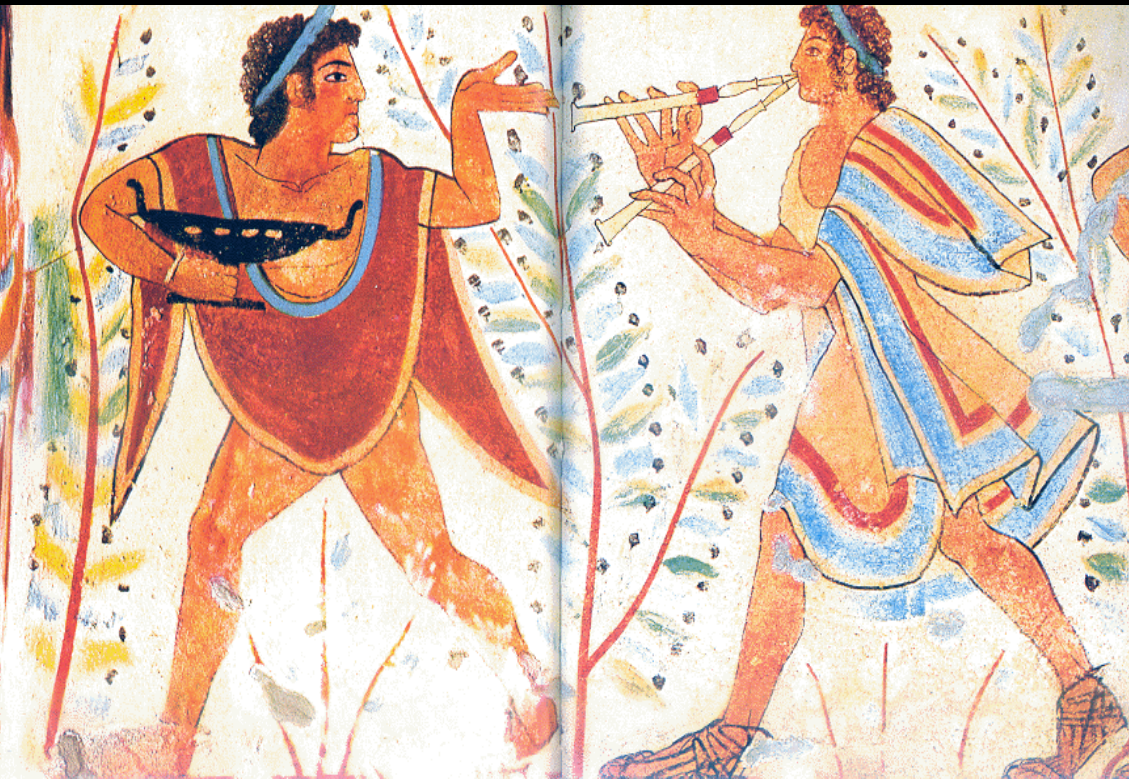
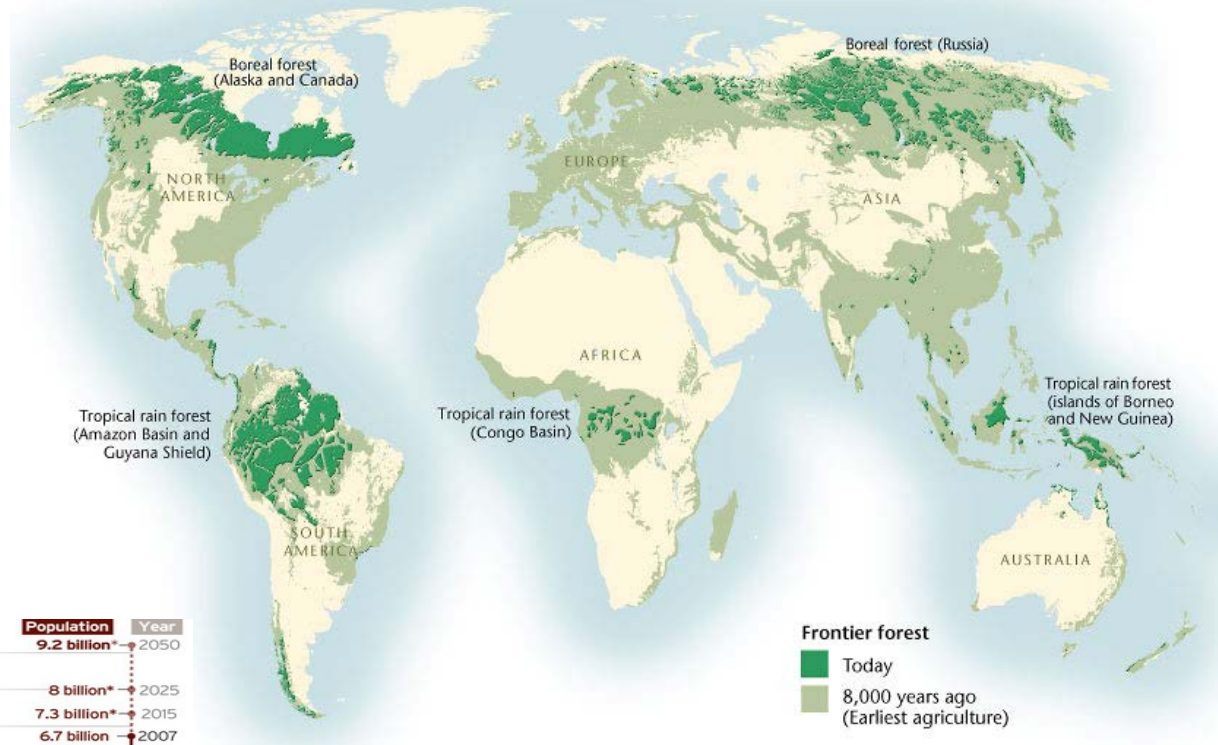


