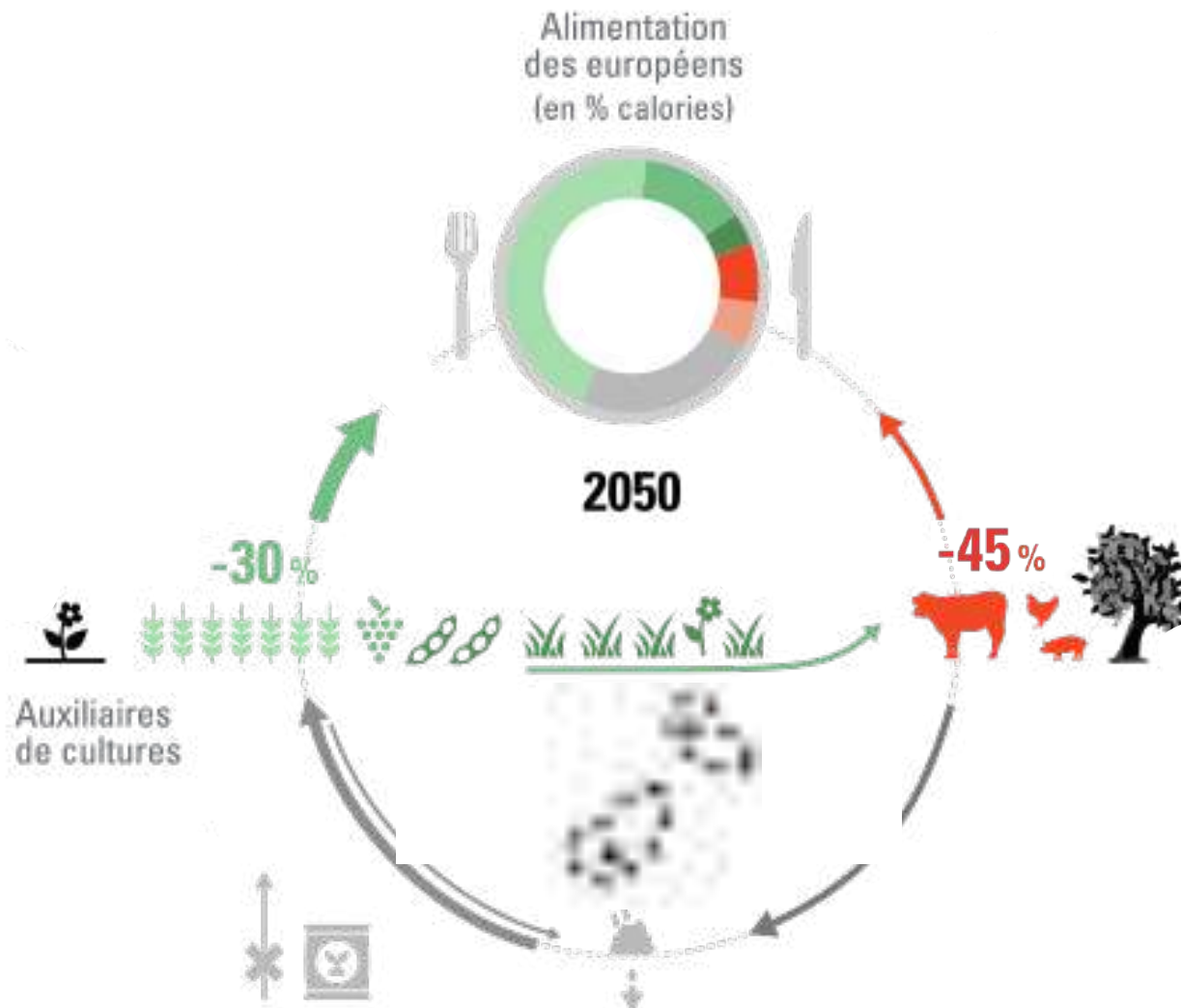
Une Europe agroécologique : le scénario TYFA



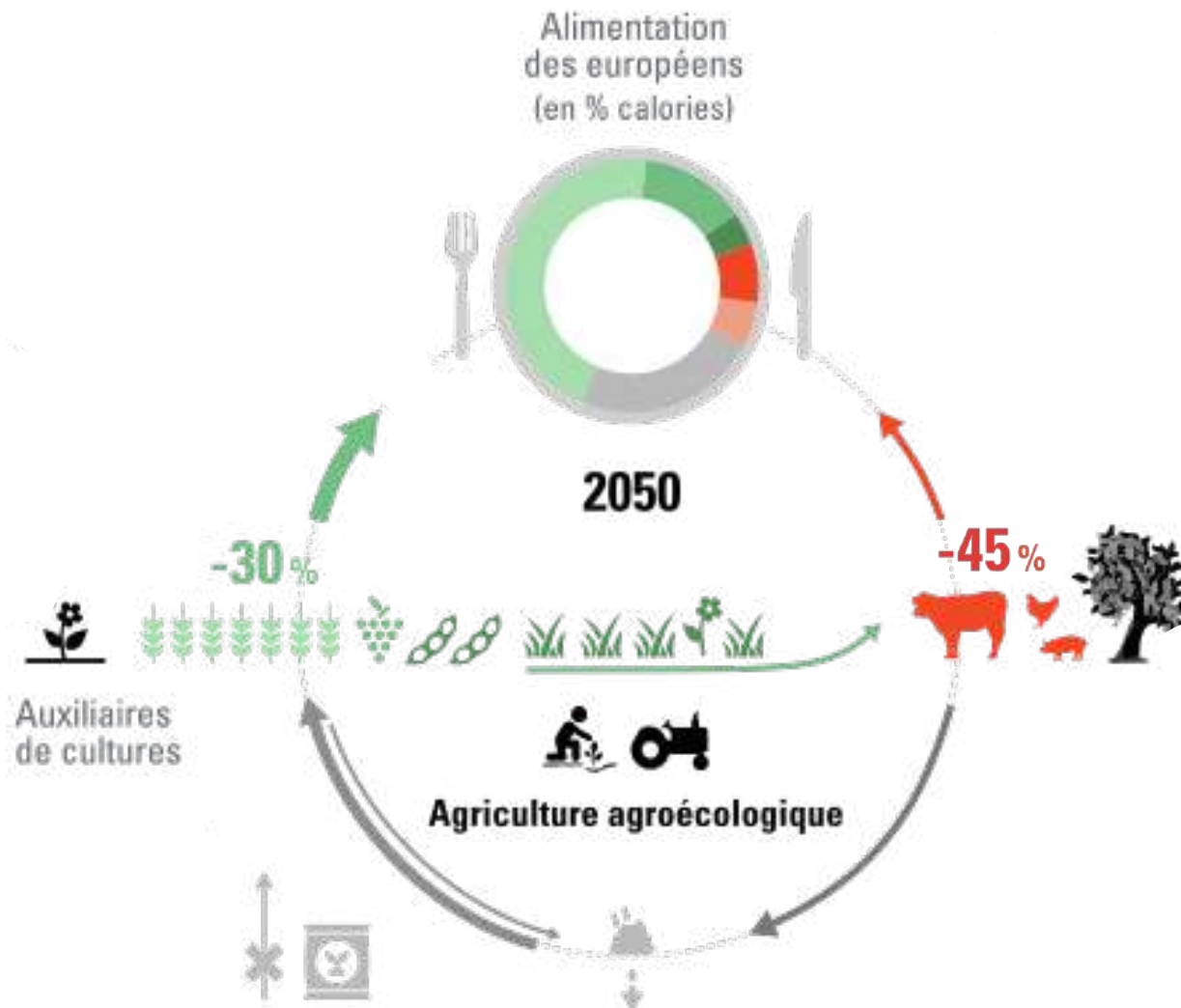
Une Europe agroécologique : le scénario TYFA



