

Welcome!

Purpose of the Sustainability Seminar

- Our values include respect for the environment; what does this mean for the way we do our work?
- In these times of climate change, what should our university be researching to give intellectual, moral and spiritual leadership?
- What can we (as lecturers, staff and local citizens) do practically to shift society towards more sustainable lifestyles?

Programme for the day:

Raymond Auerbach: Sustainable food production

- Carola Strassner: Food quality
- Deon Raubenheimer: Renewable energy
- Mark Swilling: Ecological Design
- Myles Mander: Resource economics
- Break (1 pm)
- Maarten de Wit: Earth Stewardship Science – With everybody as a stakeholder
- Workshop
 - What are Saasveld's Ecological assets?
 - What technologies can we use to showcase sustainability?
 - Practical programme for 2013 – Let's DO IT!

George Campus

Growing tomorrow



**Nelson Mandela
Metropolitan
University**

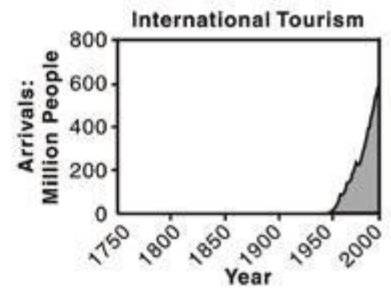
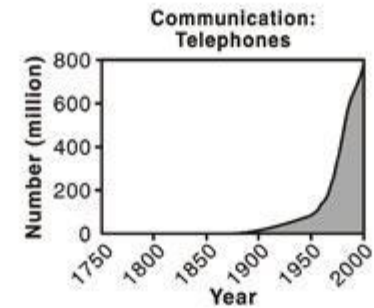
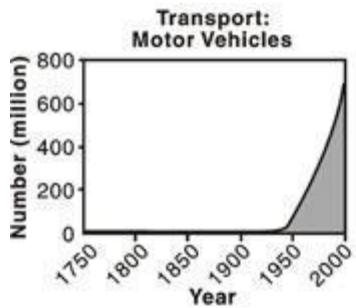
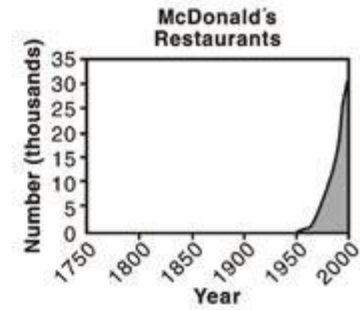
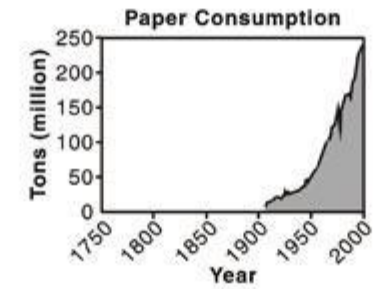
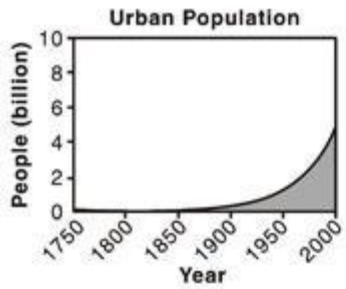
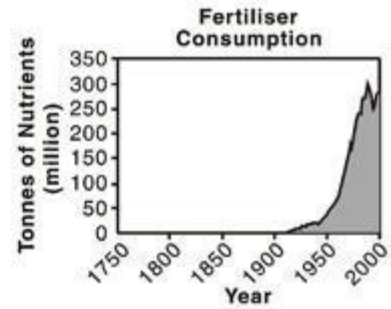
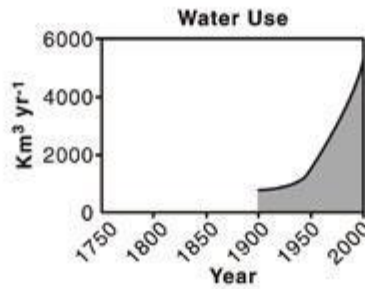
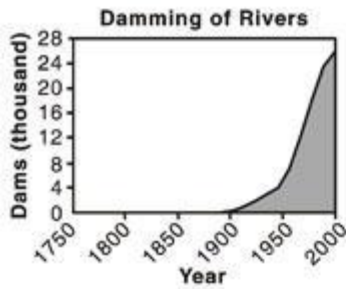
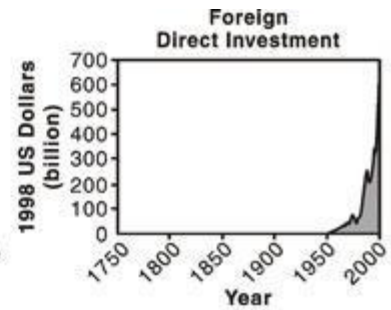
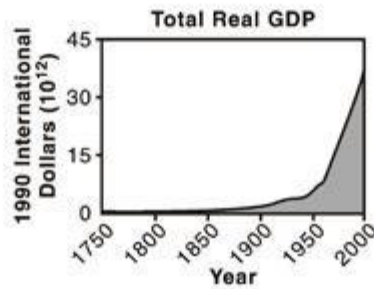
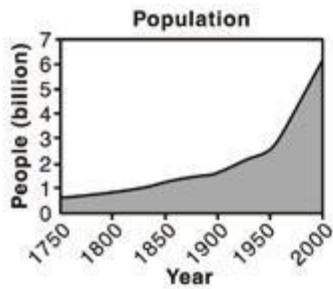
for tomorrow

