Toward a Viable 21st Century Agri-food System

Yukon Agricultural Association
Whitehorse, YT
Mar. 4, 2011

Kent Mullinix

Kwantlen
POLYTECHNIC
UNIVERSITY

INSTITUTE FOR
SUSTAINABLE HORTICULTURE

My focus- farming, farmers, people and community

Agriculture and food- a clear and primal manifestation of our worldview

and way of being

The production paradigm dominates

AKA: modern, conventional, industrial, green revolution

Situation analysis

to inform planning for the future

Energy intensive

Agriculture's EROEI = 5:1 on average
10:1 or greater for some

Formerly agriculture represented a net energetic gain

Capital intensive

Farmland values-
$100,000 +/ acre in the lower mainland, more in Okanagan

Yukon land cost reported prohibitively expensive

Costs of production escalating

Richmond Farmland, Graham Osborne photo

Input intensive
(technologically)

The "technology treadmill"

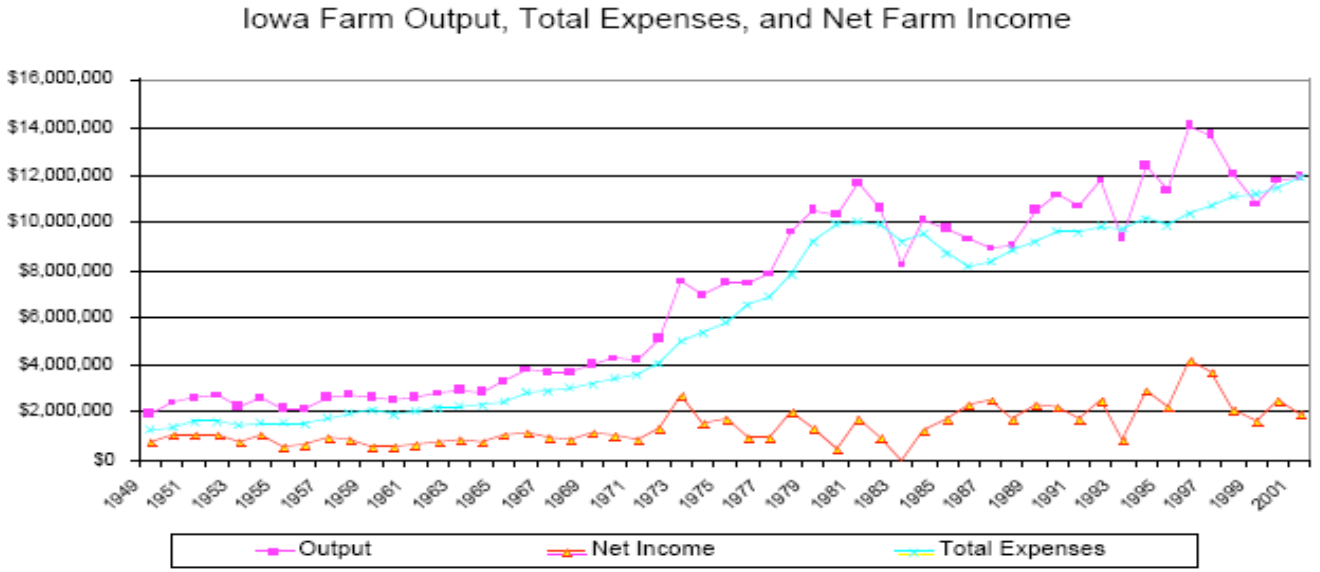
- New technologies economically benefit early adopters
- Increases production- adopted by all (to keep up)
- Costly input becomes standard practice and a fixed cost
- Increased production= depressed values (lower margins)
- In the long-term decreases profitability
- Narrow margins spur get bigger or get out mentality

Pesticides- case in point

- Use increased 10X
- Crop losses increased from 7% to 13%
- Farmers use more pesticides, spend $20 billion/year

“…major reward for an 11 fold increase is the doubling of the bug problem.”

Robert van den Bosch,
University of California- Berkley,
1979

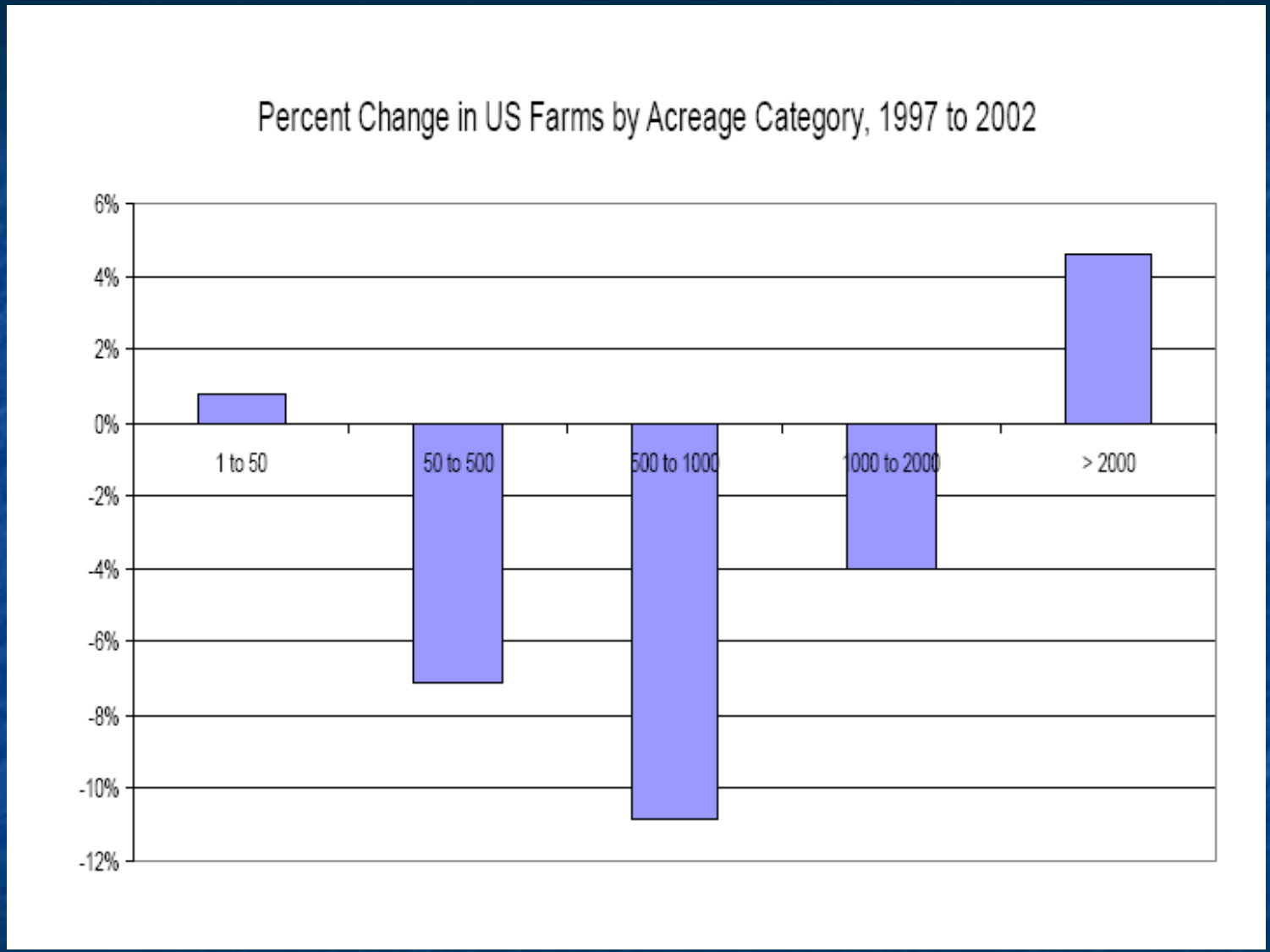


F. Kirshenmann
Leopold Center for Sustainable Agriculture
Iowa State University

Who benefits from increased mechanization, BGH, antibiotics, genetically modified organisms and other technologies?