# Agricoltura e Cambiamenti climatici: il ruolo del Territorio



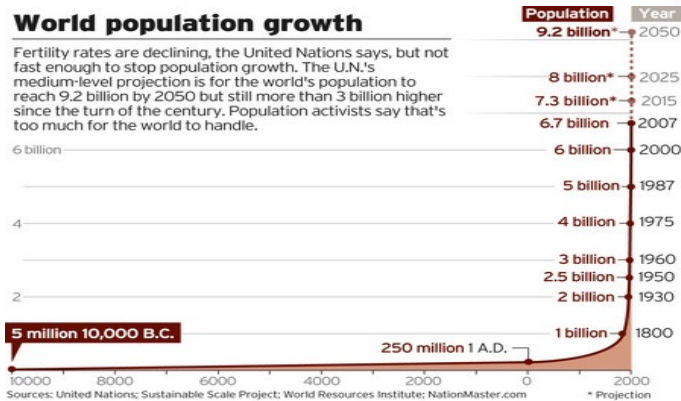
*Prof. Riccardo Valentini  
Università della Tuscia, Viterbo  
CMCC- Euromediterranean Centre for Climate Change, Italy*

# 40 % della terra è agricoltura



## World population growth

Fertility rates are declining, the United Nations says, but not fast enough to stop population growth. The U.N.'s medium-level projection is for the world's population to reach 9.2 billion by 2050 but still more than 3 billion higher since the turn of the century. Population activists say that's too much for the world to handle.



## Frontier forest

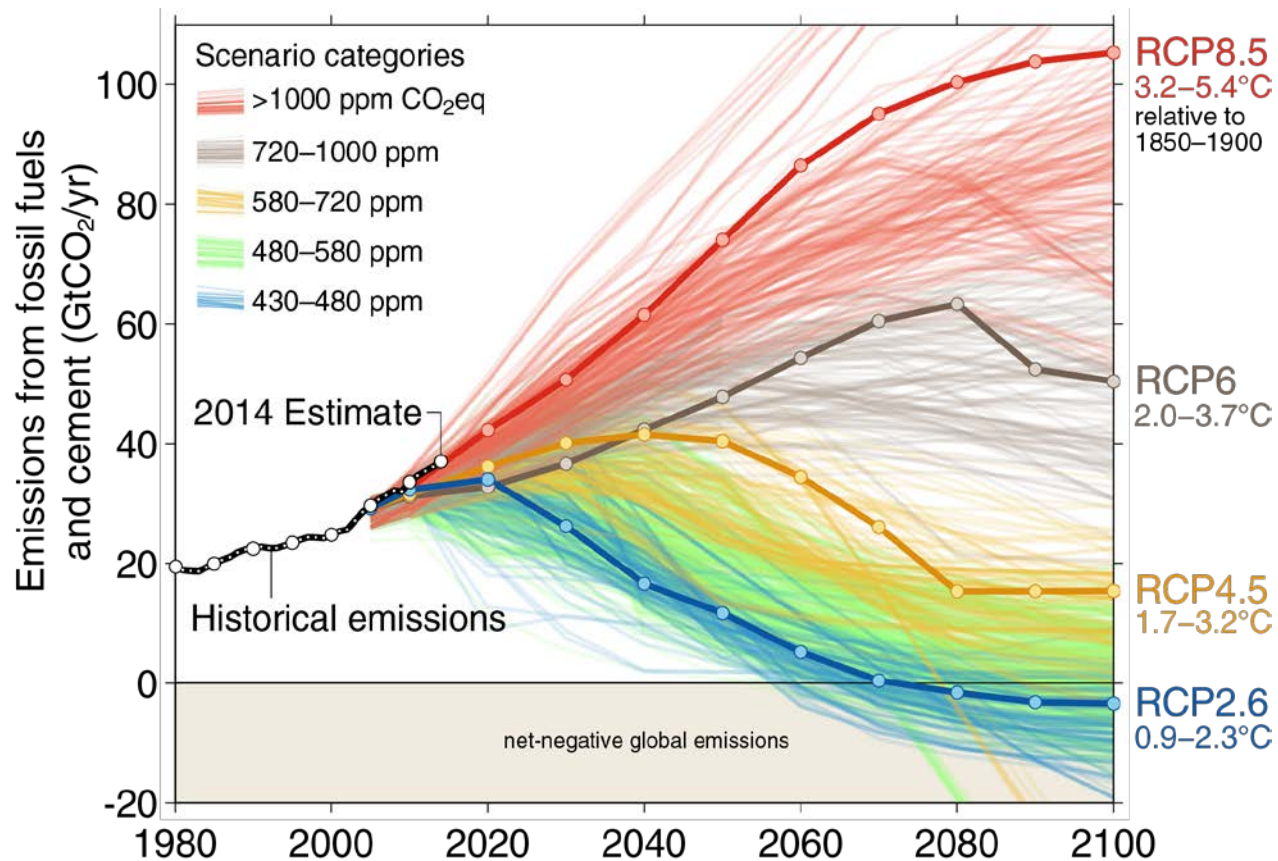
- Today
- 8,000 years ago (Earliest agriculture)



