

Phosphorus & Biodynamic Farming

Suzanne Little

12:15 pm Mon

“soil exists in a state of constant change, taking part in cycles that have no beginning and no end. ... changes are ... converting elements derived from air and water into forms suitable for ... plant life”

Phosphorus & Biodynamic Farming



GREEN REVOLUTION

1930s - 1960s



Energy, Water & Chemical-intensive

Fertilisers IN

Nutrients OUT



*How do we harvest food while
keeping soil fertile?*

Wealthy Nations

“Since 1980, the prevalence of obesity has doubled in more than 70 countries”

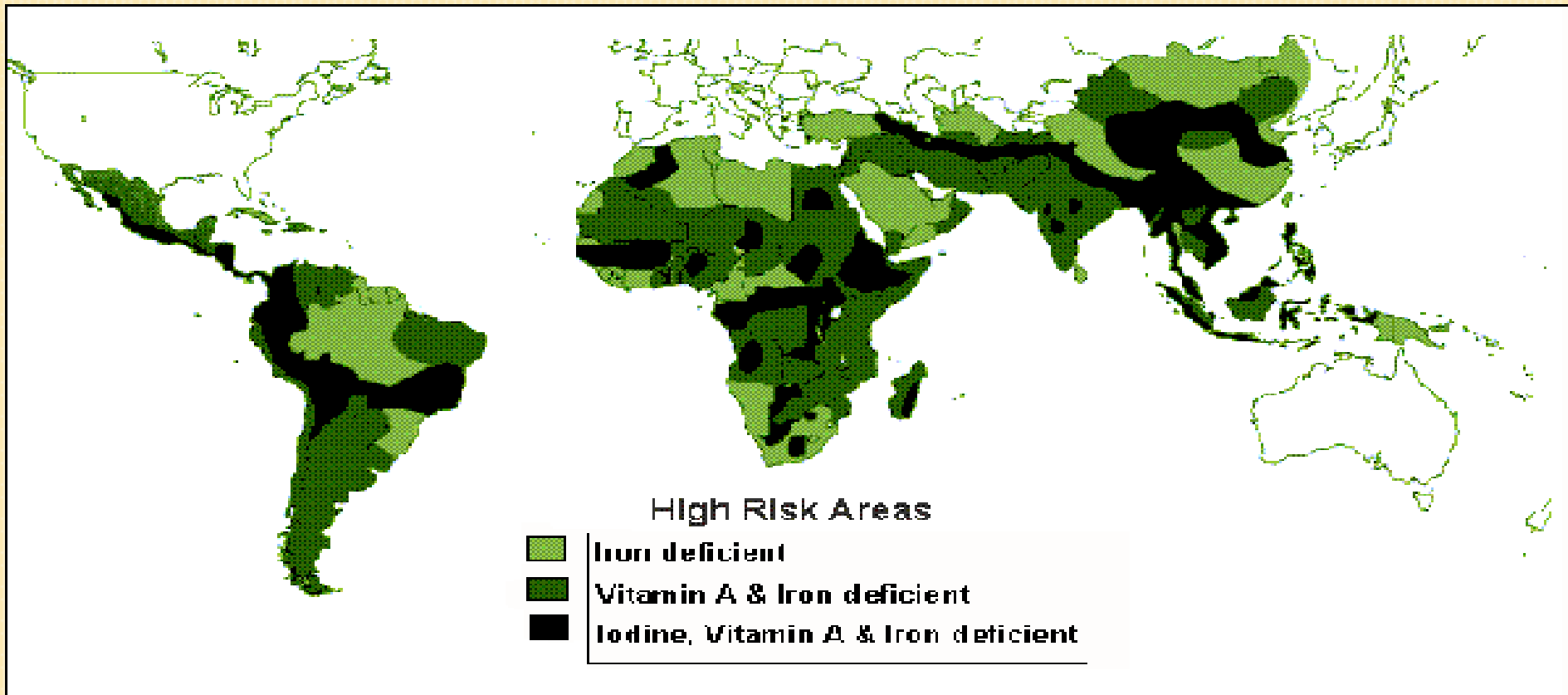


Poor Nations



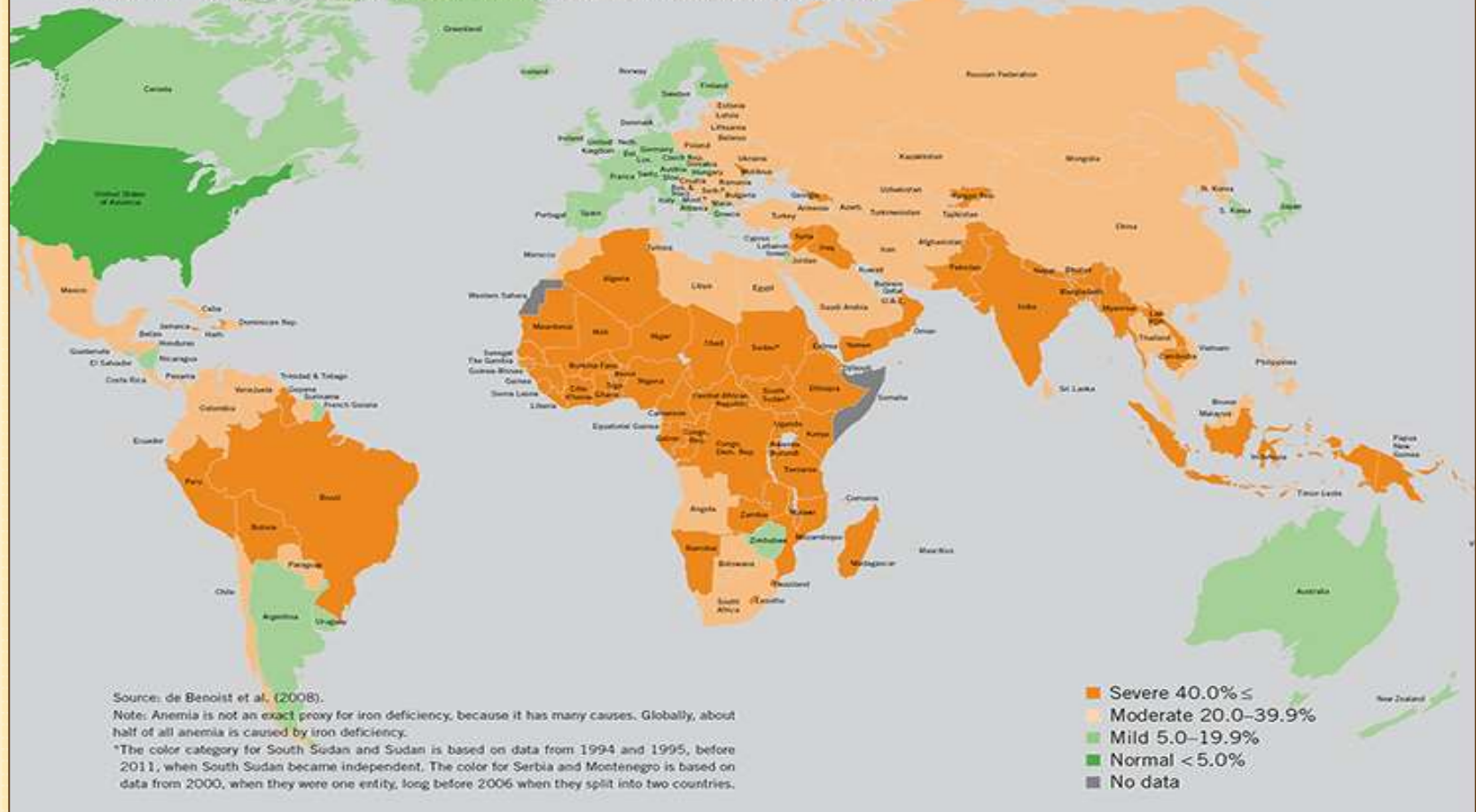
Micronutrient malnutrition
1940s – 1960s

