L'agricoltura e la riduzione delle emissioni di gas serra

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Firenze

Energia, Industria Trasporti

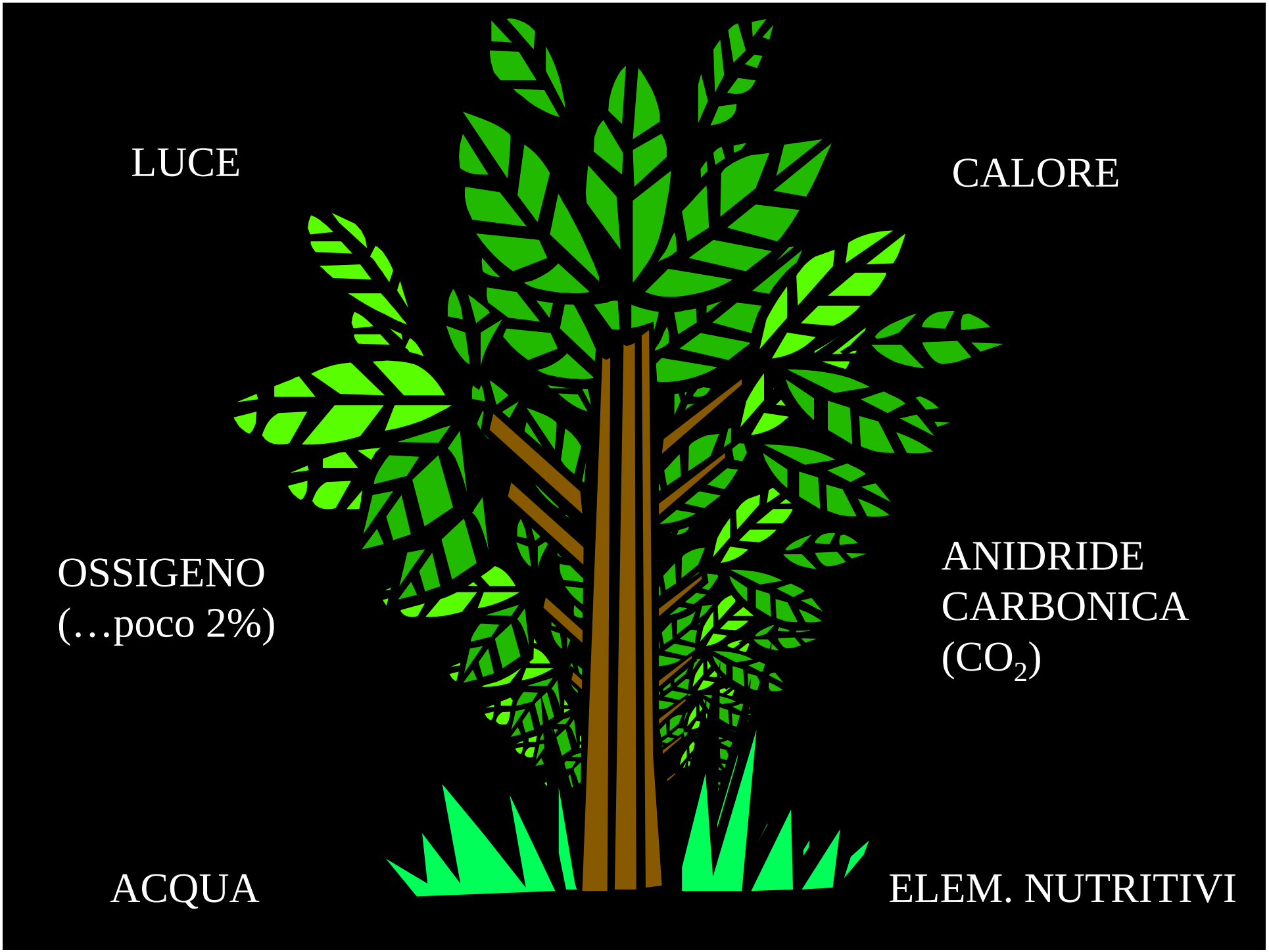
Riduzione delle emissioni

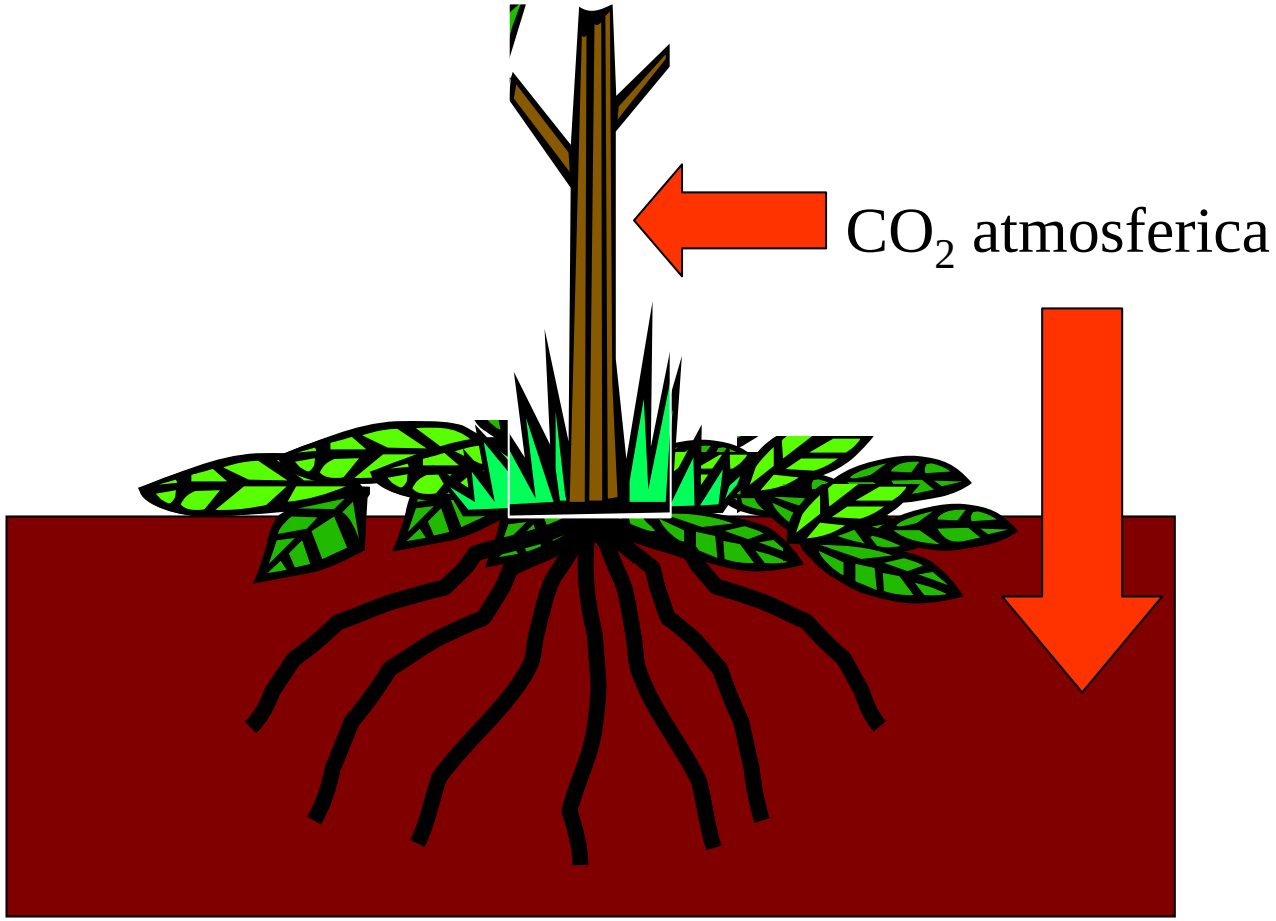
Mitigazione ⇒

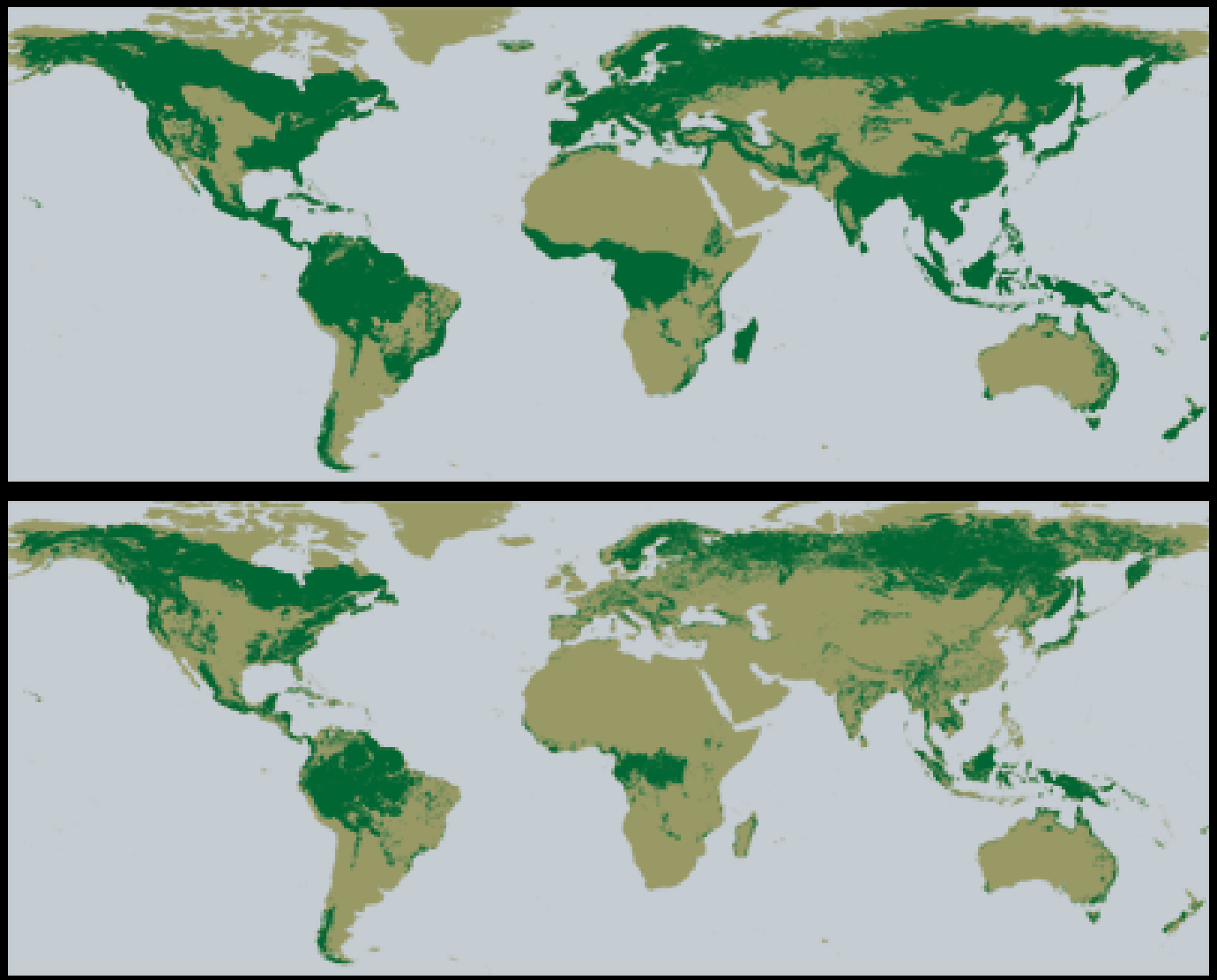
Protezione degli stock

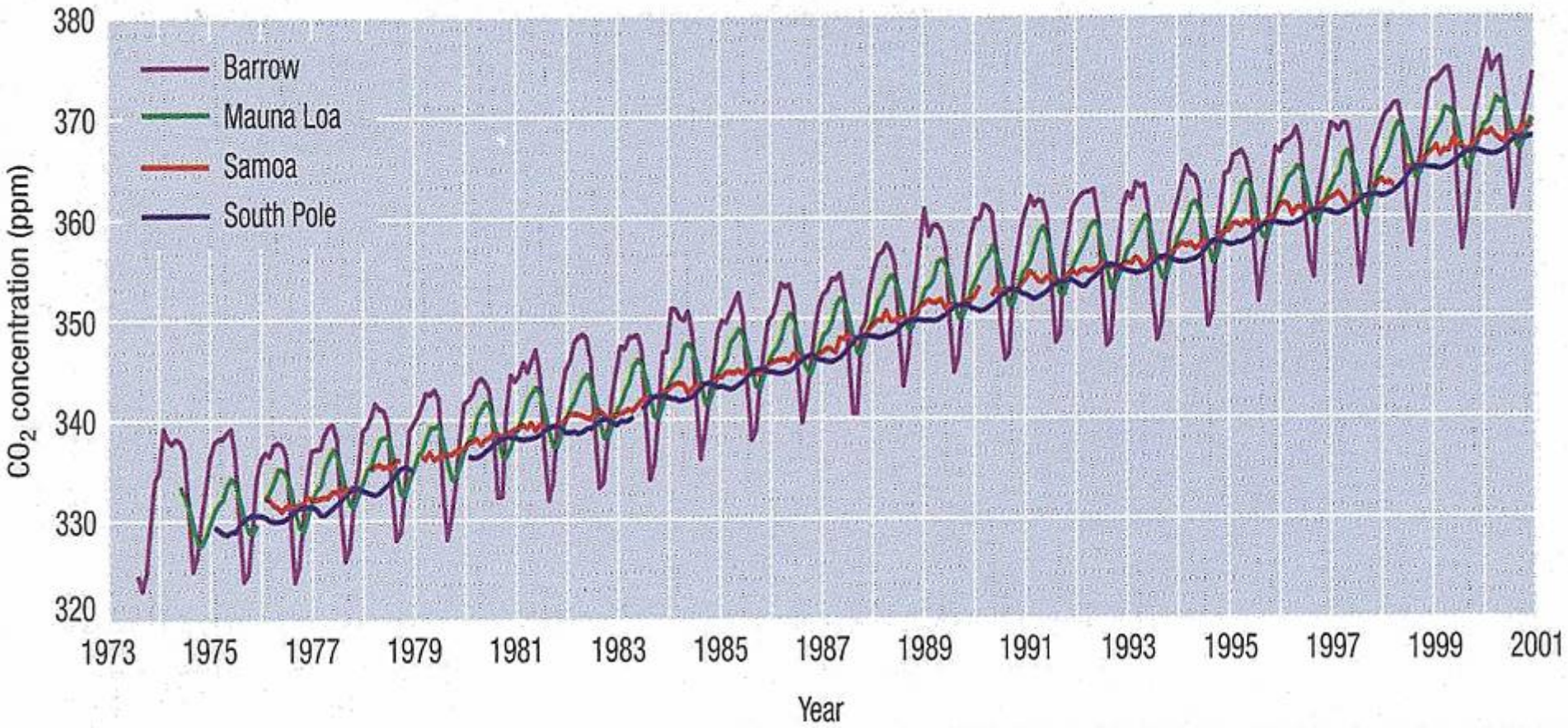
Aumento degli assorbimenti

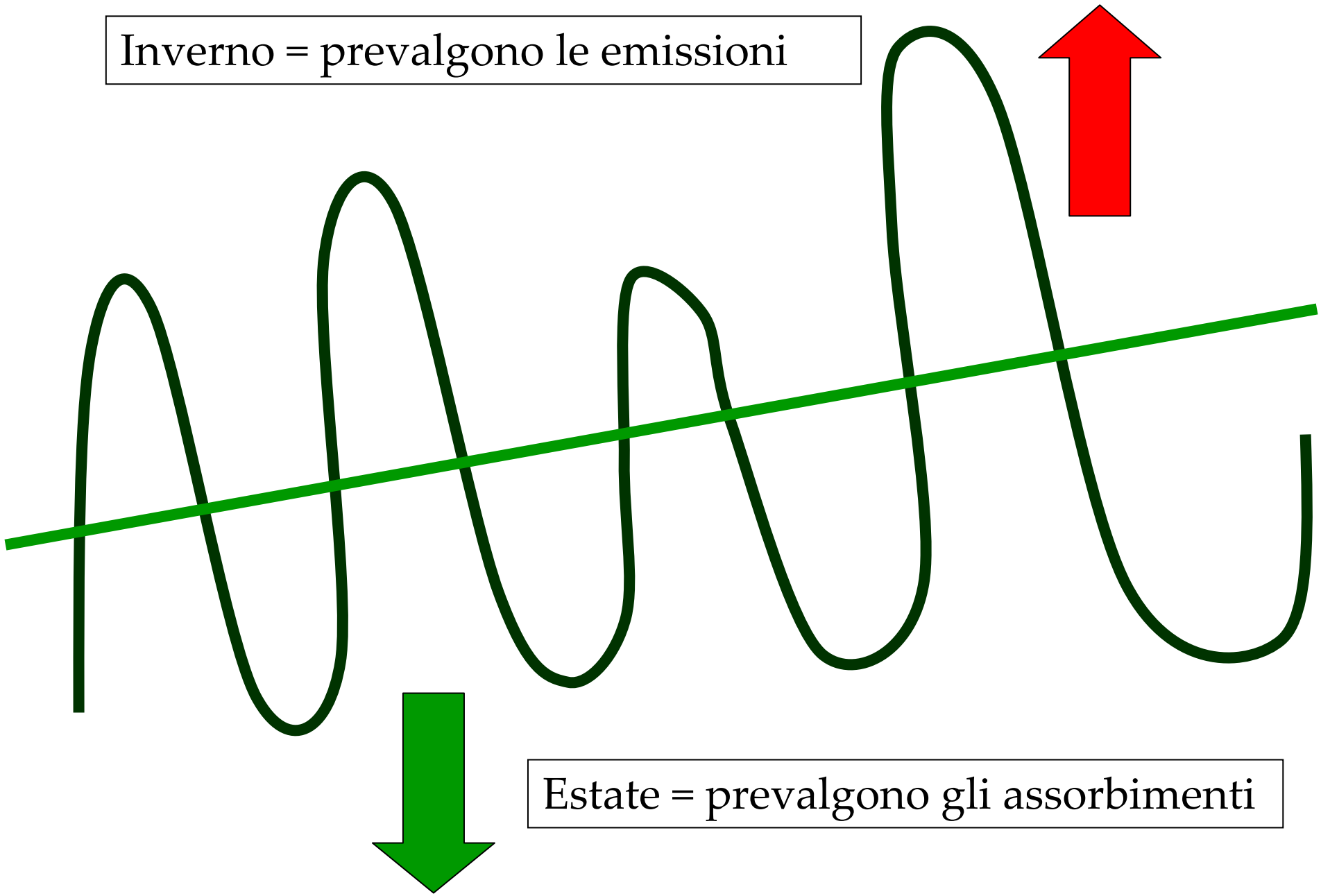