Promotes get "bigger or get out" syndrome and consolidation

- 6.6 million U.S. farms in 1930
- Less than 2 million U.S. farms today
- Same trend in Canada
- 25% fewer farms in S.W. BC last 10 years


Percent Change in US Farms by Acreage Category, 1997 to 2002
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
1 to 50
50 to 500
500 to 1000
1000 to 2000
> 2000

Manitoba's consolidating hog industry

- Produces 6.2 million hogs annually
- Worth $860 million/ year
- 200 hogs/ farm in 1976 to 1,500 in 2001
- 82% produced on 11% of the farms

Pearson and Nasby
Guelph University
2008

Loss of family farms (i.e. consolidation)- a worldwide trend

- Germany- 68% fewer
- France and Japan- 83% fewer
- U.K. and Korea- 59% fewer

Far fewer farmers

- Capital (for technology) replaced people (but young folk are cash poor and labor rich)
- 1940- farming is occupation of 40% of Canadians and Americans (50% live on farms)
- 2011- <1.5% of us are farmers

Farmers are aging

- In Canada the average age of farmer approaches 60 years
- 6% of principal farm operators under 35 years

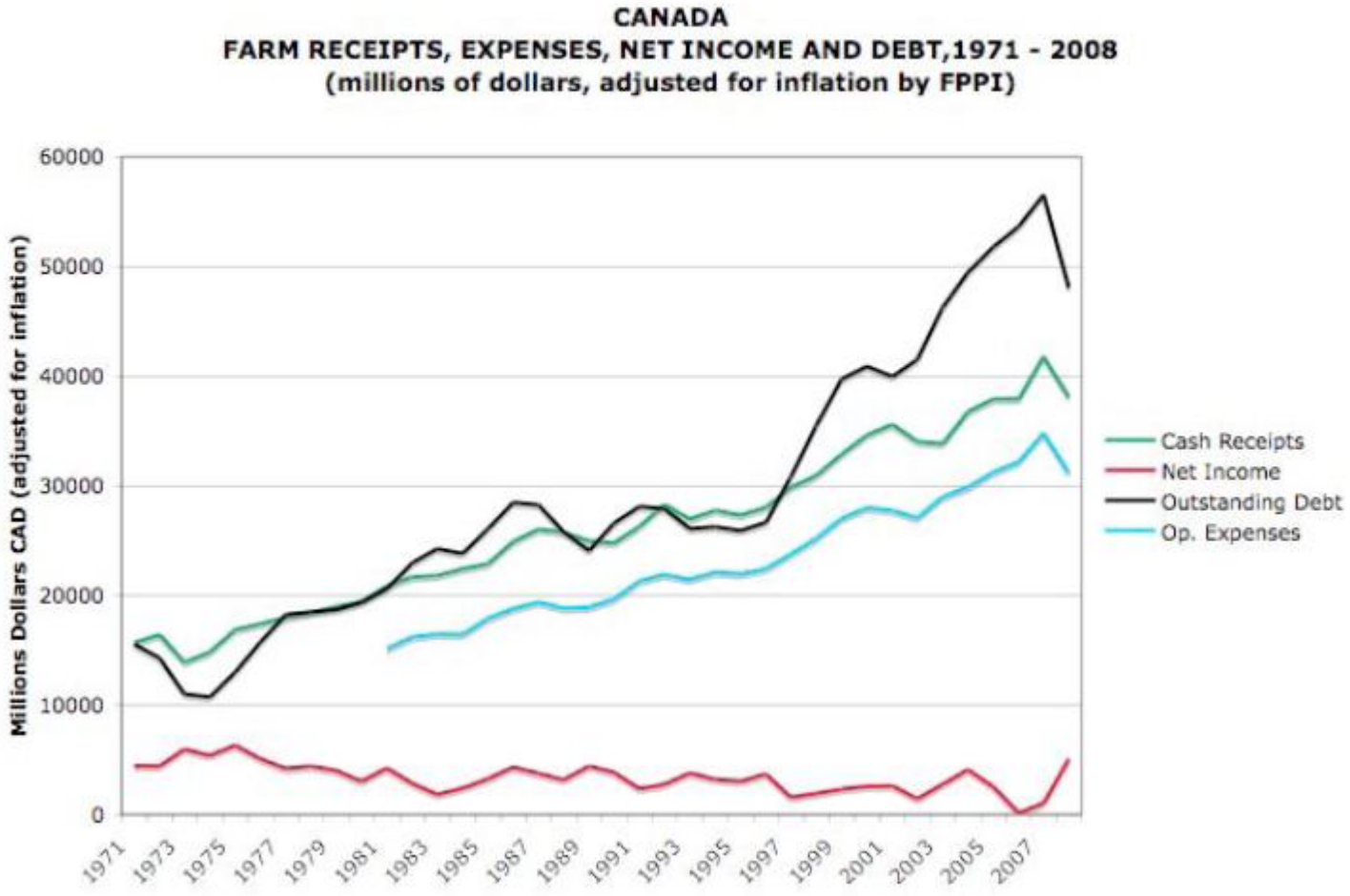
Critical loss of place-based agricultural knowledge

(just when we are going to need it)

Why is this happening?

We have set farmers and ranchers up for economic failure

Flat farm income and high risk



W. Holm
2009

The greater the cost of production relative to revenue the greater the risk

In 2006 Yukon farms grossed $4.19 million, while cost of production was $4.75 million

Strengthening Yukon Local Food 2010

"Faith in the paradigm of productivity has made most farmers not only poorer, but also exposed to more risk."

Pearson and Nasby
Guelph University
2008

Traditional family farms gone by 2030, or sooner, at current rate

Hassebrook/ Kirshenmann, 2003

Communities dominated by family farms

- Overall higher standard of living
- Poverty and crime lower
- 100% more independent businesses
- 61% more retail trade
- More parks, schools, churches, newspapers
- More citizen involvement in democratic processes

W. Goldschmidt
1977

The big question…

When did agriculture become unprofitable?