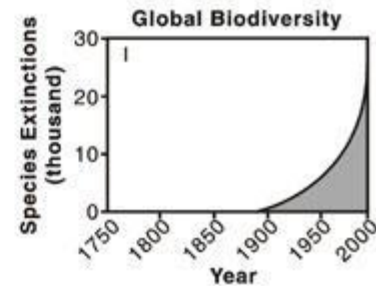
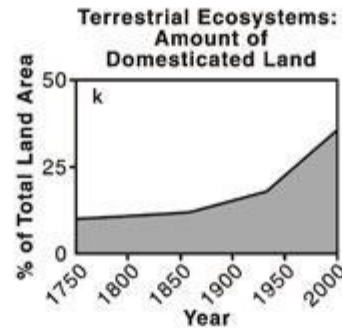
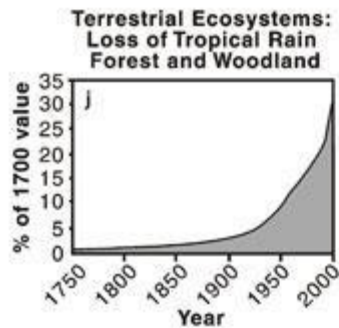
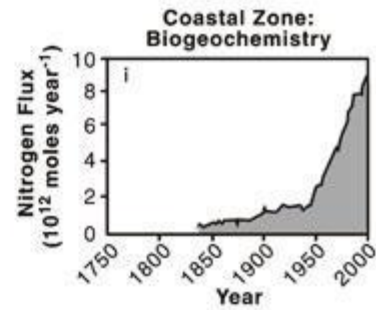
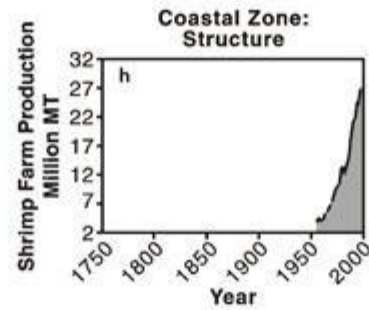
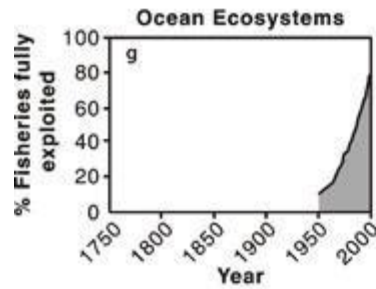
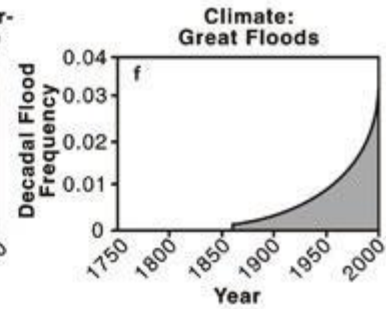
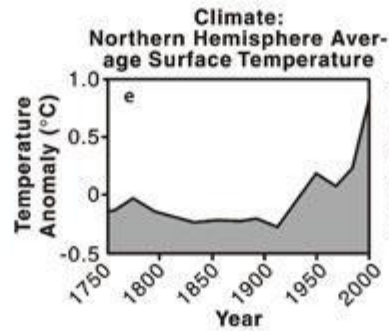
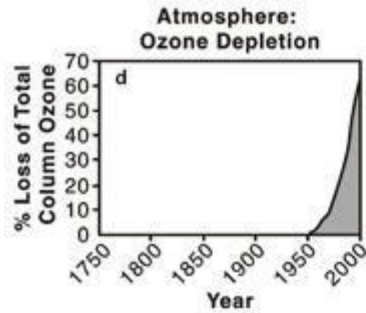
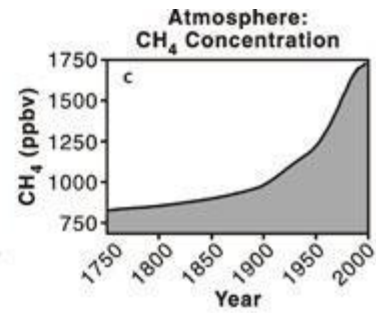
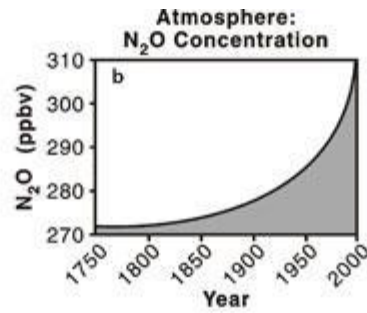
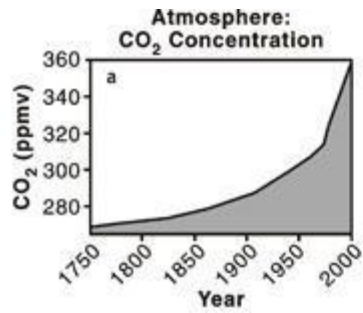
Transforming African Agriculture: Organics & AGRA

