

Figure 2.1 The Growth of World Population and Some Major Events in the History of Technology.

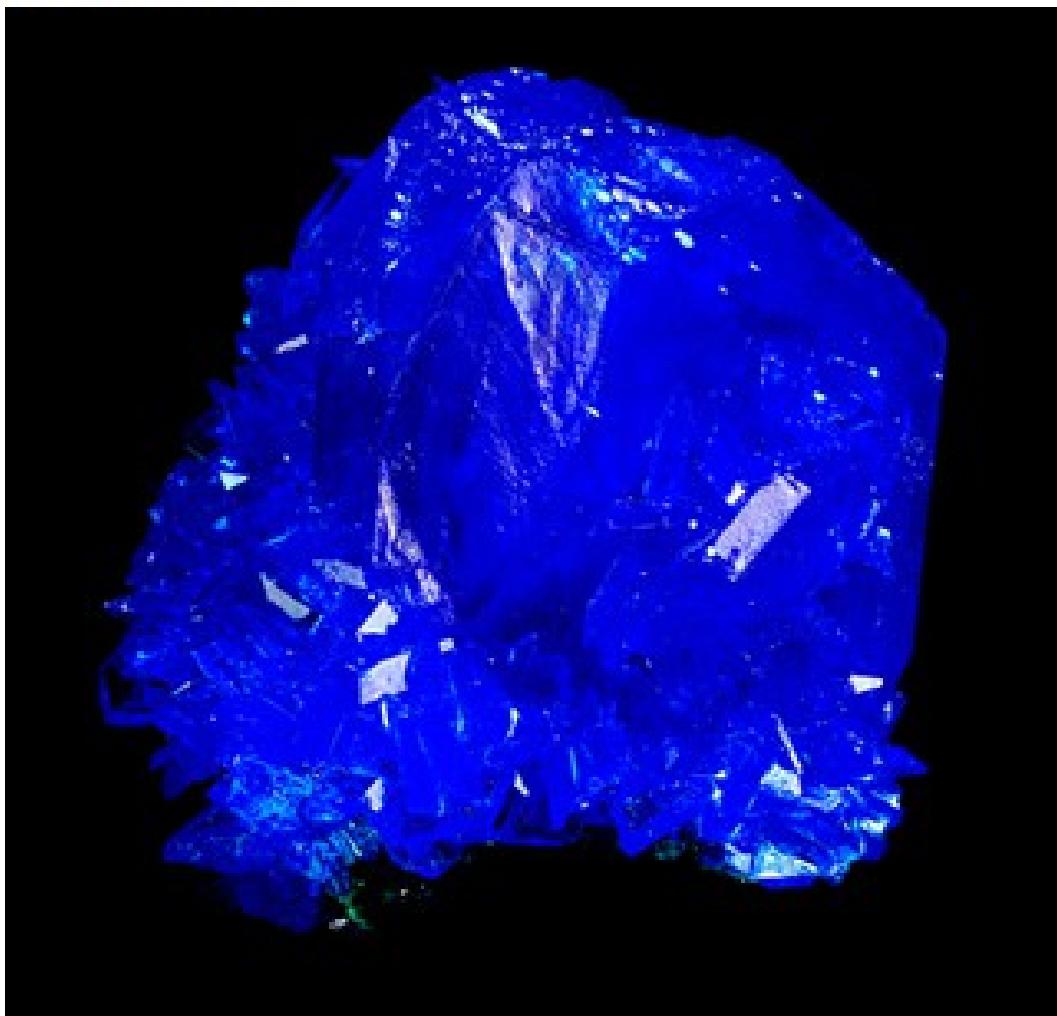
Sources: Cipolla 1974; Clark 1961; Fagan 1977; McNeill 1971; Piggott 1965; Derry and Williams 1960; Trewartha 1969. See also Allen 1992, 1994; Slicher van Bath 1963; Wrigley 1987.