Agricoltura e Foreste

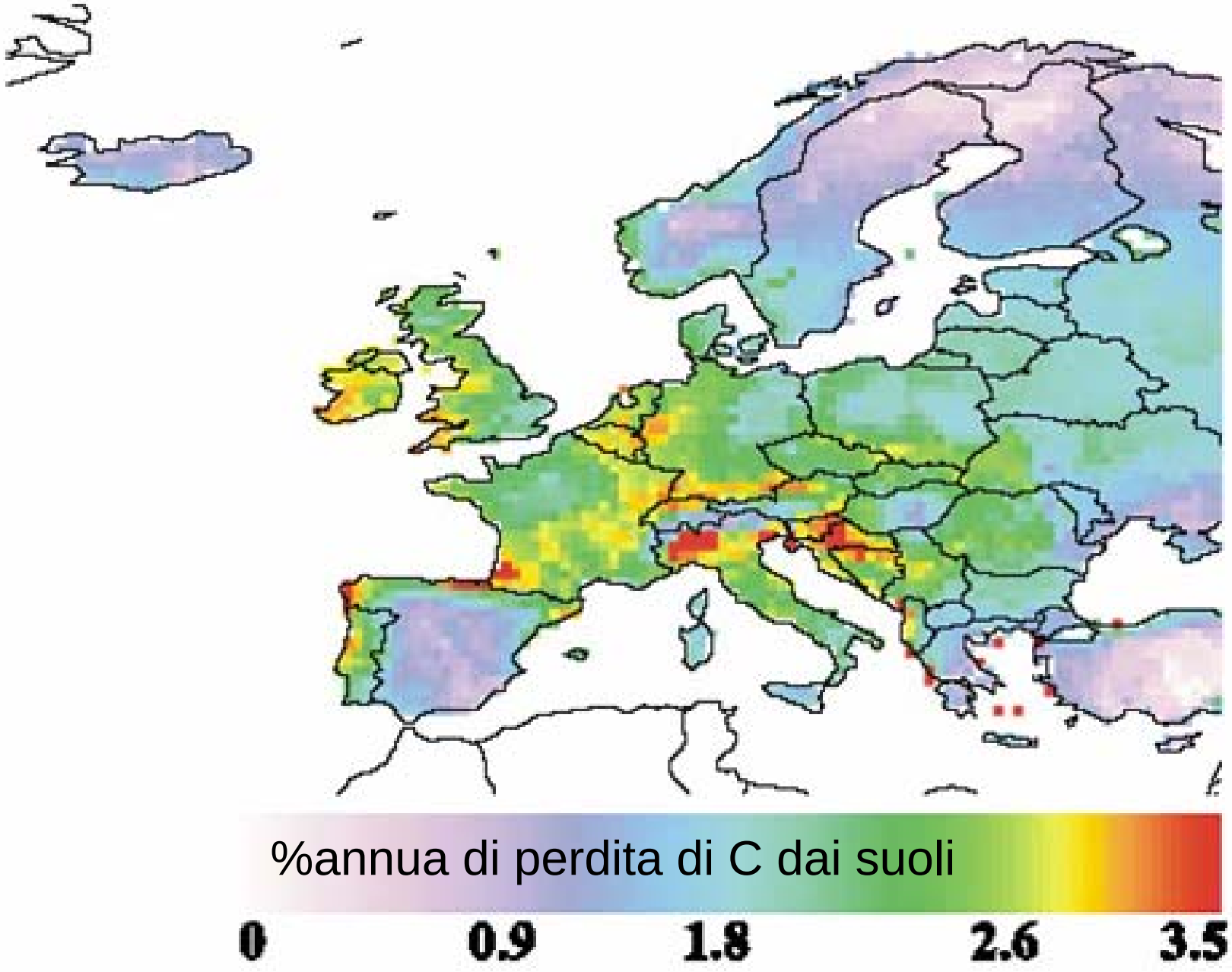

LUCE
CALORE
OSSIGENO
(…poco 2%)
ANIDRIDE
CARBONICA
(CO_2)
ACQUA
ELEM. NUTRITIVI

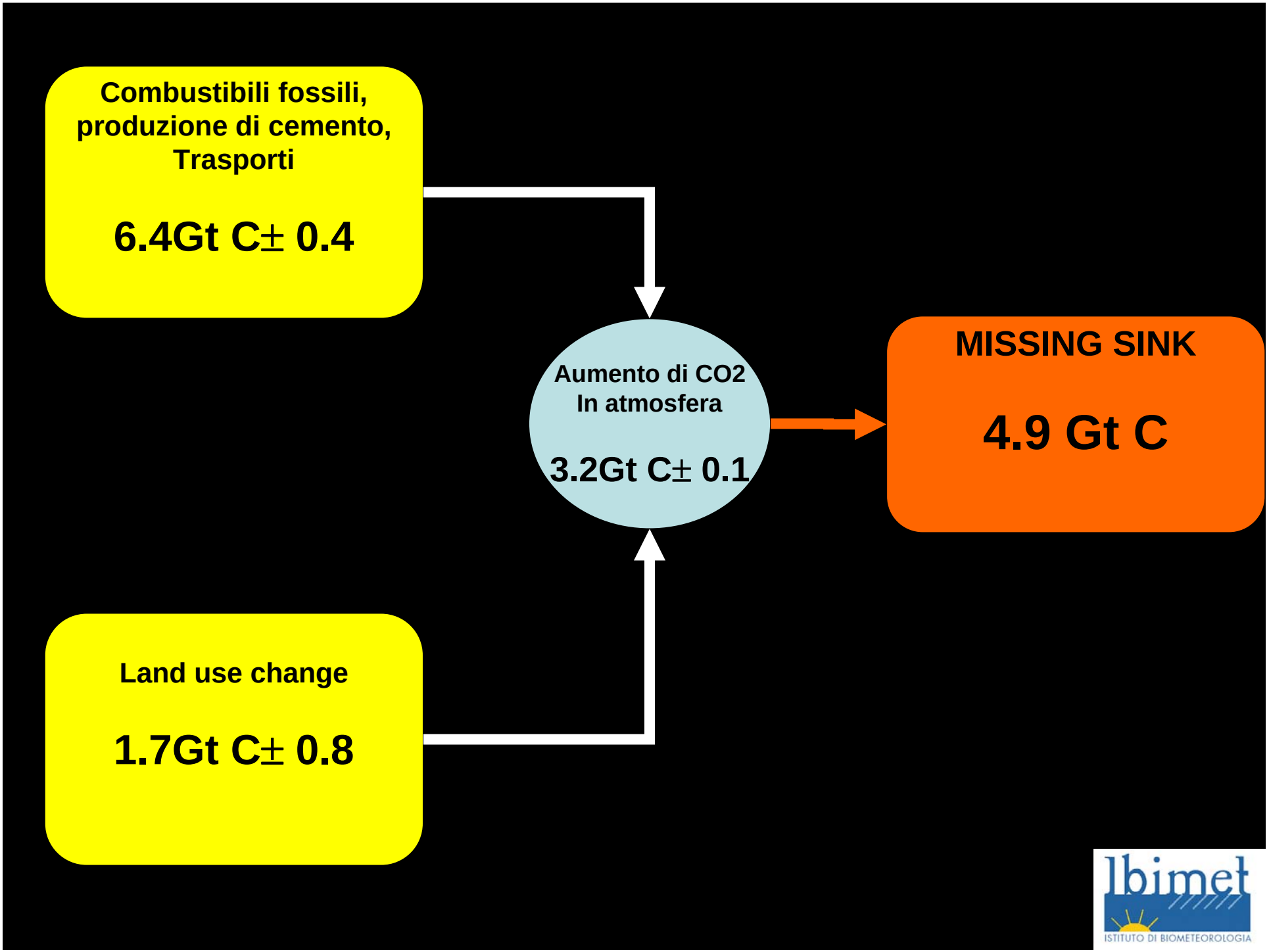

CO_2 atmosferica




Barrow
Mauna Loa
Samoa
South Pole
380
370
360
350
340
330
320
CO_2 concentration (ppm)
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
Year


Inverno = prevalgono le emissioni
Estate = prevalgono gli assorbimenti