**Professor Raymond
Auerbach**

**Soil Science & Plant
Production**

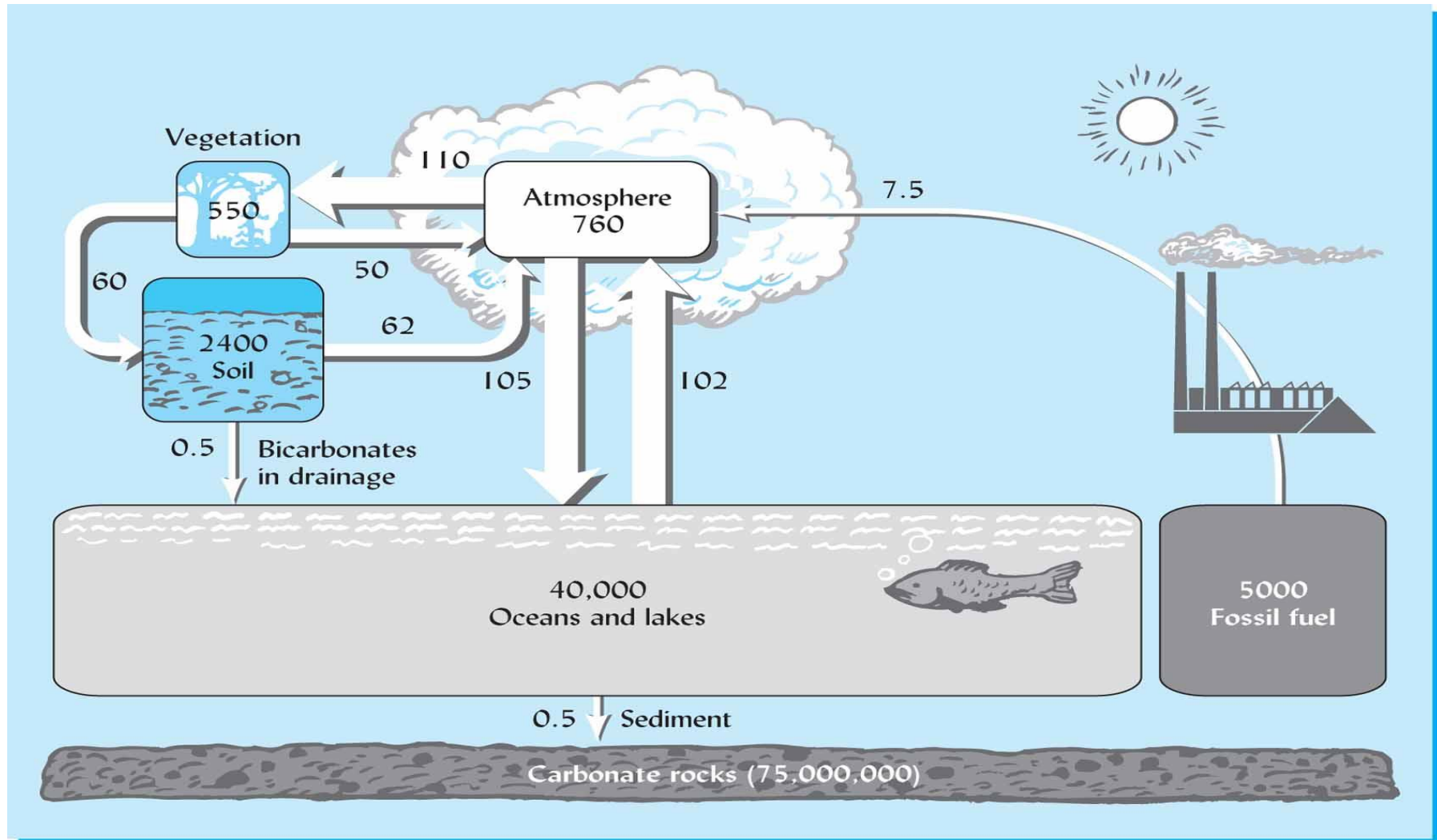
**Nelson Mandela
Metropolitan University**