# Observed Emissions and Scenarios

- Emissions are on track for 3.2–5.4°C “likely” increase in temperature above pre-industrial
- Large and sustained mitigation is required to keep below 2°C

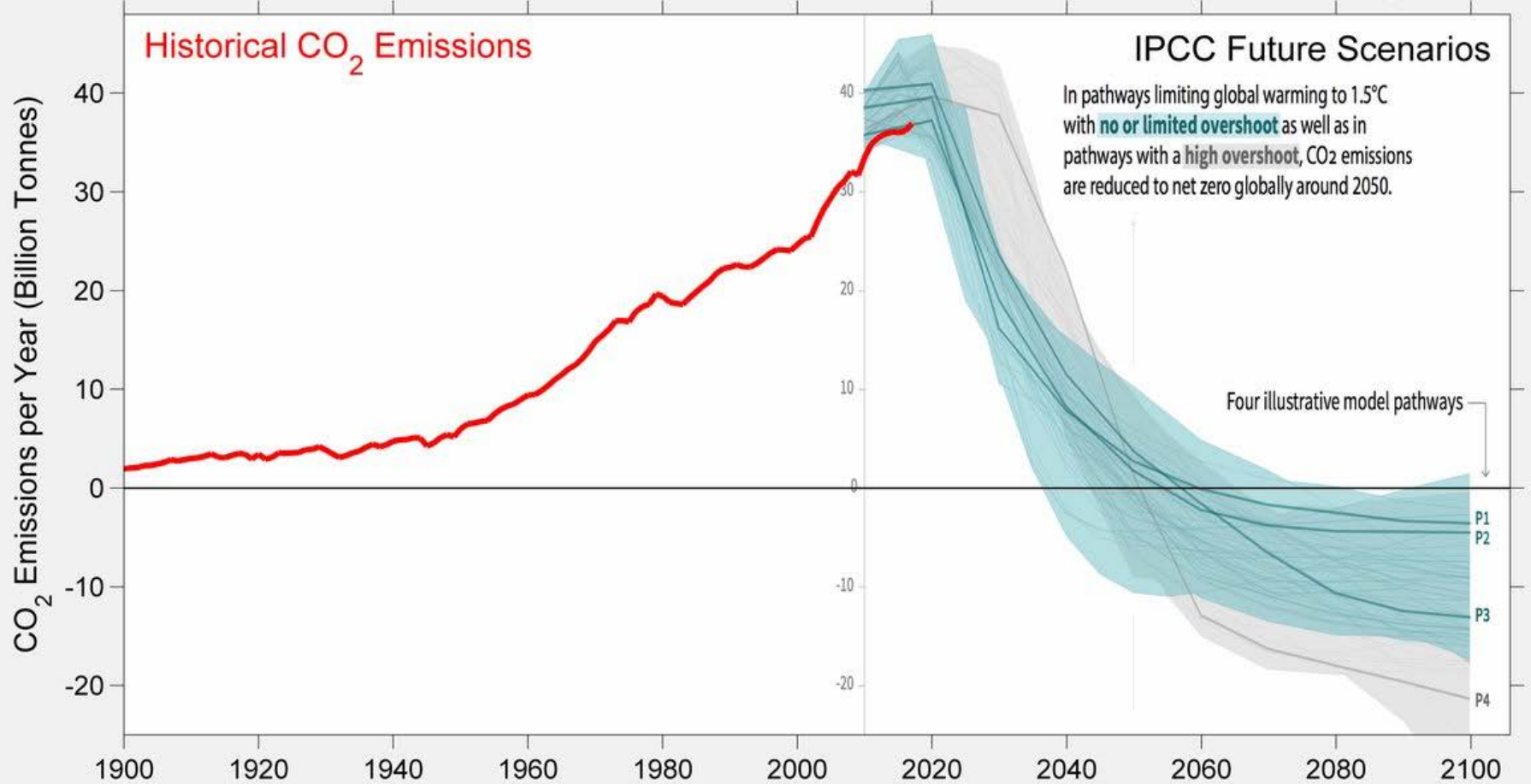
Data: CDIAC/GCP/IPCC/Fuss et al 2014



Over 1000 scenarios from the IPCC Fifth Assessment Report are shown

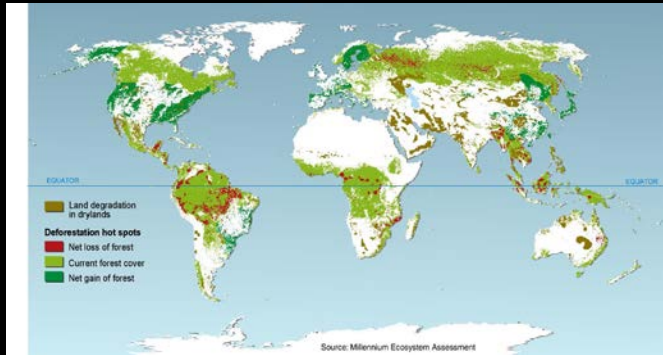
Source: [Fuss et al 2014](#); [CDIAC](#); [Global Carbon Budget 2014](#)

# Carbon Dioxide Emission Scenarios for 1.5 C of Warming



# Non Energy sources of GHG

## Deforestation (13Mha/year)



## Rapid changes

### 1.6. Increasing GHG emissions from agriculture

Over the last few decades, there has been a significant increase in global GHG emissions from agriculture, while emissions from deforestation are decreasing (IPCC, 2014a).

Global emissions from agriculture (crops & livestock) continued to increase by almost 100% in the last 50 years

2.7 billion tonnes CO<sub>2</sub> eq

1961

5.4 billion tonnes CO<sub>2</sub> eq

2012