Deficiency of Iron, Vitamin A & Iodine in Developing Nations

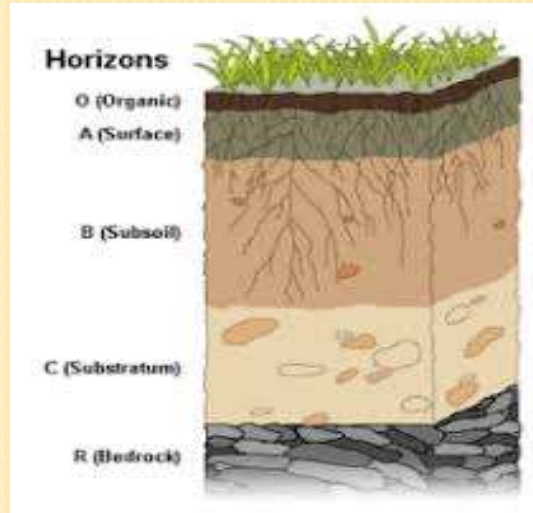


Iron deficiency in preschool children

FIGURE 3.2 PREVALENCE OF ANEMIA AMONG PRESCHOOL-AGE CHILDREN, 1993–2005



Introduction to Biodynamics



Price of food

Organic
food



cheap food

supplements

Perspectives on Biodynamics / Organics



➤ a sustainable solution



➤ a commercial risk ?



➤ voters live in cities

Perspectives on Biodynamics / Organics

Past

❑ small scale

Present

❑ less fertile land, fertiliser, soils,
water + volatile weather

Future

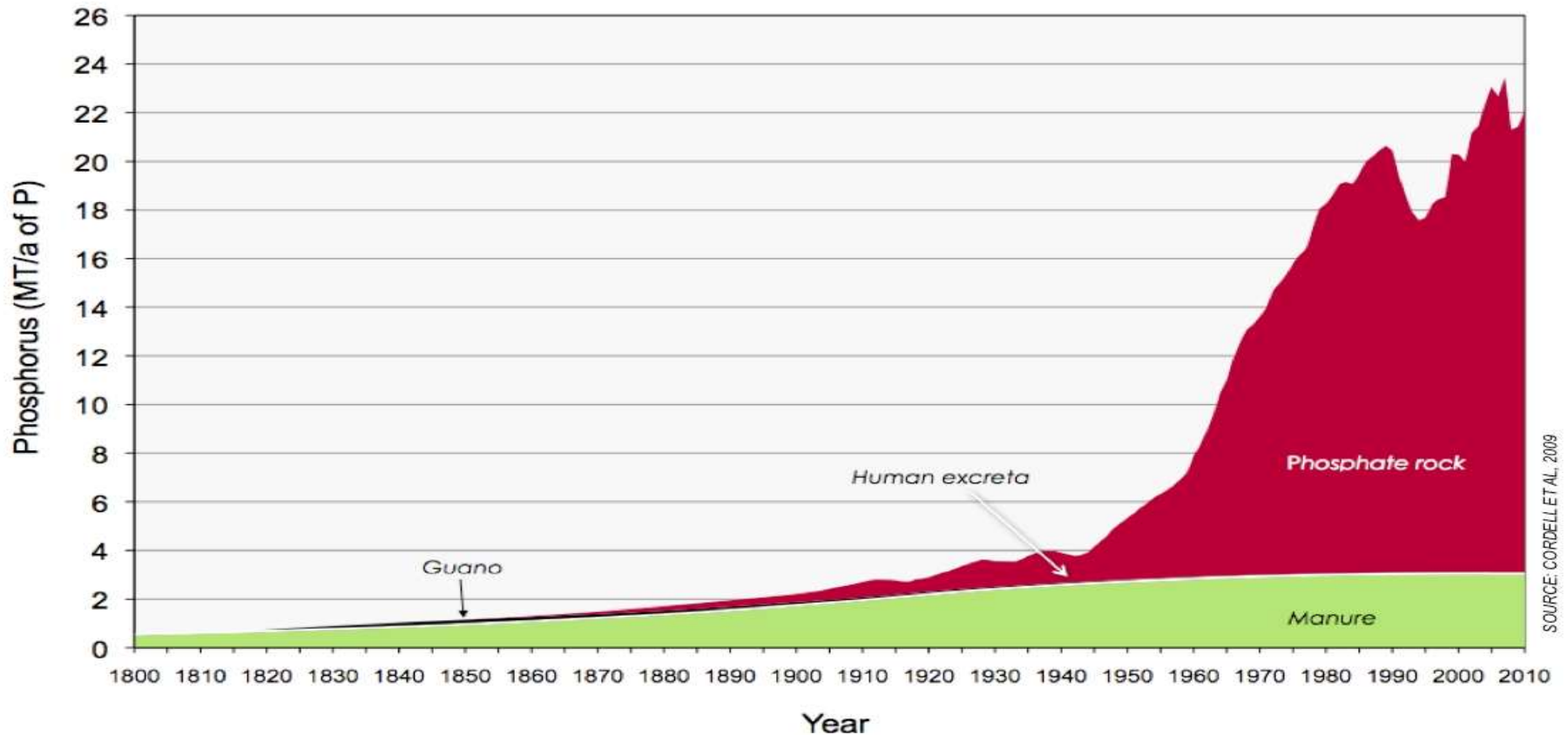
❑ agribusiness or back-to-basics?