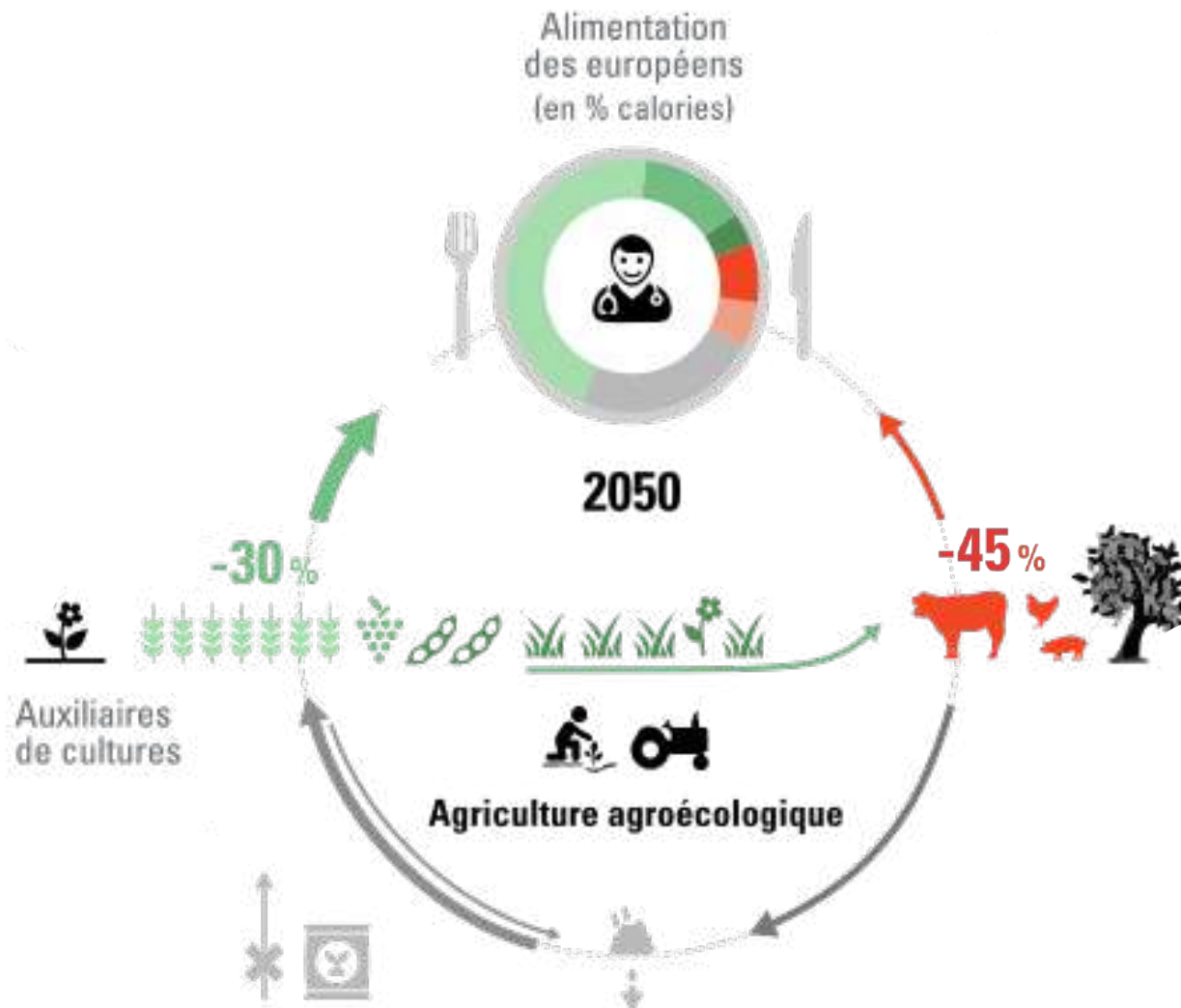
Une Europe agroécologique : le scénario TYFA



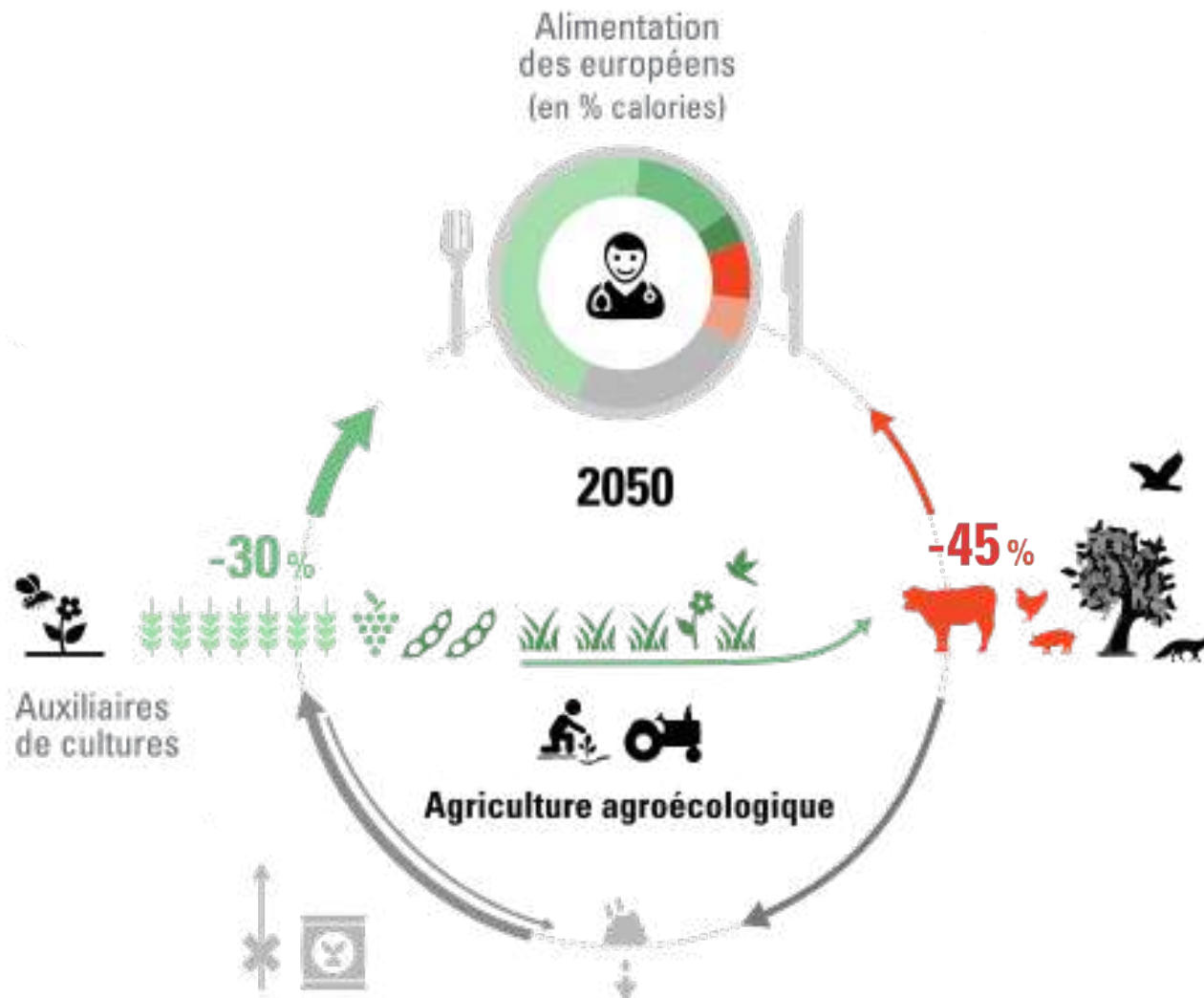
Une Europe agroécologique : le scénario TYFA