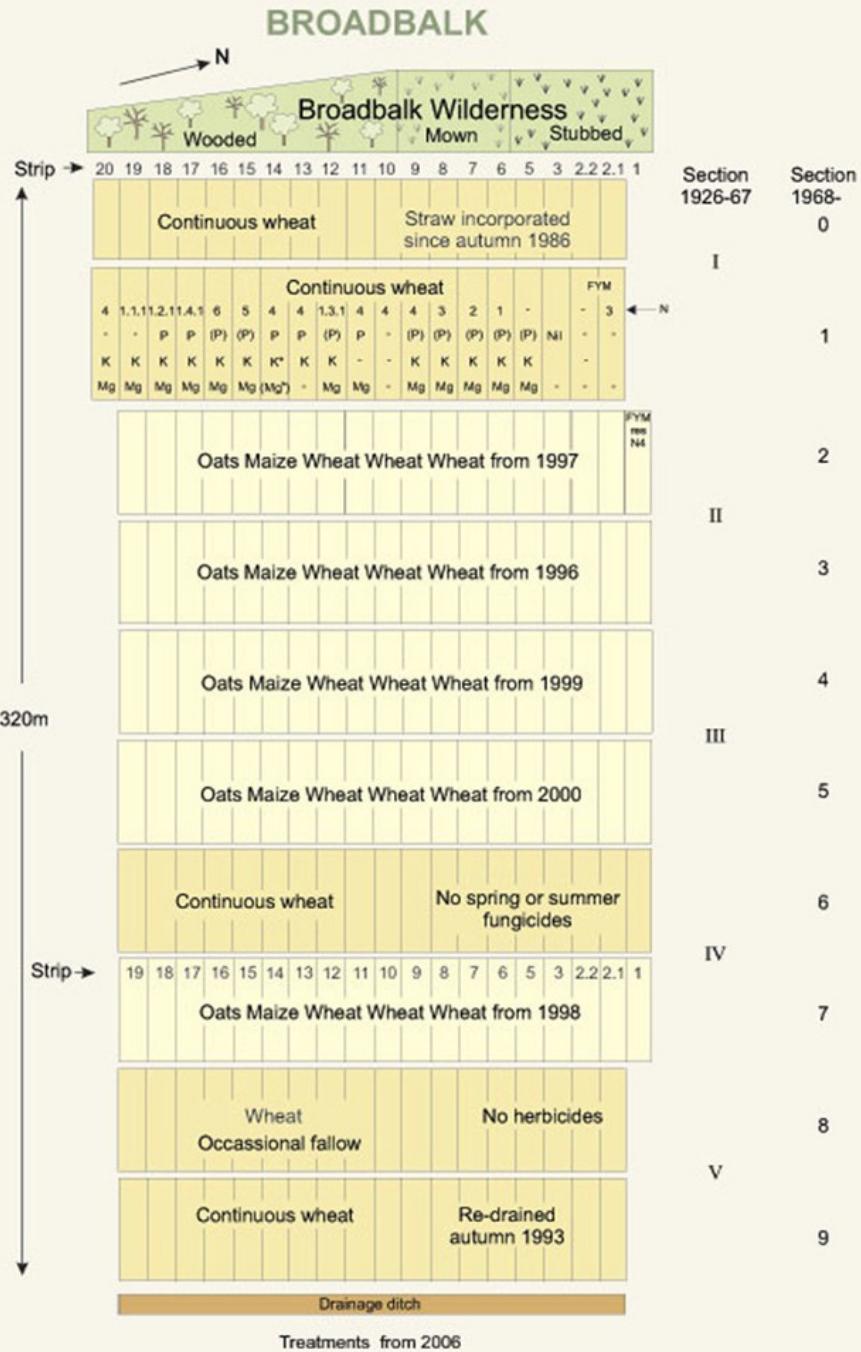
Note: There is usually a lag between the invention (I) of a process or a machine and its general application to production. "Beginning" (B) usually means the earliest stage of this diffusion process.





calcantite





1847 Broadbalk: un campo di 1.6 ettari della stazione sperimentale di Rothamsted. Da tale prova emerge che il frumento “convenzionale” produce oggi 9.5 tonnellate per ettaro mentre quello “organico” si ferma a 5 tonnellate e quello del tutto privo di fertilizzanti, antiparassitari o altri mezzi tecnici si limita a 1.2 tonnellate (quest’ultimo livello produttivo può essere considerato rappresentativo delle agricolture più arretrate a livello mondiale, quelle per intenderci proprie di vaste aree).

Le sfide del settore agricolo in Africa

Si stima che in Africa circa 218 milioni di persone, pari a circa il 30% della popolazione totale, soffrano di fame cronica e malnutrizione. L'80% delle aziende agricole in Africa, ovvero 33 milioni di unità produttive, hanno un'estensione inferiore ai due ettari.