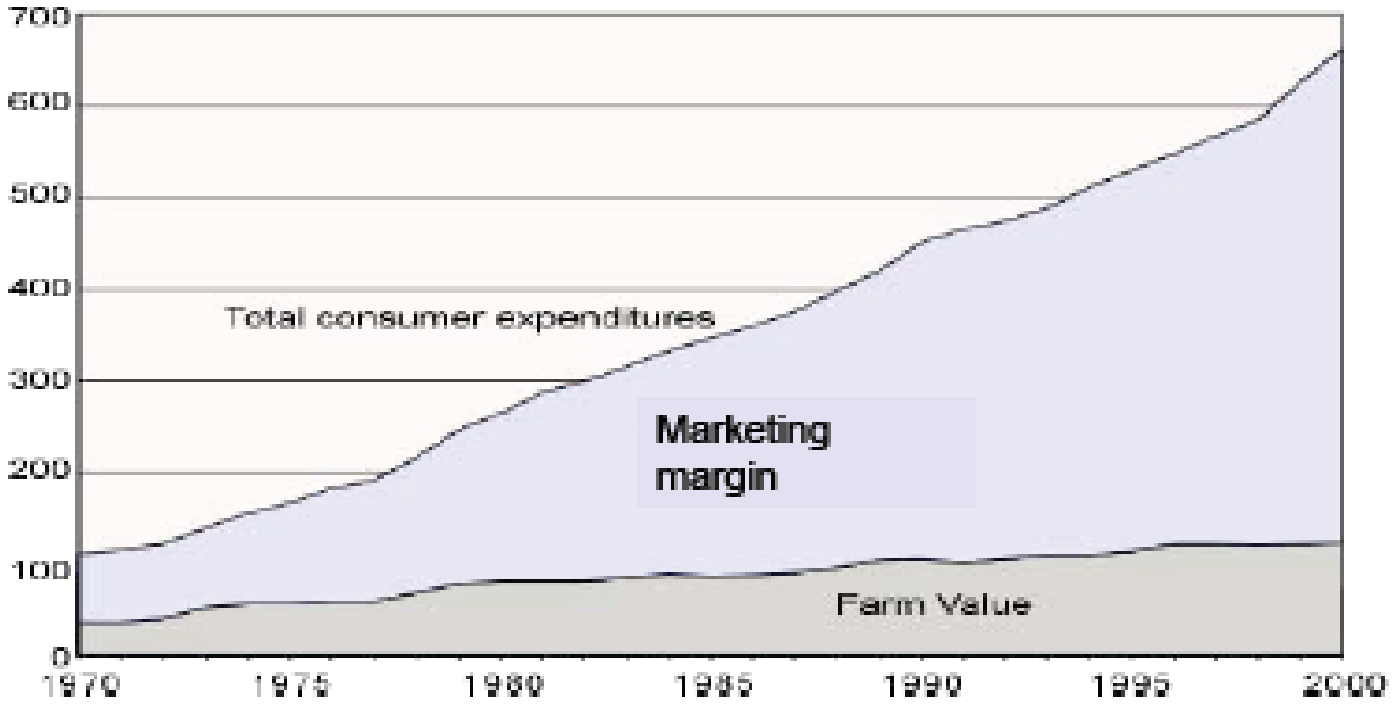
Answer: it didn't

"There is money being made in the food system. In recent years only the pharmaceutical industry has had higher rates of return on their investment than firms in the food product sector." … "those providing inputs to producers as well as those processing and marketing food products expected to make at least a 20 percent return on their investment."

W. Heffernan
University of Missouri
2003

Canadian Food Prices - retail vs farm gate

(billions of dollars unadjusted, per Brent Warner, P.Ag.)



W. Holm
2009

Farmers share of the food dollar

1910 – 1990

Farmers-	from $0.40 to $0.08
Inputs-	from $0.15 to $0.25
Marketing-	from $0.45 to $0.65

Consolidated, vertically and horizontally integrated agri-business drive the system

to their advantage and the disadvantage of producers and consumers

Vertical/horizontal integration

- 60 % of crops from 8% of the farms (U.S.)
- 4 companies- 80% of beef packing
- 3 companies- 75% of pork packing
- 4 companies- 42% of retail market
- 5 seed companies- 80% of worlds crop seed
- Tyson-IBP- largest beef/ poultry/ pork producer and processor in the world; $24 billion annual revenue; 100,000 employees

Yukon spends $110 million on food annually

but less than 2% of food dollars on locally produced commodities

Strengthening Yukon Local Food 2010

Midwest corn belt county study

- Agriculture sales at all time high
- Farm income dismally low
- Farm indebtedness great
- Loss of local spending
- Flow of funds out of community due to absentee landlords and distant suppliers

R. Levins
University of Minnesota

Neo-feudalism ?

"...a colony owned and operated by people who don't live there for the benefit of those who don't live there."

R. Levins
University of Minnesota

"We now have a global food system that is impervious to true consumer interests. Food is produced, processed and distributed almost entirely to meet the short-term business interests of the global food firms."

F. Kirshenmann
Leopold Center for Sustainable Agriculture
Iowa Sate University
2003

Nutrient dilution effect

- Yield enhancing methods tend to decrease nutrient density
- Recent studies of fruits, vegetables and wheat show a 5 to 35 percent decline in nutrient density during past fifty years
- A few nutrients in meat and milk have decreases by as much as 60 percent

D.R. Davis
University of Texas

Trends in 43 truck farm crops
1950-1999

- Calcium ↓ 16%
- Protein ↓ 6%
- Vitamin C ↓ 20%
- Riboflavin ↓ 38%
- Phosphorus ↓ 9%
- Iron ↓ 15%

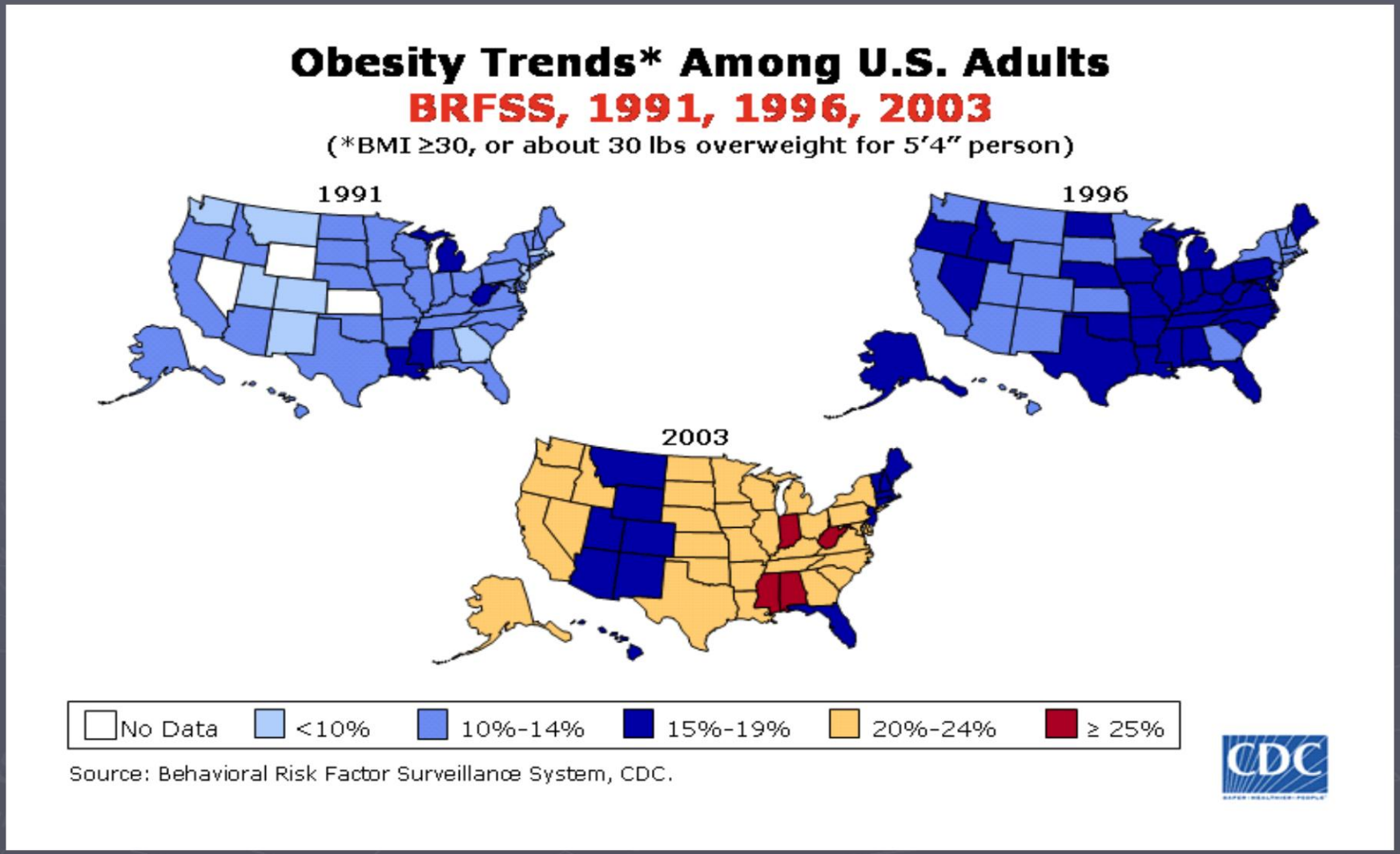
Davis, Epp and Riorden
Am. J. Coll. Nutri.