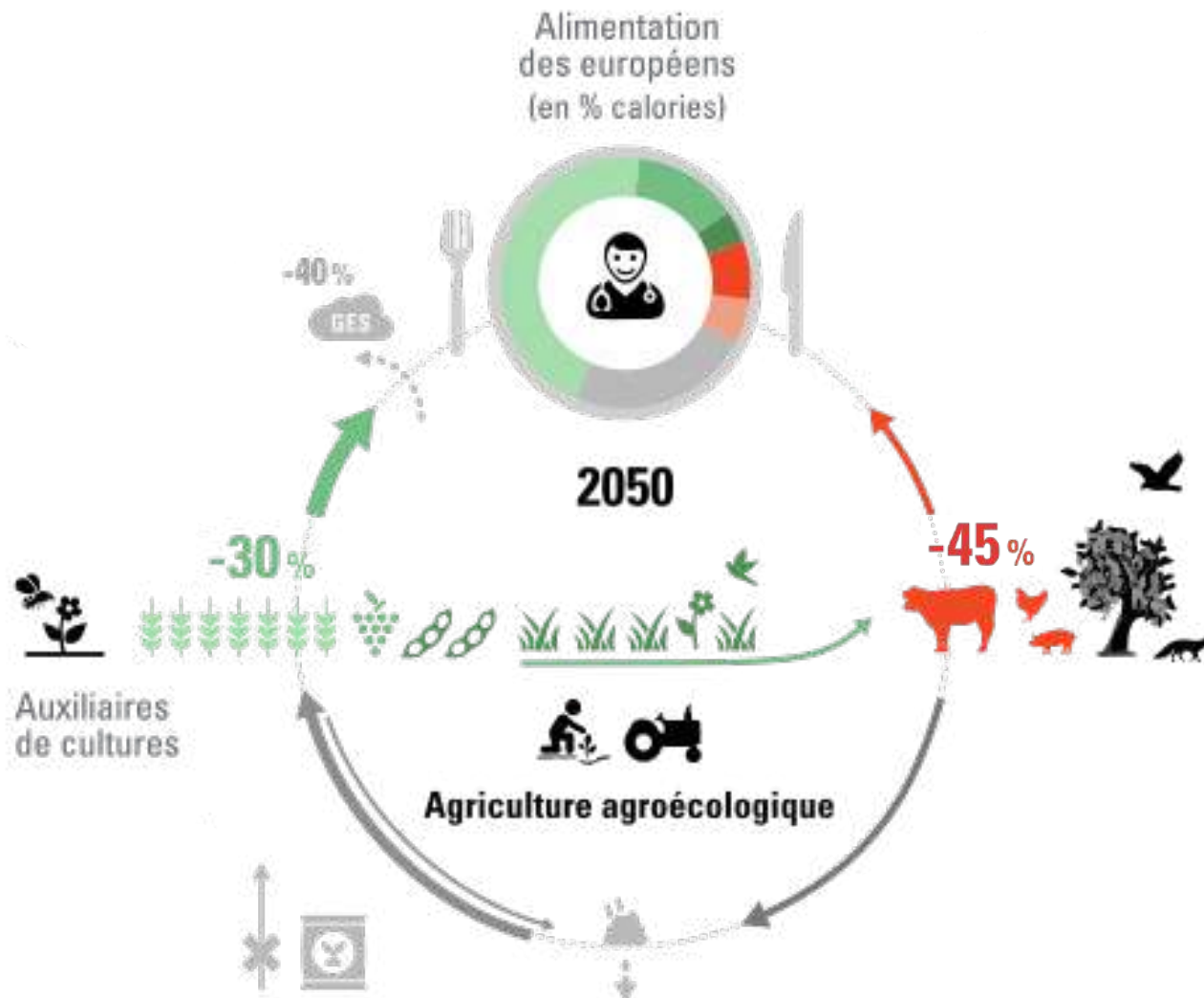
Une Europe agroécologique : le scénario TYFA



Une Europe agroécologique : le scénario TYFA

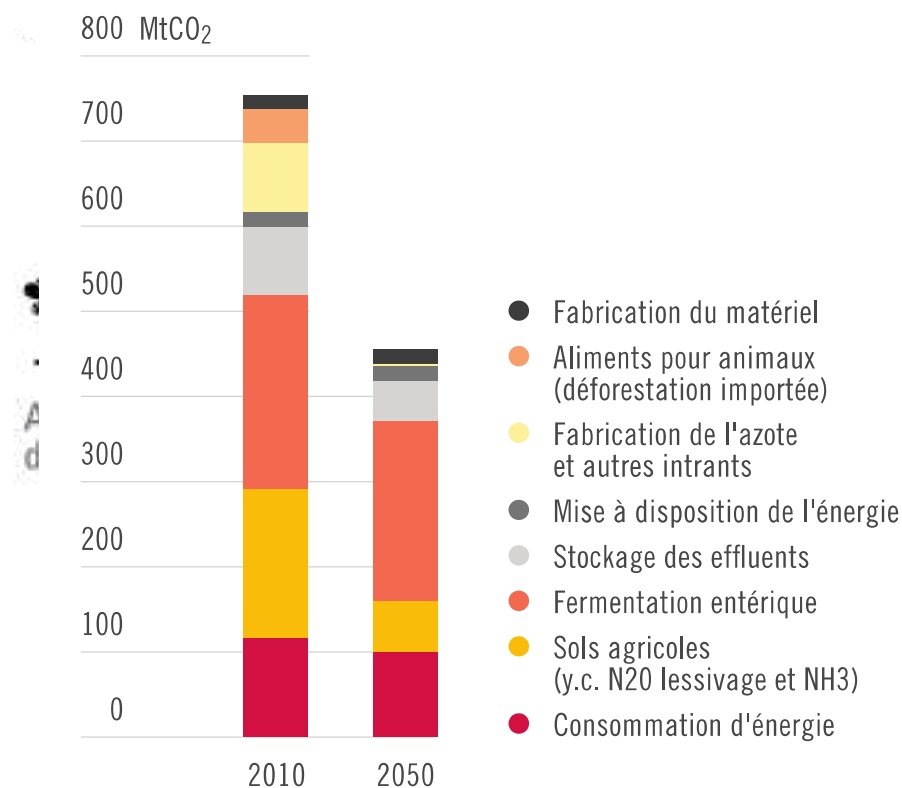


Une Europe agroécologique : le scénario TYFA



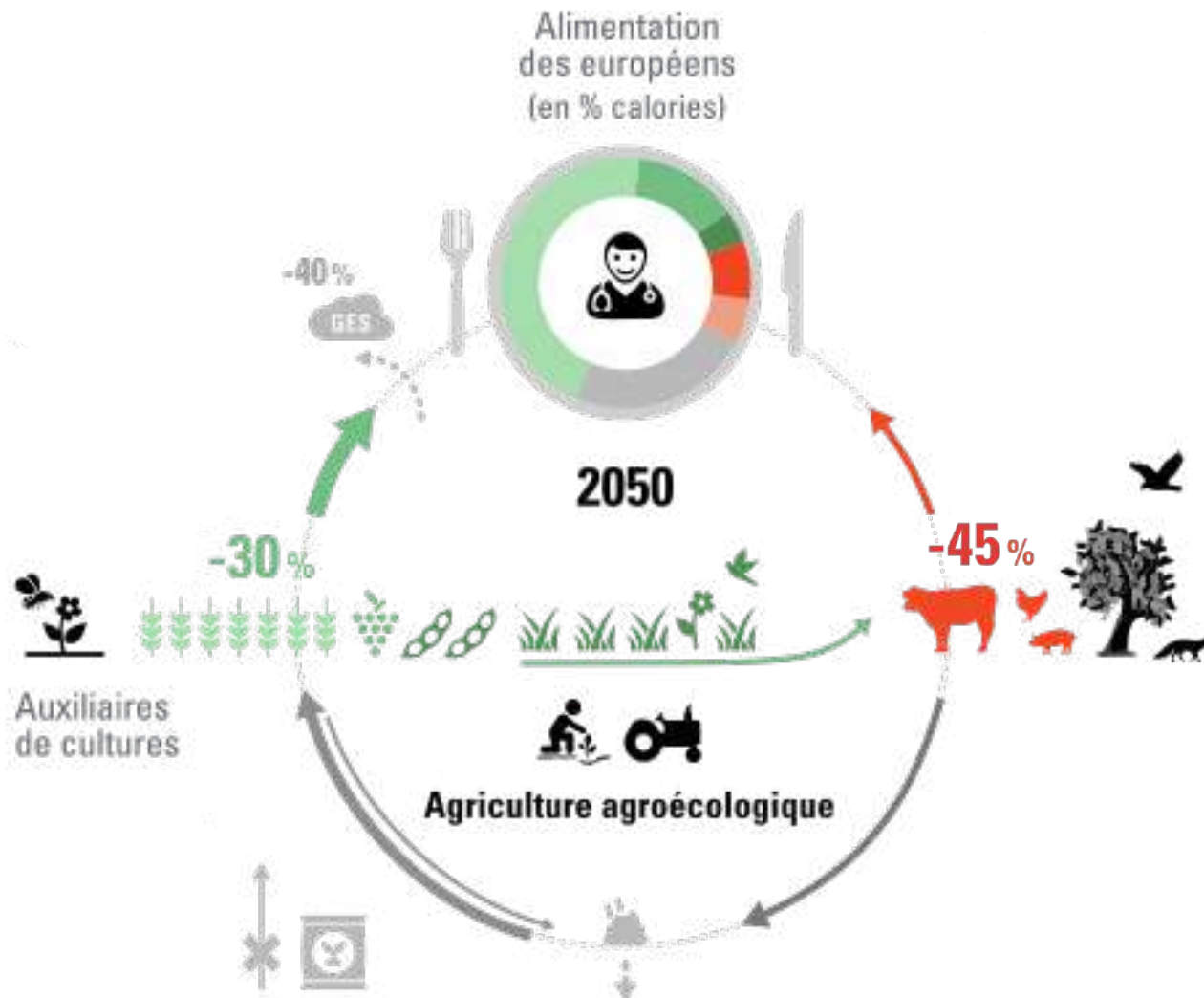
Une Europe agroécologique : le scénario TYFA