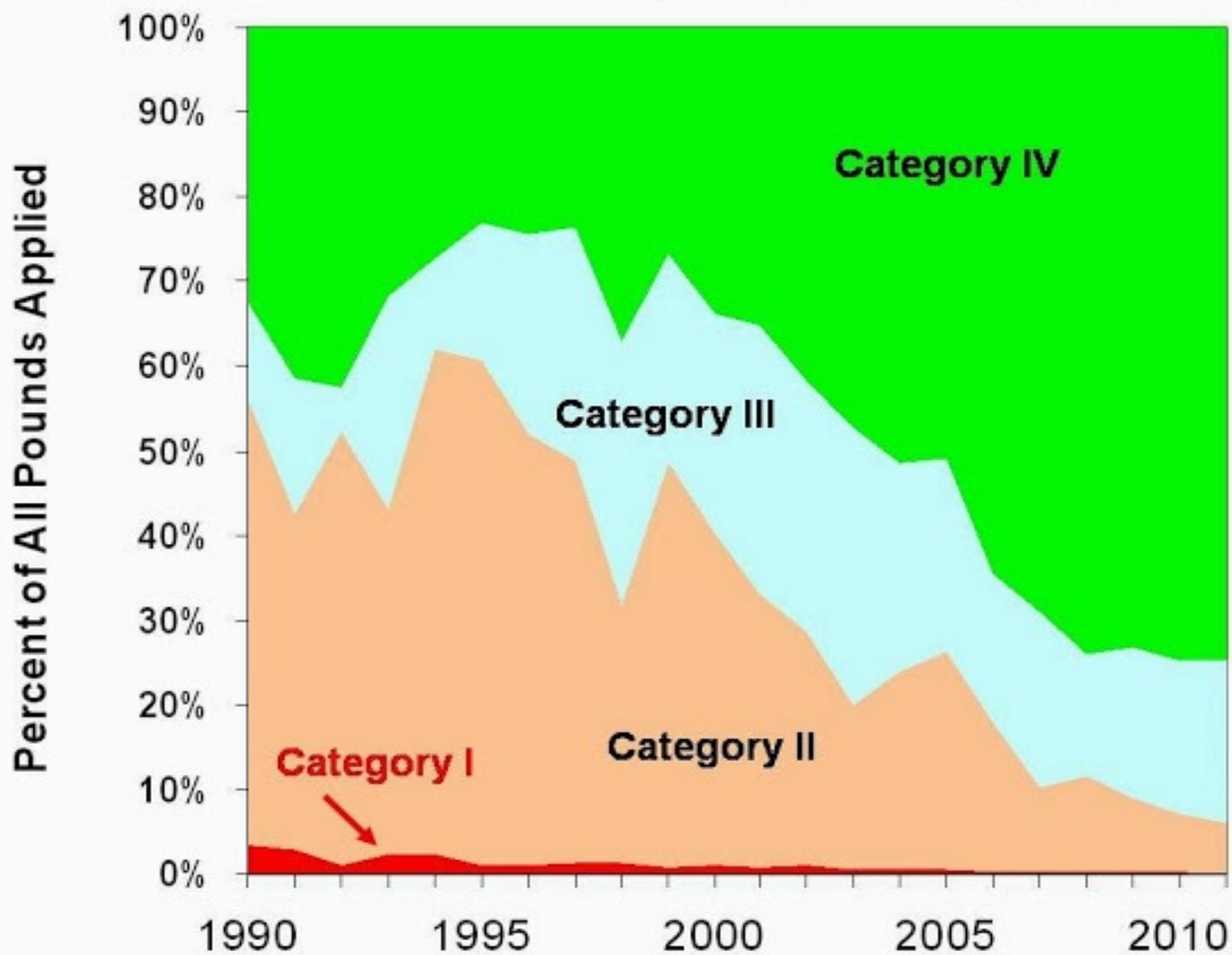
Il rendimento delle colture cerealicole è cresciuto poco e nella regione è ancora intorno alle 1,2 tonnellate per ettaro, mentre nel complesso dei paesi in via di sviluppo raggiunge le 3 tonnellate per ettaro.

L'uso di fertilizzanti nell'Africa subsahariana nel 2002 ammontava a soli 13 kg per ettaro, a fronte dei 73 kg per ettaro consumati in Medio Oriente e nel Nord Africa e dei 190 kg per ettaro consumati in Asia orientale e nel Pacifico.

Solo il 3% delle terre nell'Africa subsahariana è irrigato, a fronte di una percentuale a livello globale superiore al 20%.

