Developing Sustainability Competence and 21st Century Capacities through Transformative Agricultural Education

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Outline

- Living in unusual times and the role of science
- Doing the things we do better or doing better things?
- Trends and counter-trends in higher education
- Creating vital coalitions and ecologies of learning
- Key points
Erosion of trust in science?

- Are GMO-foods inevitable to feed the world?
- Is human caused climate change a fact?
- Are solar panels sustainable? Wind-turbines?
- Is ‘organic’ sustainable and locally grown better?
- Are vegetables grown in cities healthy?
- Should men over 50 be tested for prostate cancer?
- Is soy milk healthier than cow milk? Is it more sustainable?

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I'M READY for a GREEN ECONOMY

WOMEN REJECT 'GREEN ECONOMY'!
Freedom from Debt Coalition - Women's Committee
CONVENTIONAL STRAWBERRY

**Ingredients:**
- Captan
- Pyraclostrobin
- Boscalid
- Tetrahydrophthalimide
- Myclobutanil
- Pyrimethanil
- Fludioxonil
- Bifenthrin
- Malathion
- Fenhexamid
- Cyproconazole
- Carbendazim
- Malaoxon
- Azoxystrobin
- Methomyl
- Quinoxyfen
- Fenpropathrin
- Acetamiprid
- Propiconazole
- Bifenazate
- Thiamethoxam
- Spinosad A
- Methoxyfenozide
- Triflumizole
- Dichlorvos
- Hexythiazox
- Metalaxyl
- Propiconazole II
- Thiamethoxam
- Spinosad D
- Imidacloprid
- Endosulfan sulfate
- Propiconazole I
- Iprodione
- Piperonyl butoxide
- Endosulfan II
- Chlorpyrifos
- Carbaryl
- Pyriproxyfen
- Endosulfan I
- 1-Naphthol
- Acephate
- Clothianidin
- Azinphos methyl
- Naled
- Cyhalothrin
- Dicloran
- Folpet
- Tebuconazole

ORGANIC STRAWBERRY

**Ingredients:**
- Strawberry
5 MYTHS ABOUT ORGANIC FOOD DEBUNKED

MYTHS

1. IF IT SAYS "ORGANIC" ON THE LABEL, IT'S 100% ORGANIC.

2. ORGANIC FOOD ISN'T AFFORDABLE.

3. ORGANIC FOOD IS JUST A NEW FAD.

4. ORGANIC FOOD ISN'T MORE NUTRITIOUS THAN CONVENTIONAL.

5. ORGANIC FOOD FROM OTHER COUNTRIES MEETS DIFFERENT STANDARDS.

FACTS

1. ONLY 95% OF INGREDIENTS NEED TO BE ORGANICALLY GROWN TO HAVE THE LABEL "ORGANIC".

2. MANY ARE MAKING ORGANIC FOOD MORE ACCESSIBLE, FROM BIG SUPERMARKETS LIKE TARGET TO LOCAL NON-PROFITS.

3. ALL CROPS WERE ONCE ORGANIC. SYNTHETIC PESTICIDES & CHEMICALS WEREN'T INTRODUCED UNTIL THE 1940'S.

4. STUDIES SHOW, ORGANIC FOODS CONTAIN HIGHER CONCENTRATIONS OF ANTIOXIDANTS THAN CONVENTIONAL FOODS.

5. ANY FOOD PRODUCTS SOLD AS "ORGANIC" IN THE U.S. MUST MEET THE U.S. ORGANIC STANDARDS.
Doubt over climate science is a product with an industry behind it

With its roots in the tobacco industry, climate science denial talking points can be seen as manufactured doubt.

Source: The Guardian
Two times...

2x more

2x healthier

2x less

Accessible

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Based on Kropff, 2012
Four possible approaches

- Societal developments
- Technological developments

Incremental transition

- Promote eco-literacy
- Aquaculture
- Blue revolution
- Healthy food
- Circular economy
- Protein alternatives
- Resource use efficiency
- Reducing waste accessibility
- GMO agriculture
Sustainable Food Pyramid

- Food security: availability & access
- Food safety: reliable, non-toxic
- Food politics: sovereignty, fair & just
- Food quality: healthy, nutritious, enjoyable

From narrow to integrated approach
A clear problem with a clear solution

Predictable
Straightforward
Obvious

Many familiar elements
Hidden root courses
Non-linear
Inter-operating parts affect each other

Problem and solution not understood and keep shifting when we try to define them

Ambiguous, chaotic
Many stakeholders with conflicting perspectives
Many elements are hidden
And unknown
No right/wrong solution
Not-quantifiable
No precedents

Source: Rob Gibson, 2013
‘We are drowning in information while starved for wisdom’

E.O. Wilson, 1998, p. 300
Trends and counter-trends in higher education

**trend** | counter-trend
---|---
1. Science for impact factors – science for society
2. Increasing efficiency – promoting authentic learning
3. Science as ‘commodity’ – science as ‘community’
Science for impact factors – trend

What’s your h-factor?

Time to read/review

n-publications

n-scientists

1990 2000 2010

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Science for society – counter trend
Higher Education as commodity – trend
We are the students of today attending the schools of yesterday being taught by the teachers of the past with methods from the Middle Ages to solve the problems of the future!
Higher Education as community – counter
Authentic learning – counter trend
Cartesian View of Learning

knowledge as substance

and pedagogy as knowledge transfer

Source: http://www.educause.edu/ero/article/minds-fire-open-education-long-tail-and-
The Social View of Learning

we participate therefore we are

understanding is socially constructed
THE DIFFERENCE
HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES

Scott E. Page
Co-creating ‘sustainability’

- Research
- Education
- Governance
- Private sector
- Societal organisations
Facilitating Education for the 21st Century

Content
- Resilience
- Alternative Dev.
- Sustainable Contraction/Intensification
- Cradle-to-cradle

Research
- Phronesis
- Reflexive praxis
- Civic science

Pedagogy & Learning
- Systems thinking
- Social learning
- Integrative design
- Values & ethics

Place-based Institutional Practices
- Walking the talk: experimenting with and learning from creating sustainability on location

Society
- World of business, citizens and governance
- Operating within multi-stakeholder environments
- Societal impact
School Development Through Whole School Approaches to Sustainability Education

Environmental management

Participatory decision-making

Innovative teaching and learning

Vocational and applied learning

Entrepreneurship

School & community gardening

Backyard biodiversity
21th Century Sustain“abilities”

- Sustainability literacies
- Systems thinking
- Adopting an integral view

- Questioning hegemony and routines
- Analysing normativity
- Considering ethics

- Leadership and entrepreneurship
- Unlocking creativity, utilizing diversity
- Appreciating chaos & complexity
- Empowerment and collective change

- Connecting with people, places and other species
- Passion, values and meaning-making

Dynamics & contents of sustainability
Critical dimension
Change & Innovation
Existential dimension

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Key Points

- **21st Century Agricultural Education** requires space for systems thinking, integrative design and multiple ways of knowing.

- **21st Century Agricultural Education** requires new competencies also for facilitators/educators/administrators.

- Blurring the boundaries between institutional, community-based and workplace learning is essential (hybrid learning in vital coalitions of multiple-stakeholders).

- Critical thinking (e.g. questioning taken-for-granted values, behaviours and systems), diversity and participation are essential components of 21st Century Agricultural Education.

- Sustainability can become a catalyst of innovation in research and education with people and planet in mind.