Alimentation
des européens
(en % calories)

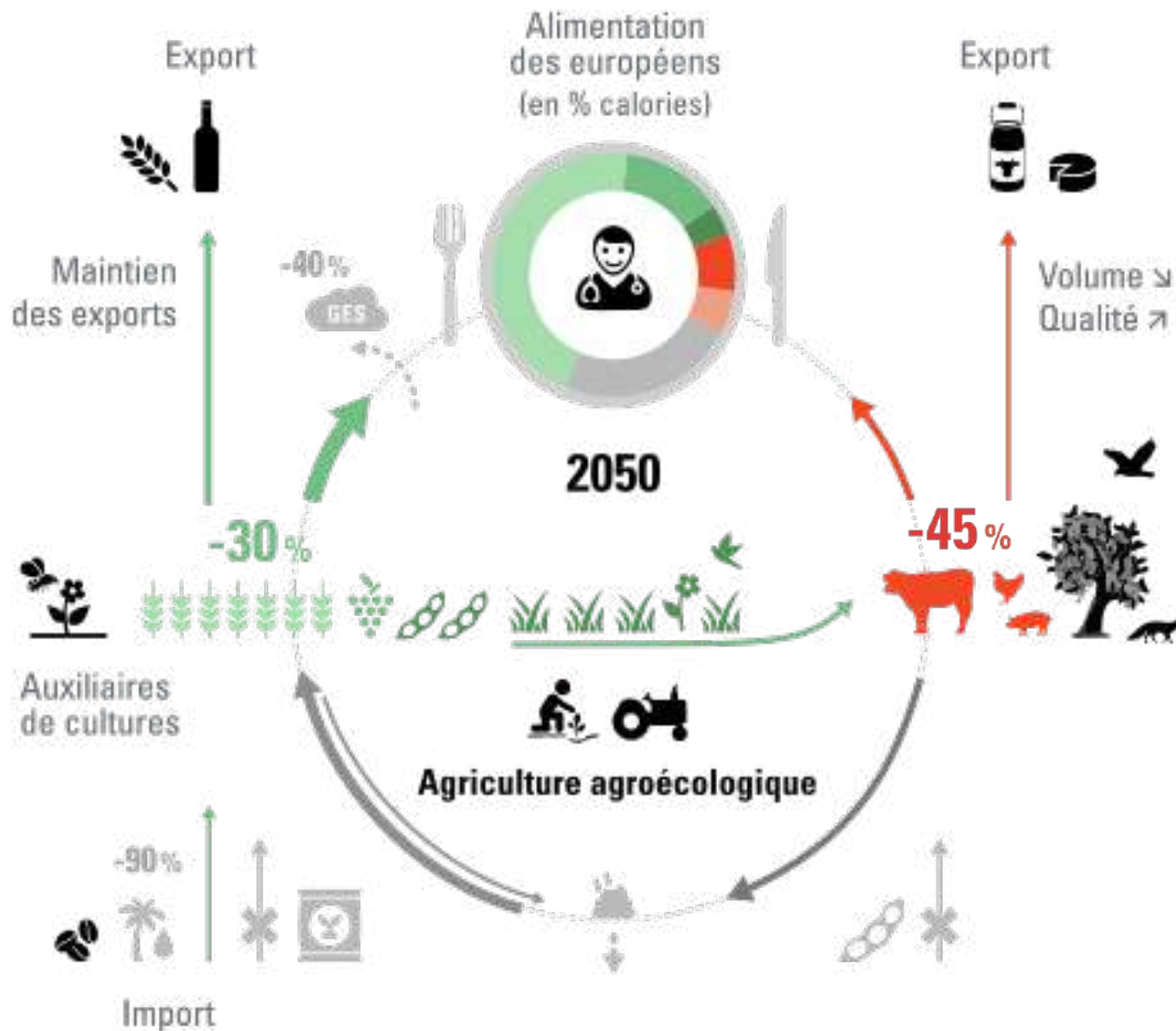


Source : TYFAM.

Une Europe agroécologique : le scénario TYFA



Une Europe agroécologique : le scénario TYFA



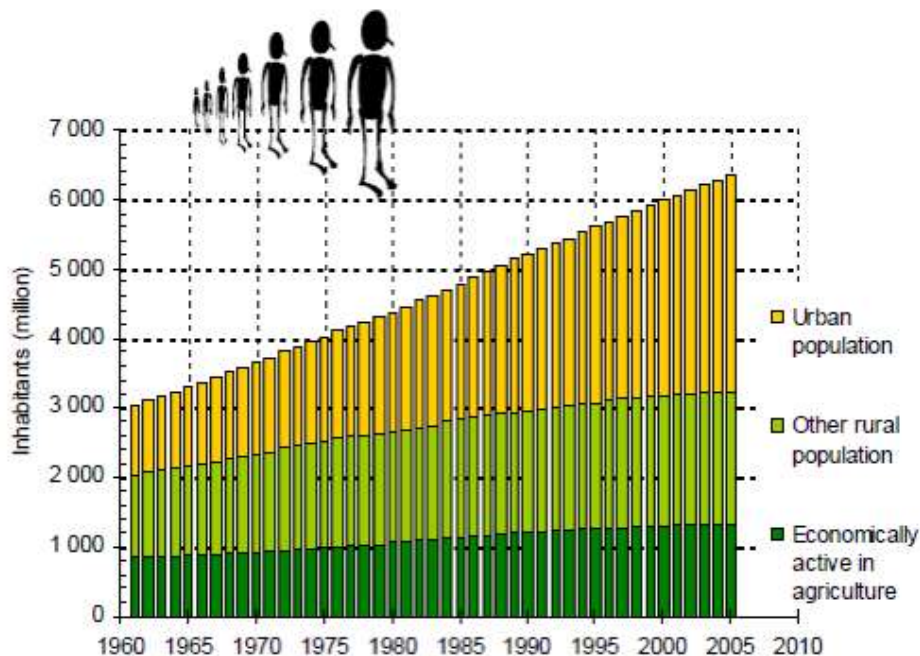
From past trends to scenarios

A 1961-2003 brief overview of the world food economy
through Agribiom eyes...