Source: FAOSTAT, 2014

#### Examples of increases in emissions from 1961 to 2010

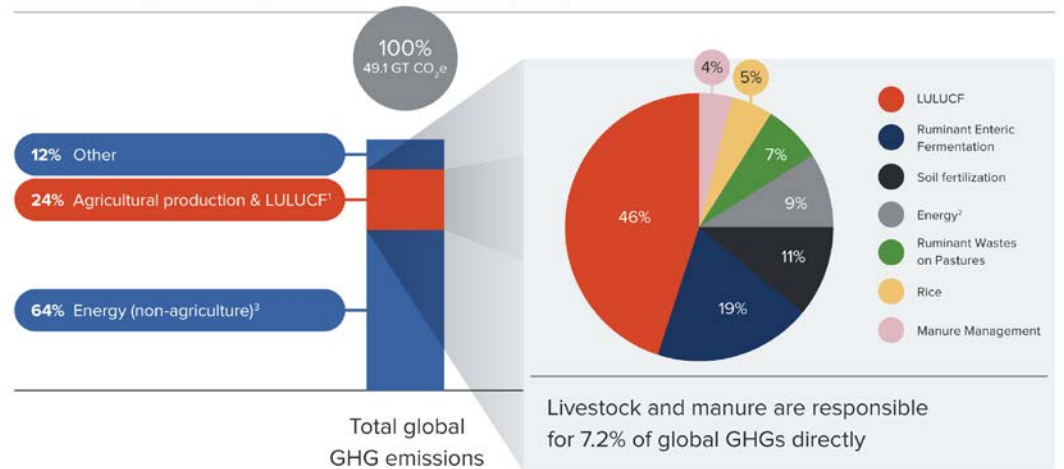
Source	Percent (%)
Synthetic fertilizers	900
Manure (either organic fertilizer on cropland or manure deposited on pasture)	73
Enteric fermentation	50
Paddy rice cultivation	41

Source: Tubiello et al., 2013; FAOSTAT, 2014

## Agriculture GHG emissions

### Land use and forestry have the biggest emissions impact, followed by livestock

Global AFOLU greenhouse gas emissions by sub-sector (2010)



<sup>1</sup> LULUCF = Land Use, Land Use Change, and Forestry

<sup>2</sup> Includes emissions from on-farm energy consumption as well as from manufacturing of farm tractors, irrigation pumps, other machinery, and key inputs such as fertilizer. It excludes emissions from the transport of food.

Source: World Resources Institute analysis based on UNEP, 2012; FAO, 2012; EIA, 2012; IEA, 2012; and Houghton, 2008, with adjustments.

<sup>3</sup> Excludes emissions from agricultural energy sources described above.

