

K EFFECTS ON YIELD QUALITY

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**SIMPÓSIO SOBRE
POTÁSSIO NA AGRICULTURA BRASILEIRA**



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- Why quality?
- Where is the link between K and quality?
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... K effects on yield quality

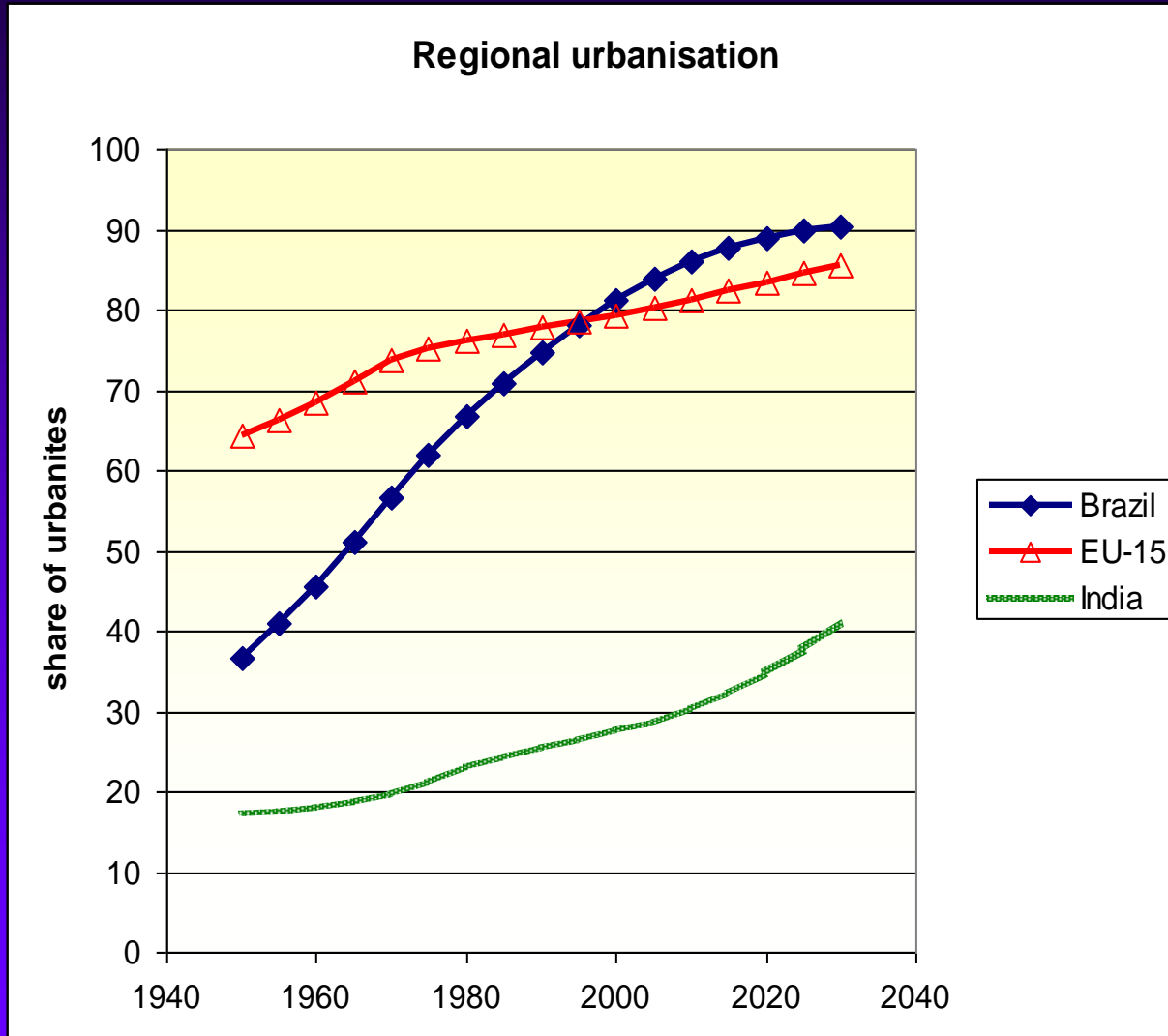
Why quality?





... Why quality?

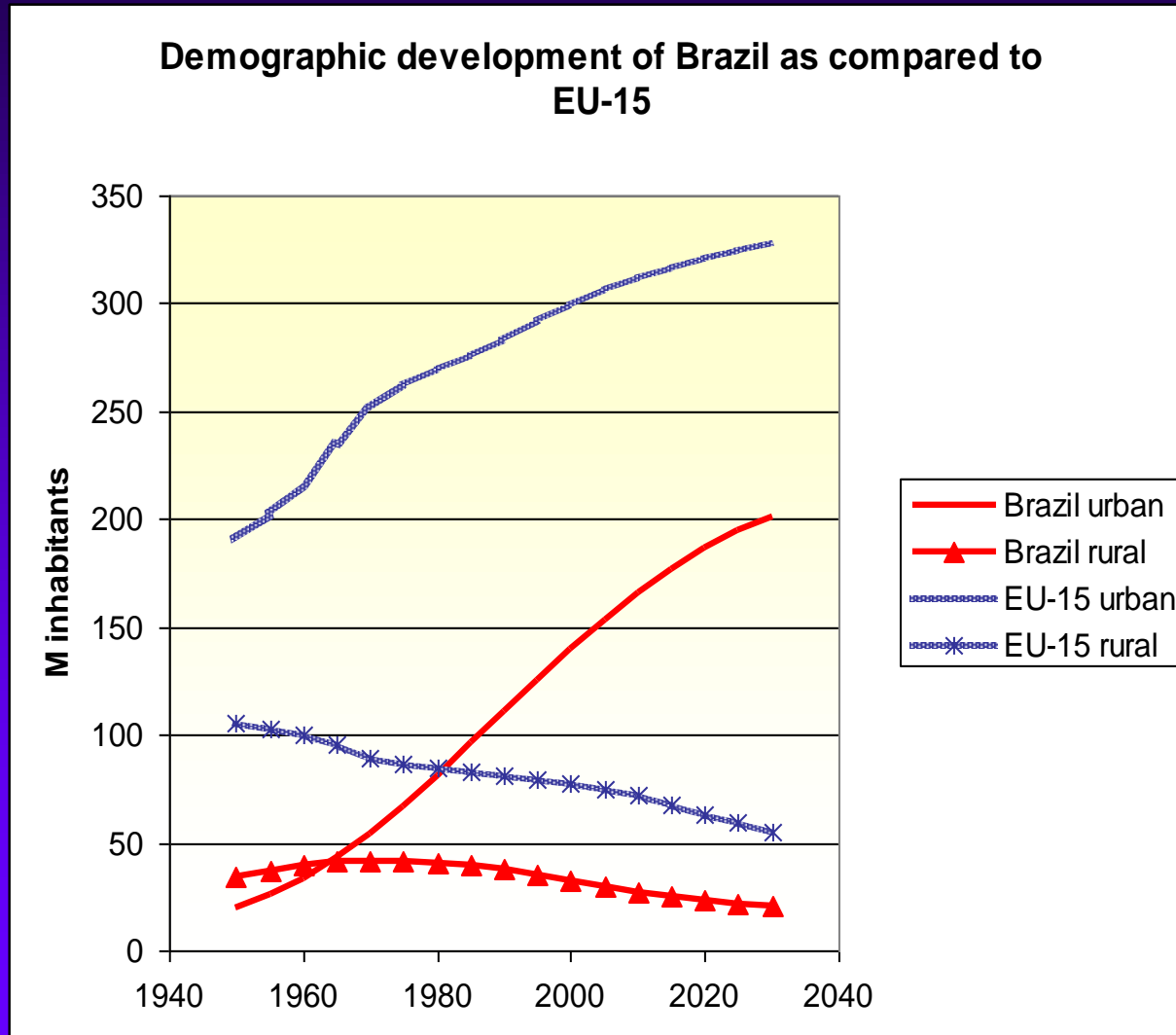
... because urbanisation is advancing





... Why quality?

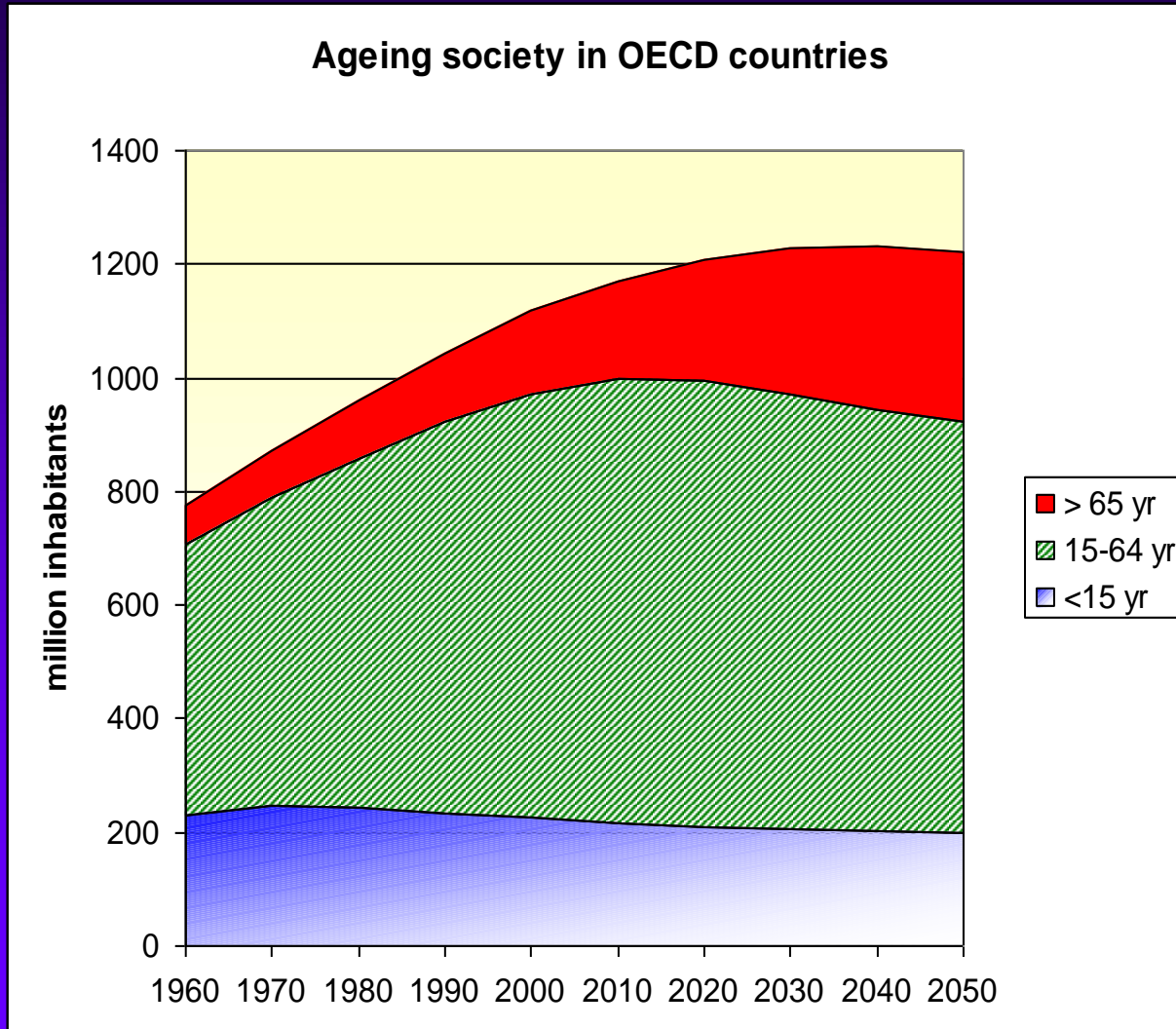
... because urbanisation is advancing, that is more urbanites and less rural people - also in Brazil





... Why quality?

... the society is also rapidly ageing like in the OECD countries





... Why quality?