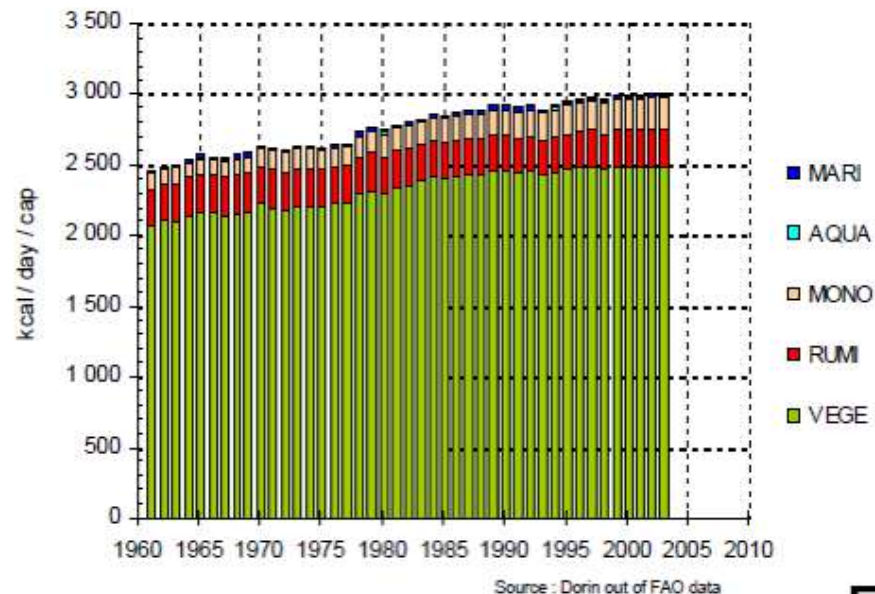
Agrimonde, 2009

① From average world increases...

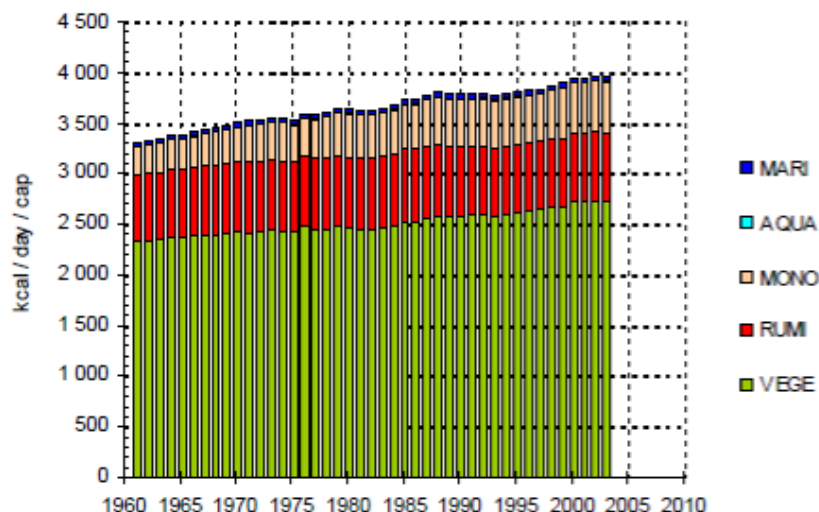
■ The population doubled



■ The per-capita food availability increased too...

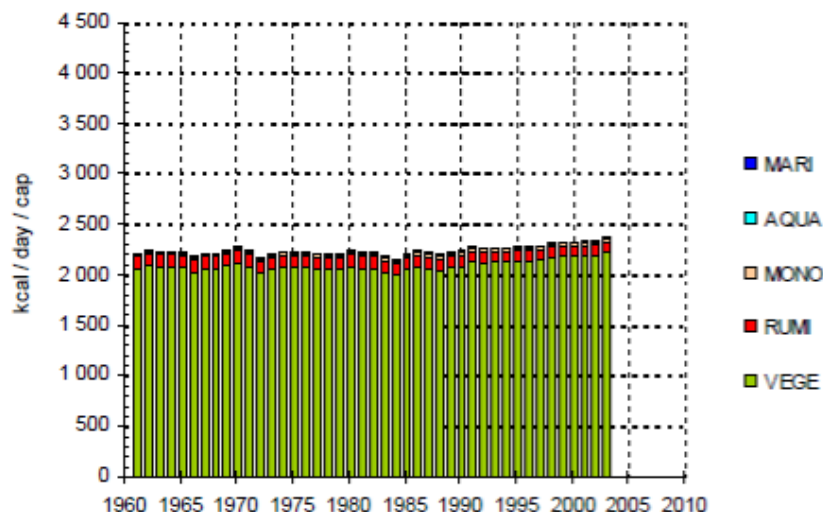


■ But still very large disparities in per-capita food availabilities



OECD

- Animal proteins :
71 g / day on 125 (60%)
- Animal fats :
89 g / day on 165 (55%)

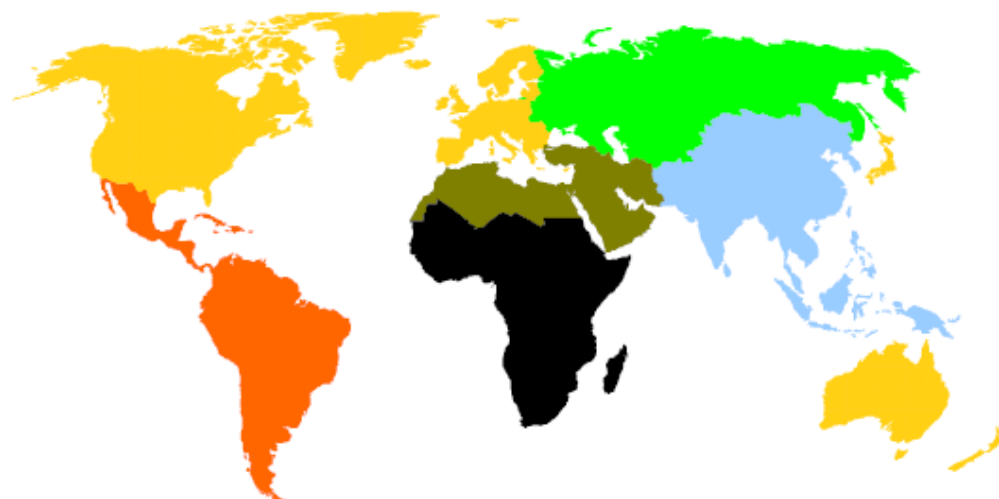


Sub-Saharan Africa

- Animal proteins :
12 on 60 g / day (20%)
- Animal fats :
10 on 48 g / jour (20%)

Source : B. Dorin out of FAO data

② ...to regional disparities

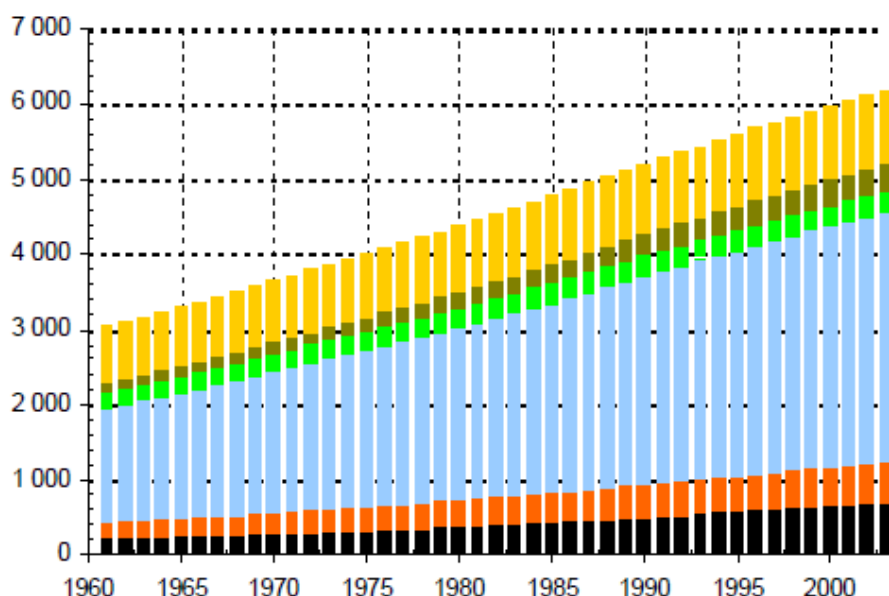


The 6 MEA regions

- OECD = Oecd-1990
- MENA = Middle East & North Africa
- FSU = Former USSR
- ASIA = Asia
- LAM = Latin America & the Caribbean
- SSA = Sub-Saharan Africa