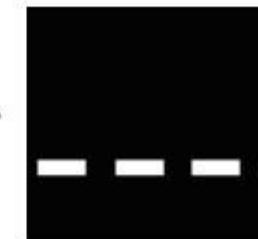
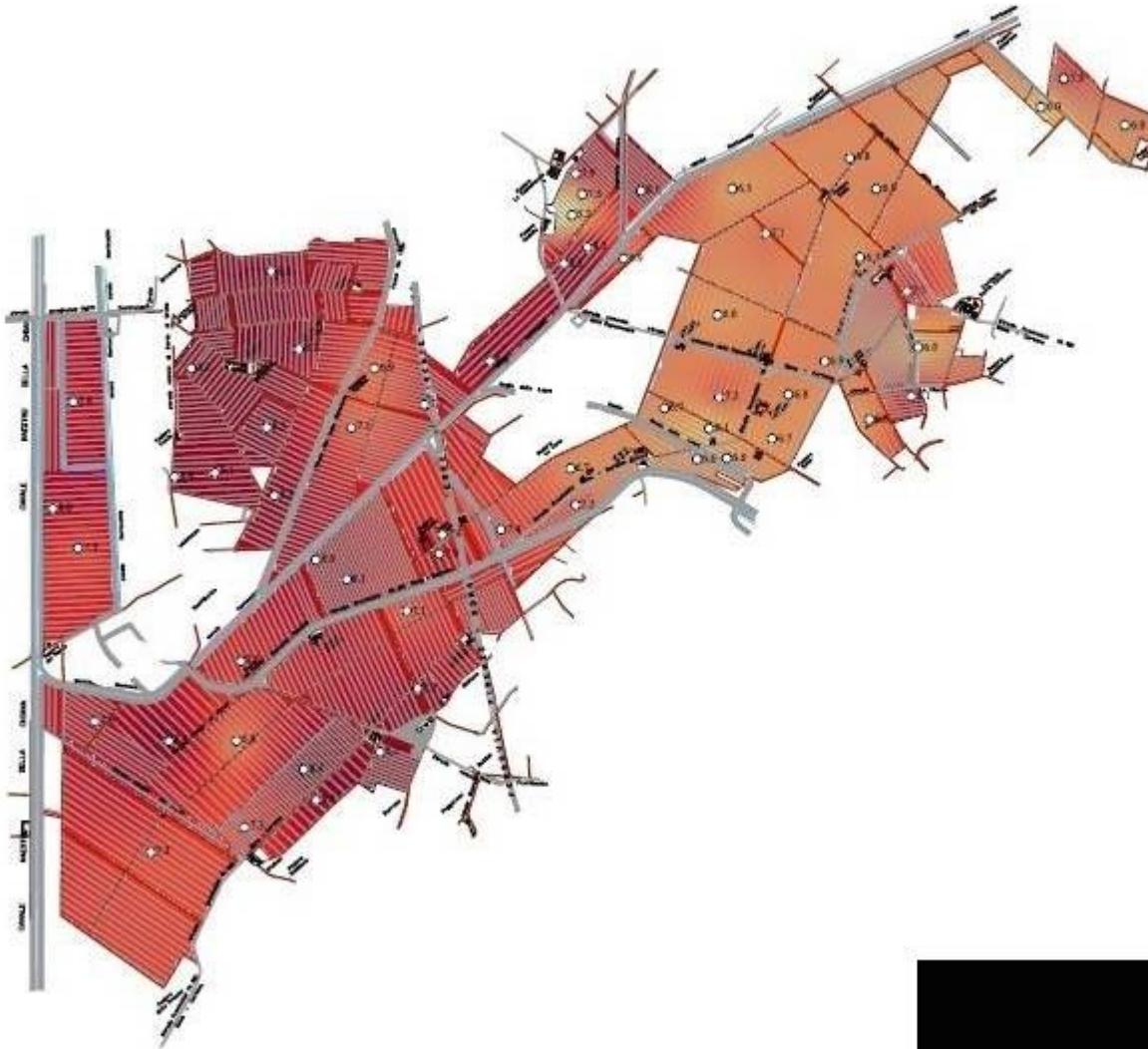
Il 40% della popolazione nella regione vive in paesi che non si affacciano sul mare, un livello ben superiore alla media del 7.5% degli altri paesi in via di sviluppo, ed i costi di trasporto in Africa subsahariana possono raggiungere addirittura il 77% del valore delle esportazioni.