%annua di perdita di C dai suoli
0
0.9
1.8
2.6
3.5


Combustibili fossili, produzione di cemento, Trasporti
6.4Gt C± 0.4
Aumento di CO2 In atmosfera
3.2Gt C± 0.1
MISSING SINK
4.9 Gt C
Land use change
1.7Gt C± 0.8

5 700 – 5 900 Gt di CO_2

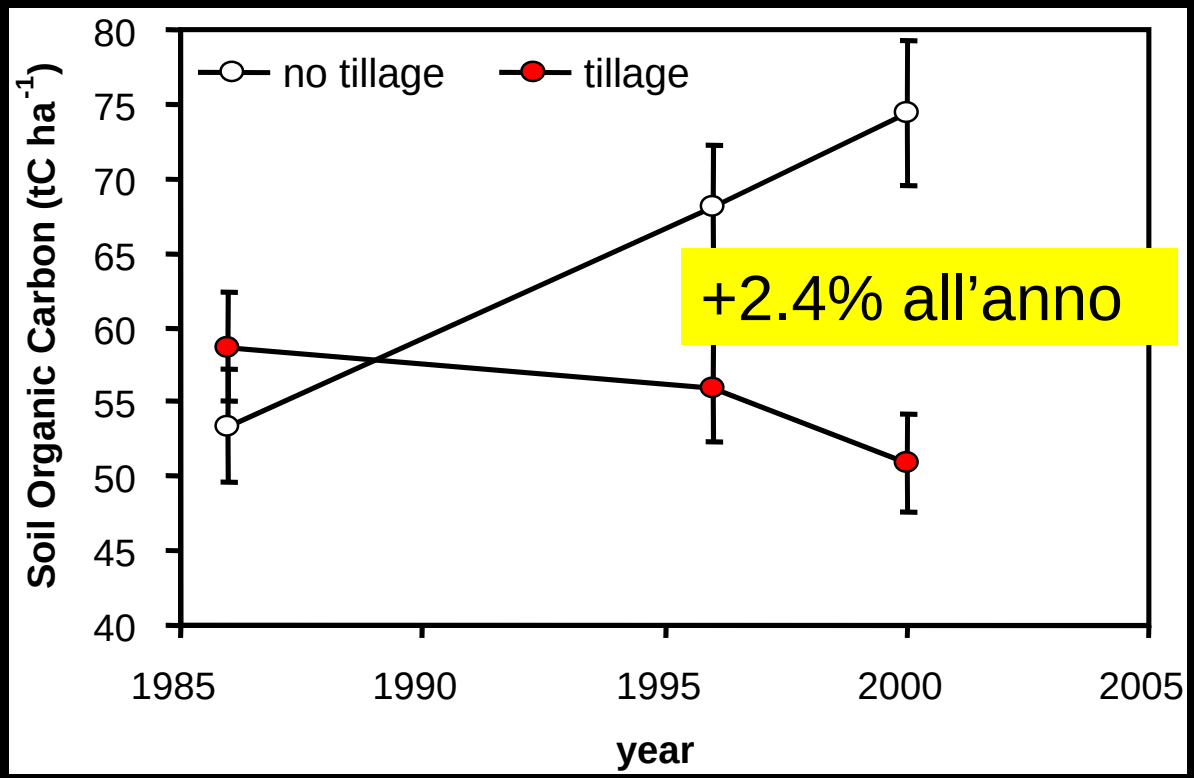
1 800 Gt di CO_2

200 - 400 Gt di CO_2

5 500 Gt di CO_2

Aumentando il contenuto di C del suolo dell'1% ogni anno (da 70 a 70.7 t ha^{-1} in 1 anno):