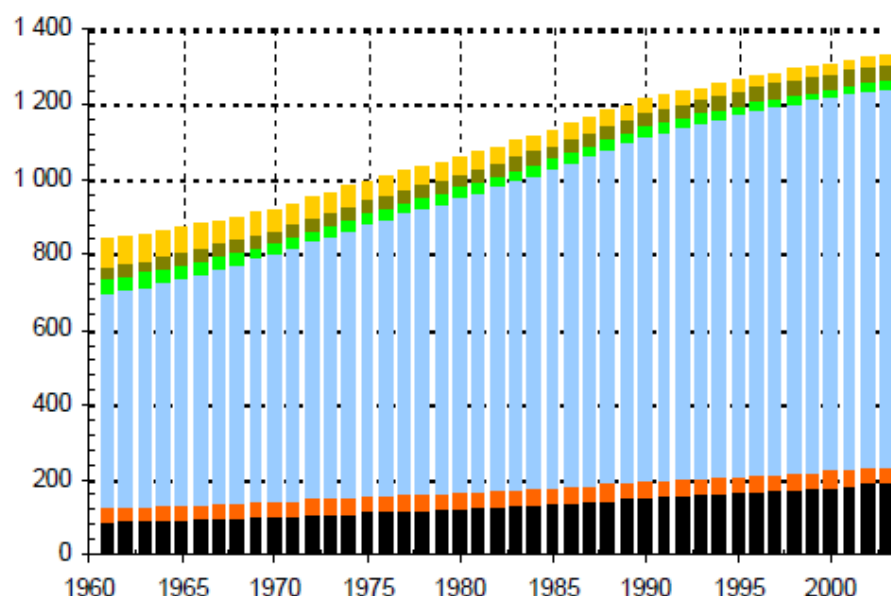
■ Human populations

Inhabitants (million)

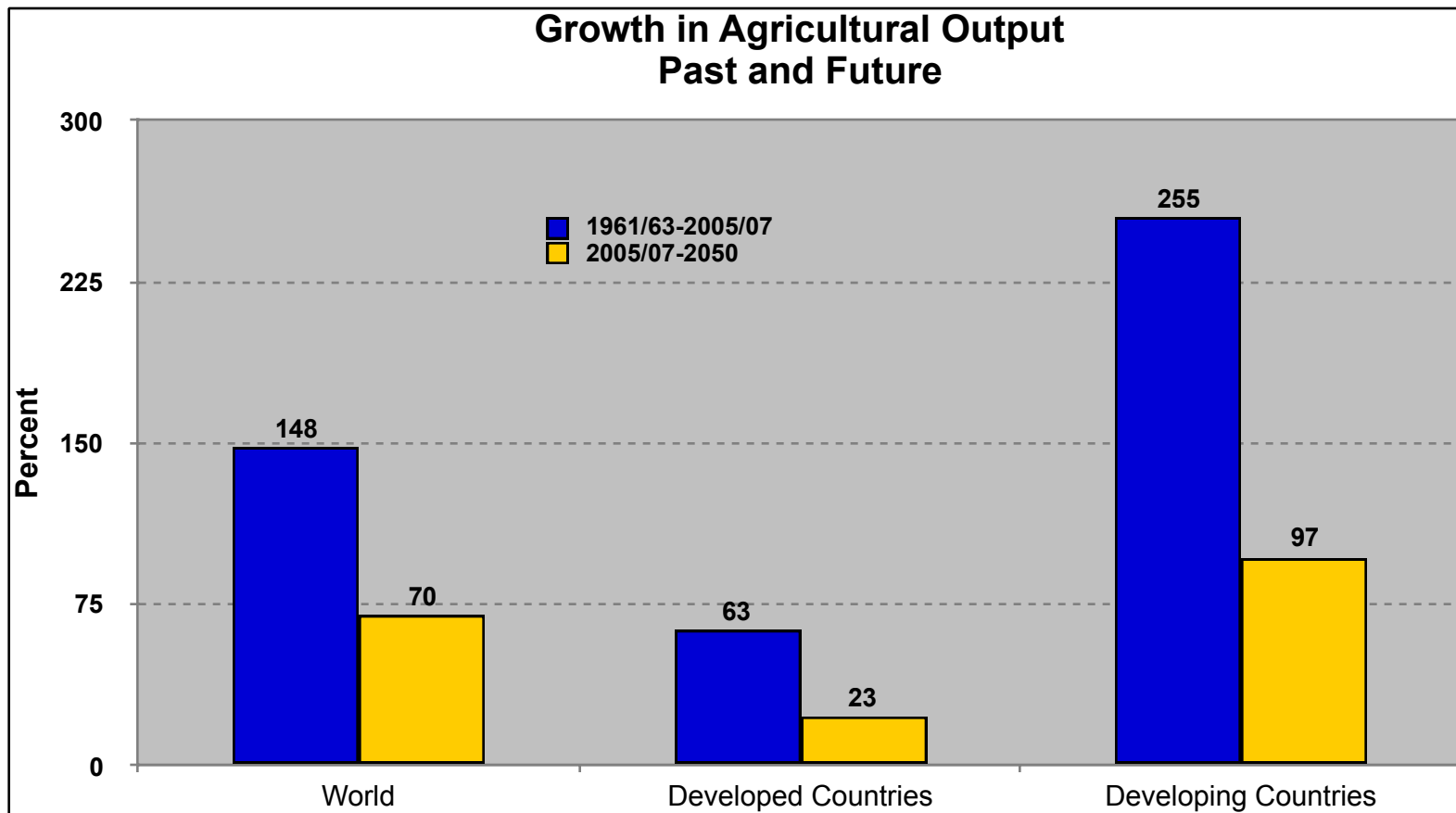


Farmers : highly and increasingly concentrated in Asia and Africa

Active agricultural workers (million)



FAO Outlook 2015-30 and now 2030-50

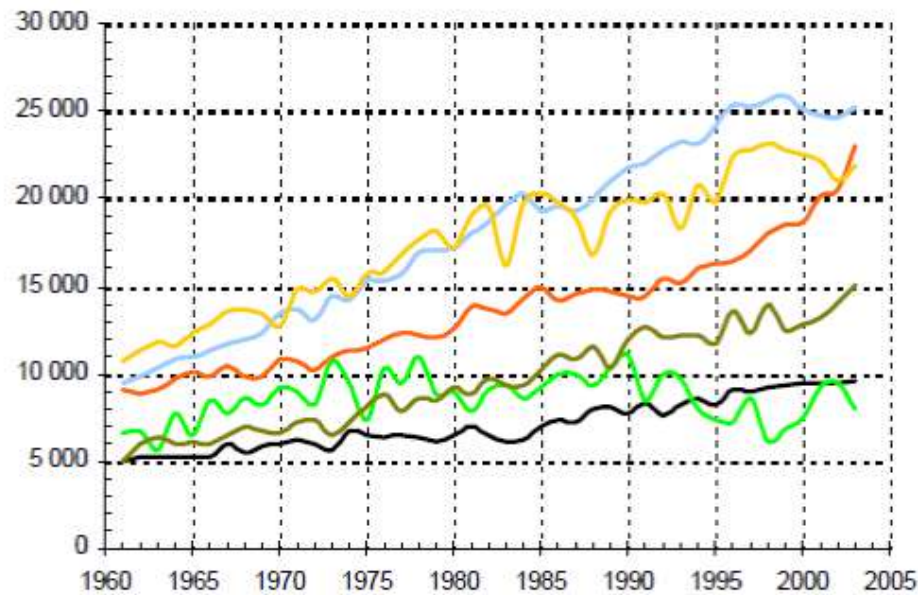


Highest land productivity in ASIA

Note : 10 000 kcal =
 ~ 2.4 kg of soybean
 ~ 2.8 kg of rice milled
 ~ 2.9 kg of pea
 ~ 3.0 kg of wheat
 ~ 15.0 kg of potato
 ~ 58.8 kg of tomato