... with income and ageing the food habit changes

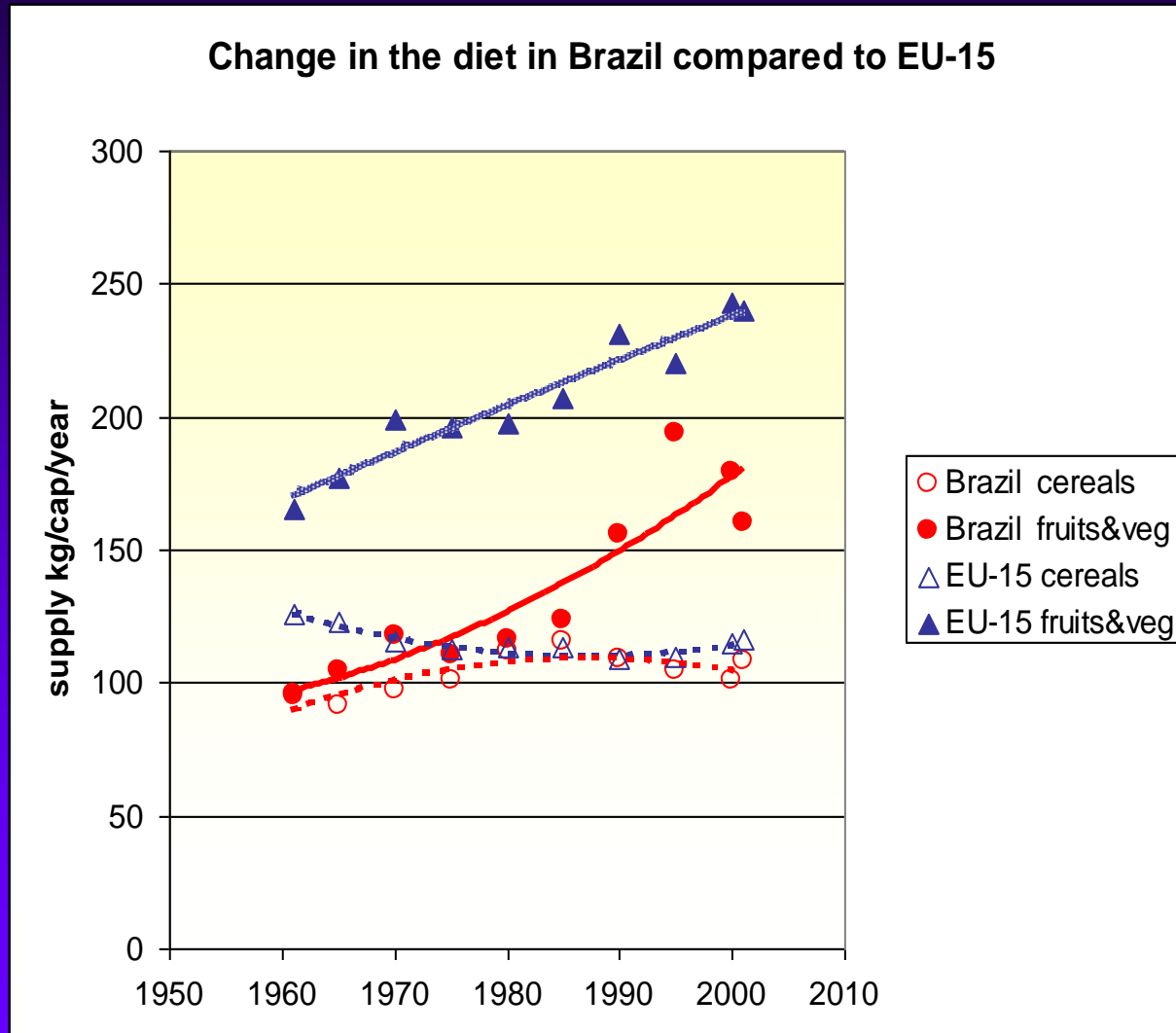
food type





... why quality?

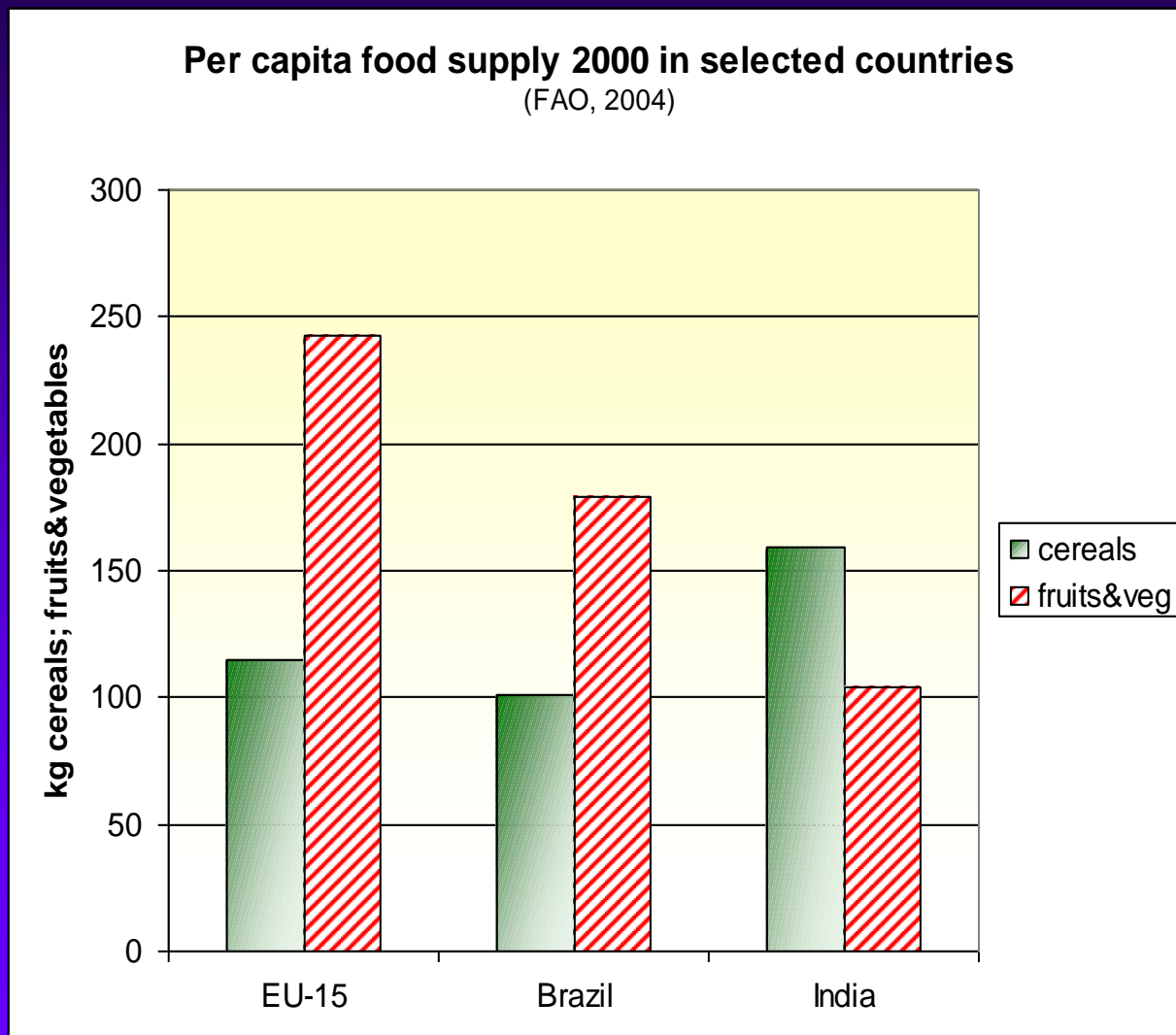
... less cereals and more fruits and vegetables ...





... why quality

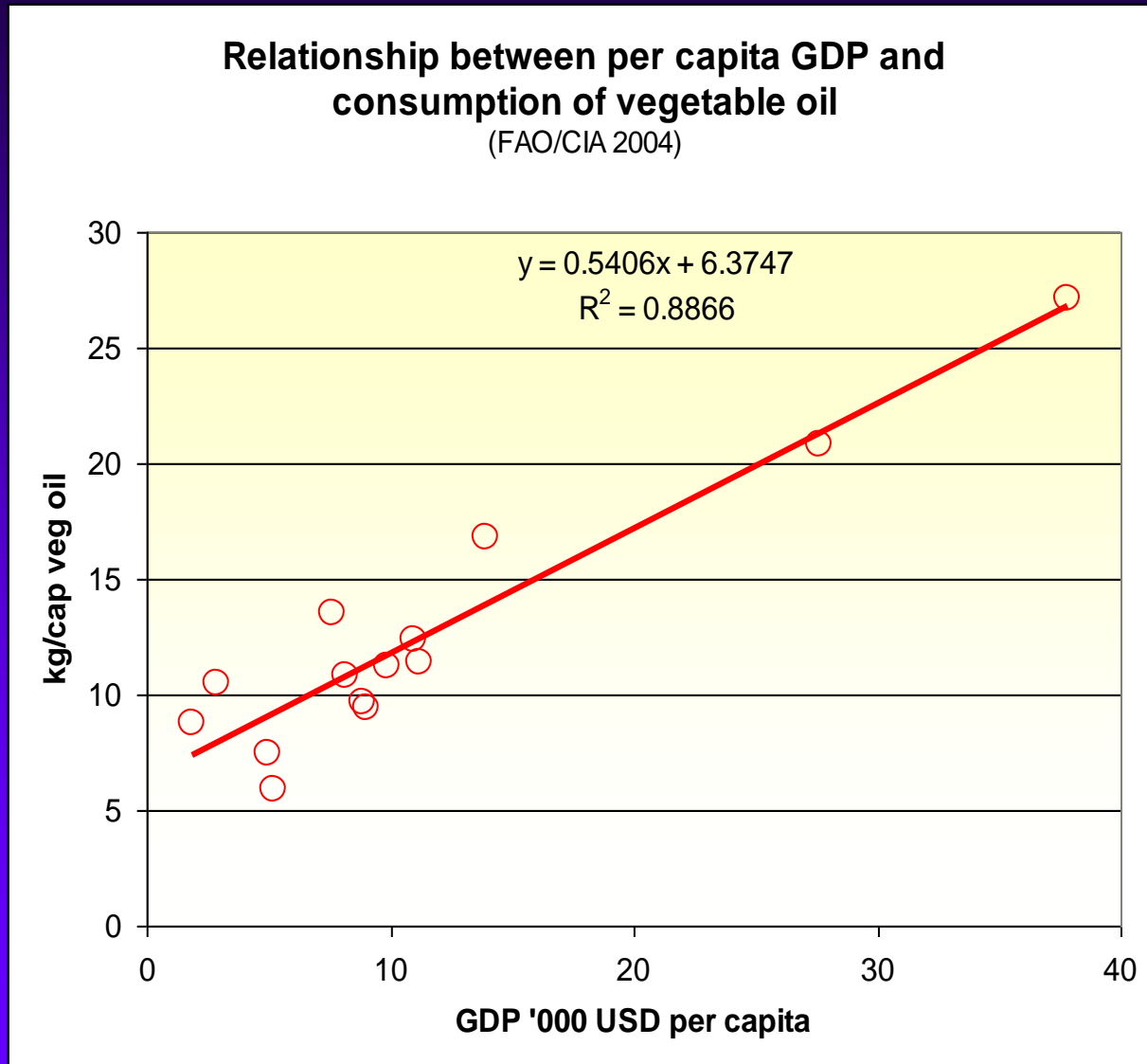
... less cereals and more fruits and vegetables ...





... why quality?

... and more vegetable oil with raising income ...



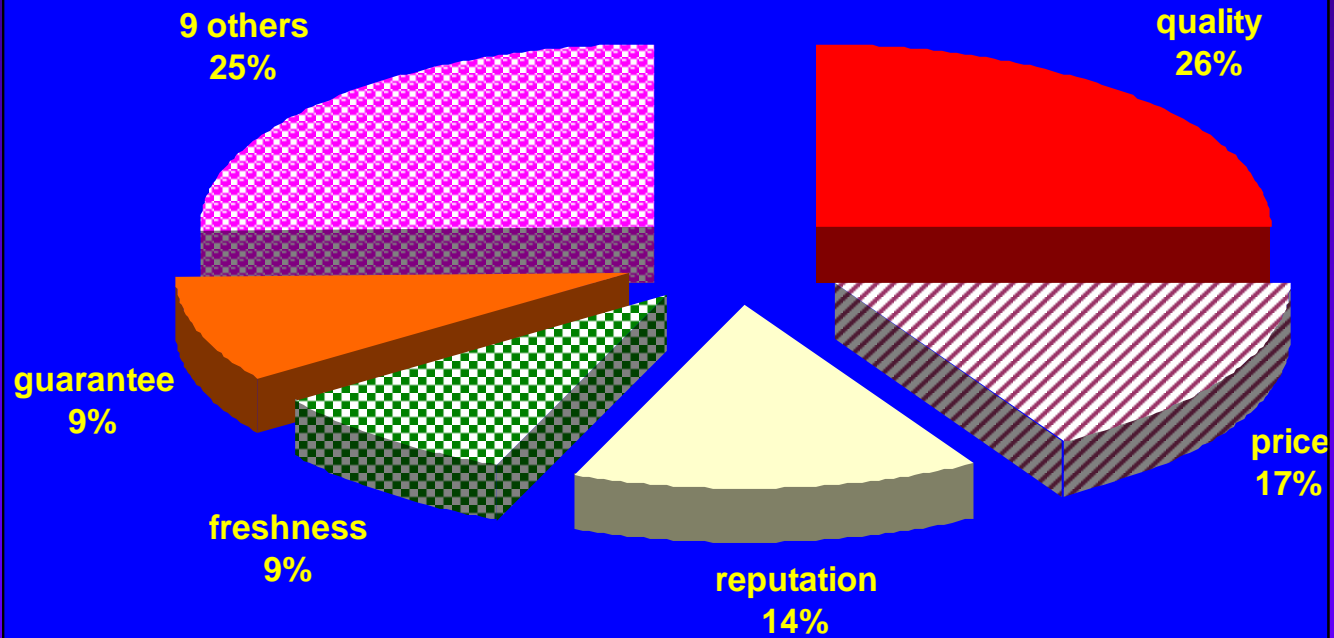


... why quality?

... and customers look first for quality when selecting food

Relative importance of product attributes in product choice

after TRAILL, 1999





... K effects on yield quality

Why quality?

What is quality?





... what is quality?