Trends in Non-Sulfur Pesticide Use For California Premium Wine Grapes By EPA Category





PH

**LEGENDA**

○²⁹ Posizione punto di campionamento



noxma[†]
fDU1W-J

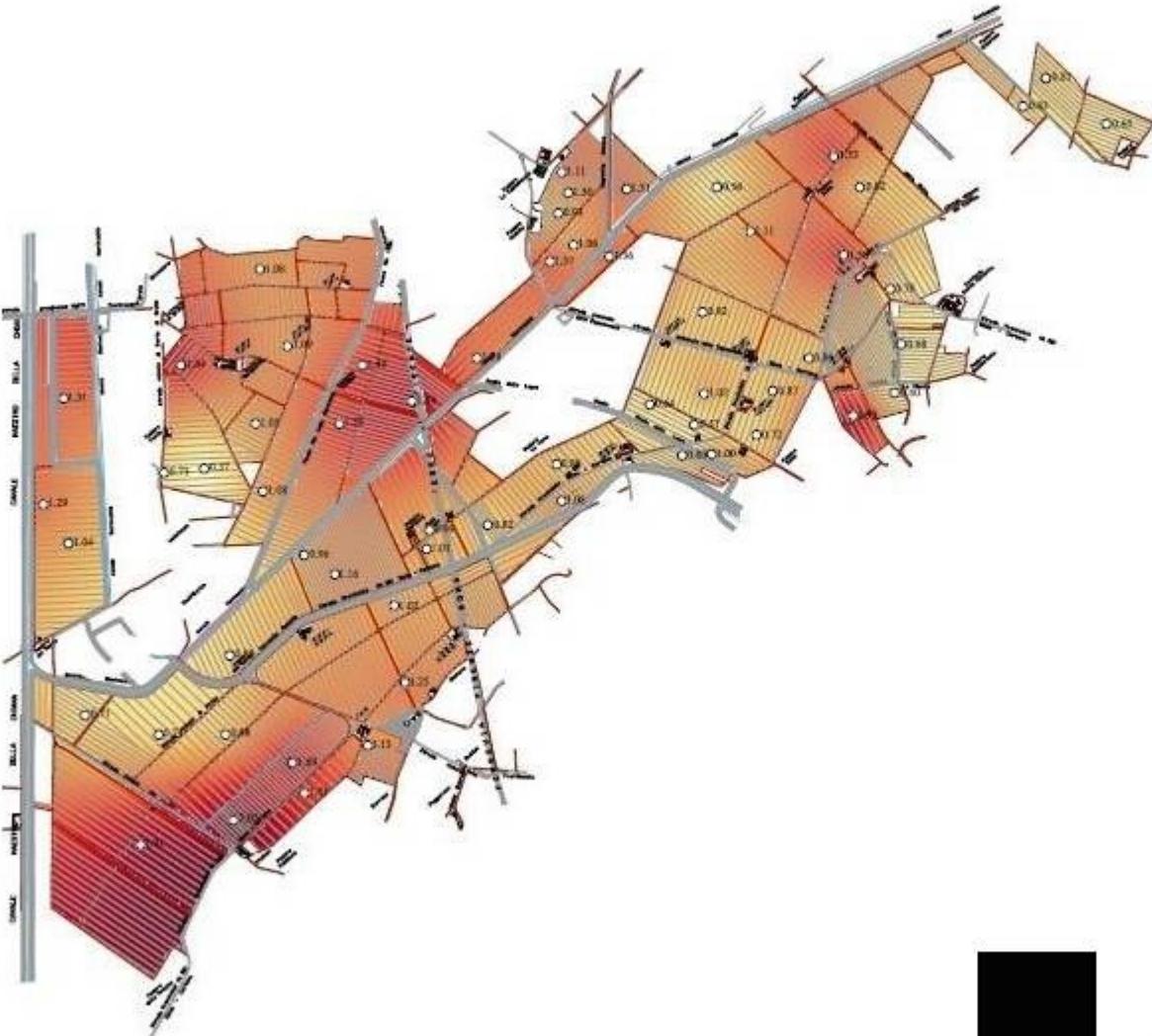
Testimone di Santa Caterina (drenaggio)



CARATTERIZZAZIONE INTEGRATA DEL SULTO	
CARICA TERRATICA - PH	
C.	
N.	
A.	
B.	
C.	
D.	
E.	
F.	
G.	
H.	
I.	
J.	
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Z.	