The Global Carbon Cycle: (after Brady & Weil, 2008)

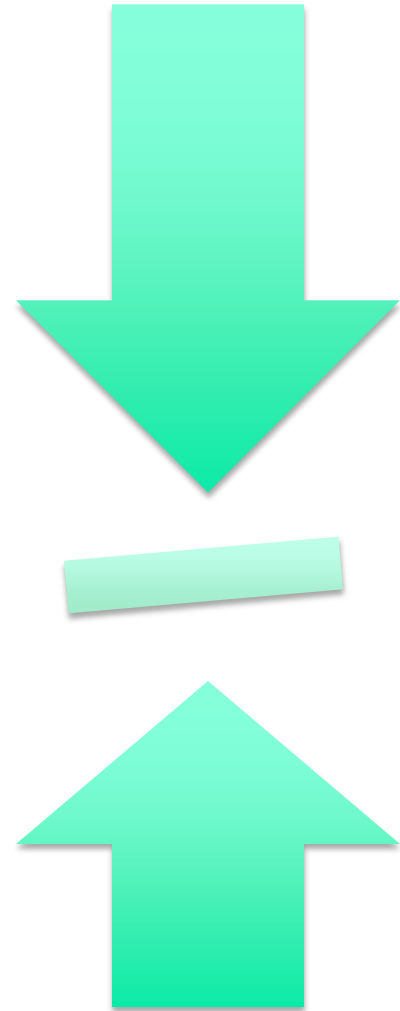
Units are Petagrams; 1 Pg = 1 billion tons Carbon



Towards Agro-ecology

- Chemical Monoculture
- Integrated Arable Farming
- Integrated Pest Management
- Conservation Agriculture
- Biological Farming

- Organic Farming
- Permaculture
- French Intensive Method
- BioDynamic Agriculture



SOAAN – Sustainable Organic Agriculture Action Network



ICROFS



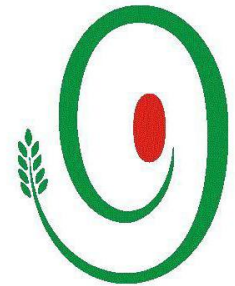
INTERNATIONAL FEDERATION OF
ORGANIC AGRICULTURE MOVEMENTS



Formed as an action network to promote a sustainable approach to agricultural development, highlighting multiple benefits of organic systems



Rainman Landcare Foundation



Navdanya

AGRA/ MVP & organic projects (e.g. EPOPA) share a lot! Several Agro-ecological principles:

- Stated aim for both: sustainable production
- Triple bottom line (economic, social, enviro-)
- Recognise importance of training
- Both try to help farmer become a price-maker
- Address the whole farming system
- Integrating production with social objectives

There are some fundamental differences in approach, but a lot to learn from each!

Can agro-ecology form a bridging link?

Can the projects learn from each other?

What is the MVP approach?

- Give out/ subsidise fertiliser & hybrid seed (mostly maize)
- Train & support farmers with efficient extension
- Set up bank accounts for farmers
- Develop crop storage facilities in each of 14 village clusters
- Place highly qualified staff (1 x PhD + 4 x MSc) in each cluster

Stated future intentions:

- Subsidise organic soil amendments
- Start irrigated vegetable production on part of fields
- Introduce more African indigenous vegetable crops

Result: Maize yields trebled from 1 t/ha to 3 t/ha; farmers store crops and sell at a better price, bank income

How does this compare with organics?