Phosphorus

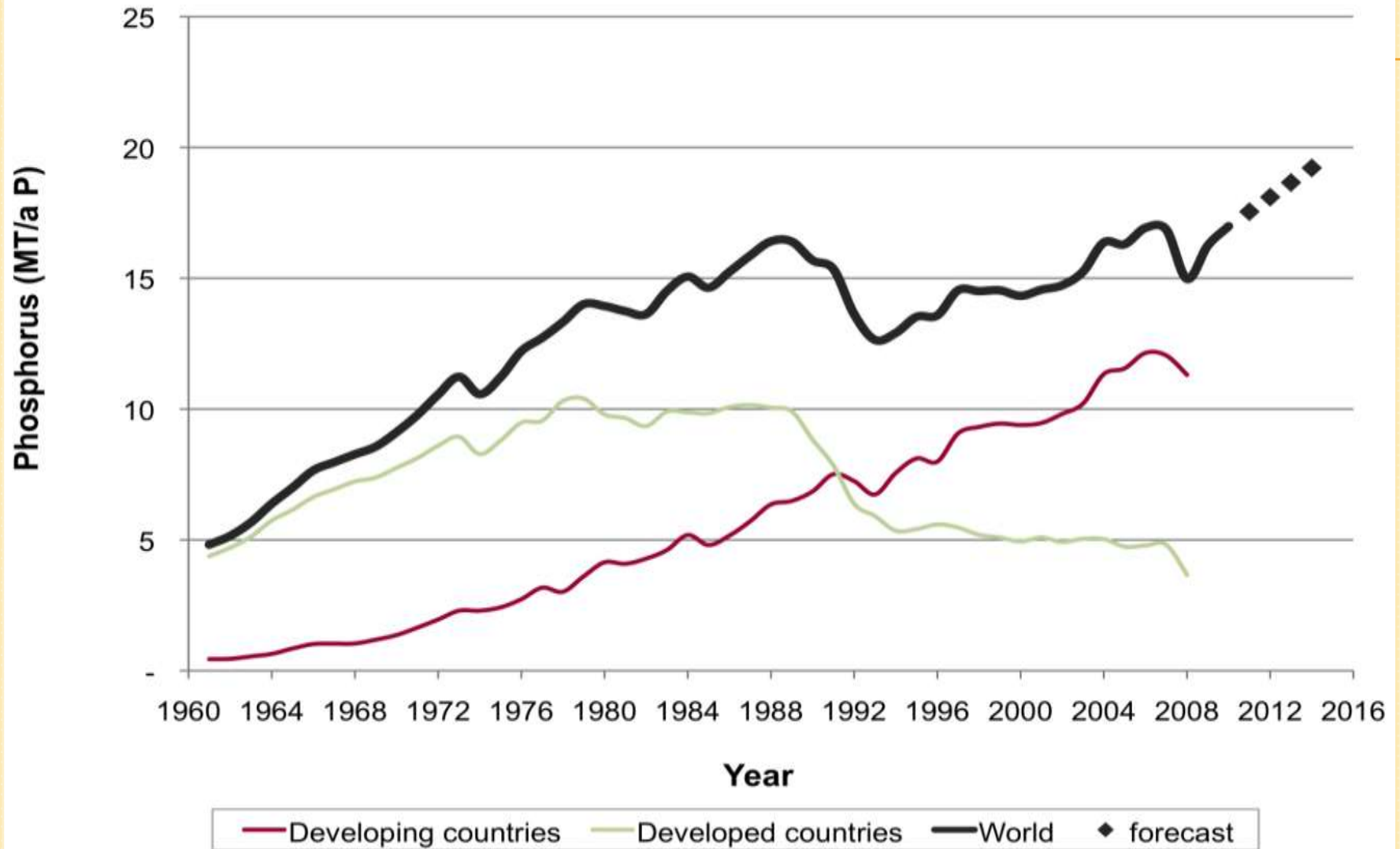


- ❑ agricultural limiter
- ❑ nutrient for metabolic function in crops