<sup>4</sup> Comprised of Ruminant enteric fermentation, Ruminant wastes on pastures, and Manure Management Source: WRI Analysis for percentages



# AGRICOLTURA E CAMBIAMENTI CLIMATICI

## RUOLO DELL'AGRICOL TURA NEL CONTESTO DEI CAMBIAMENTI CLIMATICI

Emissioni da **AGRICOLTURA** in Italia circa 30 Mil ton  $\text{CO}_{2\text{eq}}$ /anno (6,4%)  
a pari merito con settore industriale e secondo solo al settore energetico:

- $\text{CH}_4$  da fermentazione enterica (oltre 13 Mt  $\text{CO}_{2\text{eq}}$ /anno)
- $\text{CH}_4$  da gestione delle deiezioni (circa 5 Mt  $\text{CO}_{2\text{eq}}$ /anno)
- $\text{N}_2\text{O}$  da gestione dei suoli agricoli (quasi 9 Mt  $\text{CO}_{2\text{eq}}$ /anno)

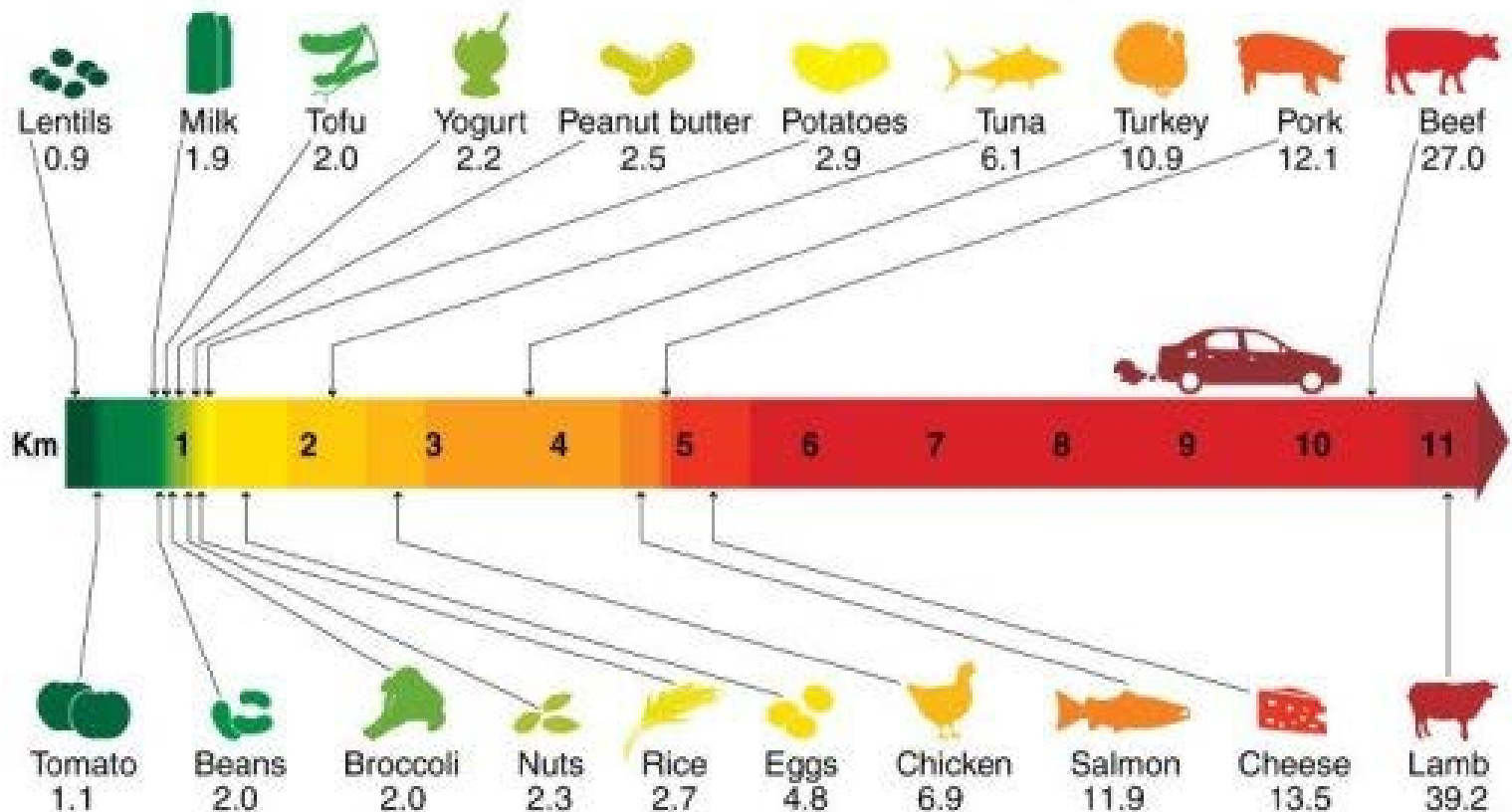


# Carbon footprint of what you eat

Calculations of greenhouse gas emissions from the production, processing and transportation of specific food items

■ Main chart compares 110g of food against a journey in a mid-sized car

■ Number shows kg of carbon dioxide equivalent produced per 1kg of food



Source: *Environment/WorkingGroup*

AFP



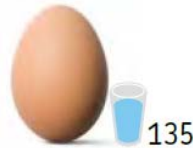
# Do you know the Water Footprint of...?