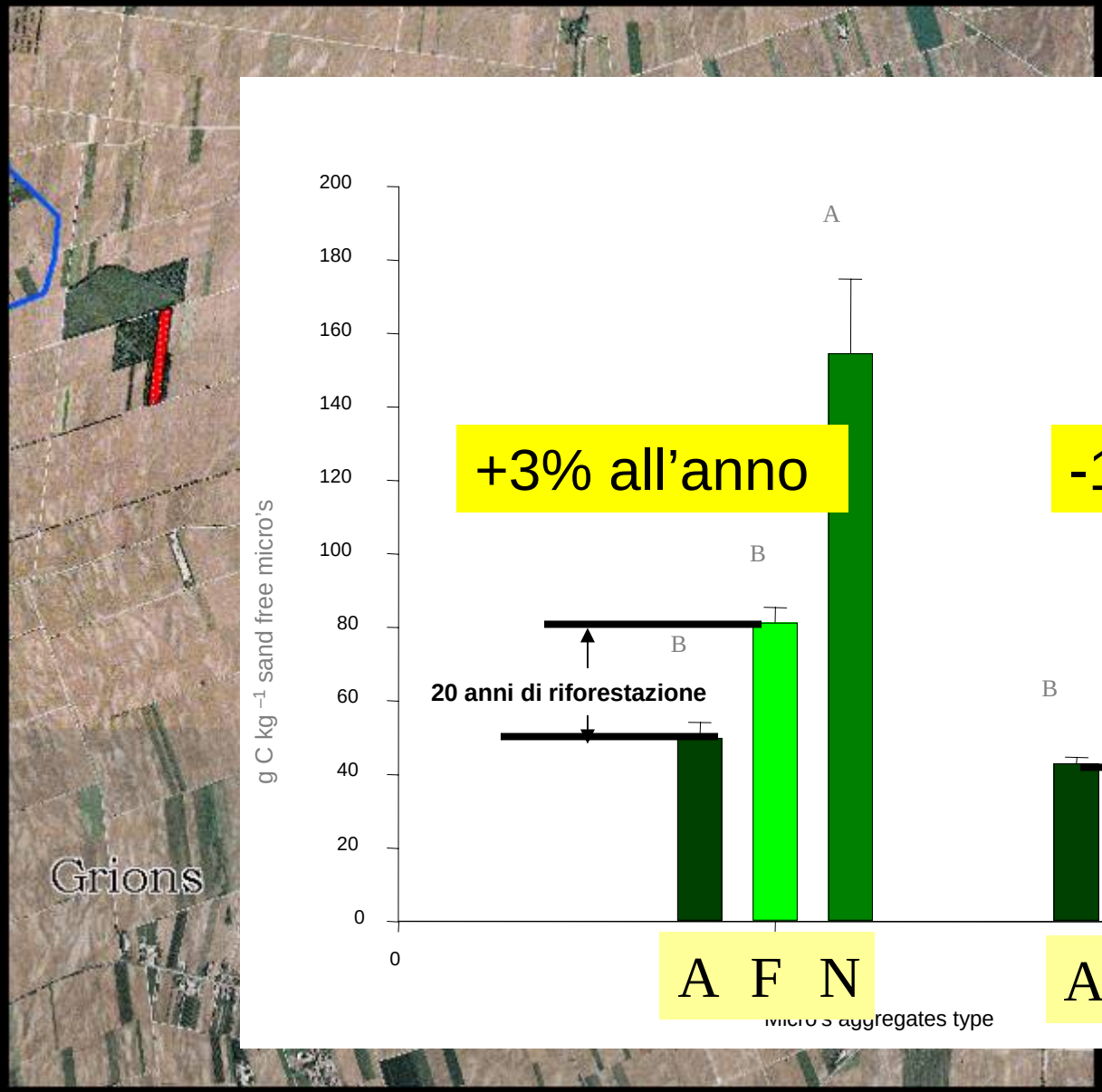
$$0.7 \text{ t C ha}^{-1} \times 18 \text{ M ha}_{\text{S.A.U.}} = 46.2 \text{ Mt CO}_2 \text{ anno}^{-1}$$



fonte: Progetto SOMIT (Soil Organic Matter in Italian Soils)

DPVTA - Università di Udine e Università di Pisa

Mazzoncini et al. European Journal of Soil Science (2002)



fonte: II° Università di Napoli, Caserta – Università di Udine

Del Galdo et al. Global Change Biology (2003)

Assolari et al., Soil Biology and Biochemistry (2003)

Domesticated biotechnology, once it gets into the hands of housewives and children, will give us an explosion of diversity of new living creatures, rather than the monoculture crops that the big corporations prefer. New lineages will proliferate to replace those that monoculture farming and deforestation have destroyed. Designing genomes will be a personal thing, a new art form as creative as painting or sculpture. *Freeman Dyson, "Our Biotech Future" The NY Review of Books - Volume 54, Number 12, 2007*

Aumentando il contenuto di C del suolo dell'10% ogni anno

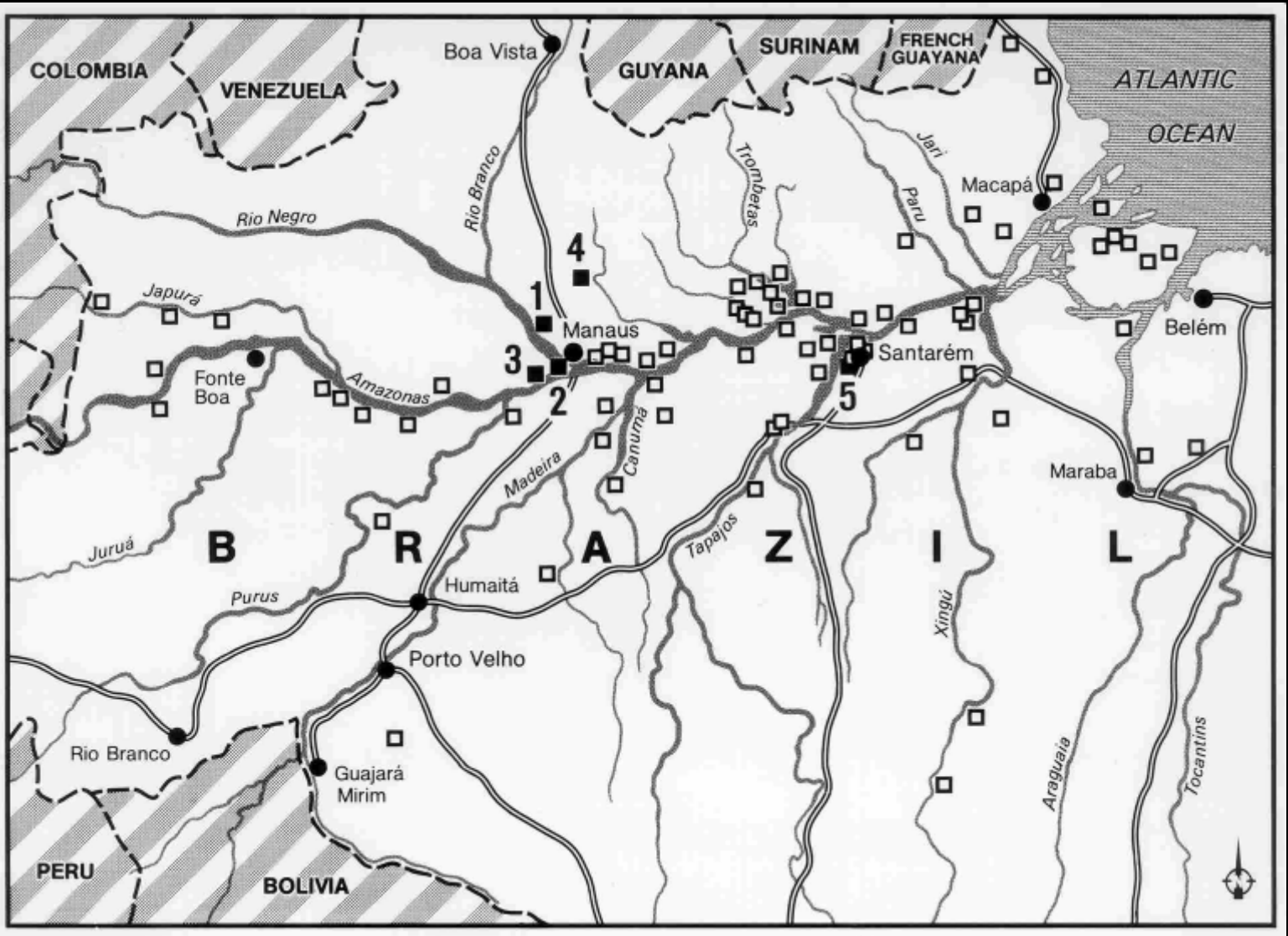
(da 70 a 77 t ha^{-1} in 1 anno):

7 t C ha^{-1} x 1.8 M ha $_{S.A.U.}$ = 46.2 Mt CO_2 $anno^{-1}$

Amazzonia, Regione di Manaus….