- ❑ stores energy in human body

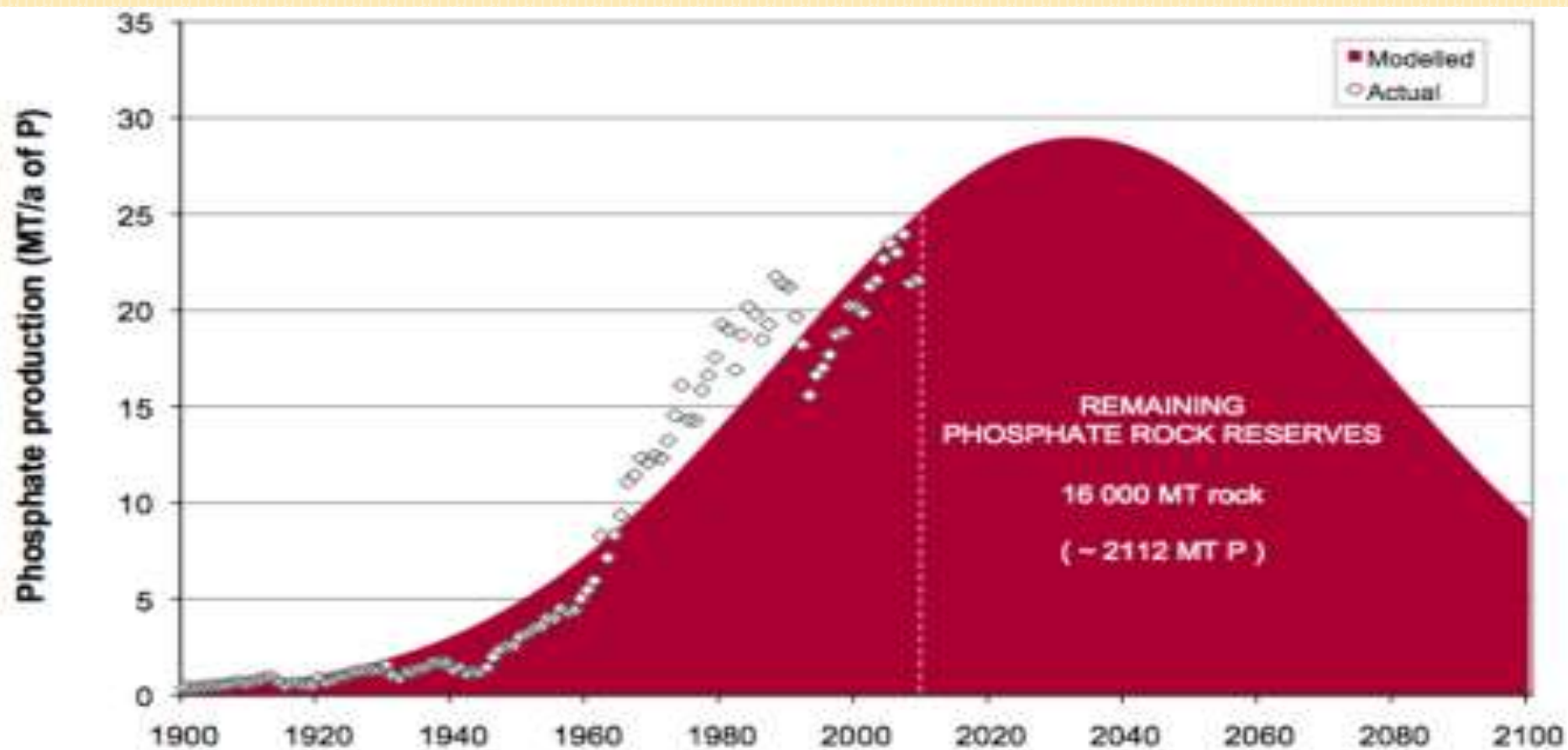
Sources of phosphorus fertiliser 1800 - 2010