Potato (100 g)



Egg (40 g)



Bag of potato chips (200 g)



Slice of cake (80 g)



Sheet of A4 paper (80 g/m<sup>2</sup>)



Tomato (70 g)



Piece of cheese (100 g)



Piece of chocolate (50 g)



T-shirt (250 g)



Slice of bread (30 g)



Orange (100 g)



Apple (100 g)



Hamburger (150 g)



Pair of a leather shoes



Global average Water Footprint of some types of commonly used products (expressed in liters)



# I paradossi del cibo

## DIE OF HUNGER OR OBESITY?

Today, worldwide, for every malnourished person, there are two people who are obese or overweight.

# 1

TODAY  
IN THE  
WORLD

UNDERNOURISHED PEOPLE  
**868**  
million

OBESE OR OVERWEIGHT PEOPLE  
**1.5**  
billion



FOR EVERY UNDERNOURISHED  
PERSON, THERE ARE TWO WHO  
ARE OBESE OR OVERWEIGHT



DEATHS  
EVERY YEAR  
WORLDWIDE FROM:

LACK  
OF FOOD  
**36**  
million

TOO MUCH  
FOOD  
**29**  
million

## FEED PEOPLE, ANIMALS, OR CARS?

One-third of all food production worldwide is destined for feeding livestock. In addition, a growing share of agricultural land is used for the production of biofuel. As a result, we are choosing to feed automobiles instead of people.

\* allocation of the use of grains as a percentage between animal food, human food, and the production of biofuel

## GRAIN PRODUCTION IN THE WORLD AND ITS USE\*



## FEED WASTE OR FEED THE HUNGRY?

Every year worldwide, 1.3 billion tons of perfectly edible food are wasted, while 868 million people suffer from hunger.

# 3

1/3 OF GLOBAL FOOD PRODUCTION = 1.3 OF FOOD ARE WASTED billion tons

ENDS UP  
IN THE GARBAGE  
EACH YEAR



4 TIMES  
WHAT IT WOULD TAKE  
TO FEED THE 868 MILLION  
PEOPLE WHO ARE HUNGRY



## THE PLANET'S BALANCE IS NEGATIVE

Today, what is consumed is greater than what we are able to regenerate. For our current lifestyle, we will need 1.5 planets, and in 40 years we will need 3