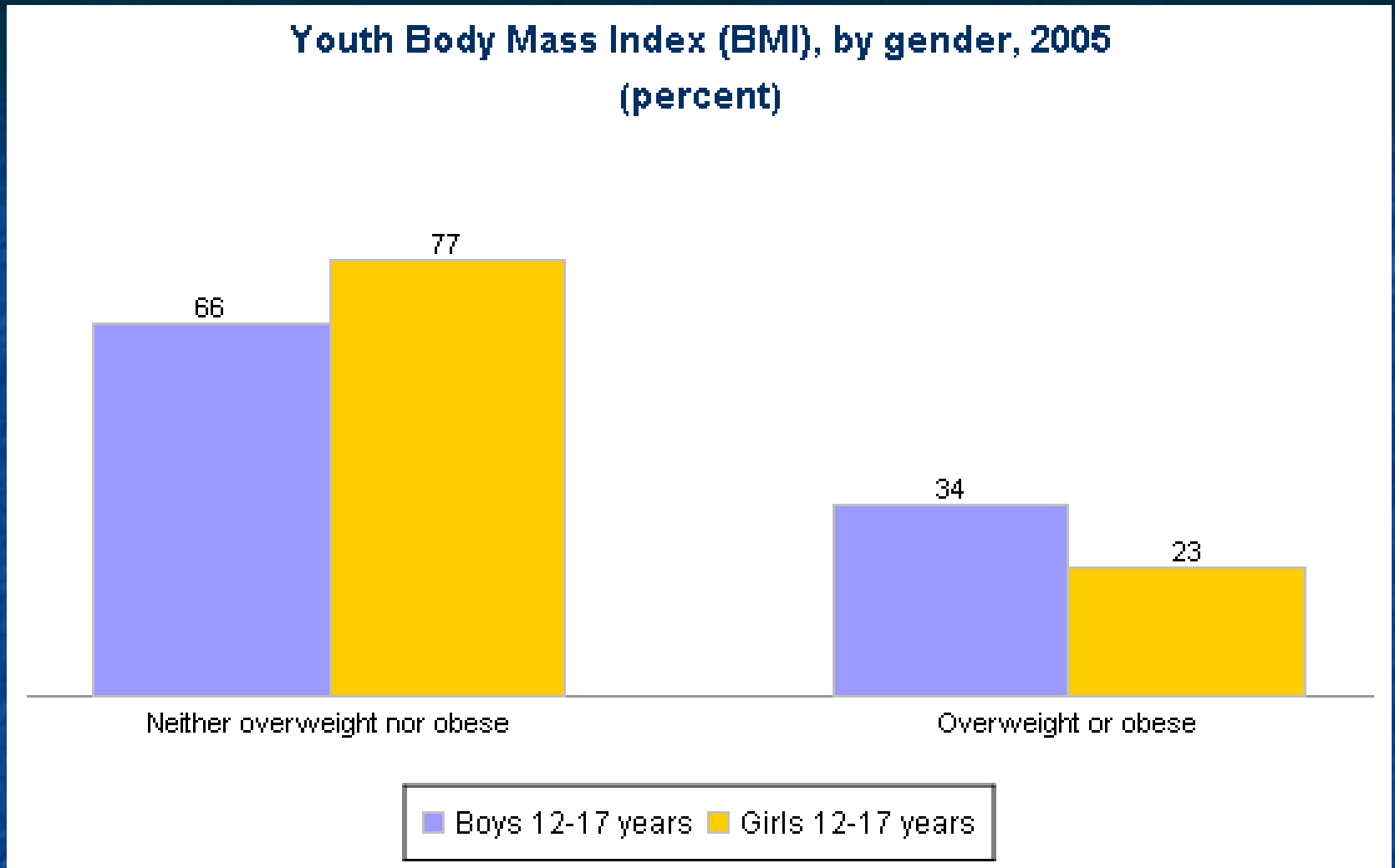
Spinach-
according to USDA

- 1948- 158.0 mg/ 100g
- 1965- 28.0 mg/ 100g
- 1973- 2.2 mg/ 100g

T. Hartmann
2009

Concern over obesity/ diabetes





Canadian youth

Health Canada

‘Western diseases’ mostly food related

Childhood onset diabetes is epidemic

Our children may be the first generation with a life span shorter than their parents

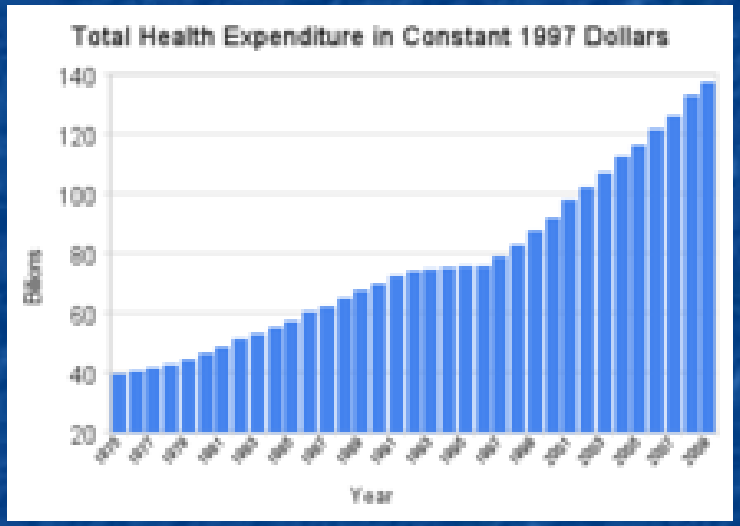
K. Clancy
Union of Concerned Scientists
2003

Cheap food?

U.S.- During the same time that we have reduced the percent of our earned income spent on food to less than 10 percent, we have also increased the percent of our income spent on health care to 16 percent.

G. Schwartz, MD
Mayo Clinic

Canadian health care expenditures



$191 billion in 2010

5.9% increase from previous year

10.1% of GDP (US 16%)

$5,452 per capita

Direct cost

Canadian inflation 2008

www.conservancy.bc.ca/imagecatalog/UBC-Farm.jpg

Overall-	1.2 %
Food overall-	7.3 %
Cereal products-	12.4 %
Fruits/ vegetables-	26.9 %

Canadian Broadcasting Corporation News, 2009

Industrial ag's environmental record

- Soil erosion/ degradation/ loss of fertility
- Pesticide contamination/ off target species
- Habitat degradation/ loss of bio-diversity
- Nitrates in water supplies
- Aquifer depletion
- Point and non-point source pollution- hypoxia zones
- Untested, genetically modified organisms unleashed

"Agriculture… the single greatest source of human damage to the global environment."