— SSA
 — LAM
 — ASIA
 — FSU
 — MENA
 — OECD

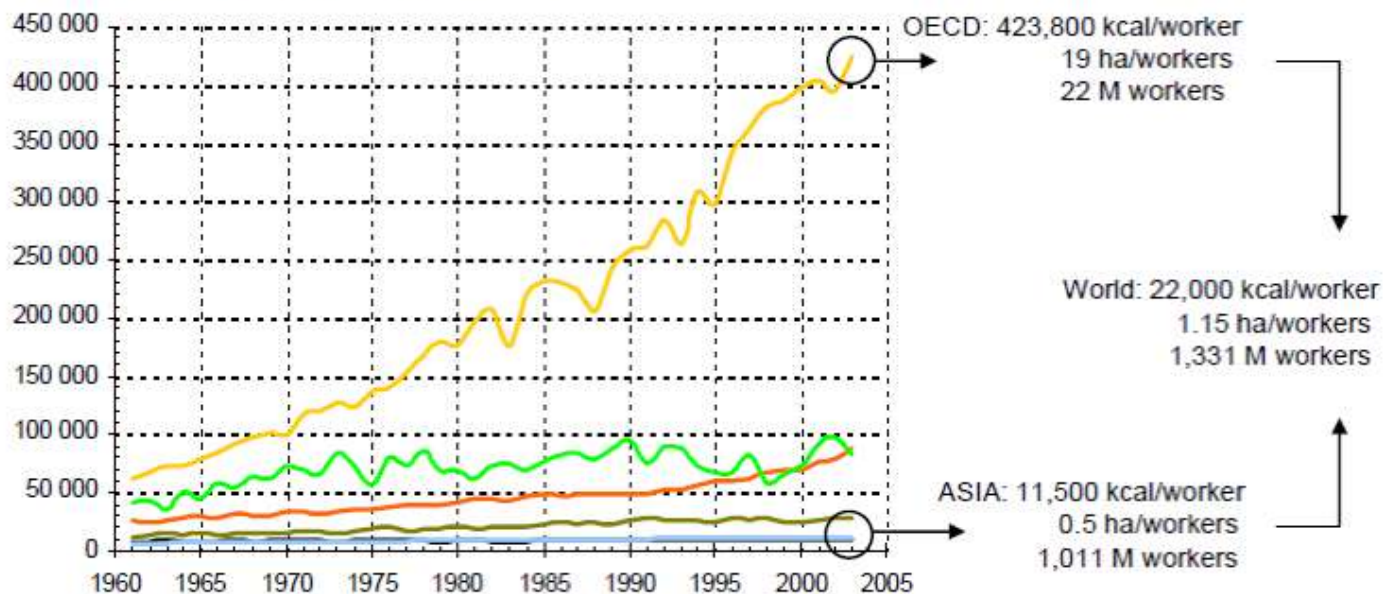
Vegetal kcal / day / cultivated hectare



Source : Dorin out of FAO data

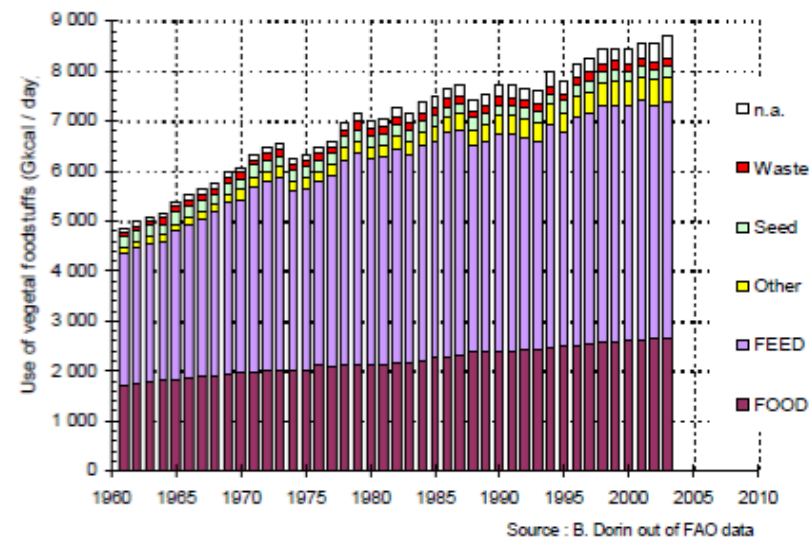
A labour productivity boom in OECD

Vegetal kcal / day / agricultural worker

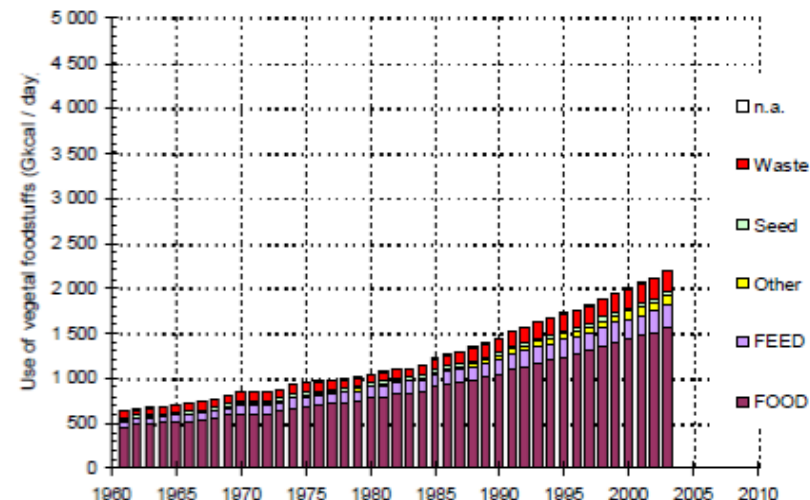


Quelle lecture des tendances passées ? Agrimonde, 2009

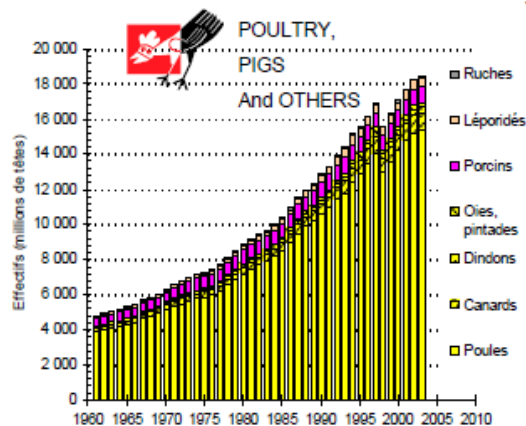
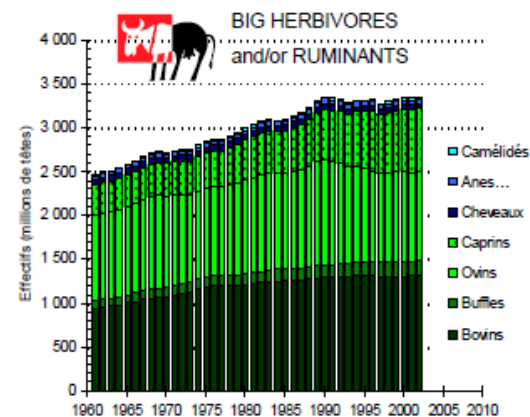
OCDE



(in 2003, the OECD cattle ate 3 times as much foodstuff as the SSA human population did)