TODAY



1.5 planets



2050

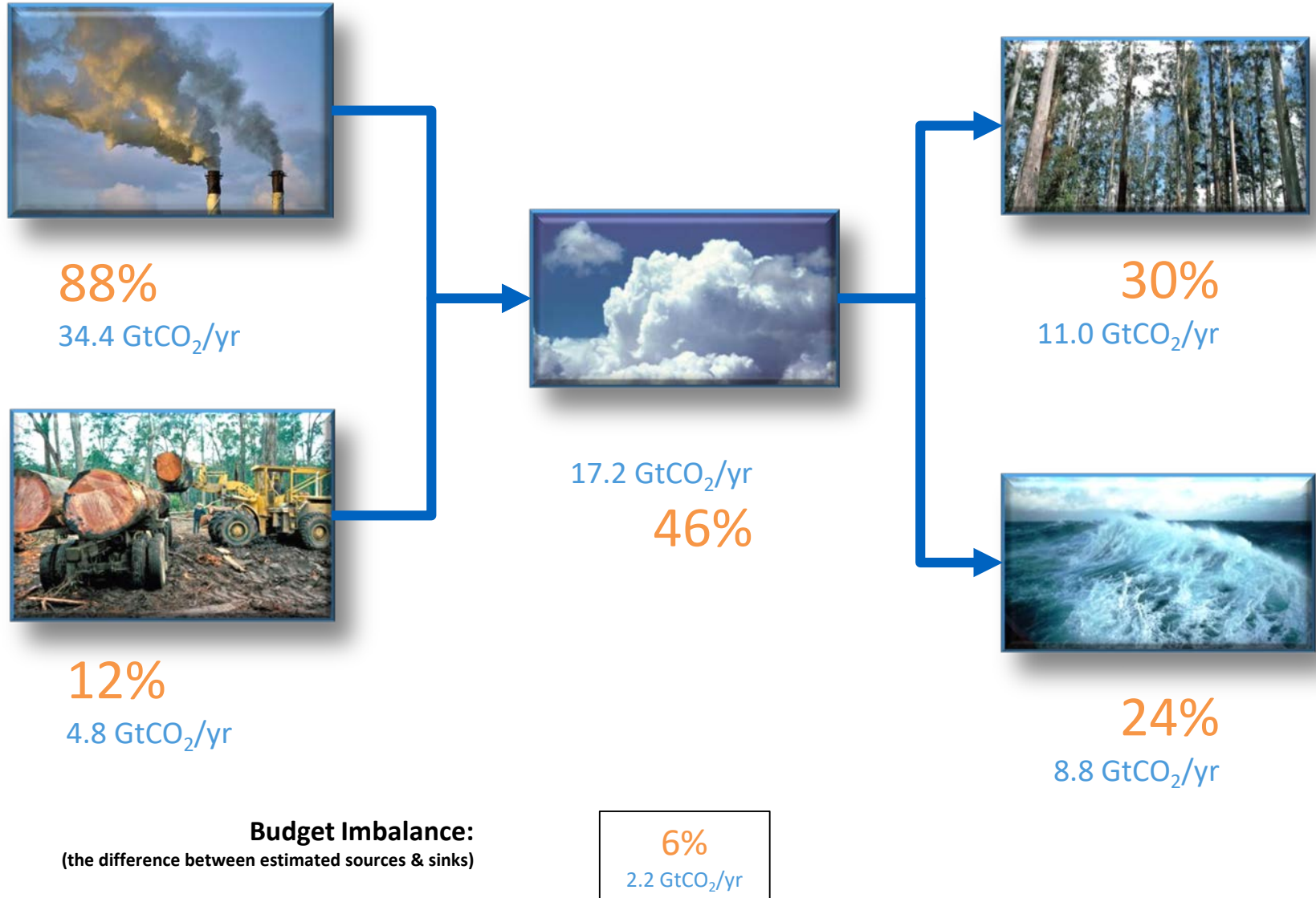


3 planets

**Come possiamo rendere il settore zootecnico più sostenibile ?**

**Che strategie territoriali adottare ?**

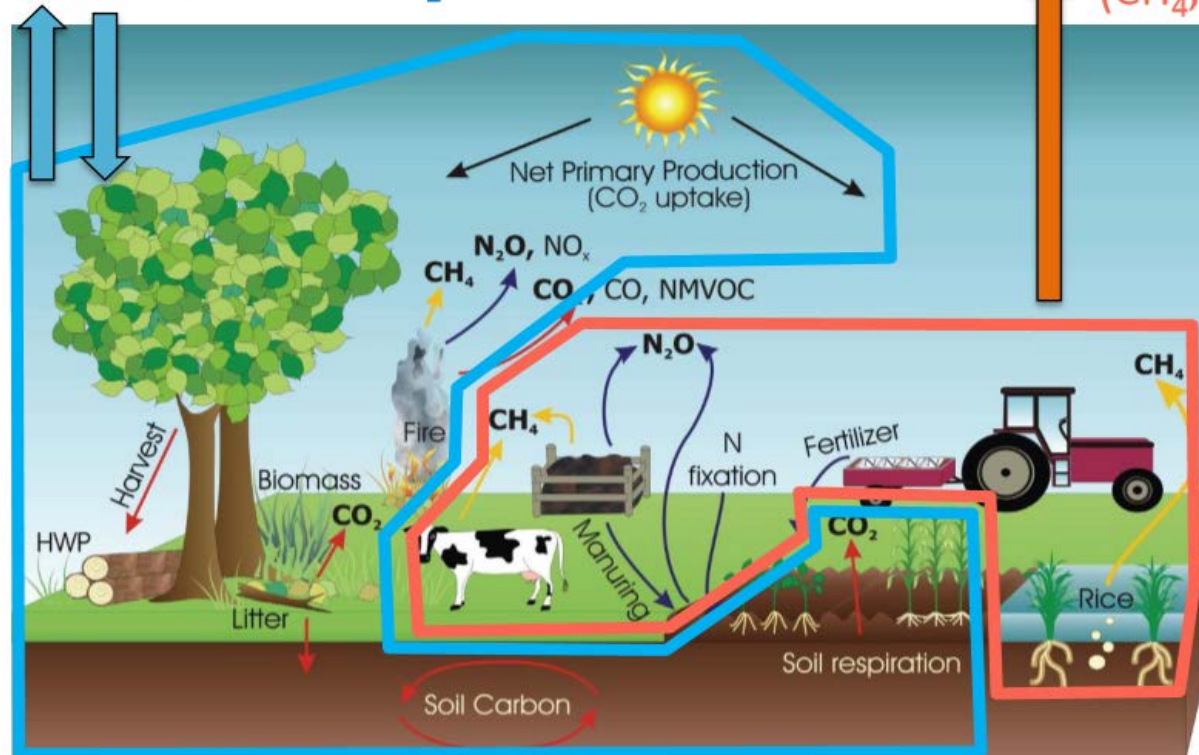
# Fate of anthropogenic CO<sub>2</sub> emissions (2007–2016)



# Settori di reporting/accounting

Land Use, Land use Change and Forestry

(LULUCF): mainly  $CO_2$



Land base accounting ?