R. Heinberg
New College Of California, 2006

But it does not have to be so

The Production Paradigm-

the jury is in

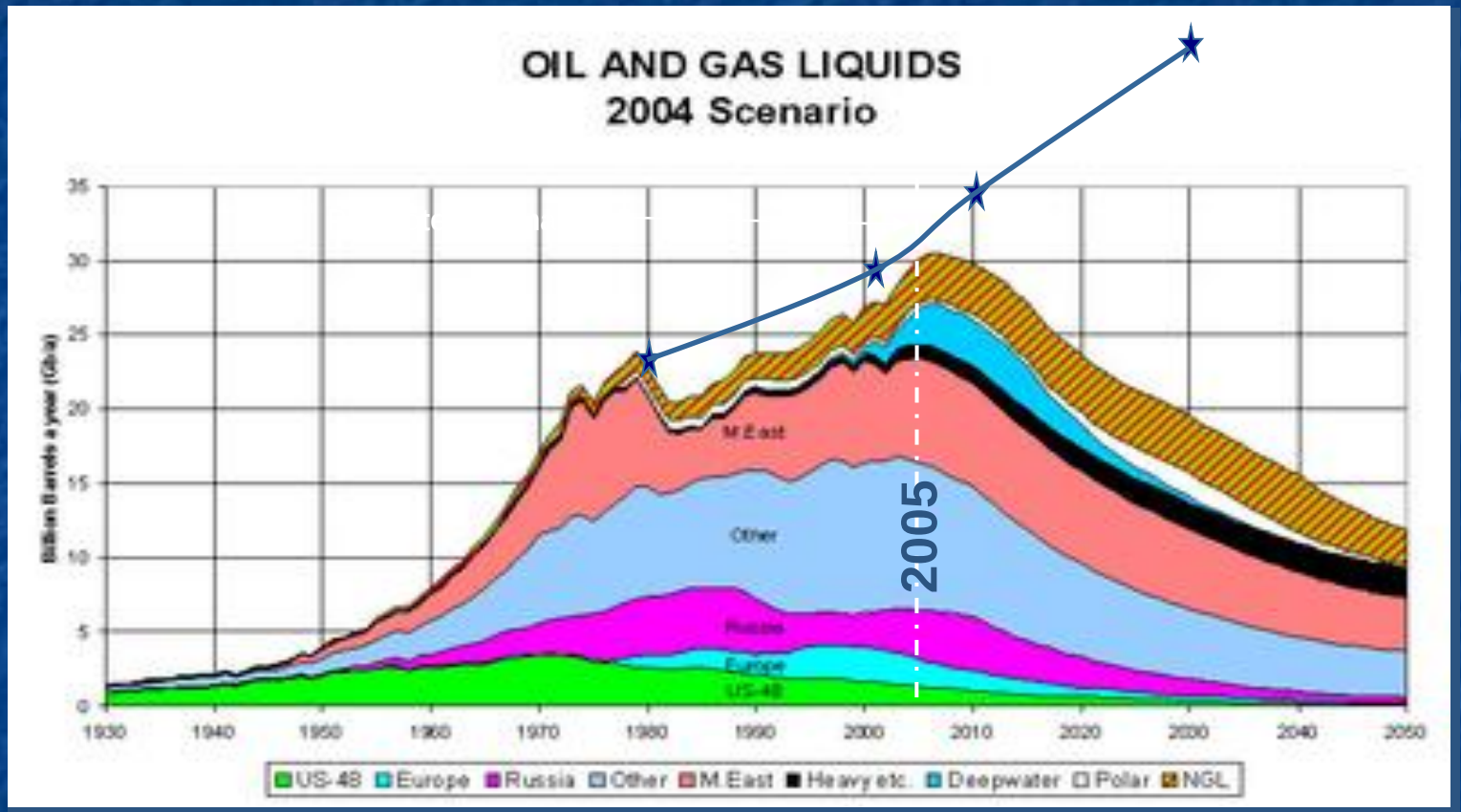
Verdict- it's not all its cracked up to be environmentally, socially, economically

"The challenge for the future… is to find ways to address these issues… scale back our use of non-renewable resources, through connectivity and a new regenerative agriculture."

Pearson and Nasby
Guelph University
2008

Global trends and factors with very real regional implications

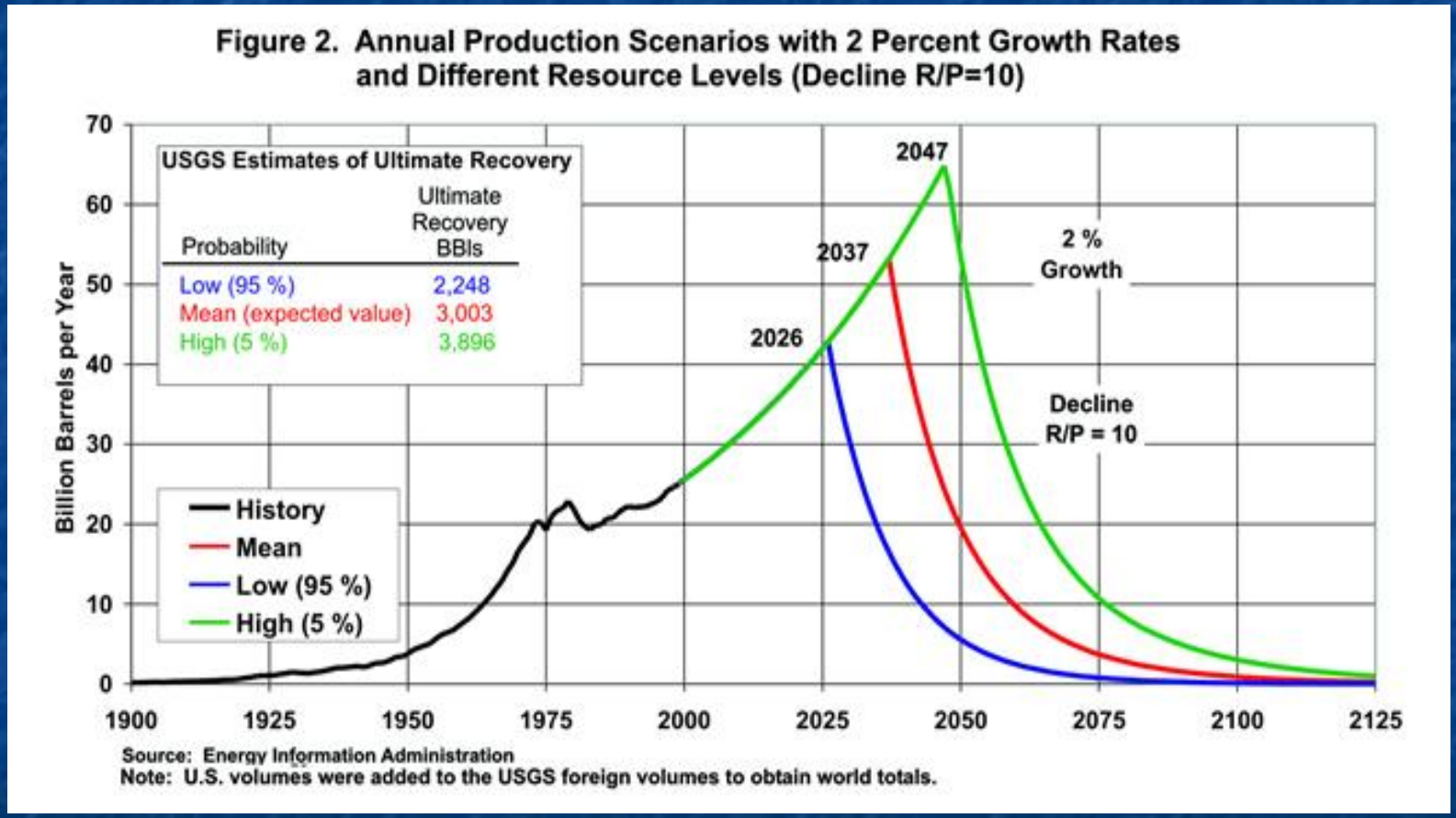
Hubbert's Peak: Global Oil Depletion



Campbell, C. 2004

More cautious: Princeton Geologist K. Deffeyes, Geologist Colin Campbell, Energy Analyst M. Simmons, etc.

Hubbert's Peak: Global Oil Depletion



Optimists: USGS, US Dept. of Energy, American Petroleum Institute, Shell Oil

“world’s first forced energy transition” and “only poison pills”

R. Bezdek
Global Oil Depletion and Implications for the Pacific Northwest
2006

No replacement for oil on the horizon

"End of transnational-global agri-food system"

"Resurgence of local agriculture, bottling, canning, processing eminent"

M. Simmons
Global Oil Depletion and
Implications for the Pacific Northwest
2006

50 million farmers needed in U.S. and Canada for de-industrialized, post-oil agriculture