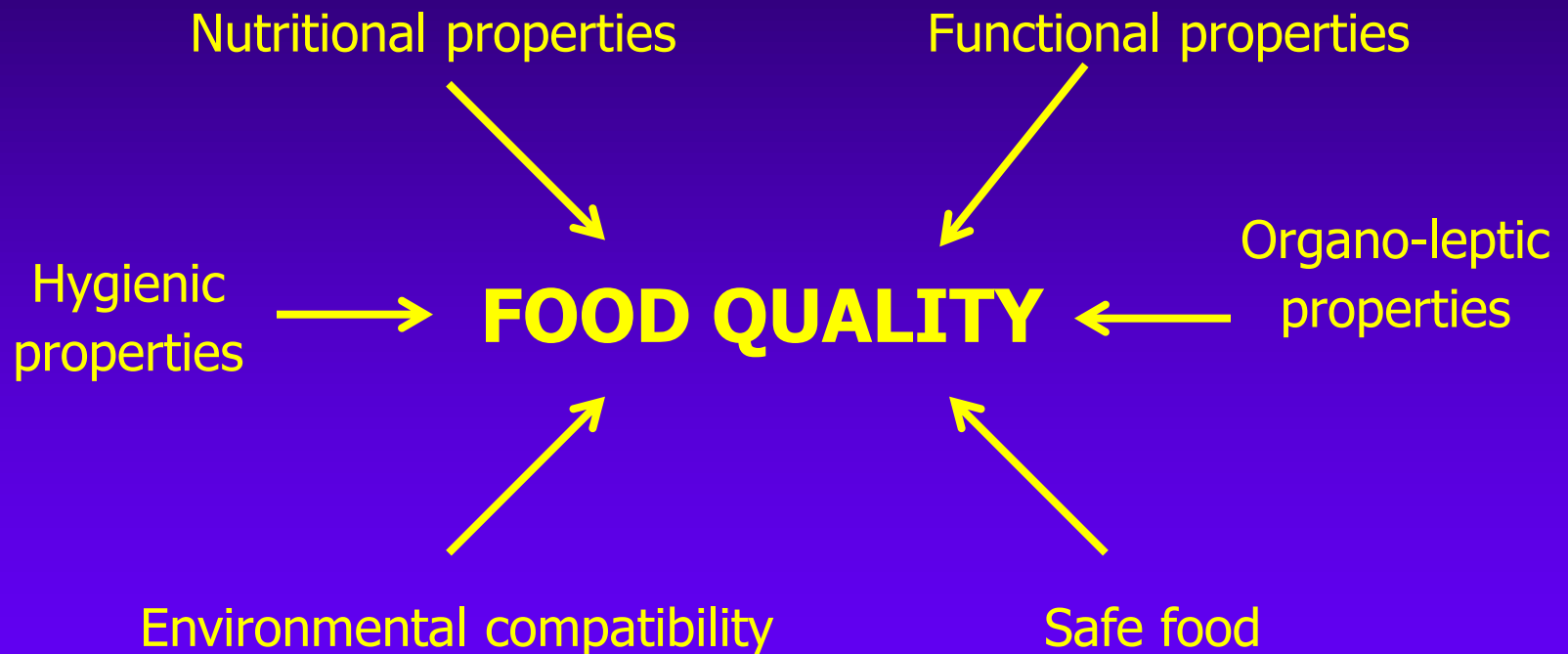
Quality is

...an intrinsic property of food by which it meets predefined standard requirements. Determinants of food quality can be grouped into several properties. Food quality therefore refers to the value, which is subjectively or objectively attached to food with respect to quality properties...

(Alabaka, 1999)



... What is quality?





... K effects on yield quality

Why quality?

What is quality?

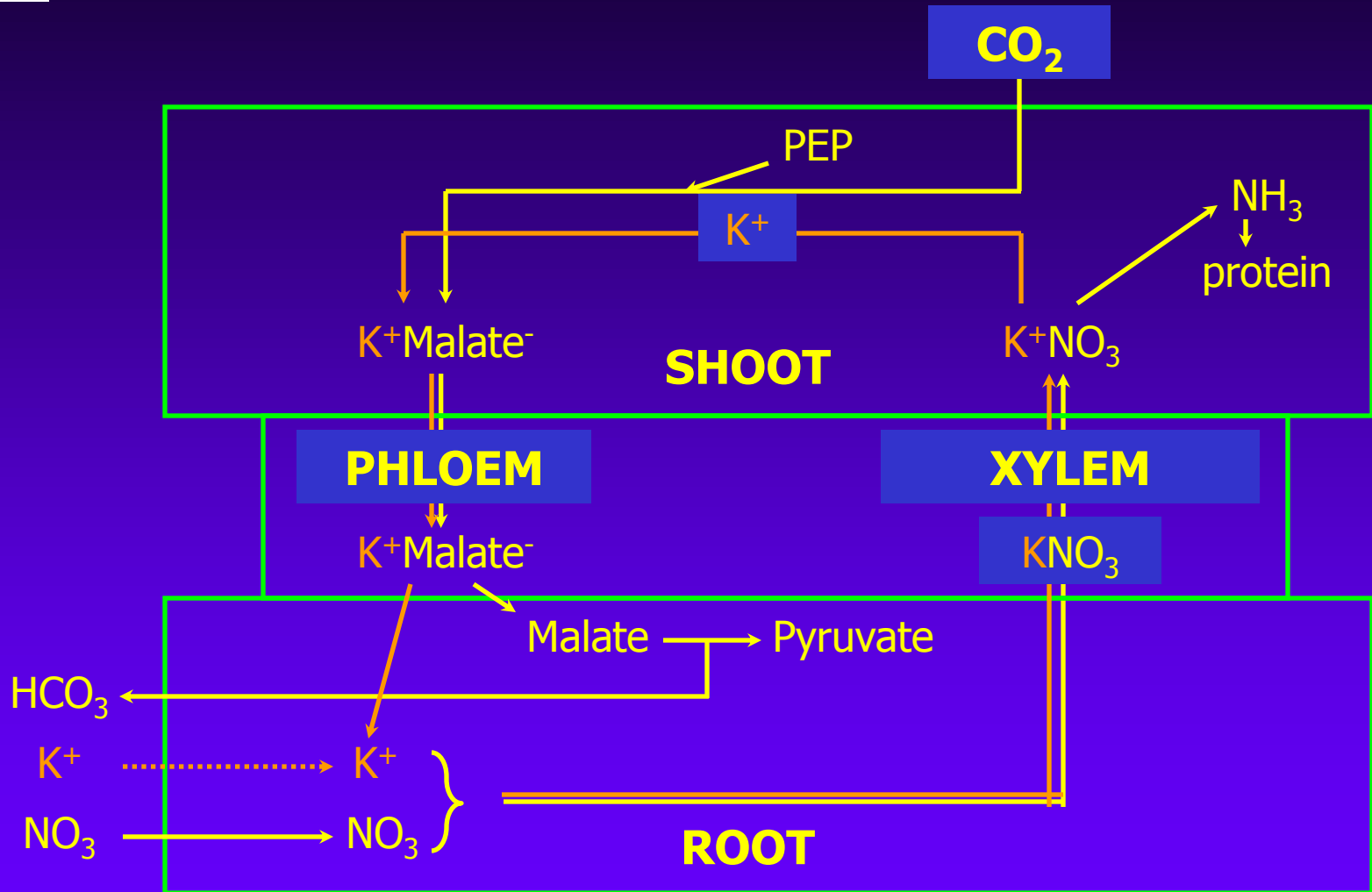
Where is the link between K and quality?





... Where is the link between K and quality?

... for example, in N metabolism ...

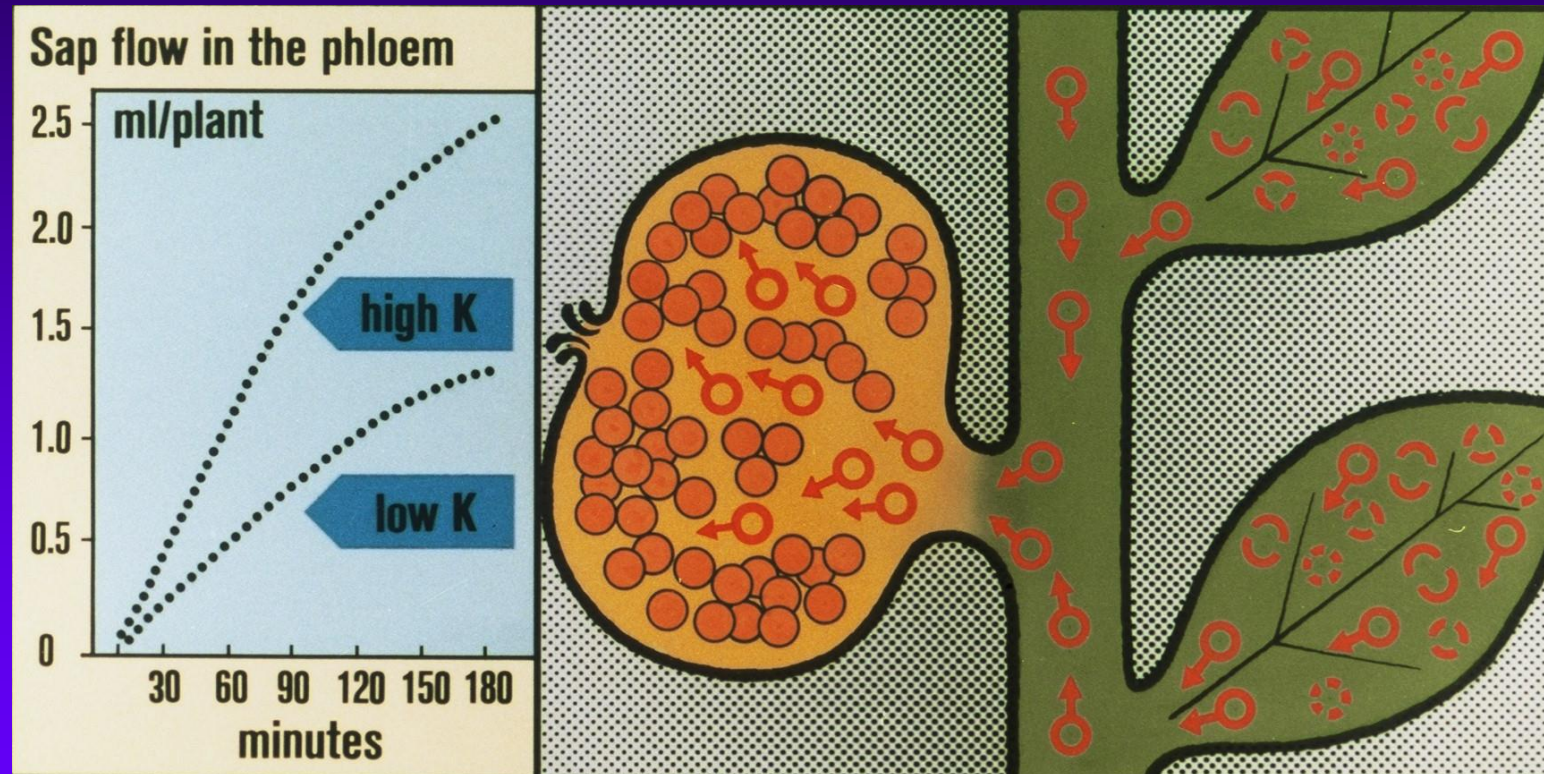


Model for the circulation of potassium in relation to nitrate and malate transport (after MARSCHNER, 1995)



... Where is the link between K and quality?

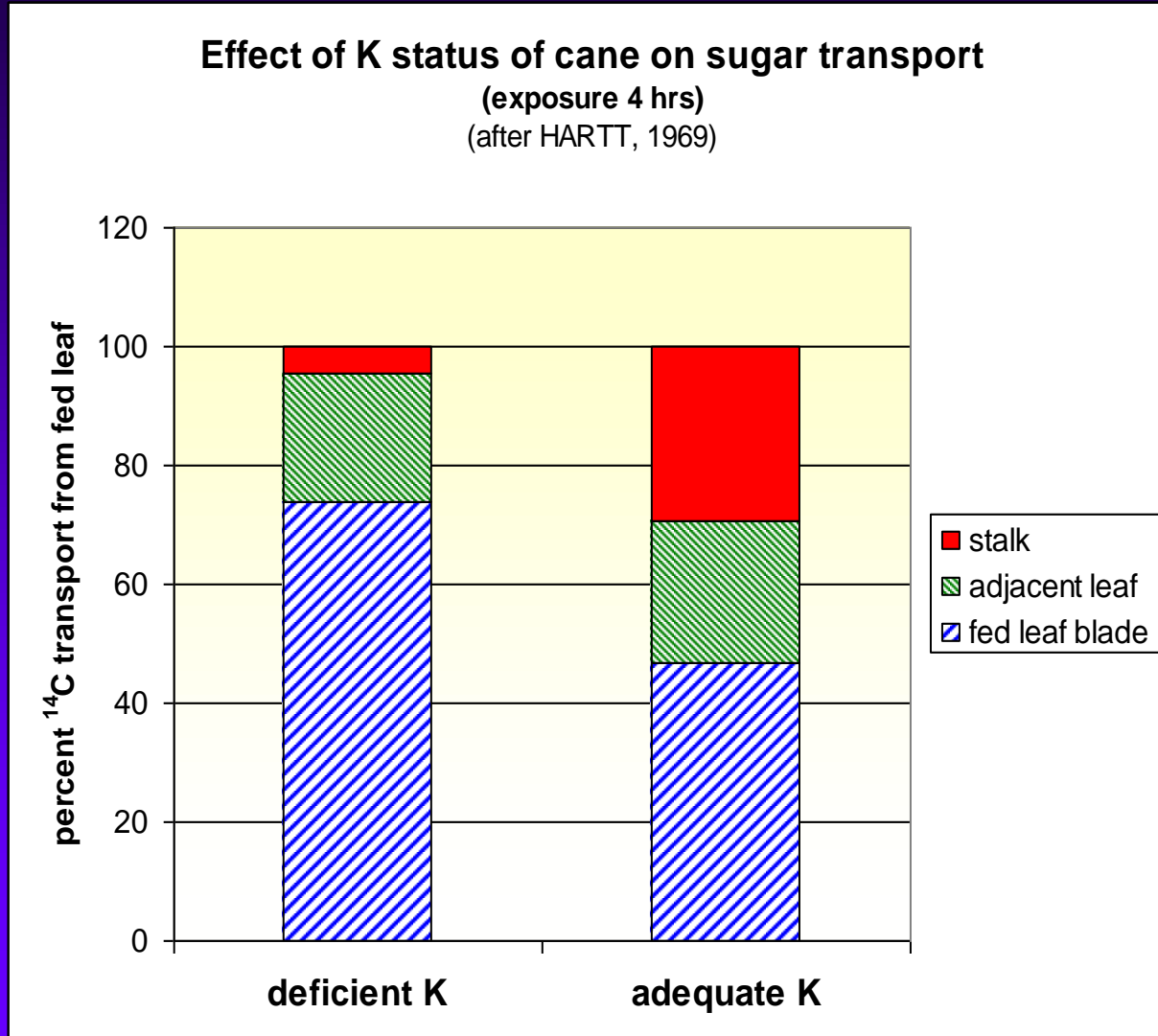
... for example, in sugar transport





... Where is the link between K and quality?