# DISTRETTO ZOOTECNICO

## 1° STEP:

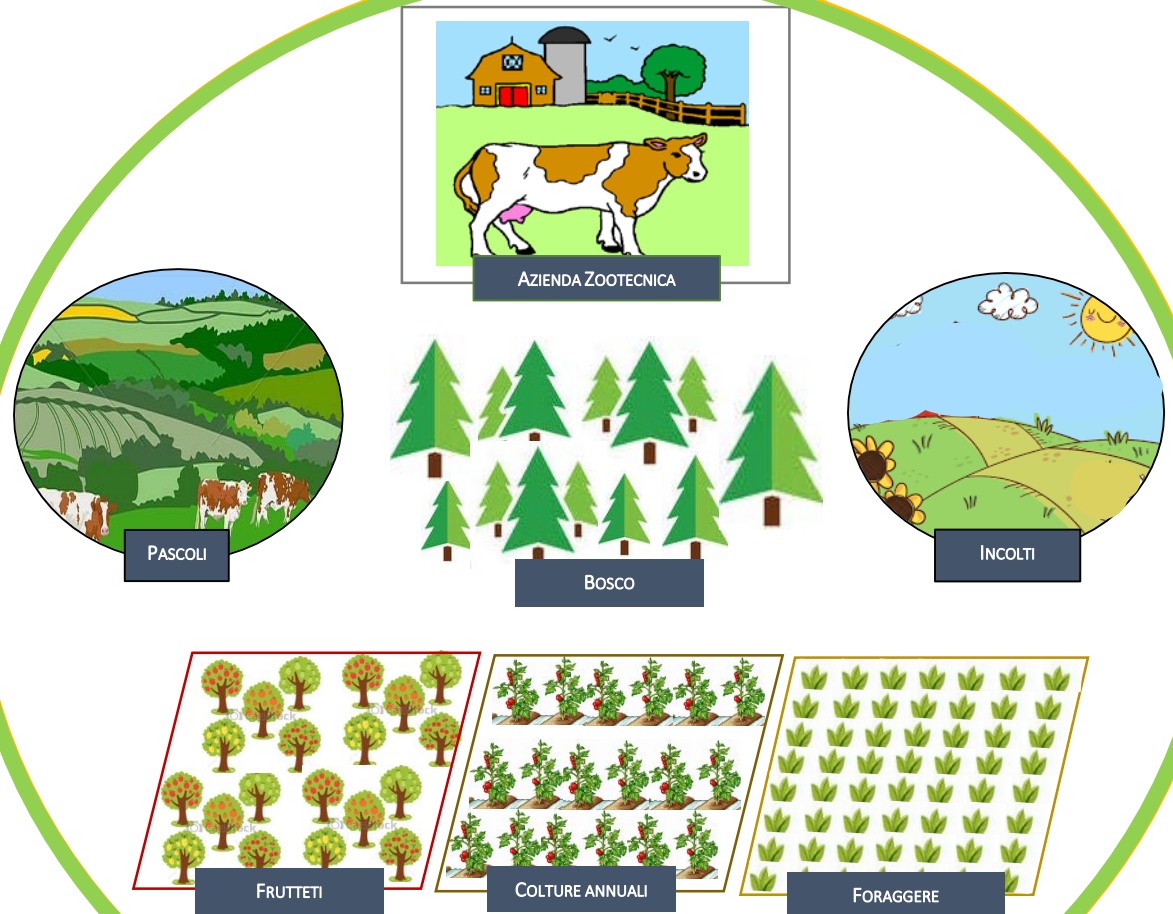
### STIMA EMISSIONI ZOOTECNICHE:

- SPEDITIVO (TIER 1)
- LCA COMPLETO (TIER 2/3)

## 2° STEP:

### STIMA CREDITI GENERABILI CON AZIONI DI MITIGAZIONE:

- MIGLIORAMENTO DELLA DIETA DEI RUMINANTI
- GESTIONE DELLE DEIEZIONI
- UTILIZZO SOSTENIBILE DEI FERTILIZZANTI CHIMICI
- RIDUZIONE DEL DISTURBO DEI SUOLI AGRICOLI
- MANTENIMENTO DELLA COPERTURA ERBOSA NELLE COLTURE PERMANENTI
- GESTIONE SOSTENIBILE DEI RESIDUI AGRICOLI (ENERGIA/INTERRAMENTO)
- NUOVI IMPIANTI DI FRUTTICOLTURA
- RIMBOSCHIMENTI/IMBOSCHIMENTI



Bilancio della componente AGROFORESTALE  
Settore AFOLU (IPCC, 2006)