20% of our population

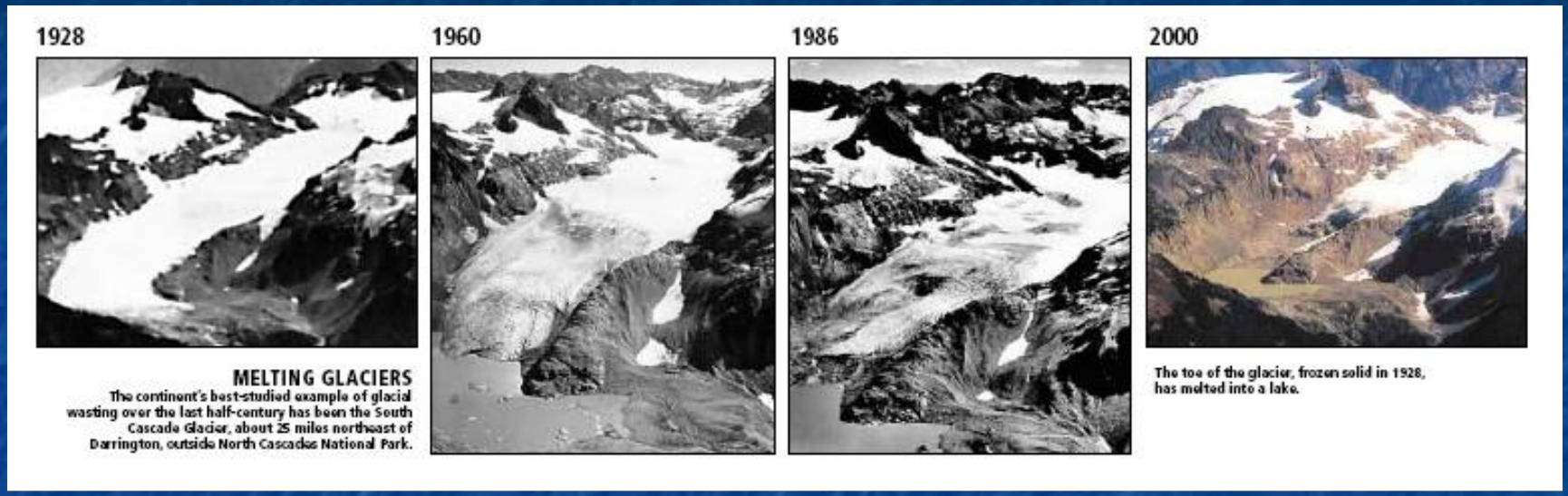
R. Heinberg
New College of California
Post Carbon Institute
2006

Fresh water increasingly a limiting factor

60 % of U.S. fresh water used for agriculture- our fruits and vegetables are mostly water

Many areas of B.C. routinely face water shortages

Global climate change- a wild card



Precipitation patterns/ snow pack

Irrigation water availability

Insect and disease incidence

Unpredictable and severe weather

Crop plant adaptation

Agriculture contributes 10- 20% of GHG emissions- up to 50% for the whole agri-food system

Moreau et al. 2011

B.C. provincial government mandate-

all municipalities must reduce GHG emissions by 80% by 2050

Population growth and urbanization

- From 6.5 to 9.5 billion by 2050
- 2009-majority urbanized for first time in human history
- In Canada 80% are urban dwellers

The agri-food system

quickly becoming an abstraction and another urban throughput

Our challenge as planners, developers and policy-makers of the built environment in an era of climate change is to figure out how to strengthen agriculture systems and biodiversity of our farmlands, and connect them to livable cities and their consumers.

K. Benefield
2009

How can we feed the world without industrial-global agriculture?

More production paradigm?

Ultra-intensification of the production paradigm- Dennis Avery, Hudson Institute

Advanced technology, especially GMO's- Norman Borlaug

Expanding the discussion

- Food security (supply)
- Food sovereignty (control)
- Food self-reliance
- Community resilience and adapability
- Human sustainability

Sustainability

- A powerful concept
- Unifying
- Defining/ directing
- Our supreme challenge

Competing agricultural paradigms

Production

- Dependence
- Centralization
- Competition
- Domination of nature
- Specialization
- Exploitative, external costs ignored, short-term benefits
- High input

Sustainable

- Independence
- Decentralization
- Community
- Harmony with nature
- Diversity
- Restraint: full accounting, long-term
- Renewable resources, conserve for future

Through agriculture and food system (re)design

there exists opportunity to advance our understanding and actualization of sustainability via connecting people to their means of daily sustenance, the natural world and each other

American Planning Association

"Food is a sustaining and enduring necessity. Yet among the basic essentials for life- air, water, shelter, and food- only food has been absent over the years as a focus of serious professional planning interest. This is a puzzling omission..."

Policy Guide on Community and Regional Food Planning 2007

The place to start-
envisioning a preferred agri-food system

- Economically robust, contributes significantly to local economy
- Farmers capture more, equitable value
- Creates many rewarding jobs, attracts a new generation focused on sustainability
- Impediment to land speculation and urban sprawl
- Environmentally sound – provides ecological services

Envisioning a preferred agri-food system cont.

- Provides nutritious, wholesome foods for all- mitigates disease
- Diverse, multi-dimensional, adaptive
- Engages urbanity- creates connectivity/ community
- Addresses food self-reliance and urban sustainability

Integrating eco-logic, notably diversification, in the system is key

Local-regional scale, human intensive, direct market agri-food systems a critical but largely ignored element

Integrated strategies

- Bio-regional agri-food systems
- Municipally Enabled and Supported Agriculture (M.E.S.A.)
- Teach people how to farm
- Production system research and outreach

Systems research and demonstration

Regionally adapted

Bio-intensive

Low input

Ecologically sound

Highly productive

Meeting the challenge?

western governments scale back agricultural research and education

In Canada:

- 37% decline in person years in public agricultural and food research
- 55% decline in government spending for extension (knowledge transfer)

Pearson and Nasby
Guelph University
2008

Bachelor of Applied Science-Sustainable Agriculture

at Kwantlen Polytechnic University 2011/12

Municipally Enabled and Supported Agriculture

Credit: Michael Marrapese via Farm Folk/City Folk

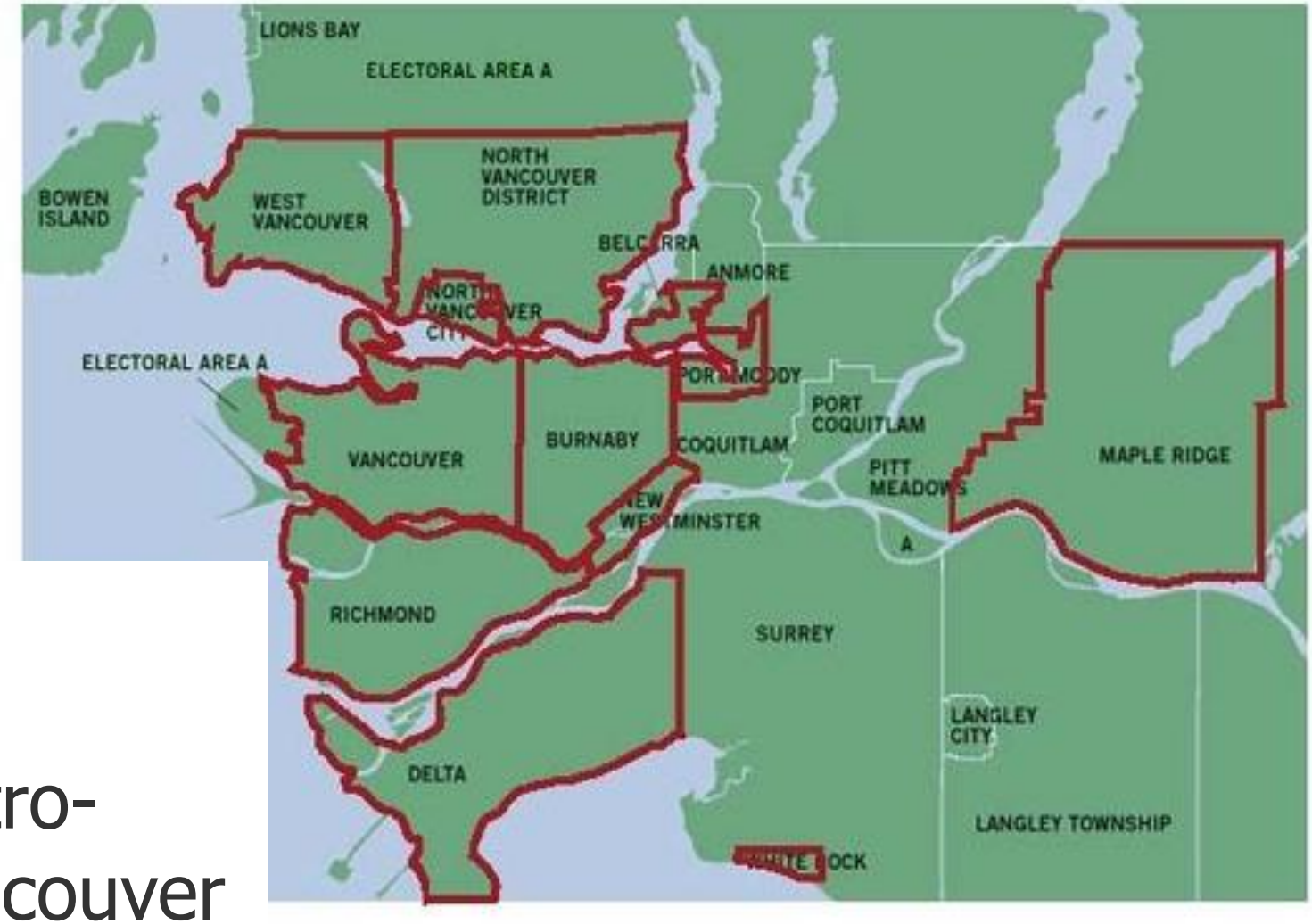
M.E.S.A. Municipalities take a leadership role in facilitating a local, community focused agri-food system