... for example, in sugar transport

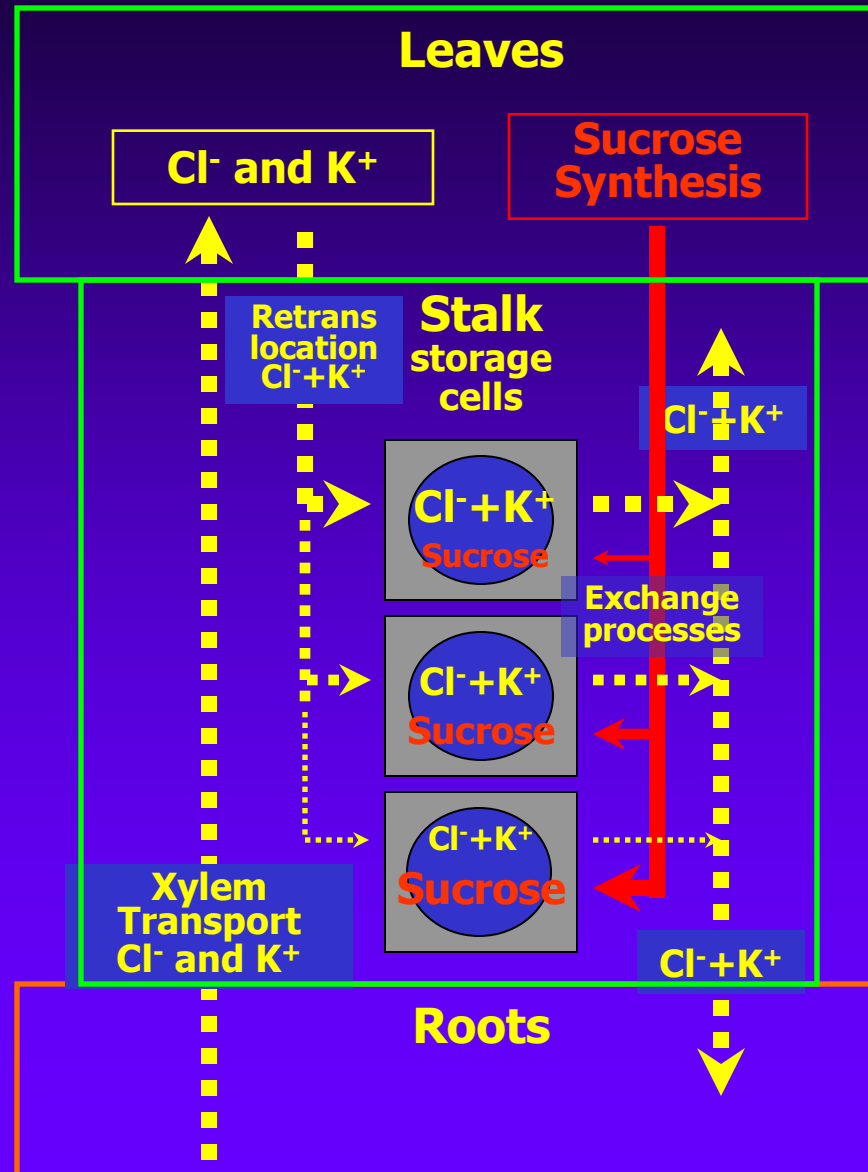




... Where is the link between K and quality?

... unless excessive Cl^- affects sucrose storage in cane stalks

Exchange processes of Cl^- and sucrose in sugarcane
(KRAUSS, 1992)

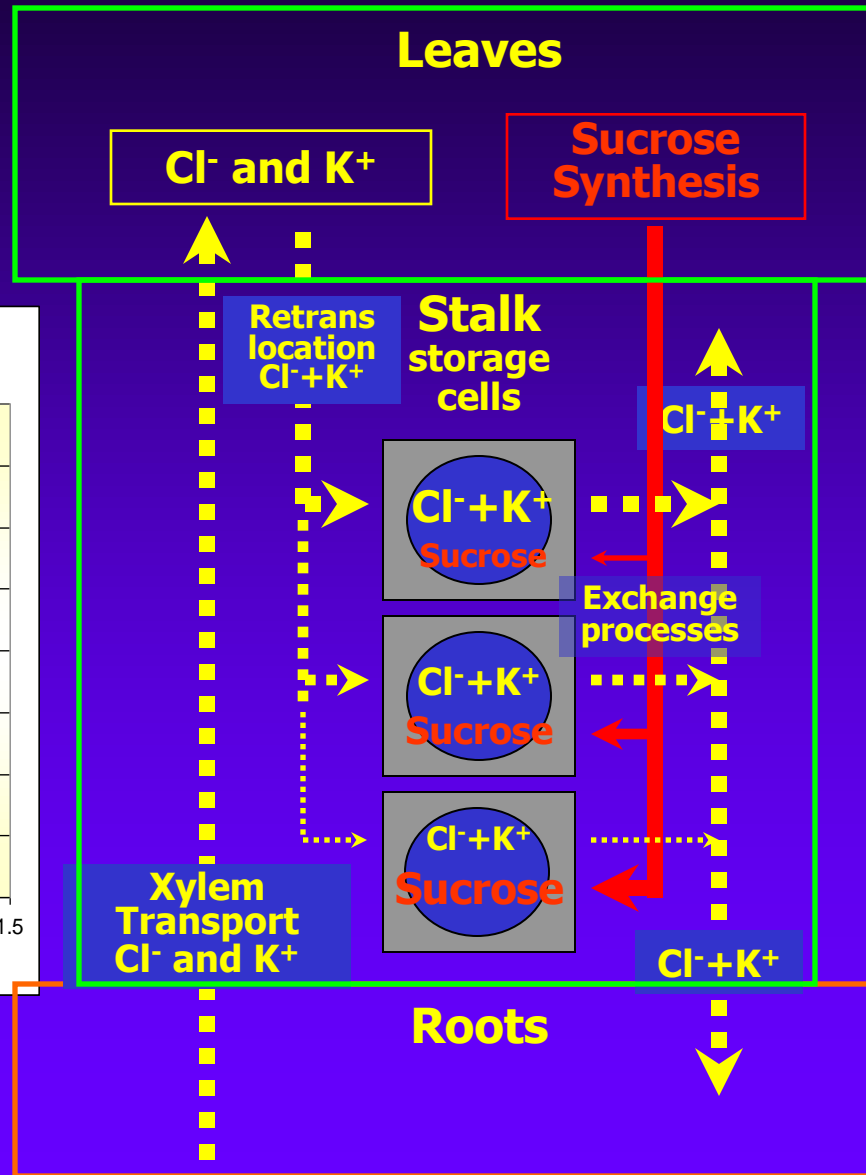
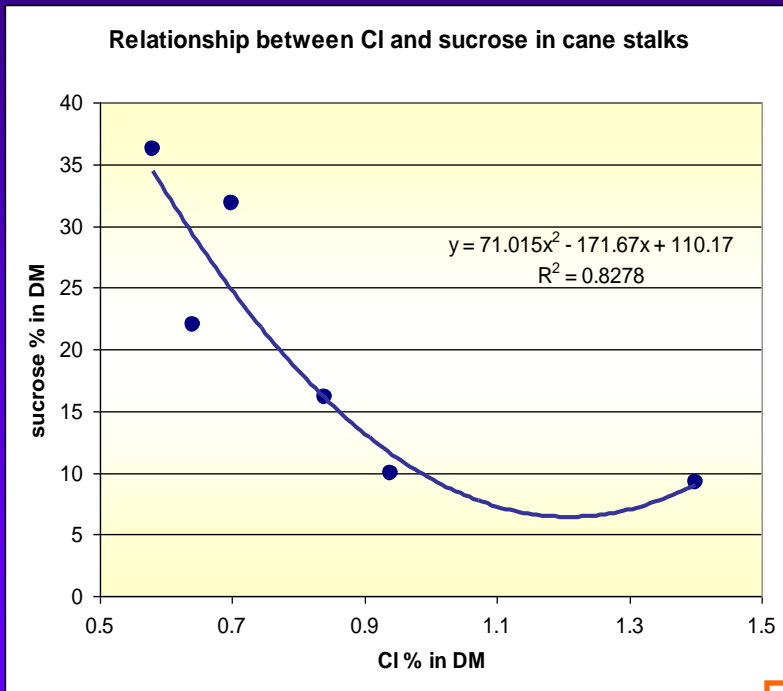




... Where is the link between K and quality?

... unless excessive Cl⁻ affects sucrose storage in cane stalks

Exchange processes of Cl⁻ and sucrose in sugarcane
(KRAUSS, 1992)





... Where is the link between K and quality?

... for example, in water utilization

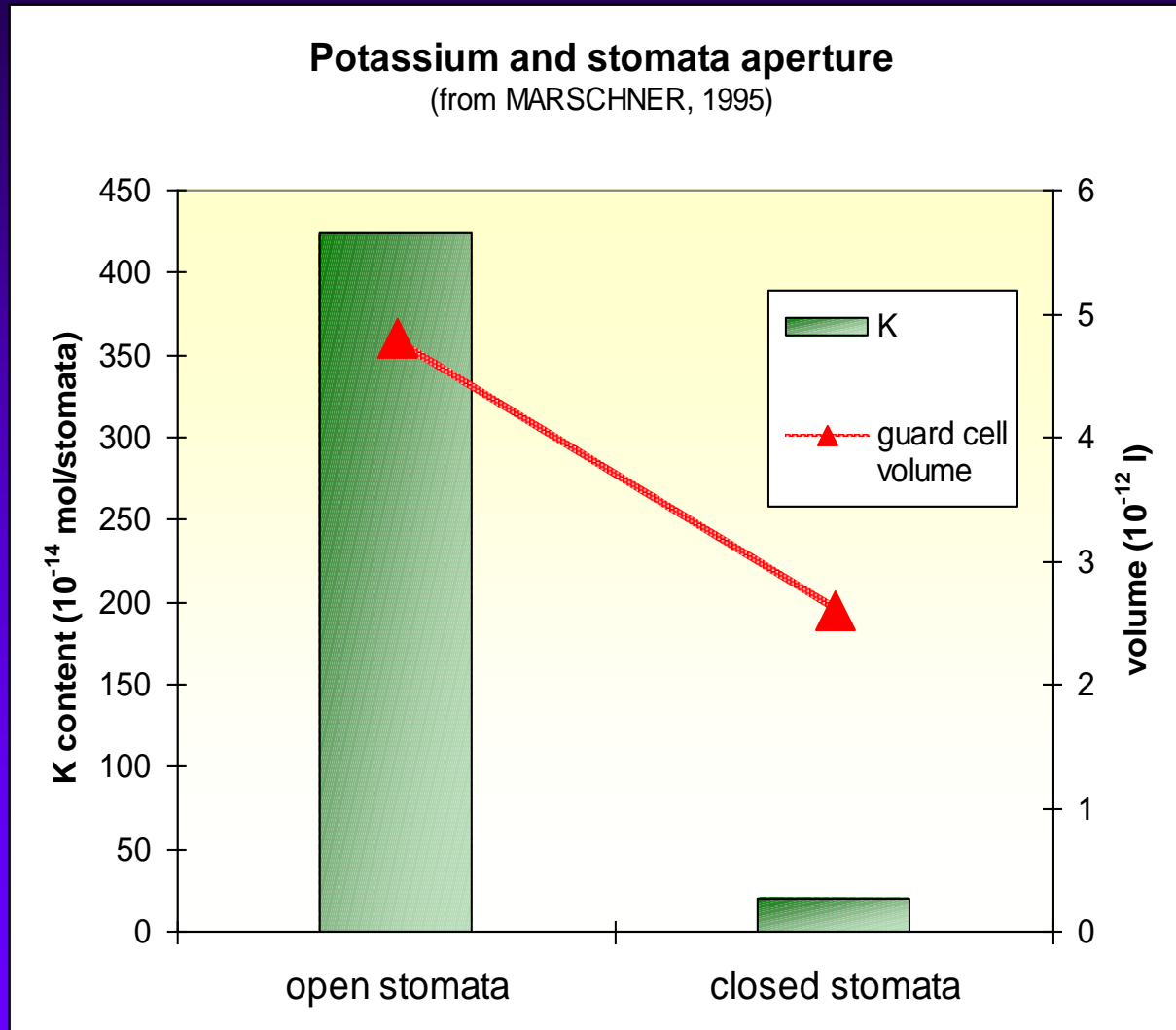


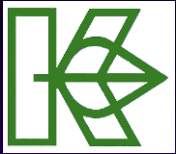
Wilting of sugar beets as affected by K supply



... Where is the link between K and quality?