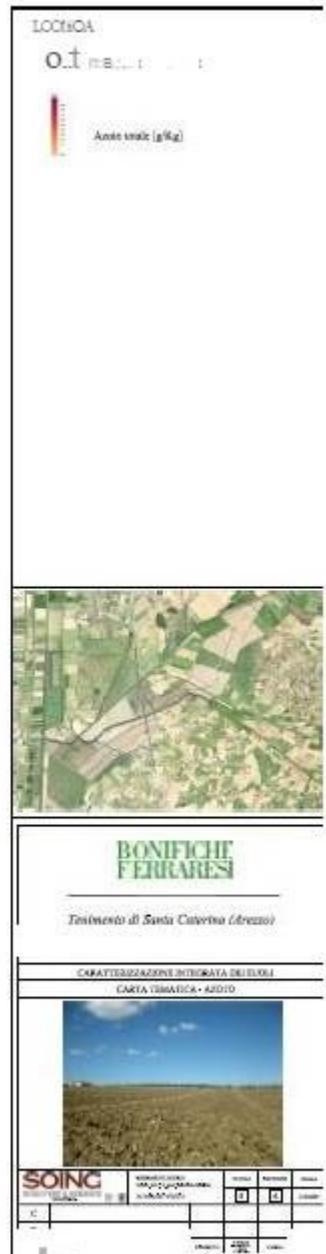


AZOTO



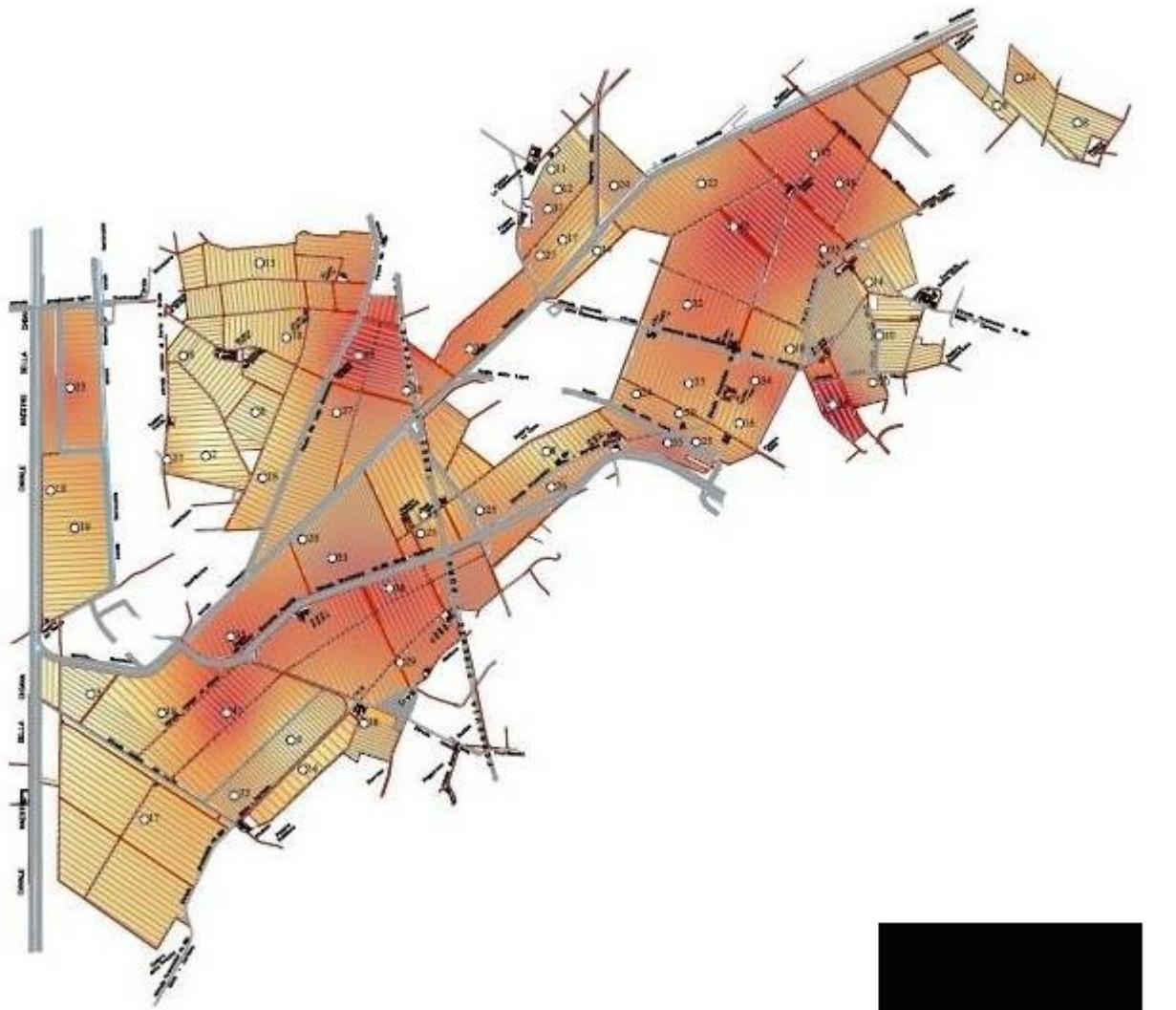
6

2000
Metres





FOSFORO



A gel electrophoresis image showing four lanes. Lane 1 has a marker dot at the top and a band at the 100 bp position. Lanes 2, 3, and 4 have bands at the 100 bp and 200 bp positions.