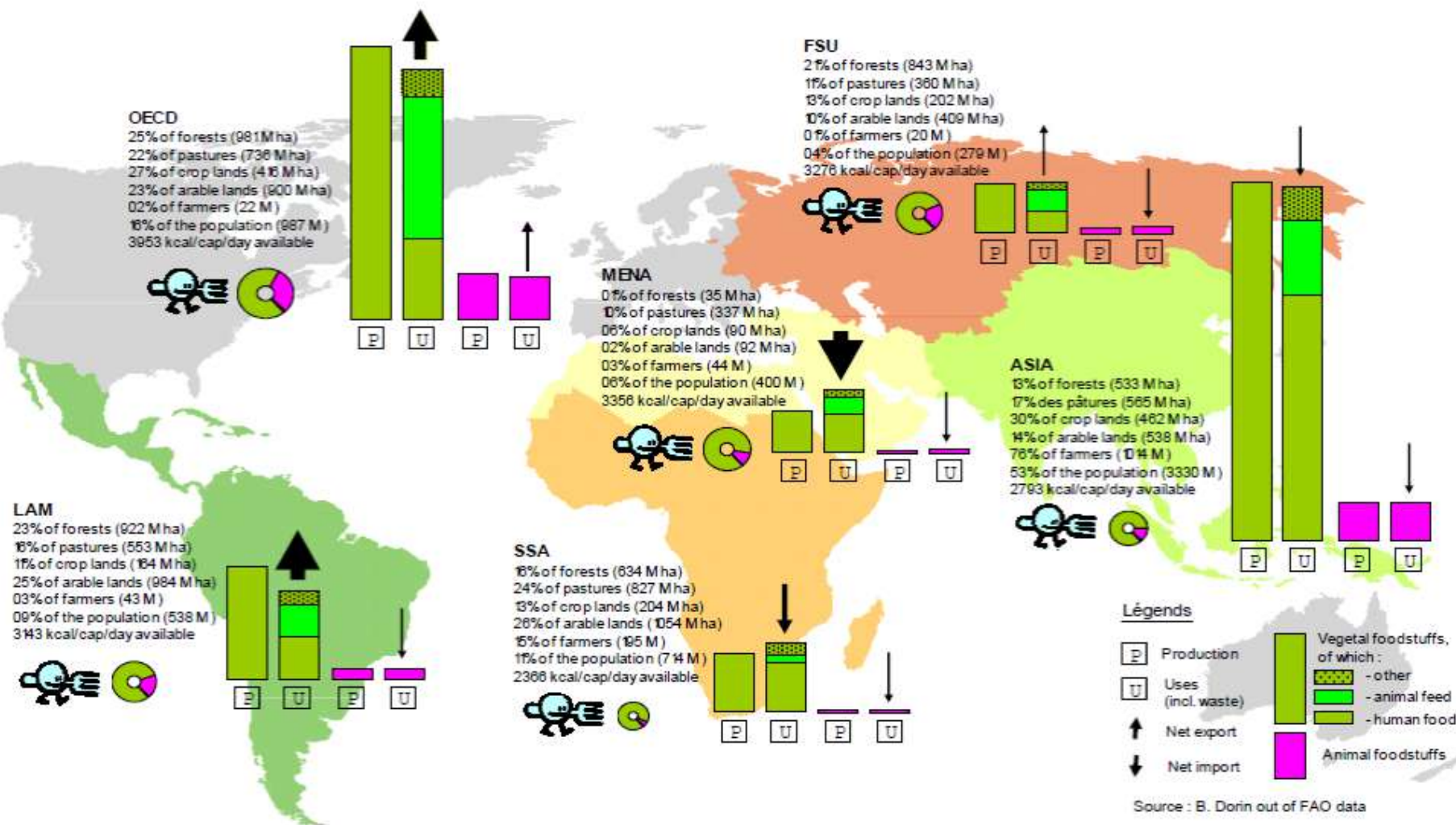
Sub Saharan Africa



③ Towards which new «equilibrium» in 2050 ?

Resources, productions, trade and uses of food biomasses (2003)

<http://www.cirad.fr/upload/en/communique/Cirad-Inra-Agrimonde-GB.pdf>



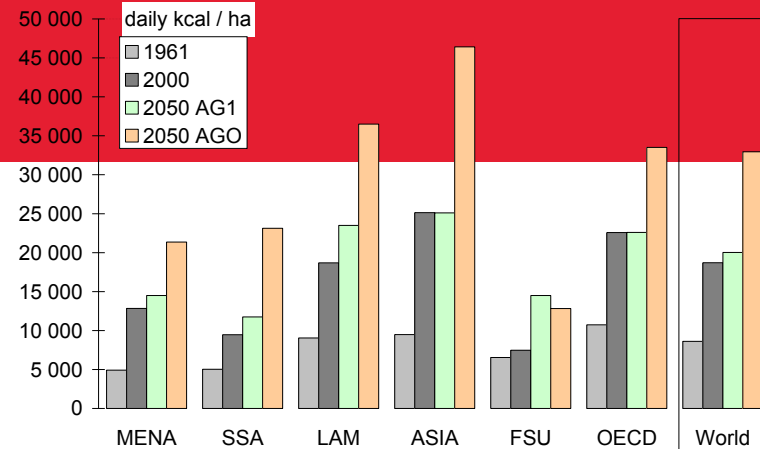
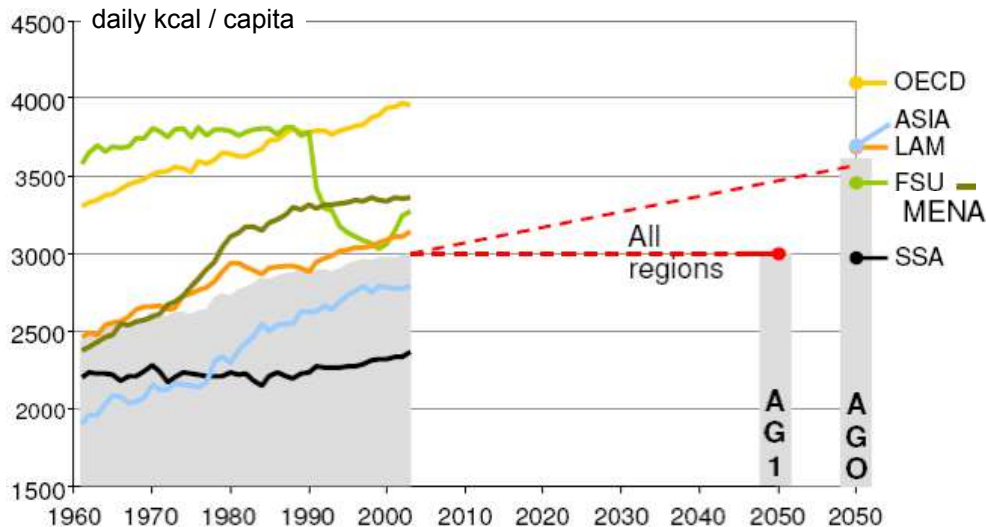
Scenarios, hypotheses, collective debates... (2050)

Agribiom simulations

Uses		2003	2050 - AG1	2050 - AGO
		Population	6.2 Gcap	8.8 (+42%)
		Human food	3,000 kcal/day/cap 17% Non-Veg	3,000 17% Non-Veg
		Other uses	~14,440 Gkcal/day	Feed (Agribiom) + seed (3%) + waste (max 4%) + other (max 5%)
Resources		2003	2050 - AG1	2050 - AGO
		Food yields	~19,190 kcal/day/ha	~20,030 (+4%)
		Crop land - for N-Food	~1,530 Mha neg.	~2,105 (+38%) 224 Mha
		Pastures	~3,330 Mha	~2,845 (-14%)
		2003	2050 - AG1	2050 - AGO
		Forest	~3,905 Mha	no change

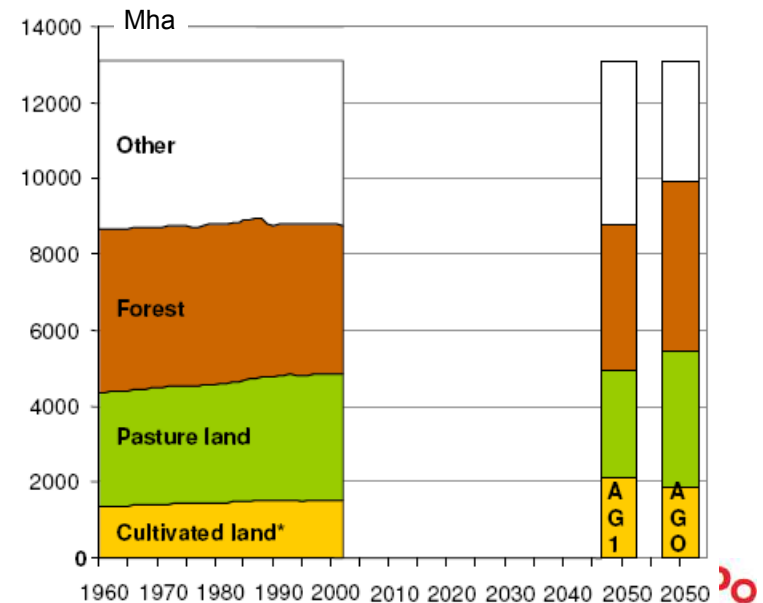
Trade : h01 : trade of plant food only (i.e. no trade of animal foodstuffs or by-products)
h02 : import of animal foodstuffs instead of import of plant feed

Food



Yield

Land



CONTACT

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