Auerbach maize research (early 1990's) in KwaZulu-Natal, South Africa:

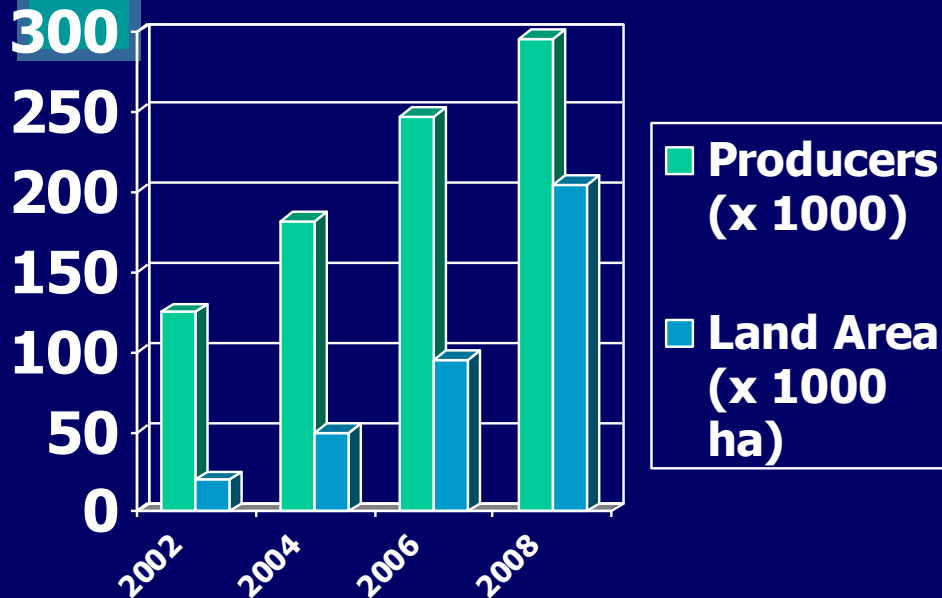
- Initial farmer yields: 0.4 to 1 t/ha of maize
- Raised to 3 t/ha with weed control, 1 t/ha manure and right planting time
- Well adapted hybrids raised yields 20%
- Weed control and soil fertility major limiting factors

Limitations of mono-cropped maize in KwaZulu-Natal:

- In mono-crop system, 3.2 t/ha is the yield limit with low organic inputs
- Chemical fertiliser can raise yields to twice this level
- Organic systems require biodiversity to become highly productive

Conclusion: For 3 t/ha maize yield, low external input organic systems work very well; above this, choose chemicals or bio-diversity

Uganda: Development of Organic Agriculture (EPOPA)



- East African Organic Standard (2007)
- Cotton, coffee, pineapples and bananas for export
- Growing local market
- US\$ 35 million certified organic export (www.organic-world.net)

UN FAO Research: Organic benefits

Ten years of African research shows (Scialabba, 2007):

- Yields under organic measurement double or treble (mean 132% increase)
- Raised water use efficiency (20-40% better water retention)
- Non-solar energy use is 33 – 56% less
- Carbon sequestration almost doubled
- Agro-biodiversity improved significantly
- Major impact on poverty

Conclusion:

Low external input sustainable organic agricultural systems work in Africa

They help farmers to adapt to climate change

They help to mitigate climate change

In line with Millennium Development Goals (reducing poverty & hunger)

See: www.un.org/millenniumgoals

How do we reduce hunger and poverty?

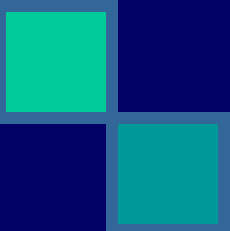

International Assessment of Agricultural Knowledge, Science and Technology for Development

The IAASTD Report for Sub-Saharan Africa states (IAASTD, 2008a, p.19 [www.agassessment.org]):

Strategies of rapid agricultural development need to be coordinated more directly with strategies for biodiversity and water conservation such as retaining areas of natural vegetation in production areas, keeping areas where pollinators can thrive, **promoting organic agriculture**, incorporating trees in agricultural landscape



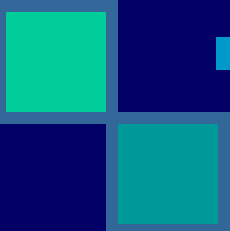

Economic and environmental benefits: why uphill for organics?