M.E.S.A.

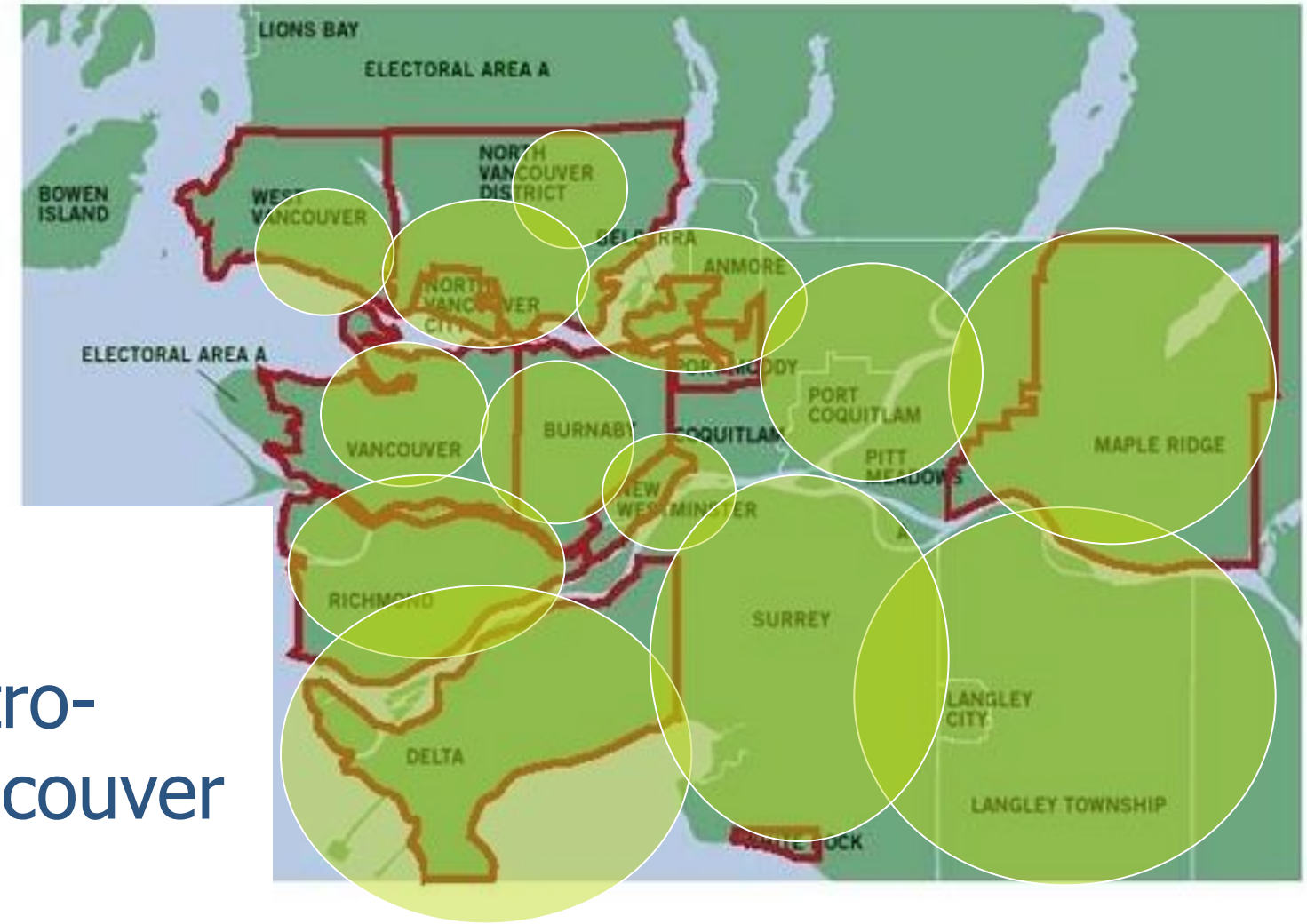
The full integration of the agri-food system within the planning, design, development and function of cities and vice- versa

Community focused, human intensive, ecologically sound, in and around cities, for and by residents, in all of its dimensions

Metro-Vancouver



M.E.S.A. agriculture cells operate/ interact to comprise a regional agri-food system