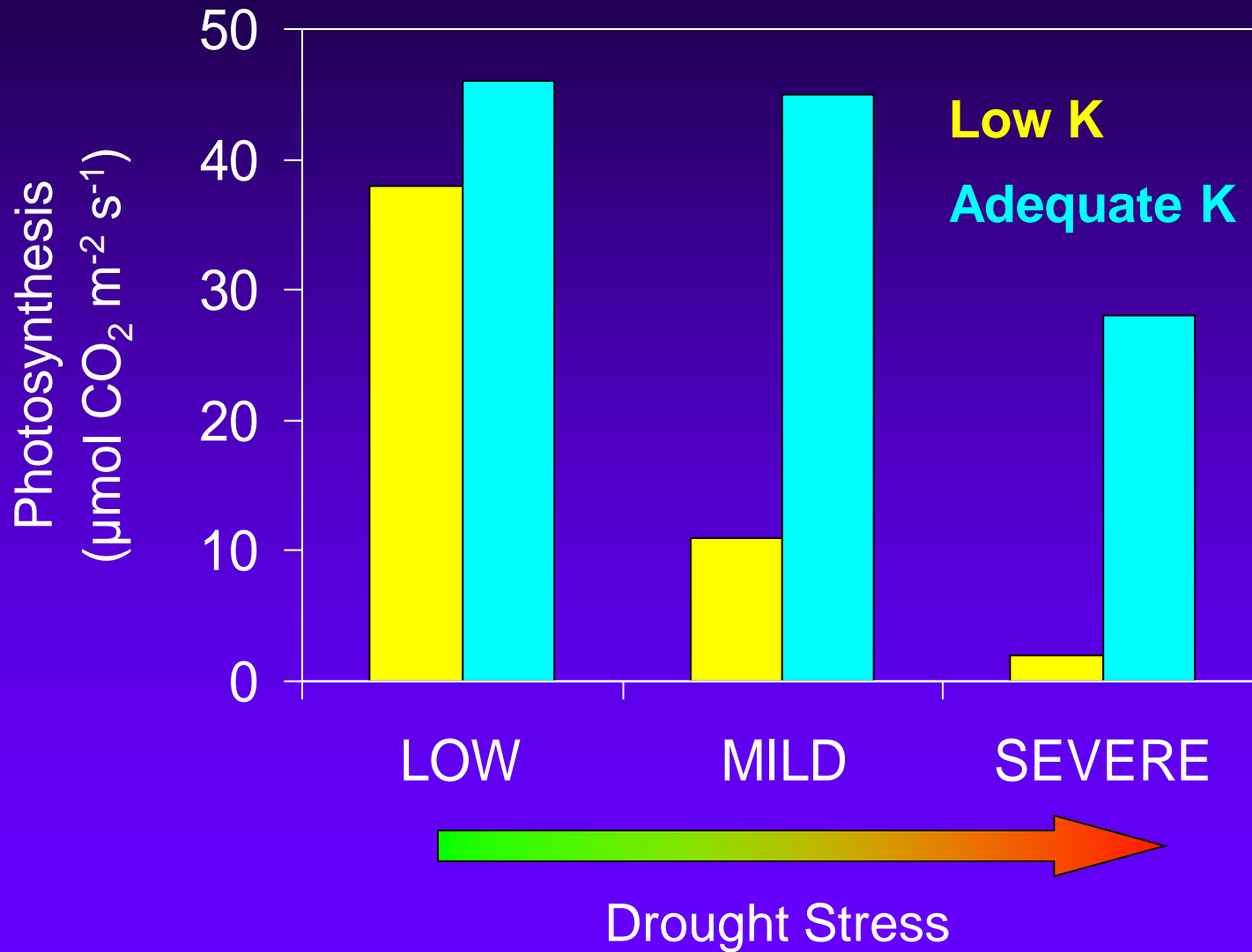
... K regulates stomata aperture





... Where is the link between K and quality?

... K is the insurance for quality formation even under climatic ...

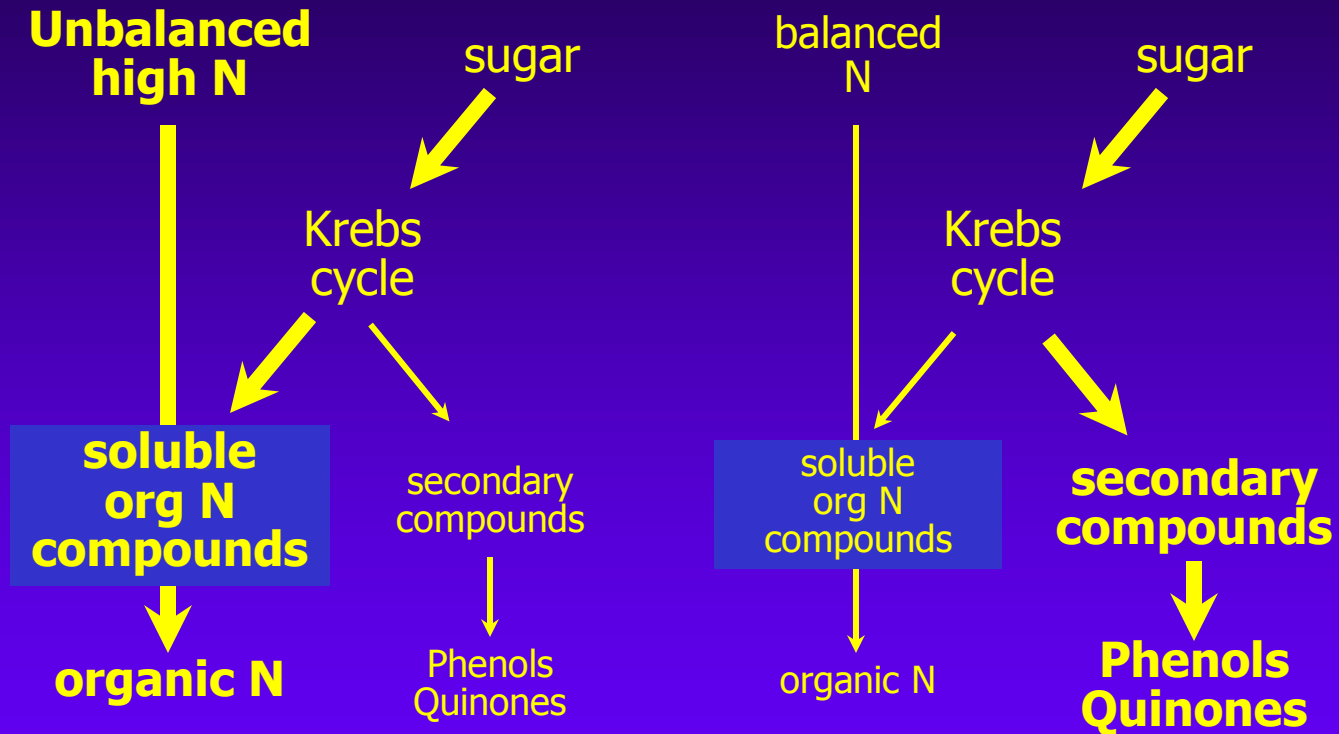


From CAKMAK, 2003



... Where is the link between K and quality?

... or biotic stress



Synthesis of pathogen repellents in plants as affected by the level of N supply
(after GRAHAM, 1983)



... K effects on yield quality

Why quality?

What is quality?

Where is the link between K and quality?

What can we prove?

K 300

K 0

K 200

K 100

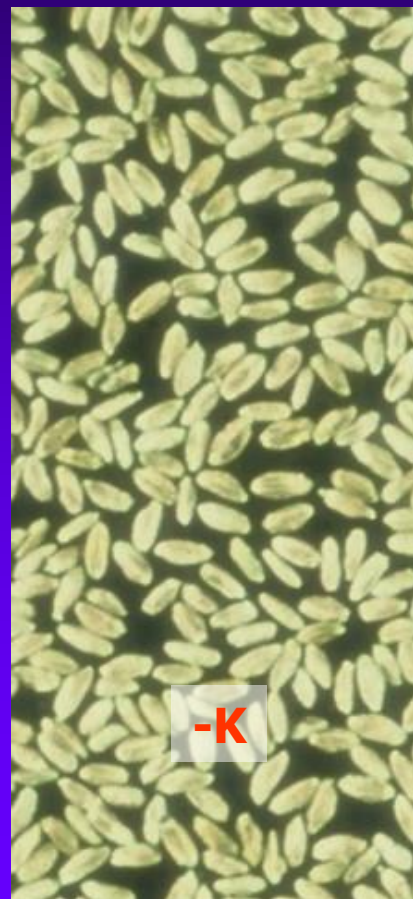
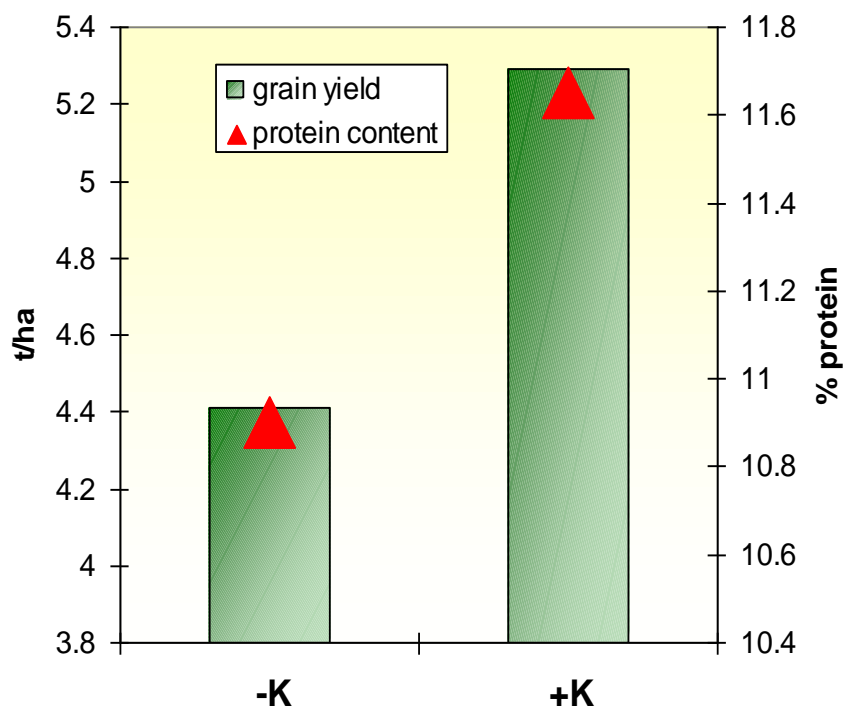


... What can we prove?

... adequate K improves the nutritive value

- for instance in wheat - higher protein content and better appearance

Yield and quality of wheat in India as affected by K



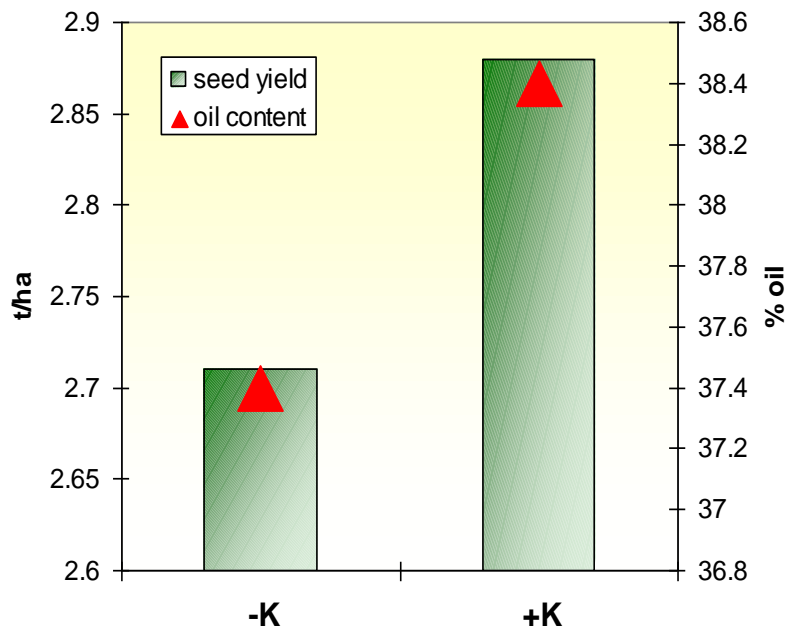


... What can we prove?