LEGENDA

- 19 Posteriormente al tronco cerebral

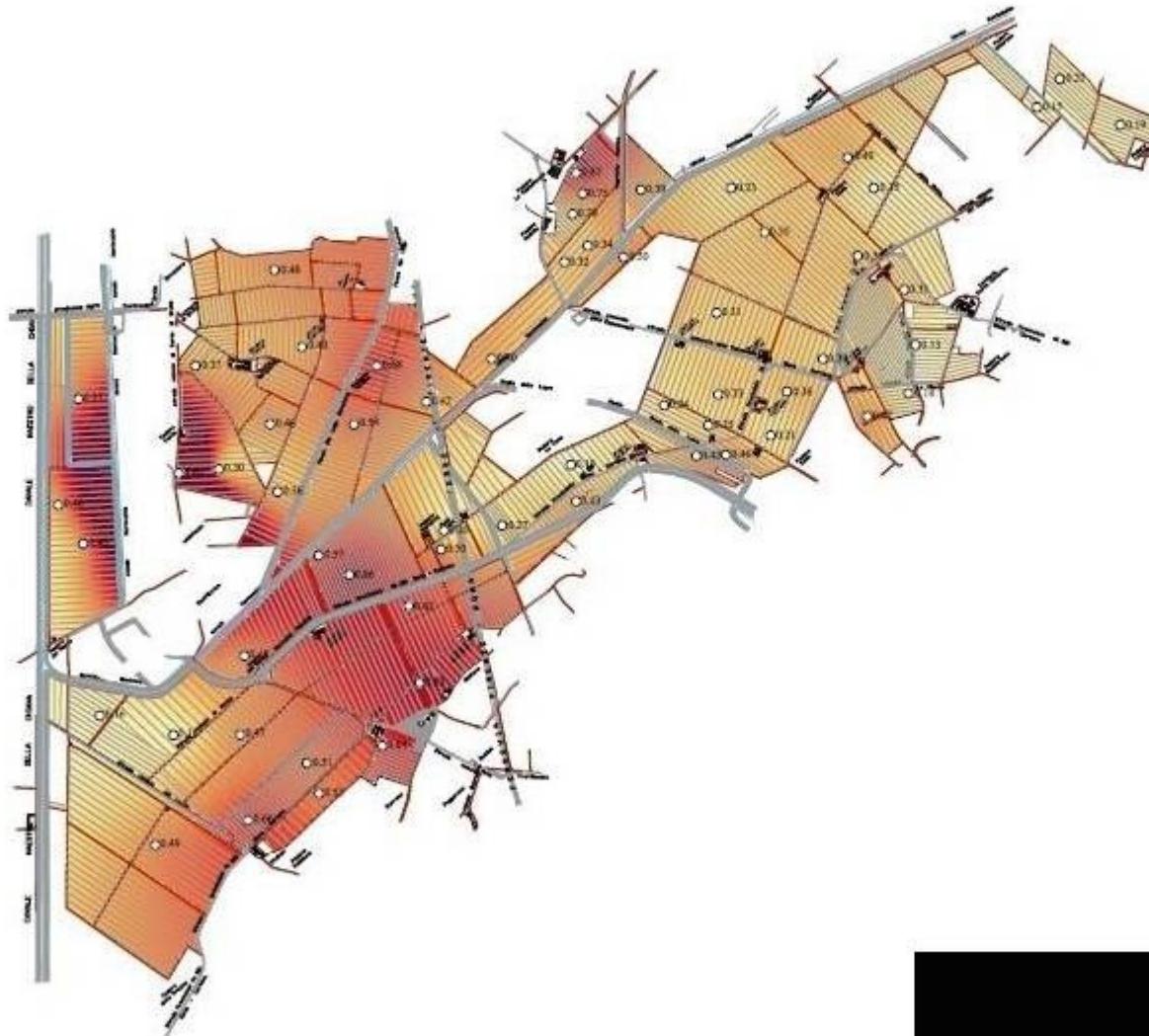


nommr
fD'URE"

Tenimento di Santa Caterina (Arezzo)