- 
- US Board on Agriculture (Nat Res Council) Report on Alternative Agriculture 1989, already concluded:
 - Organic farmers derive significant sustained economic and environmental benefits.
 - Federal Policies work against organic farming, and should be changed.
 - Prof John Reganold, Science, May 2011: Transforming US Agriculture – Update and verification of 1989 study.
- 

International developmental policies still militate against organic farming, in favour of industrial agriculture, which benefits the sponsoring countries, who sell inputs & technology



Transforming US Agriculture

- 
- Prof John Reganold and 100 colleagues studied US agriculture, and concluded that US agriculture produces industrial food for the cheap mass food market; this food and the food products sold give rise to health and environmental problems and are often not sustainable – US Nat Research Council
 - (Summary in Science, vol 332, 6 May 2011)
- 



HOURS
6:00-10:00 AM





Place Cup Push & Fill

Carbon's **GOLDEN** Pancake & Waffle Flour
SINCE 1937 **MALTED**

Simply the Finest!

www.goldenmalted.com

Push Lever Back

CAUTION HOT! Self Serve

ATTENTION! Children under the age of 16 must be accompanied by an adult when operating waffle maker.

CAUTION HOT

WHEN NOT IN USE, PLEASE LEAVE GRID OPEN!

- 1 Fill Waffle Iron
- 2 Rotate Iron
- 3 Remove Waffle

Place Cup Push & Fill





PRIDE
SWEETENERS
SUGAR FREE
CALORIE FREE
NON DAIRY
NON GLUTEN

***This is not what Africa needs!
Rather Food sovereignty:***

“Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It ensures that the rights to use and manage lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food.”


*—Declaration of the Forum for Food
Sovereignty, Nyeleni, February 2007*

Science shows organic food is better: Poison Residues in Food in German Supermarkets –Kwalis Labs



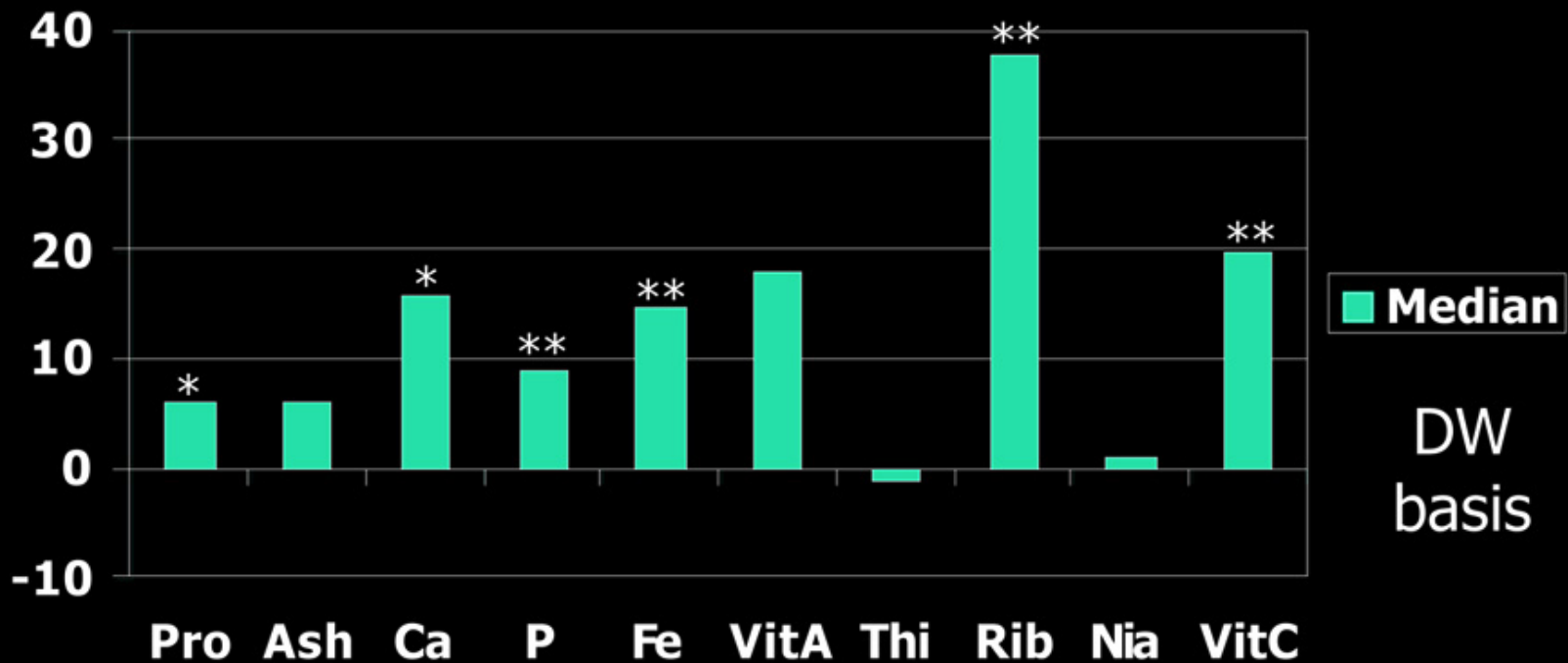


Food quality has declined steadily over the past century

- Yields have trebled
 - Calories have increased
 - Protein, Vitamins and minerals have not
 - Organic foods today compare in quality to food produced a hundred years ago
 - No wonder obesity is on the increase!!
- 