Terra Preta

Terra Preta - Amazonia


COLOMBIA
VENEZUELA
Boa Vista
GUYANA
SURINAM
FRENCH GUAYANA
ATLANTIC OCEAN
Rio Branco
Trombetas
Jari
Paru
Macapá
Rio Negro
Japurá
4
1
Manaus
3
2
Santarém
5
Belém
Fonte Boa
Amazonas
Madeira
Canumã
Maraba
Juruá
B R A Z I L
Tapajós
Purus
Humaitá
Xingú
Porto Velho
Rio Branco
Guajará Mirim
Araguaia
Tocantins
PERU
BOLIVIA

W.G. Sombroek (1934-2003)

Sombroek WG (1966) Amazzons Soils. CAPD, Wageningen, NL

Terra Preta (ADE) è sicuramente un prodotto dell'uomo

Civiltà indigene pre-colombiane tra 2400 - 600 anni fa

L'ingrediente base è Carbone vegetale

Popolazioni amazzoniche	Società del XXI secolo
Aumento della fertilità Aumento delle produzioni	Sequestro di CO_2 atmosferica Produzione di energia rinnovabile Aumento della fertilità Aumento delle produzioni Riduzione dei fertilizzanti

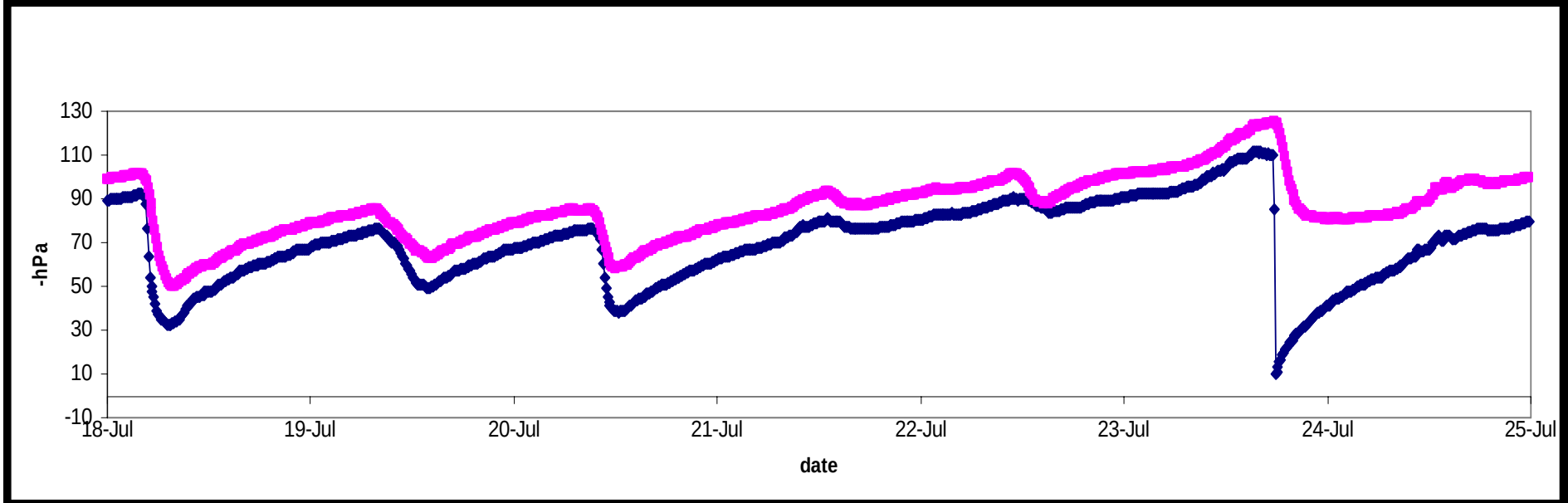
Perchè il Carbone vegetale fa aumentare i raccolti?

- Ipotesi 1: apporto diretto di elementi nutritivi

Biochar (g kg^{-1})	K ($cmol_c$ kg^{-1})	Ca ($cmol_c$ kg^{-1})	Mg ($cmol_c$ kg^{-1})	N (g kg^{-1})	P (mg kg^{-1})
0	2.8	1.5	0.9	3.2	8
135	25.8	1.7	1.0	4.0	11

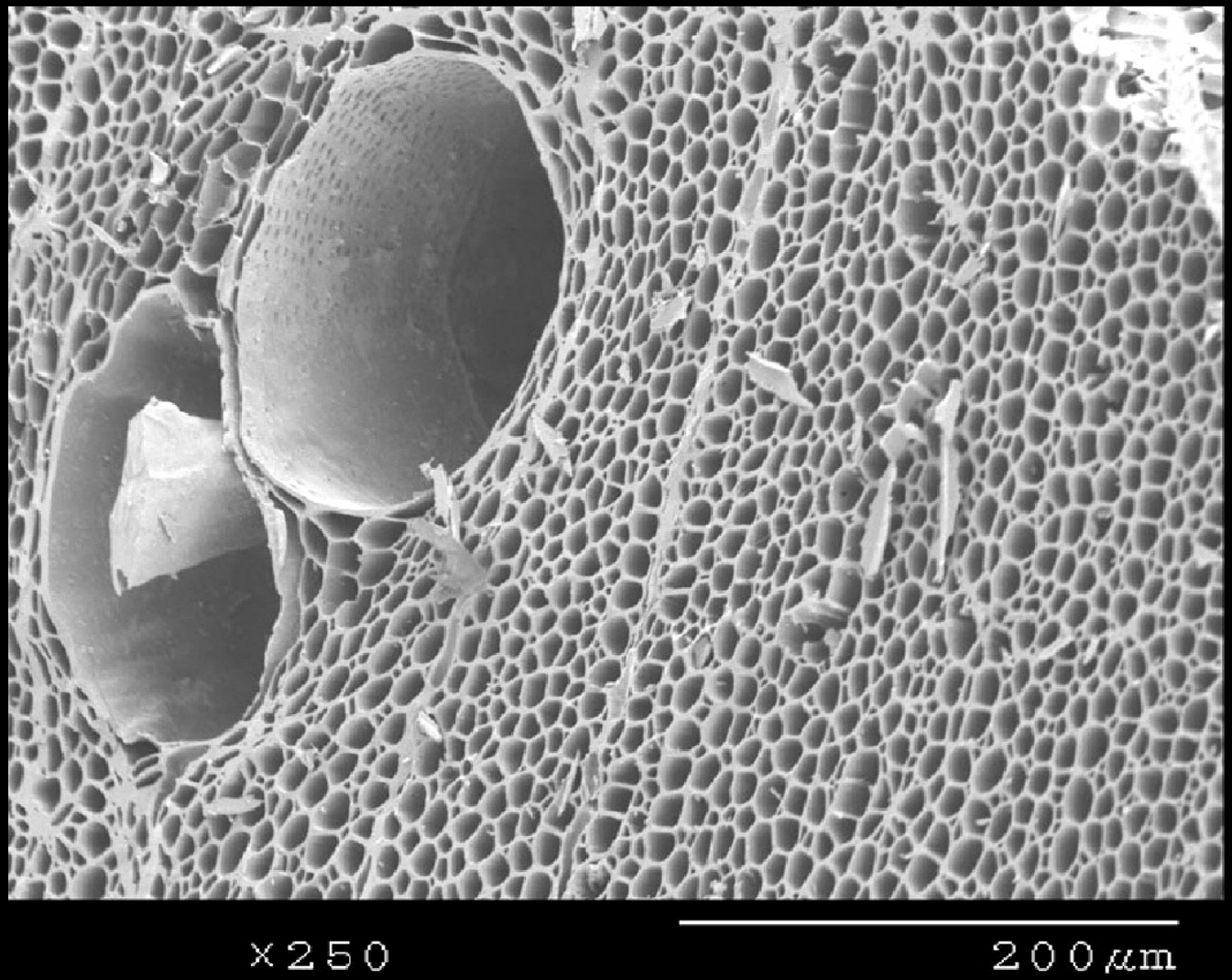
Dati per Oxisol, Lehmann et al. (2002)

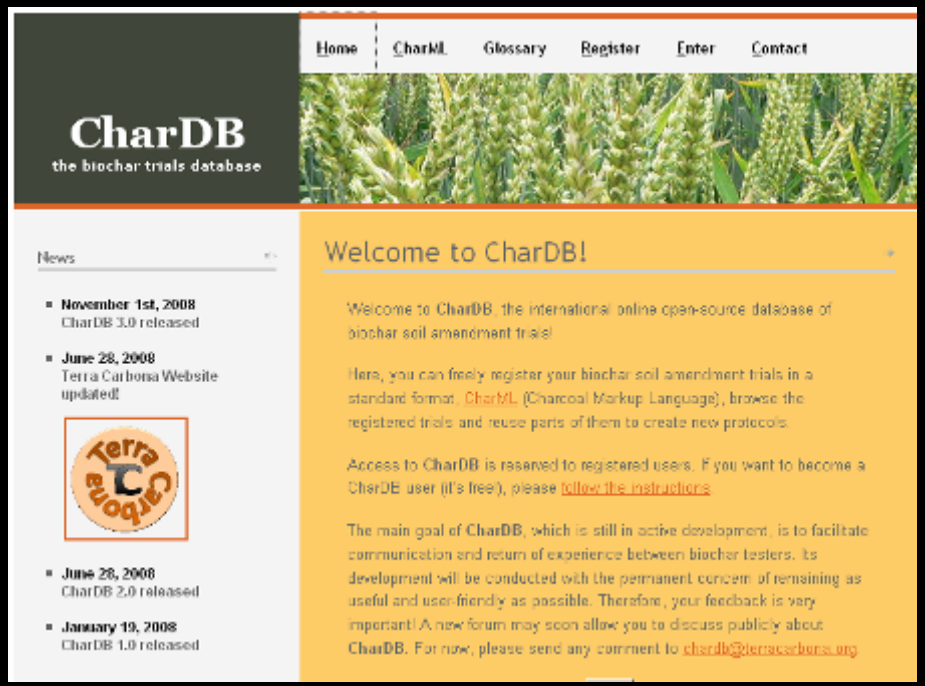
- Ipotesi 2: miglioramento della struttura del suolo