... adequate K improves the nutritive value

- with higher oil content, more people can get their daily need from the same field

Yield and quality of oilseed rape in China as affected by K



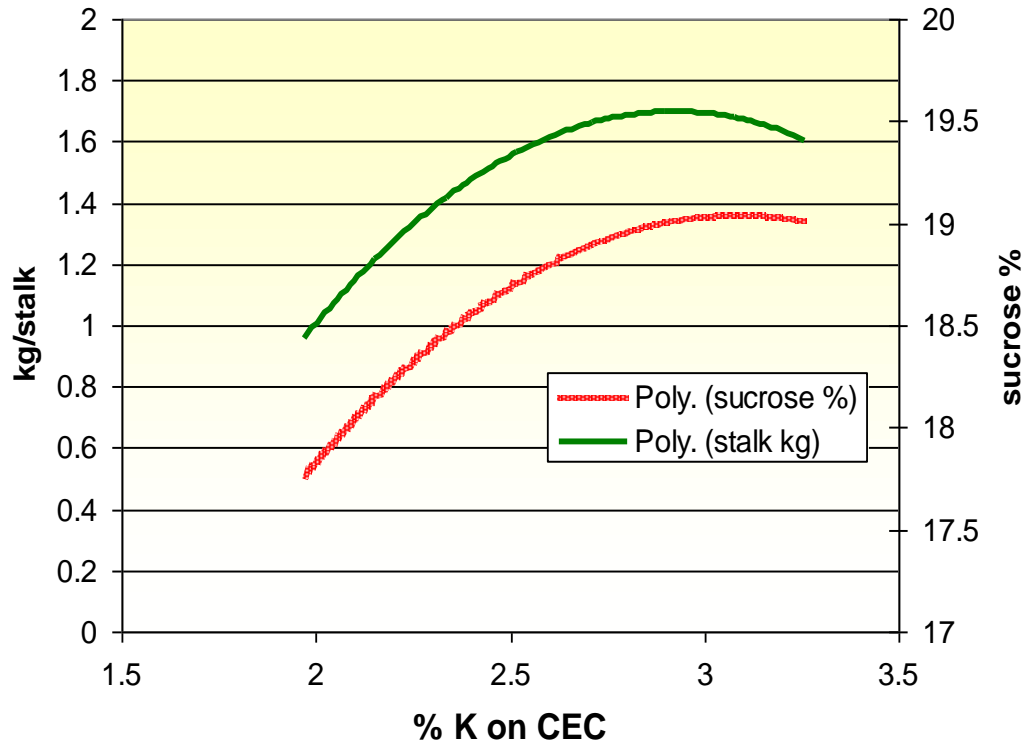


... What can we prove?

... adequate K affects the functional property

- with higher sugar content, less cane is required for the same sugar output and thus, less energy for transport and extraction

Relationship between soil K absorption ratio (K in % of CEC) and stalk size and sucrose content of cane in Egypt



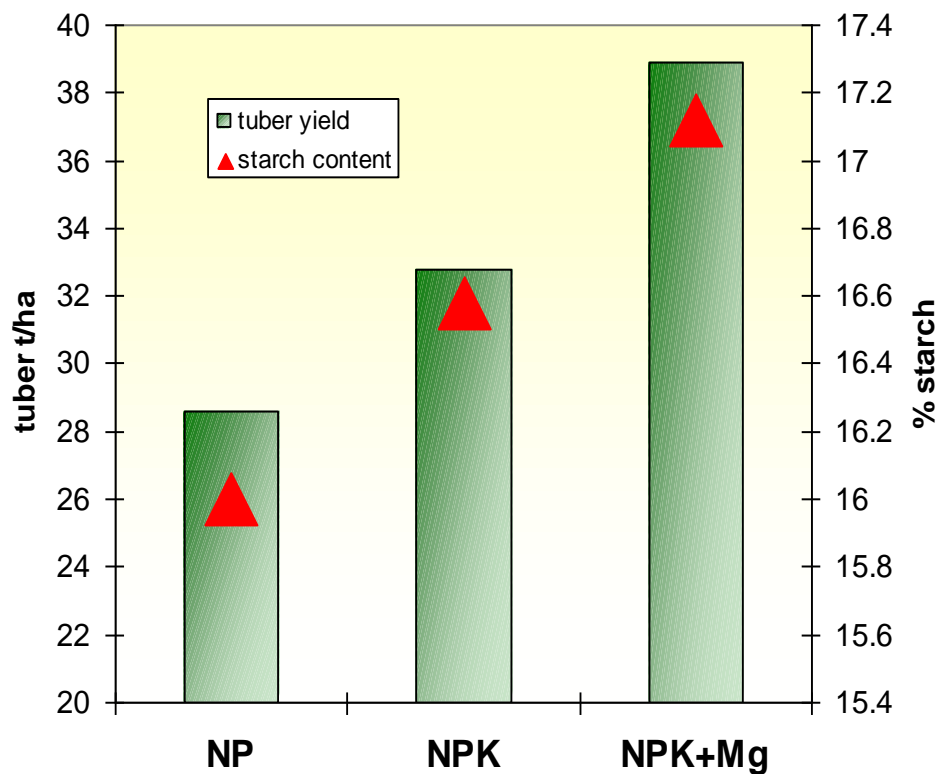


... What can we prove?

... adequate K affects the functional property

... the same applies to potato and starch production

Tuber yield and quality of potatoes in Poland

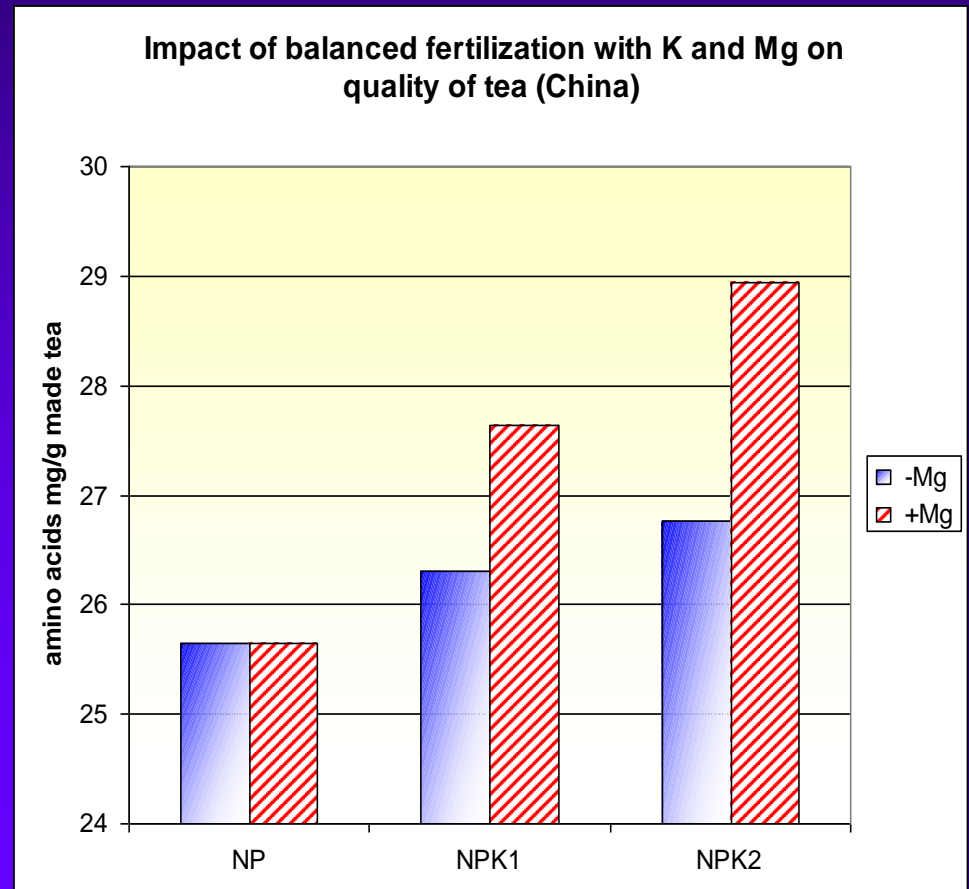




... What can we prove?

... K is involved with organo-leptic properties

... amino acids are important components for tea quality ...



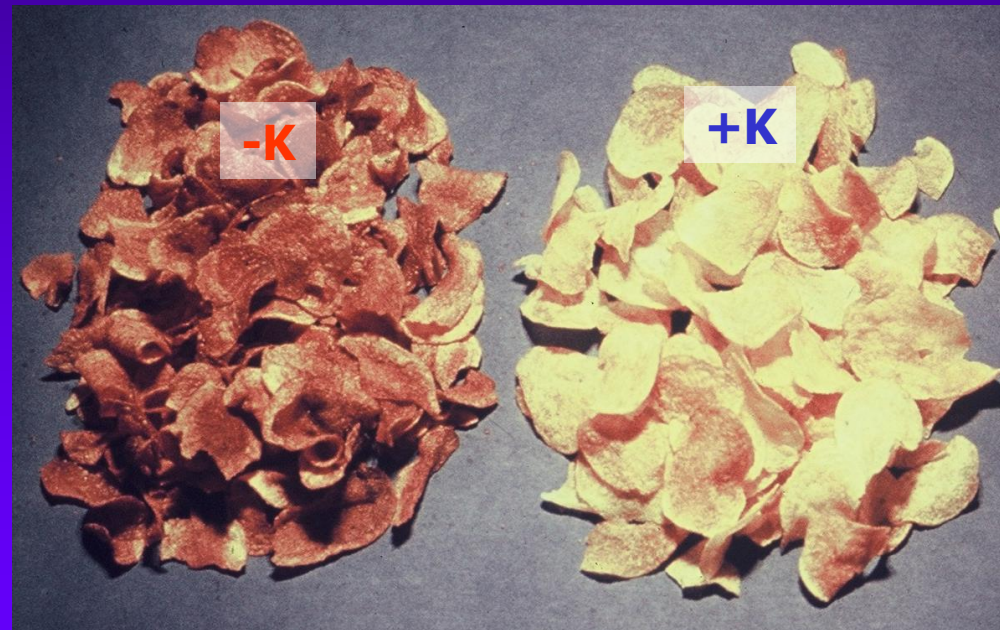
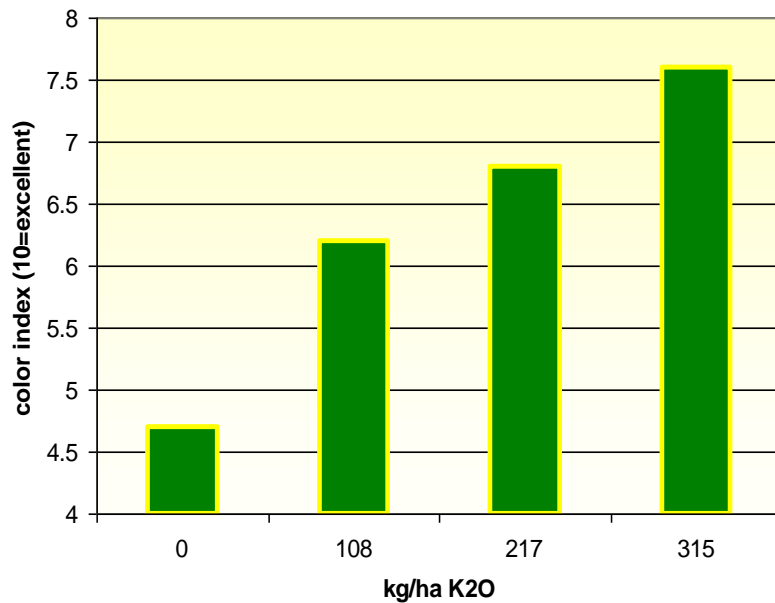


... What can we prove?

... K is involved with organo-leptic properties

... and potato crisps keep a bright colour when the tubers are fed with adequate K because it lowers the content of reducing sugars

Color index of potato chips as affected by K supply





... What can we prove?

... K controls hygienic properties

... mouldy fruits, cracked tomatoes from K deficient plants are disliked by consumers ...