Trends in 43 Garden Crops, USDA data, 1950 to 1999

Percent Decline



* $P < 0.05$

** $P < 0.01$


Davis, Epp & Riordan, J Am Coll Nutr, 2004; 23:669

Despite what the Cape Times says, science shows organic food is better: Poison Residues in Food in German Supermarkets –Kwalis Labs





Organics and Food Quality (see: www.qlif.org)

- Quality Low Input Food Research Project (Europe, 18 mil Euros, 31 Institutions):
 - Prof Carlo Leifert & Colleagues found
 - Anti-oxidants, 60% higher in dairy;
 - Vitamins, 20% higher in many foods;
 - Wide range of benefits in organic vs conventional foods (Hohenheim, 2007)
- 

Organic milk composition

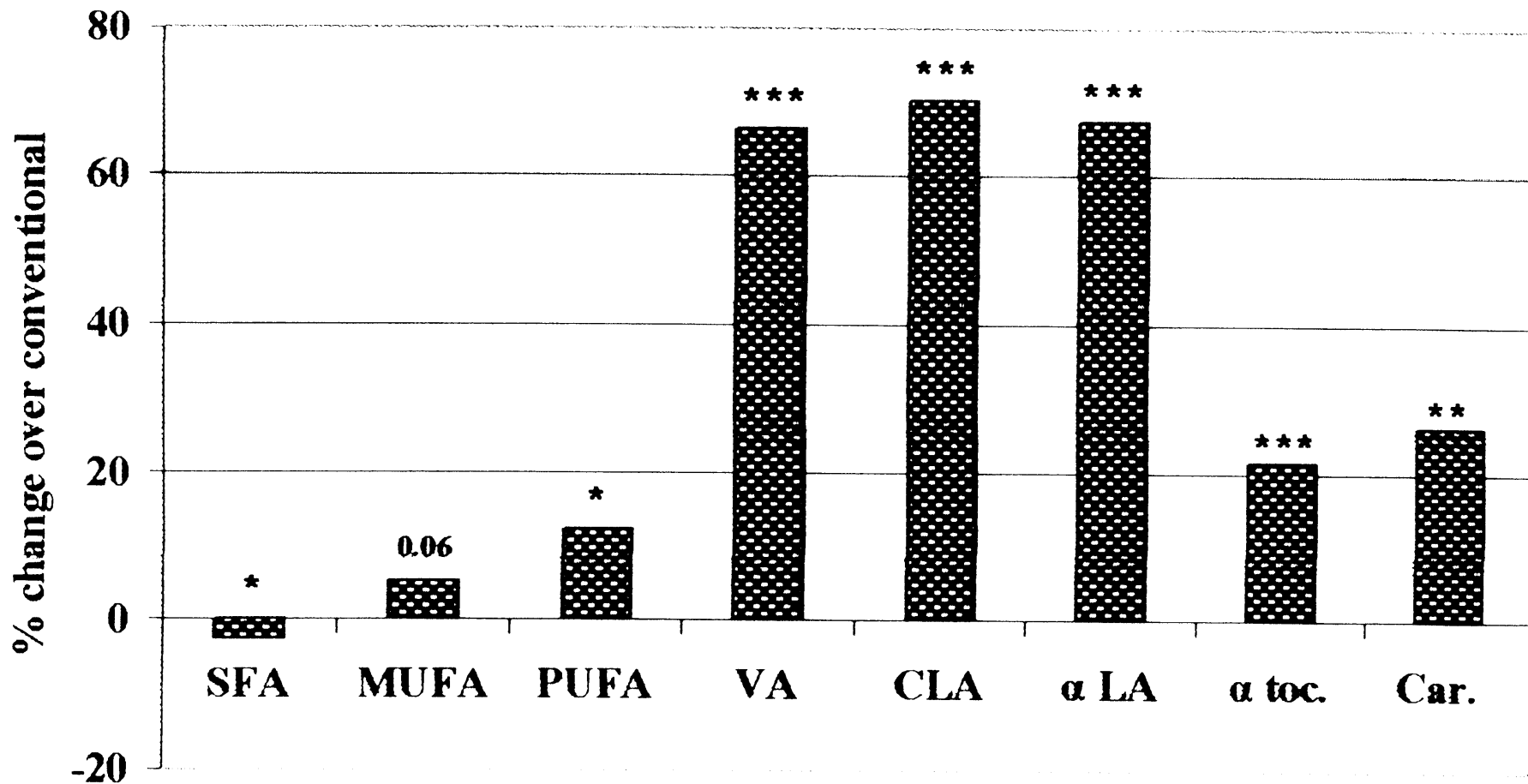
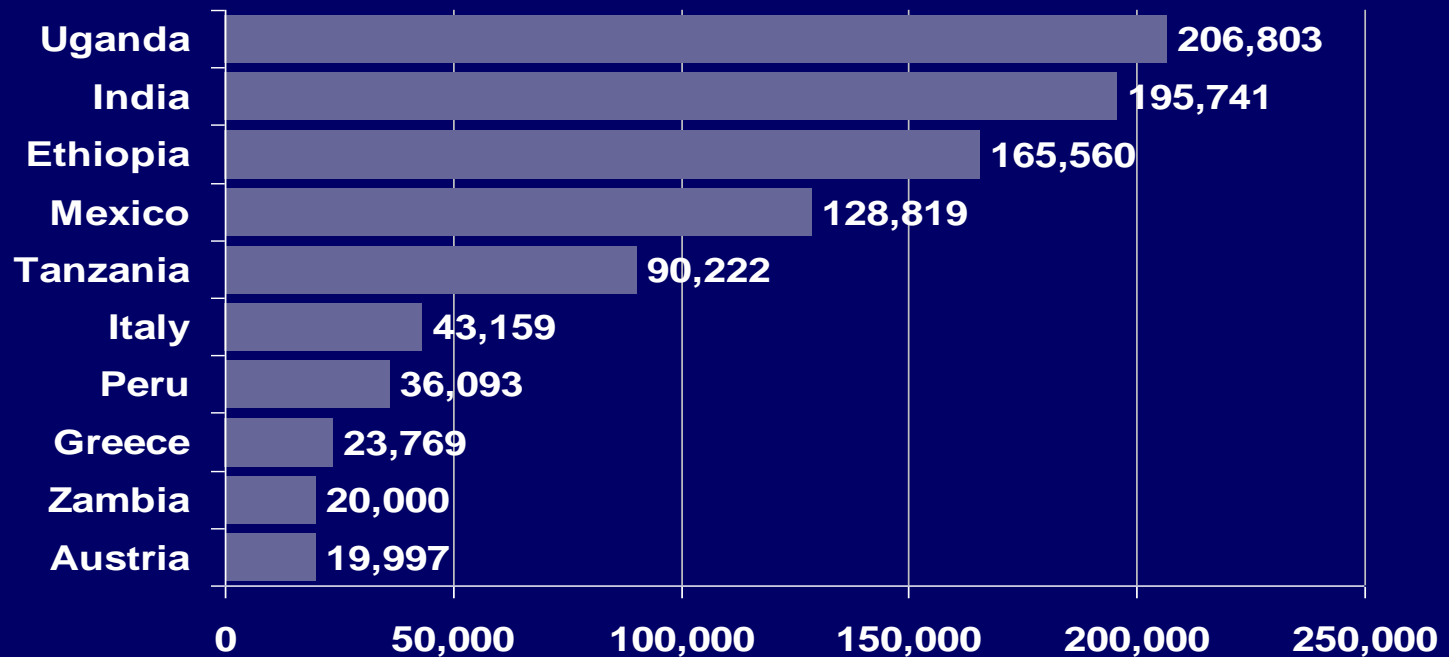


Figure 2. Composition of milk from organic farms, relative to that from conventional farms. SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; VA, vaccenic acid; CLA, conjugated linoleic acid; α LA, alpha linolenic acid; α toc, α-tocopherol; Car, carotenoids. ANOVA p values for the difference between organic and conventional milk: * $p < 0.05$. ** $p < 0.01$. * $p < 0.001$.**

World: The ten countries with the largest numbers of organic producers 2008



Source: FiBL & IFOAM Survey 2009

Participatory Guarantee Systems promote market access (also Green Road, Siyavuna and Bryanston Organic Market)

Rainman
Landcare
Foundation

Mthombongashi Internal
Quality
Management
(IQM)



Certification of a Group of Organic Farmers

What are the implications?

Our programmes at SAASVELD should show:

- What is sustainable agriculture?
 - Permaculture Garden at least
 - Proper composting system re-cycling grass
 - Develop worm-farm to re-cycle food-waste
- Other programmes:
 - Building to show renewable energy use
 - Solar water pumping systems
 - Centre where students can meet
 - Green Student's Forum, AgSoc, Forestry