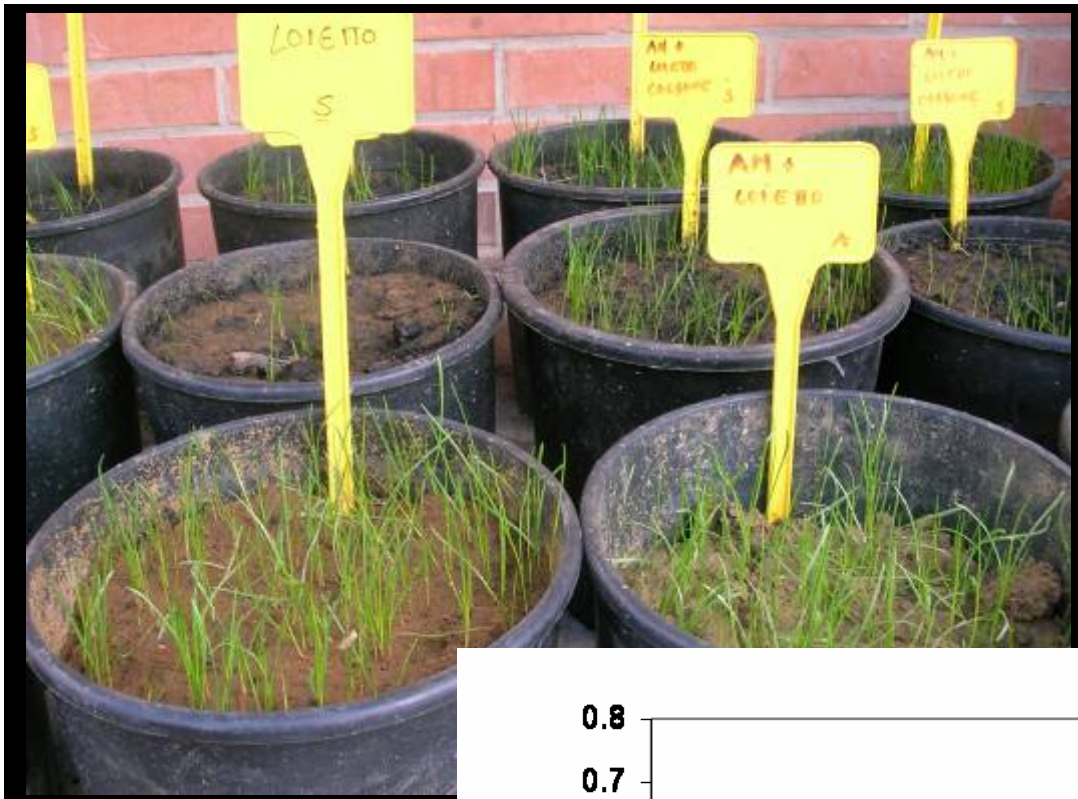


J. Major, 2007

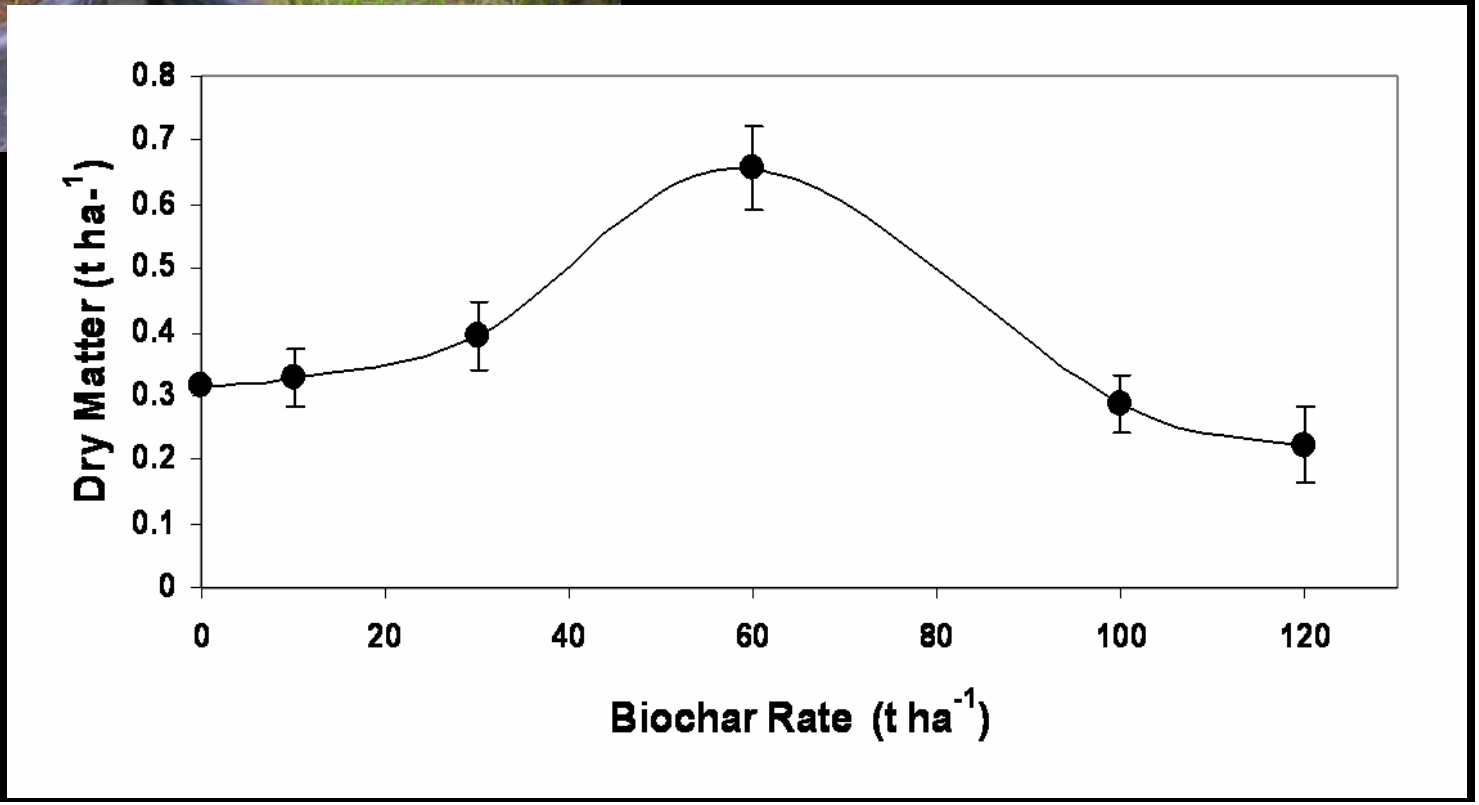
- Ipotesi 3: funzione “rifugio” per I microorgamismi



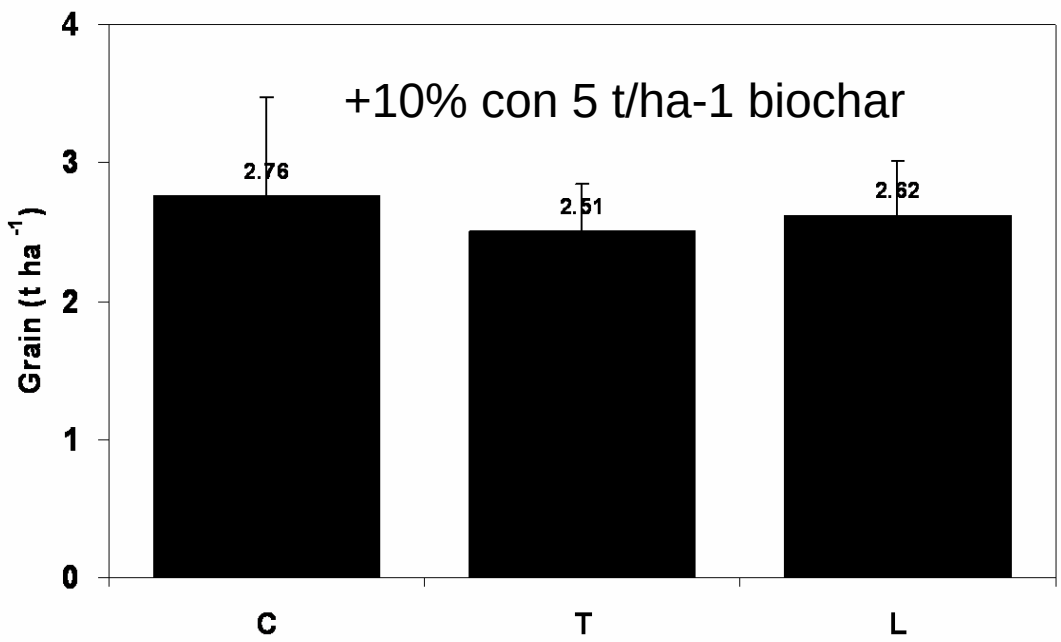

Home
CharML
Glossary
Register
Enter
Contact
CharDB
the biochar trials database
News
November 1st, 2008
CharDB 3.0 released
June 28, 2008
Terra Carbona Website updated!
Terra Carbona
June 28, 2008
CharDB 2.0 released
January 19, 2008
CharDB 1.0 released
Welcome to CharDB!
Welcome to CharDB, the international online open-source database of biochar soil amendment trials!
Here, you can freely register your biochar soil amendment trials in a standard format, CharML (Charcoal Markup Language), browse the registered trials and reuse parts of them to create new protocols.
Access to CharDB is reserved to registered users. If you want to become a CharDB user (it's free), please follow the instructions.
The main goal of CharDB, which is still in active development, is to facilitate communication and return of experience between biochar testers. Its development will be conducted with the permanent concern of remaining as useful and user-friendly as possible. Therefore, your feedback is very important! A new forum may soon allow you to discuss publicly about CharDB. For now, please send any comment to chardb@terracarbona.org