POTASSIO



10 Metric



LEGENDA

- 29 Positivo para el empoderamiento



normalair

Tenimento di Santa Caterina (Arezzo)

CARATTERIZZAZIONE INTEGRATA DI SINGOLO
CARTA TEMATICA - POTASSIO

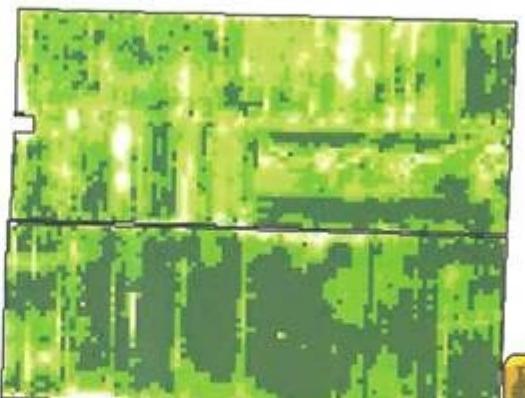


SOINC SOUTHERN INDUSTRIAL NATIONAL INSURANCE COMPANY	AMERICAN INDUSTRIAL INSURANCE COMPANY	INDUSTRIAL INSURANCE COMPANY	INDUSTRIAL INSURANCE COMPANY	INDUSTRIAL INSURANCE COMPANY
C				
B				
A	—	100000	100000	100000

- Stagione 2013 – Monitoraggio delle rese: Salana -

Soia (t/ha)

- ≤ 2,5
- 2,5 ÷ 3,5
- 3,5 ÷ 4,5
- ≥ 4,5



Grano (t/ha)

- ≤ 2
- 2 ÷ 3,5
- 3,5 ÷ 5,5
- 5,5 ÷ 7,5
- ≥ 7,5

Mais (t/ha)

- ≤ 7,5
- 7,5 ÷ 9,5
- 9,5 ÷ 10,5
- 10,5 ÷ 11,5
- ≥ 11,5



Riso (t/ha)

- ≤ 5,5
- 5,5 ÷ 7,5
- 7,5 ÷ 9,5
- ≥ 9,5

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Crop Modification Techniques

Cross Breeding

Combining two sexually compatible species to create a variety with the desired traits of the parents



The Honeycrisp Apple gets its famous texture and flavor by blending the traits of its parents.

Mutagenesis

Use of mutagens such as radioactivity to induce random mutations, creating the desired trait



Radiation was used to produce a deeper color in the red grapefruit.

Polypliody

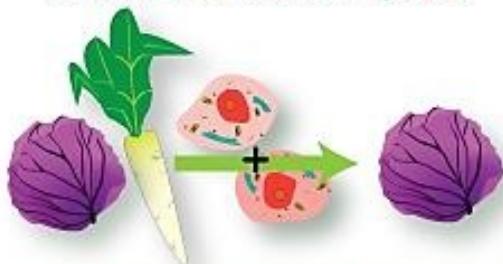
Multiplication of the number of chromosomes in a crop to impact its fertility



Seedless watermelons are created by crossing a plant with 2 sets of chromosomes with another that has 4 sets. The seedless fruit has 3 sets.

Protoplast Fusion

Fusion of cells or cell components to transfer traits between species

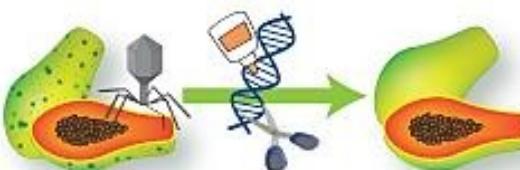


Male sterility is transferred from radishes to red cabbage by fusing their cells. Male sterility helps plant breeders make hybrid crops.

www.biofortified.org

Transgenesis

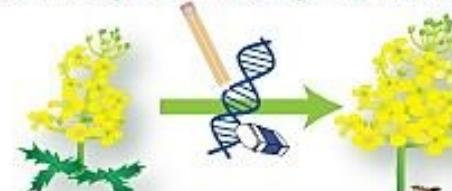
Addition of genes from any species to create a new variety with desired traits



The Rainbow Papaya is modified with a gene that gives it resistance to the Papaya Ringspot Virus.

Genome Editing

Use of an enzyme system to modify DNA directly within the cell



Genome editing was used to develop herbicide resistant canola to help farmers control weeds.

Follow us on Twitter (@frankfoode) or join our Facebook Page

By Layla Katraee (@BiochicaGMO) in collaboration with Karl Haro von Mogel (@kjhwml)

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Melanzane selvatiche e coltivate













Breeding/engineering tree for 'Golden' IR64