Global phosphorus fertilizer consumption



Peak phosphorus



Soil fertility

- ✓ Water
- ✓ Humus
- ✓ Nutrients
- ✓ Structure
- ✓ Organic matter
- ✓ Micro-organisms



Biodynamic / Organic approach to soil



- ❑ **activate microbiology of soil** (bacteria & fungi)

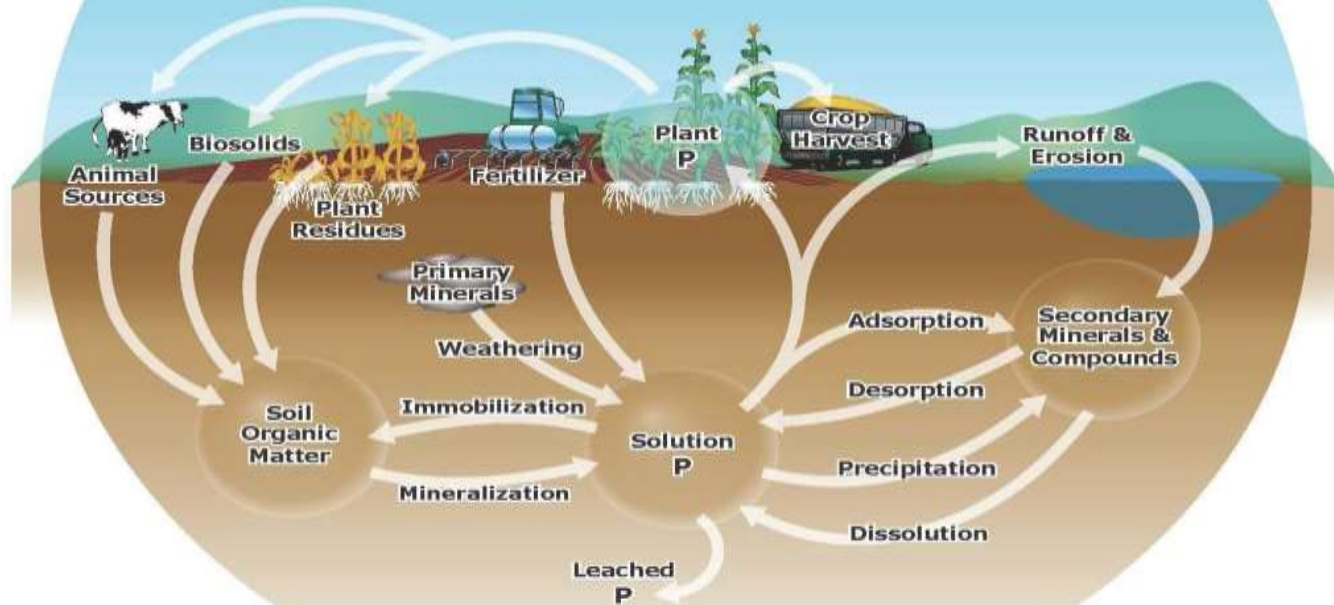


- ❑ **leave crop residue** (nutrients)