Esperimento in vaso *Lolium perenne*, Firenze 2008



Grano duro, Empoli 2007-2008



Grano duro, Pistoia 2008-2009

Pistoia-Cespevi- 2009

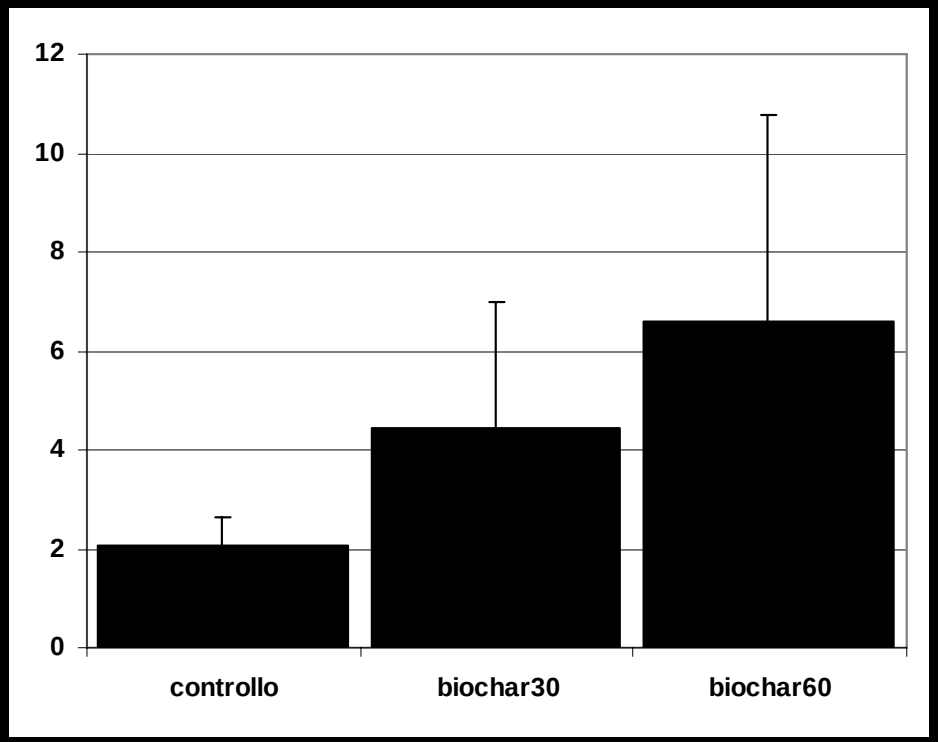
Semina: Gennaio 2009

Campo Sperimentale a blocchi randomizzati
Tesi:
30t/ha di Carbone
60t/ha di carbone
Controllo

Primi risultati esperimento 2009

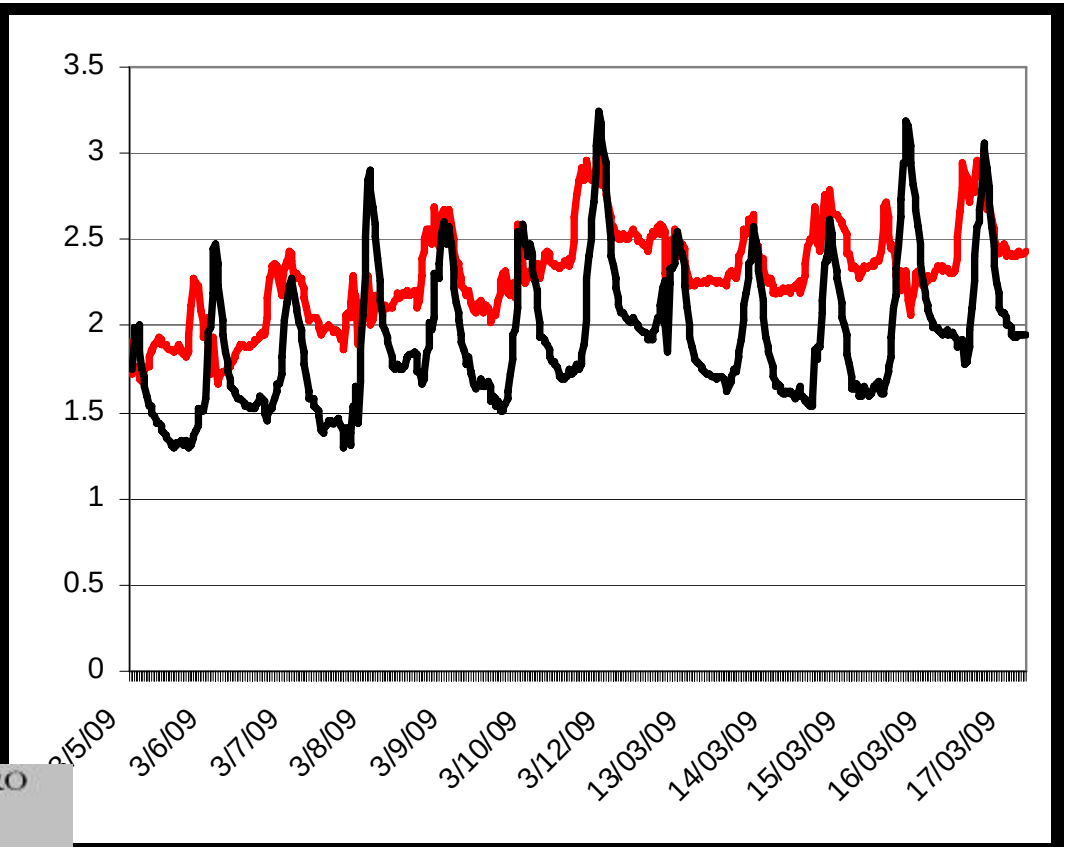
Velocità di emergenza: il 20 Febbraio + 30% piante emerse

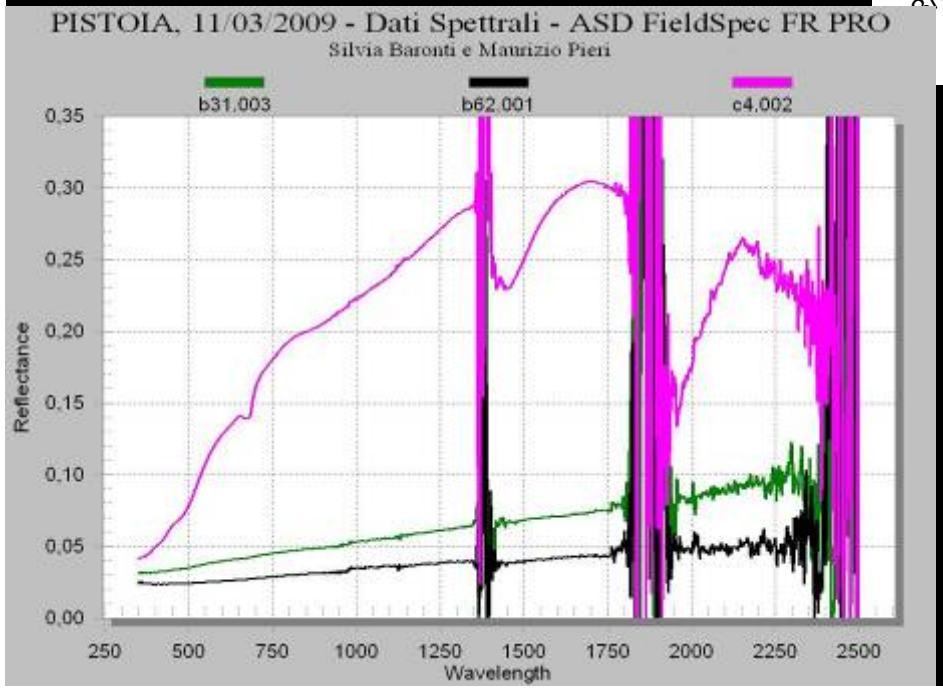
Accrescimento più rapido:



Emissione di N2O: (?)