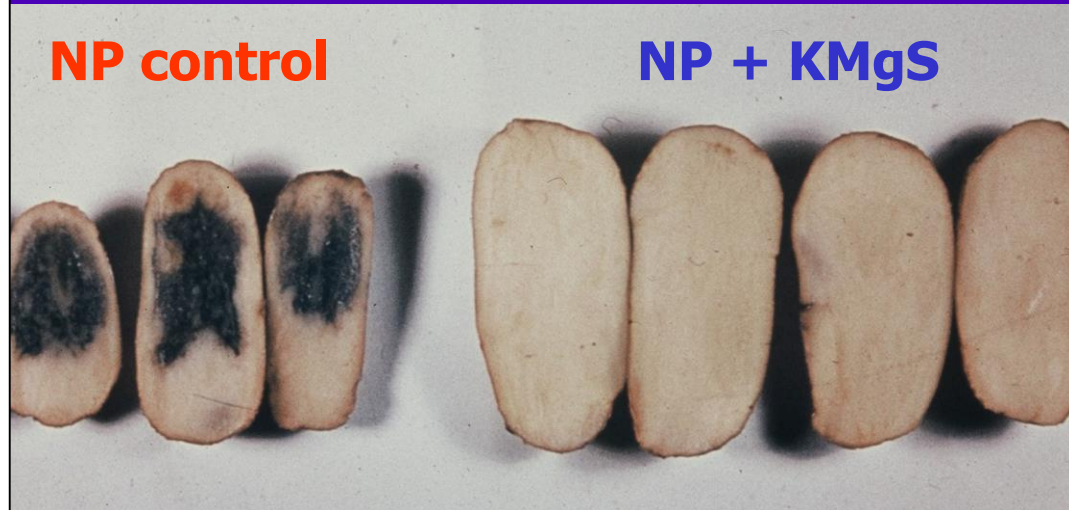
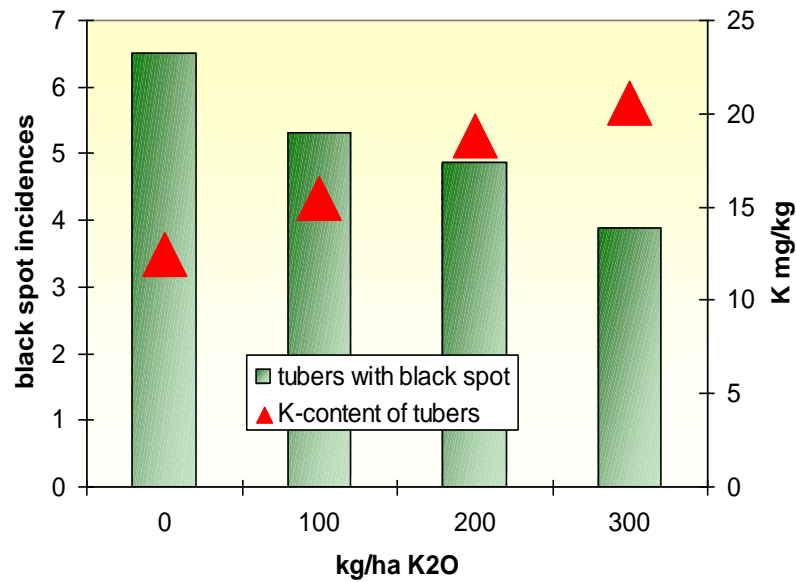


... What can we prove?

... K controls hygienic properties

... also black spots in potato tubers can be controlled by adequate K ...

Relationship between K supply and incidences of black spots in potato tubers (Germany)



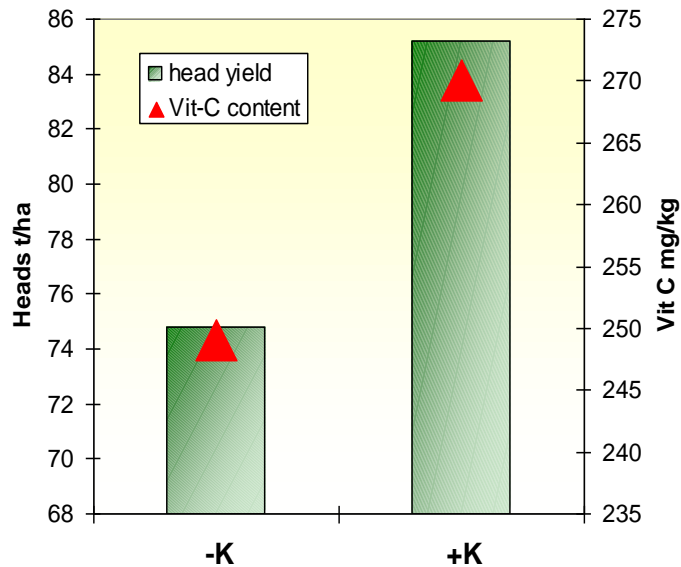


... What can we prove?

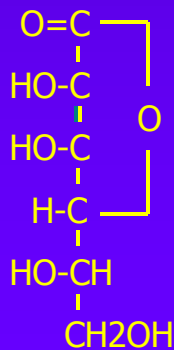
... K enhances the content of functional compounds

... Vitamin C and antioxidant contents are improved by adequate K ...

Balanced fertilization increased yield and improved quality of cabbage in Russia

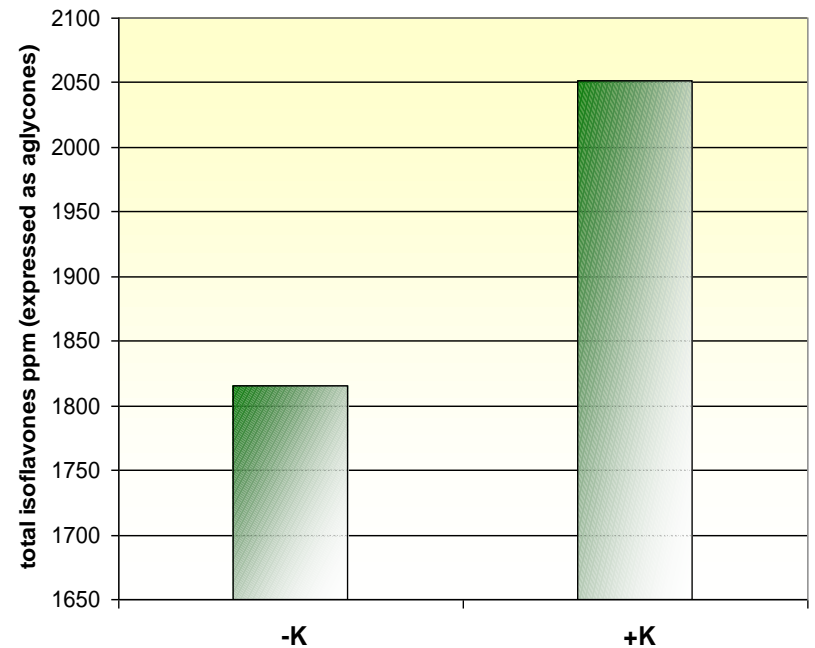


Vit C



Effect of K on isoflavones in soybean seeds

(BRUULSEMA*, 2002)





... What can we prove?

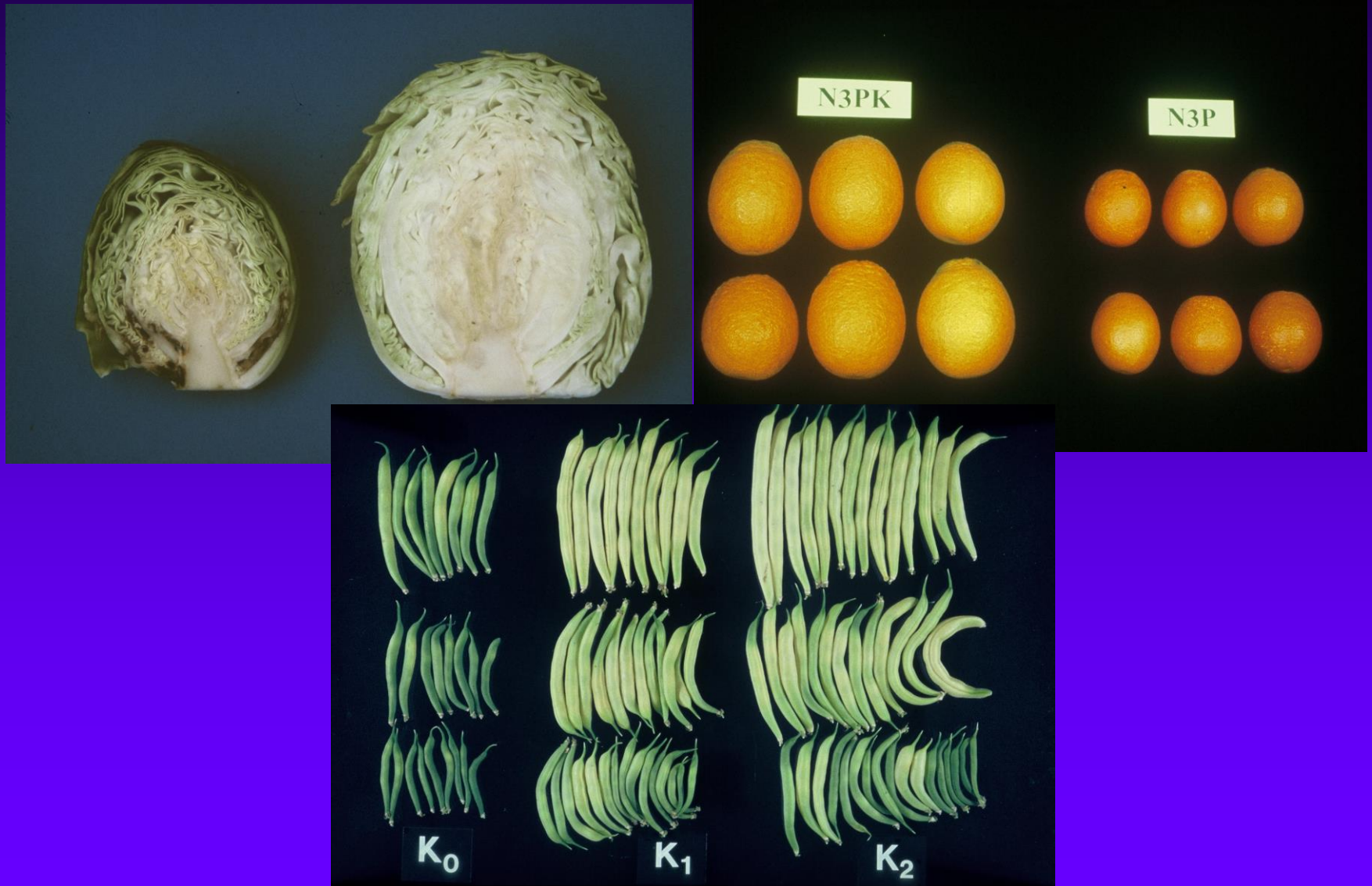
... K keeps plants healthy and hence the food





... What can we prove?

... K improves the appearance and shelf-life of many crops



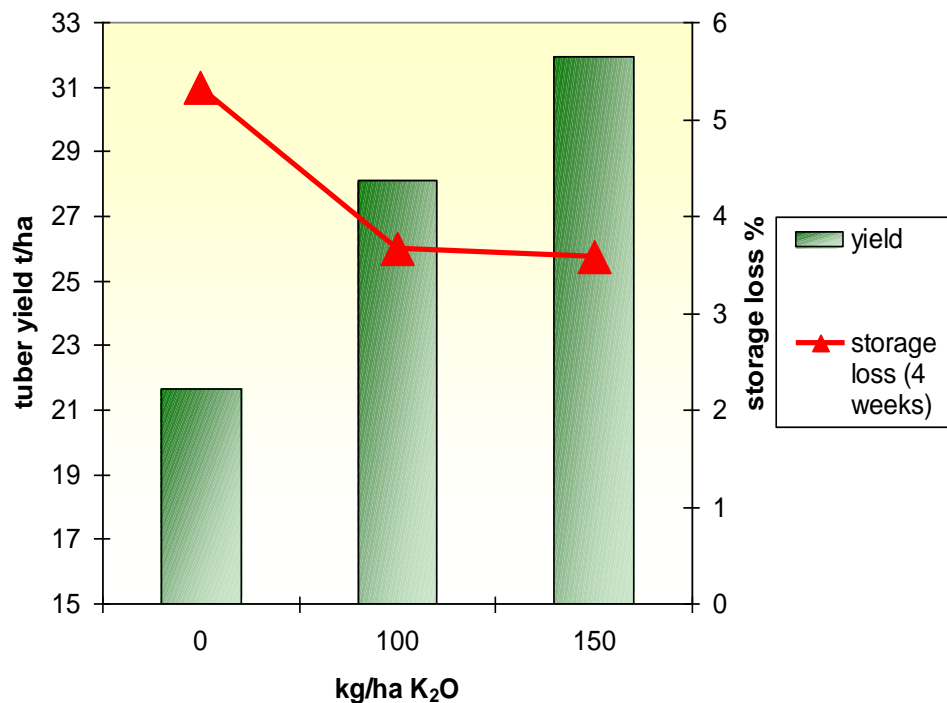


... What can we prove?