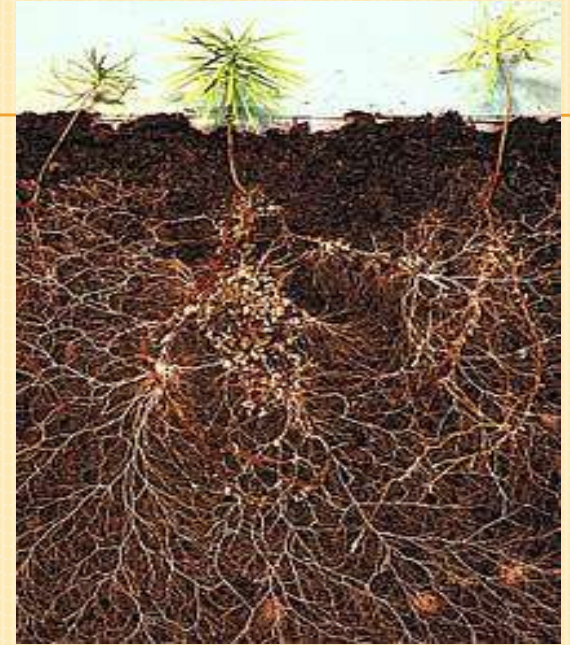


- ❑ **rotate crops** (converts phosphorus to useable form)

The Phosphorus Cycle



Fungi



Fungi

Symbiotic relationship:

- ❑ Fungi give nutrients to plants
- ❑ Plants give carbohydrates to fungi

Certified Food



- ❑ No fertilisers from superphosphate, urea, muriate of potash
- ❑ No pesticides, fungicides, herbicides
- ❑ No Genetically Modified Organisms.

What's the difference?

Organic Food

- ❑ certified
- ❑ no synthetic materials
- ❑ limited superphosphate



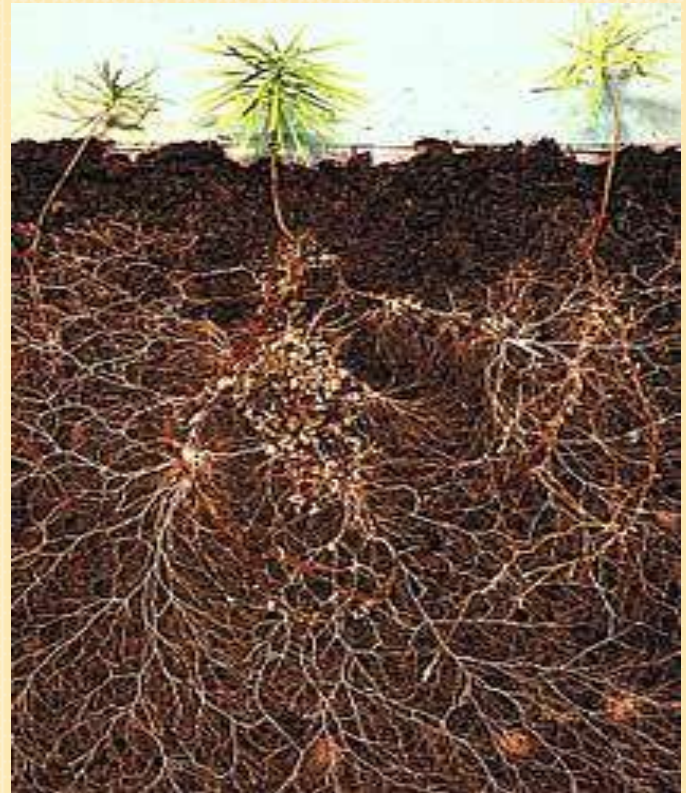
Biodynamic Food

- ❑ soil microbiome
- ❑ humus
- ❑ cycles of nature
- ❑ Steiner soil preparations

Biodynamic vs Conventional Farm

- ❑ Soil ➤ more microbes
- ❑ Soil structure ➤ better
- ❑ Crop yields ➤ lower
- ❑ Profitability ➤ steadier revenue
- ❑ Phosphorus ➤ similar
- ❑ Ca, Mg, K ➤ similar
- ❑ Water ➤ holds much more
- ❑ Earthworms ➤ 8 times more

Resilience



Conclusion

- ❖ Conventional farmers increased yield
- ❖ Micronutrient malnutrition: 40% world
- ❖ Phosphate fertiliser nearing end-date
- ❖ *Green Revolution* didn't deliver
- ❖ *Biodynamic/Organics* closes cycles
- ❖ *Biodynamic/Organics* is sustainable.

Which side of the fence?

Conventional
farm



Biodynamic
farm

Farm in NSW on poor granite soil (Deans, 2014)