Forte modifica **dell'albedo**



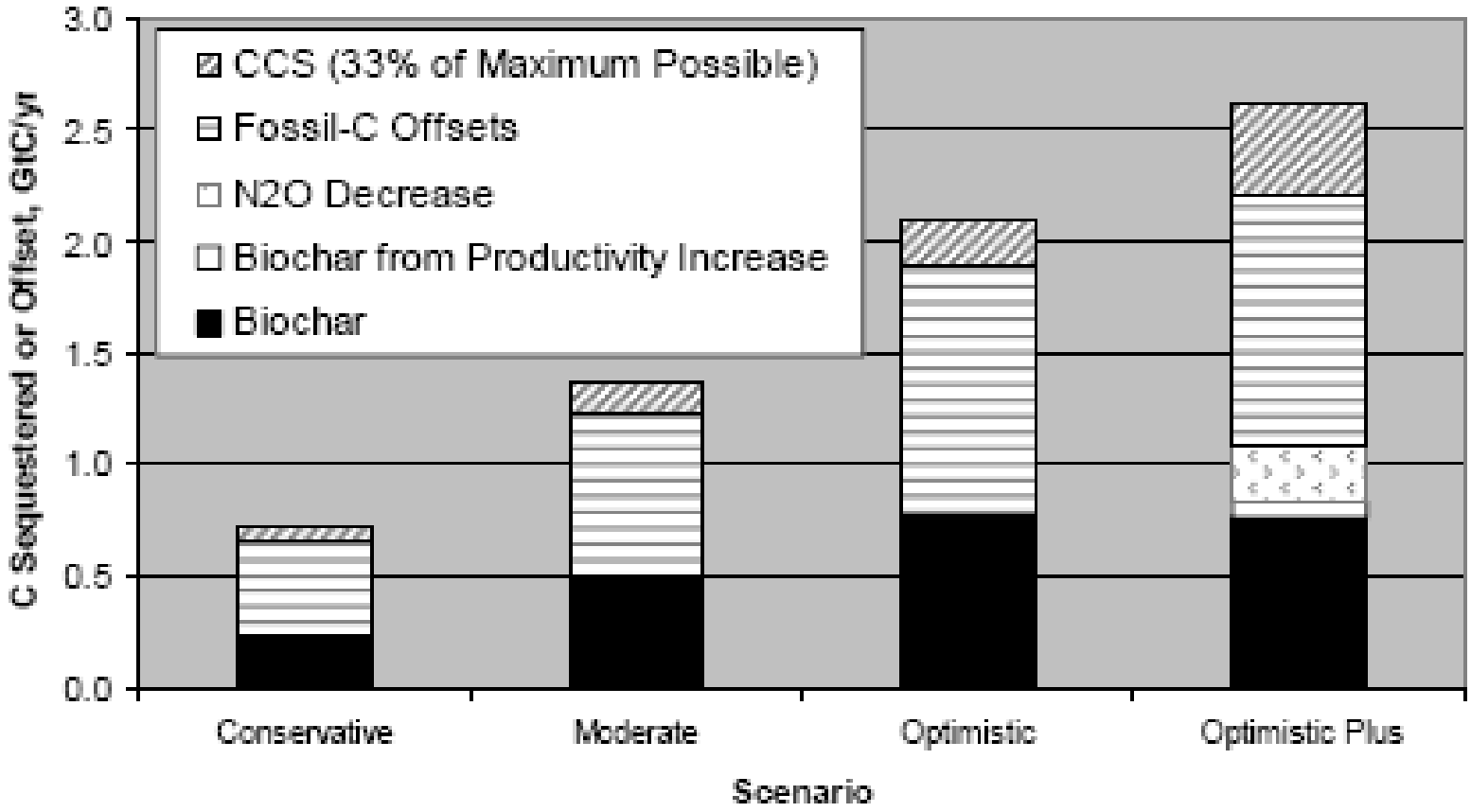


Incremento della temperatura del suolo a 5cm

Table 1 – Assumptions Behind Four Sustainable Biochar "Wedge" Scenarios

Row	Parameter	Units	Conservative	Moderate	Optimistic	Optimistic Plus
1	To, Start Year	yr	2010	2010	2010	2010
2	N, years to reach maximum rate	yr	30	25	20	N/A
3	Tn, year maximum rate is reached	--	2040	2035	2030	N/A
4	Global Net Primary Production (NPP)	GtC/yr	61.5	61.5	61.5	61.5
6	Fraction of Global NPP available to make biochar sustainably	%	1.2	2.1	3.2	3.2
7a	Carbonization efficiency	%	40	40	40	40
7b	Carbonization/Sequestration efficiency w/CCS	%	87	87	87	87
8a	Fossil-C (coal) Offset efficiency	%	58	58	58	58
8b	Fossil-C (coal) Offset efficiency w/ CCS	%	43	43	43	43
9	Biochar Application Rate	t C/ha	5	5	5	5
10	Impact of Biochar Application on Local NPP	% in-crease/ha	0	0	0	25
11	Impact of Biochar Application on N_2O Emissions	% de-crease/ha	0	0	0	50
12	Half-life of Biochar in soil	yr	80	500	500	500

Figure 4. Annual contributions of components of sustainable biochar technology to carbon sequestration (2050)



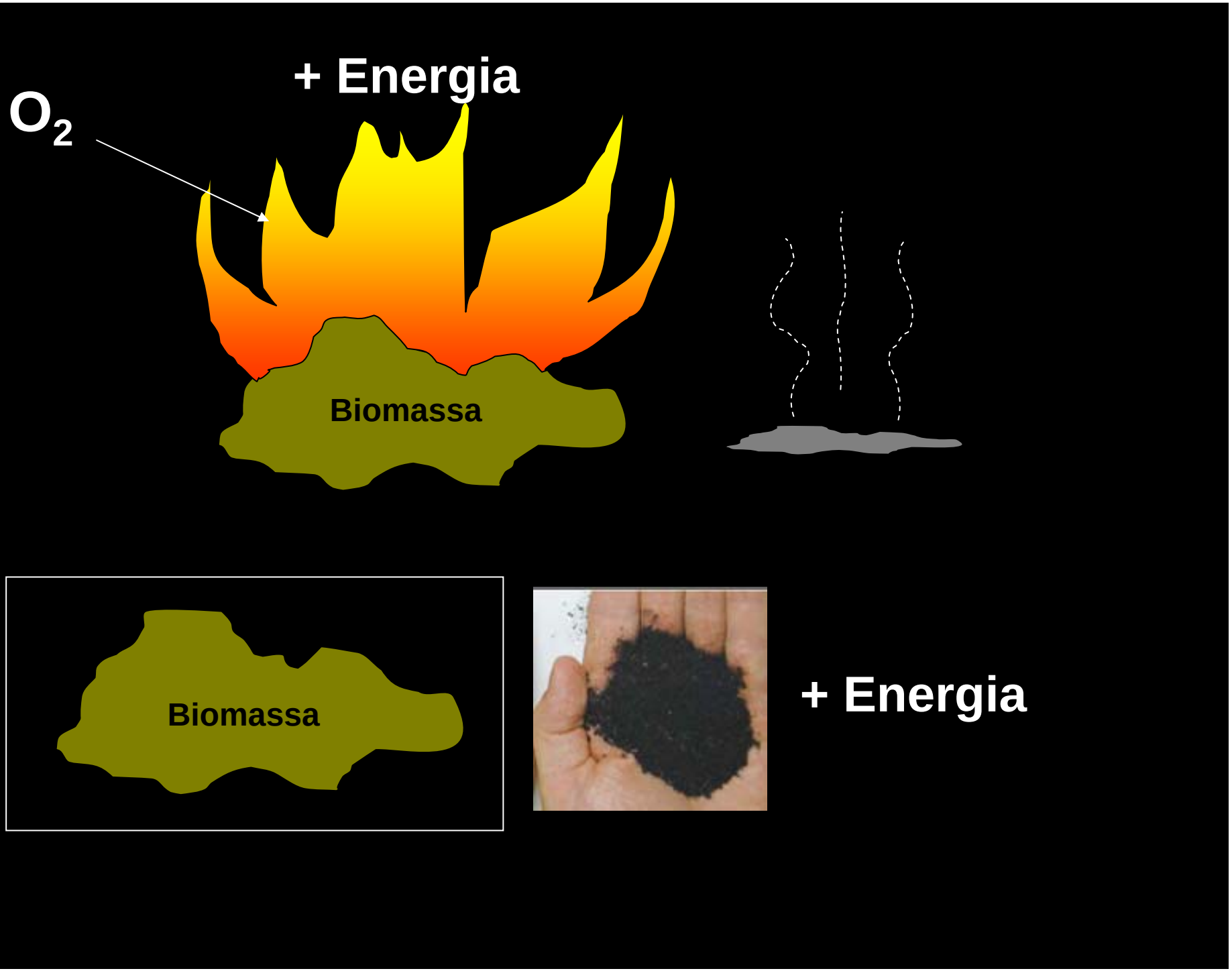
NPP agricola italiana: 0.18 GtC y-1 ***(1/300 della NPP globale)***

Scenario conservative = 2.3 MtC = 8.5 MtCO2 (1.2% NPP)

Scenario "optimistic" = 8 Mt C = 29 Mt CO2 (3.2% NPP)

Riduzione di fertilizzanti

Residui forestali / orticoltura in serra / vivaismo


+ Energia
O_2
Biomassa
Biomassa
+ Energia

Biochar = carbone vegetale

PYREG.DE

0.5 MW potenza

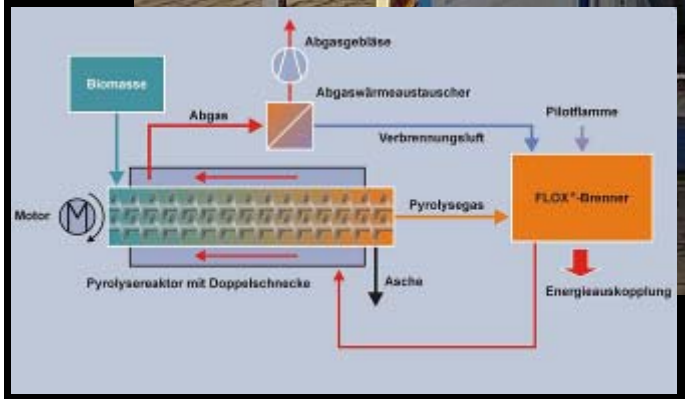
Input: 2 t/ora di residui

Output: 0.88 t/ora Biochar

170 KWh termici

Investimento 350.000 €

Consegna nel 2010



Chimney
Hot Water Out
Fuel Feed Hopper
Flash Boiler
Water In
Combustion
Fuel Feed Auger
Viewer
Gasifier
Steam Pipe
Ash Auger
Circulation Pump
Ash Drawer

Interesse in Google Ricerca Web: fotovoltaico, biomasse, eolico, nucleare

Italia, gen 2006 - set 2009

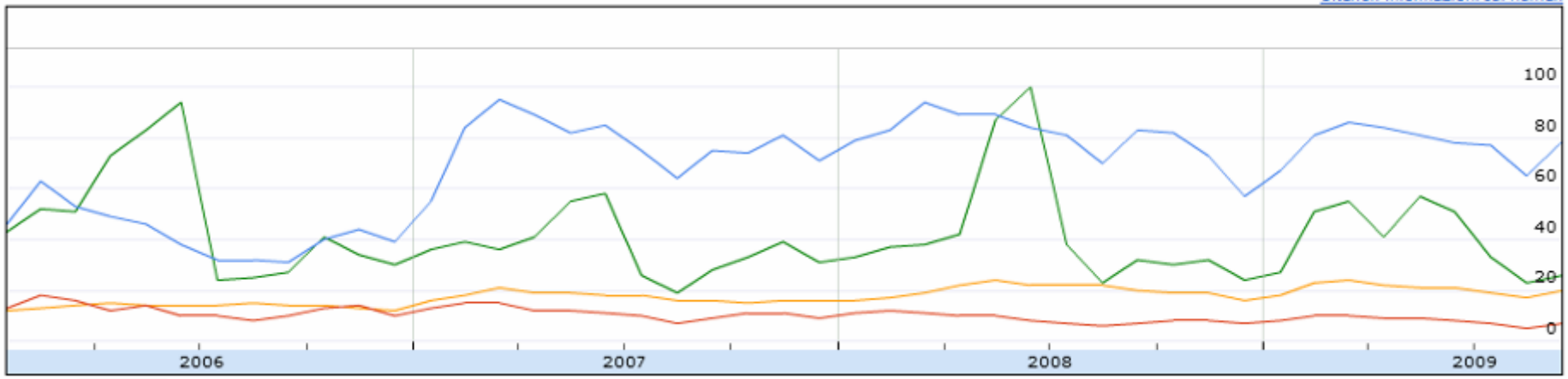
Categorie: Settori, Salute, Arti e materie umanistiche, Locale, Società , altre...

Totali	
fotovoltaico	69
biomasse	10
eolico	18
nucleare	42

Interesse nel tempo

Previsione Intestazioni notizie

Ulteriori informazioni sui numeri



Interesse in Google Ricerca Web: biochar, biocarburanti

Italia, gen 2006 - set 2009

Categorie: Settori, Società

Totali	
biochar	3
biocarburanti	50

Interesse nel tempo

Previsione Intestazioni notizie

Ulteriori informazioni sui numeri

Nathaniel Mulcahy

WorldStove Corporation, Tortona