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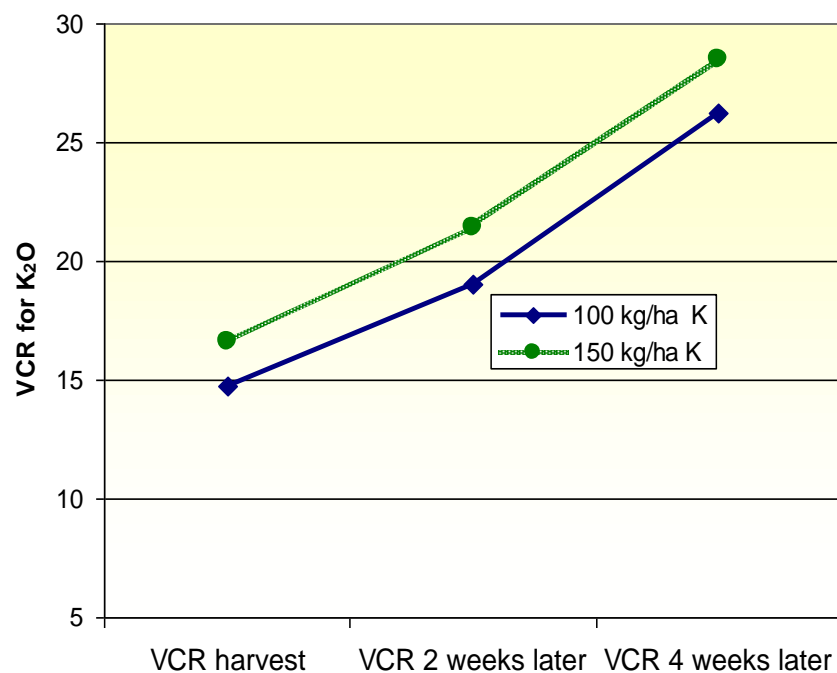
Tuber yield and storage loss of potato tubers

(Bansal & Shahid Umar, 1998)



Economy of potato tubers in India

(Bansal & Shahid, 1998)

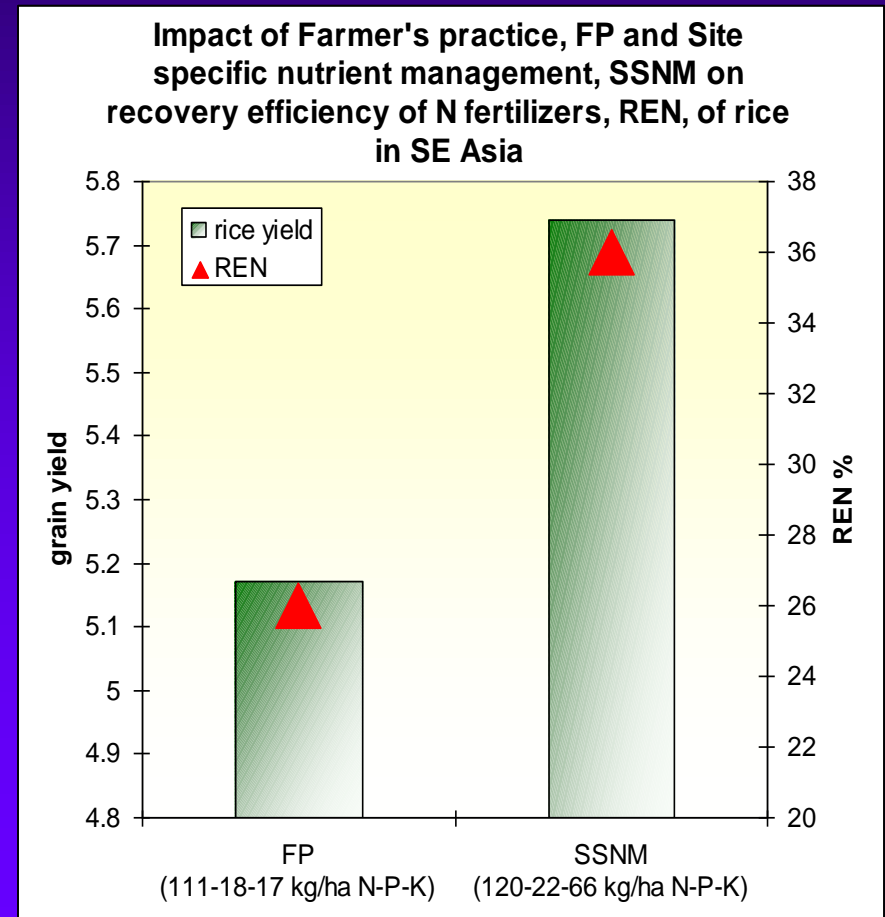
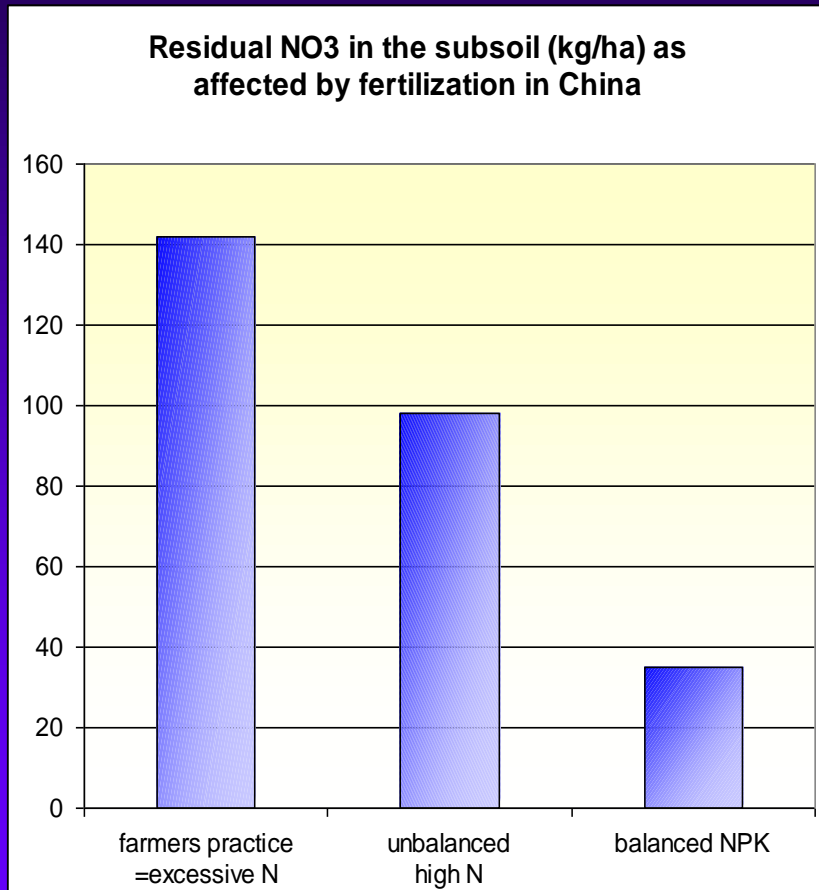


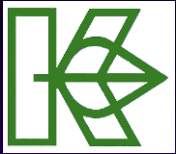


... What can we prove?

... K use meets the environmental requirements

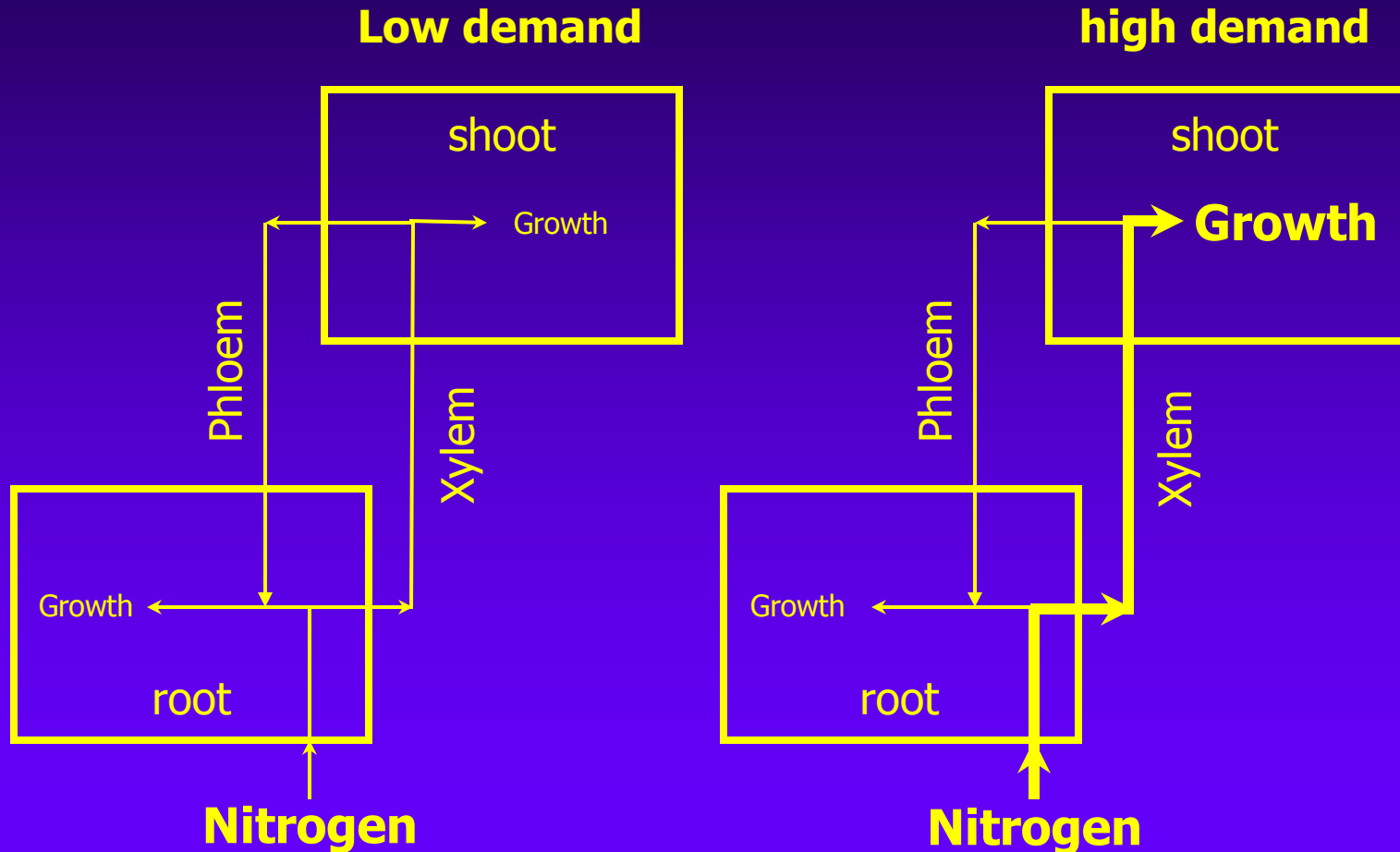
... because at balanced fertilization, N use efficiency is improved





... What can we prove?

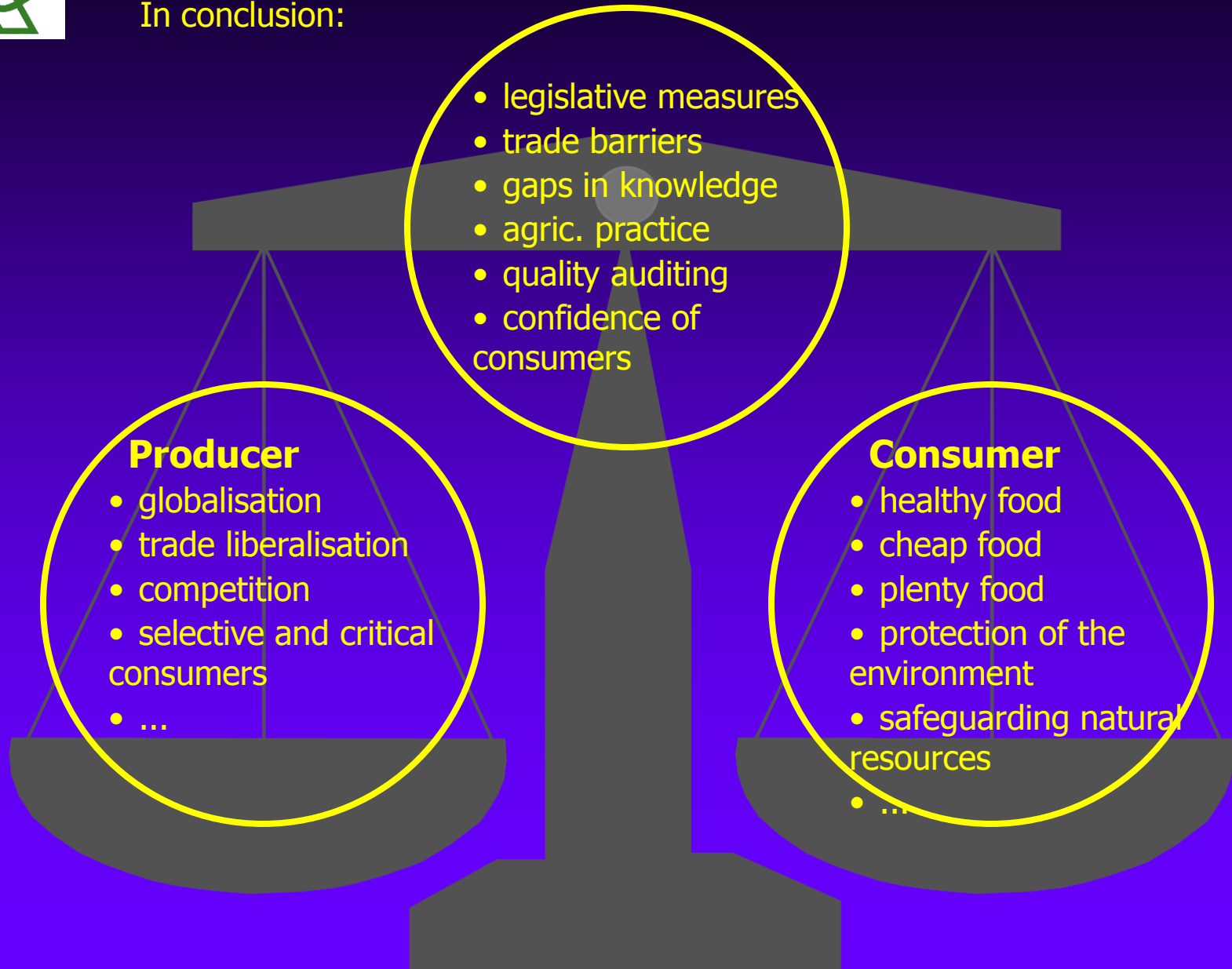
... growth limitation of the shoot e.g. at K deficiency signals to the roots to refrain from further N uptake, so, the plant cannot be forced to absorb N above its needs ...





... K effects on yield quality

In conclusion:





... K effects on yield quality

... Thank you