Metro-Vancouver

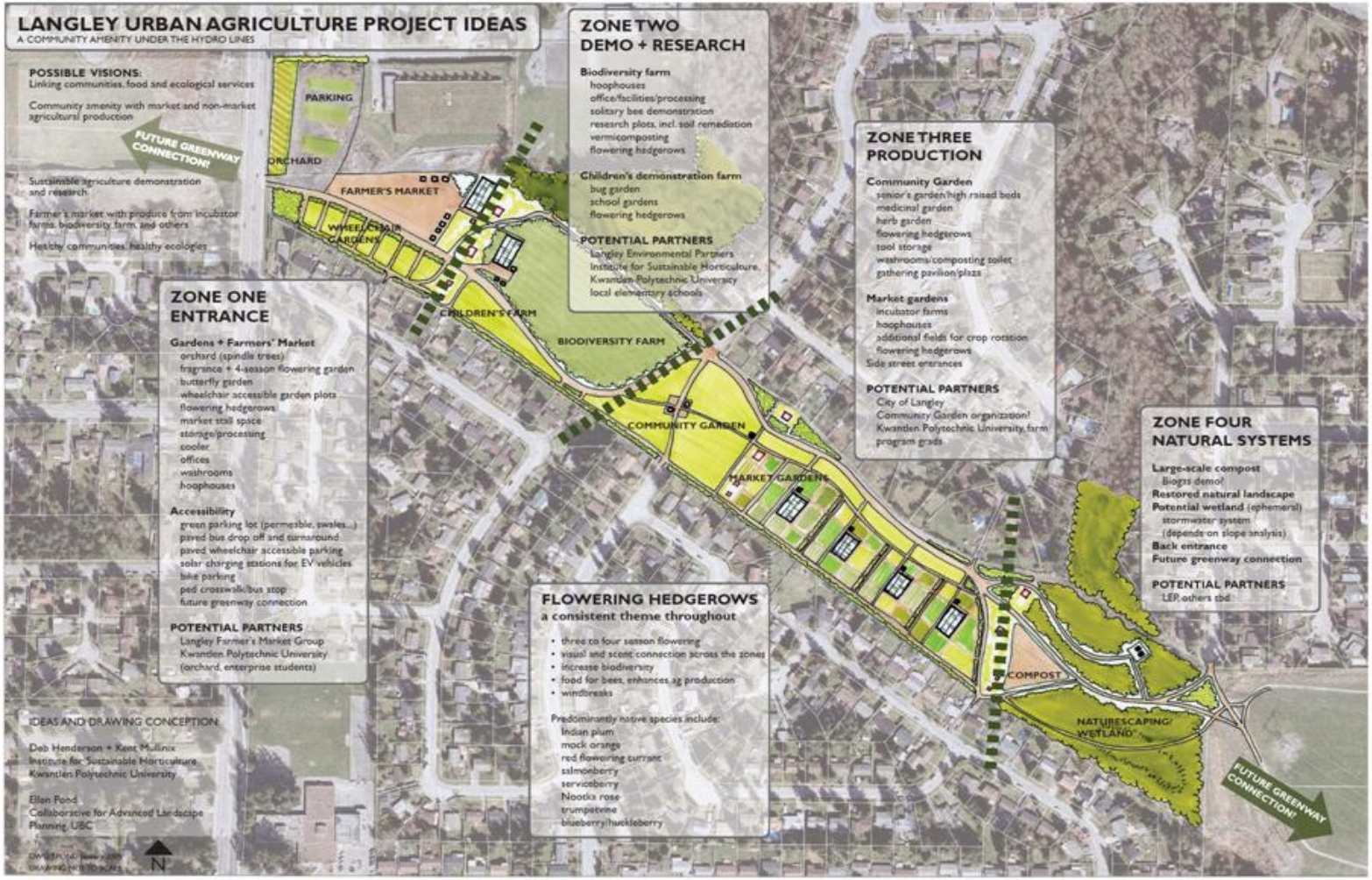
M.E.S.A. tools

Community Trust Farming

- Municipalities procure land in and around the city
- Provide long term, economically favorable leases
- Stipulate sustainable farming methods
- Require direct marketing to city residents
- Overseen by community steering committee
- Land owned by the people for common good

Modeling Community Trust Farming- Delta, BC

Urban research, production and demonstration farm- Langley, BC



Farm Schools- Richmond, BC

A partnership:

Municipality of Richmond

Richmond Food Security Society

Richmond Fruit Tree Sharing Project

Kwantlen Polytechnic University

Students transition to "Incubator Farm Plots"

to

Municipally owned farm land (CTF)

Surrey, BC: Strategies, actions and recommendations to enhance local- scale, human-intensive, direct- market agriculture

- Economic contribution
- Employment
- Food self-reliance
- GHG reduction
- Stop urban encroachment

Bio-regional agri-food systems

Bio-regions

Areas that shares similar topography, plant and animal life, and human culture.

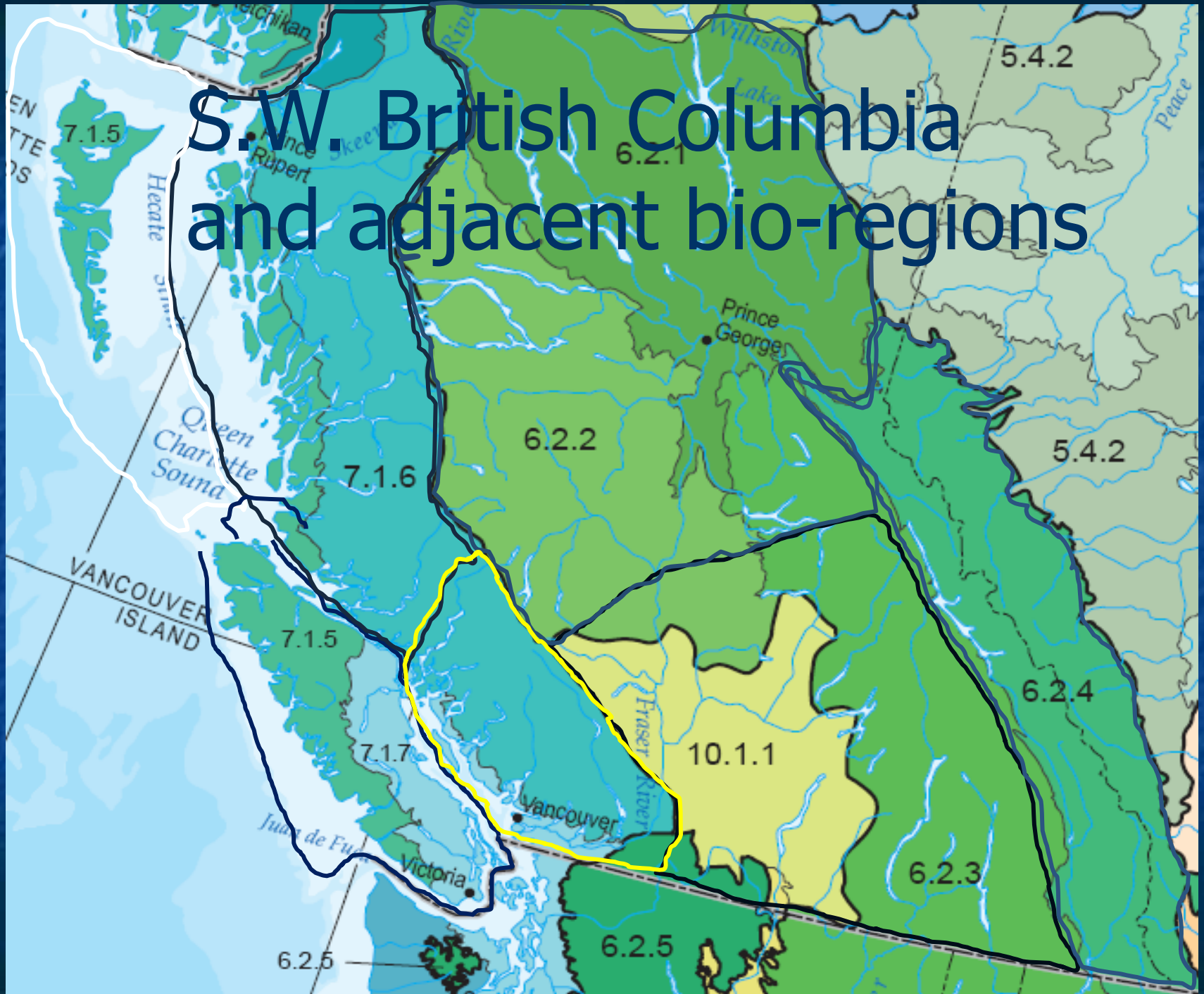
Bio-regional boundaries are not rigid and differ from geo-political borders.

Bio-regional agri-food systems

- Based on regional resources/ capacities
- Respects ecological limitations
- Focuses on/ nurtures place and community
- Compliments global system
- M.E.S.A. a functional-relational unit w/in the bio-regional system
- Building a bio-regional agri-food system model- a roadmap

Eco-regions generally equate to bio-regions

USA.- EPA Ecoregion maps and posters


S.W. British Columbia
and adjacent bio-regions
7.1.5
6.2.1
5.4.2
Prince Rupert
Hecate
Prince George
6.2.2
7.1.6
5.4.2
Queen Charlotte Sound
VANCOUVER ISLAND
7.1.5
6.2.4
7.1.7
10.1.1
Fraser River
Vancouver
Victoria
6.2.3
6.2.5
6.2.5

Sea to Sky Regional Agri-food System Management Plan

(Whistler, Pemberton, Squamish, Lilloet, BC)

Bio-regional agri-food system design to maximize regional production, processing, marketing, consumption and waste cycling operating within the regions ecological dimensions/ capacity

connect farmers with consumers, build value-based relationships, and allow farmers to capture the value of the what they produce

Country Natural Beef

"Consumer driven beef marketing cooperative"

"own, control and finance our beef from birth of the calf to our retail customer"

"our product is more than beef…provide value to our urban customers and meaning to our ranchers work"

"honoring the relationship from the land to the customer and back"

Yukon Food

Sustainable, family based, community focused agriculture is not ‘going backwards’

A logical progression based upon our experience, knowledge and the needs/ desire of post-industrial society.

Evoking a neo- agrarian sensibility/ worldview

Agrarianism

- A social system manifestation of the concept of sustainability
- A way of life, respectful /appreciative of creation
- Committed stewardship of natural resources
- Life place centered
- Builds/ nurtures relationships/ community at all levels

Our unsustainable human economy and agriculture-

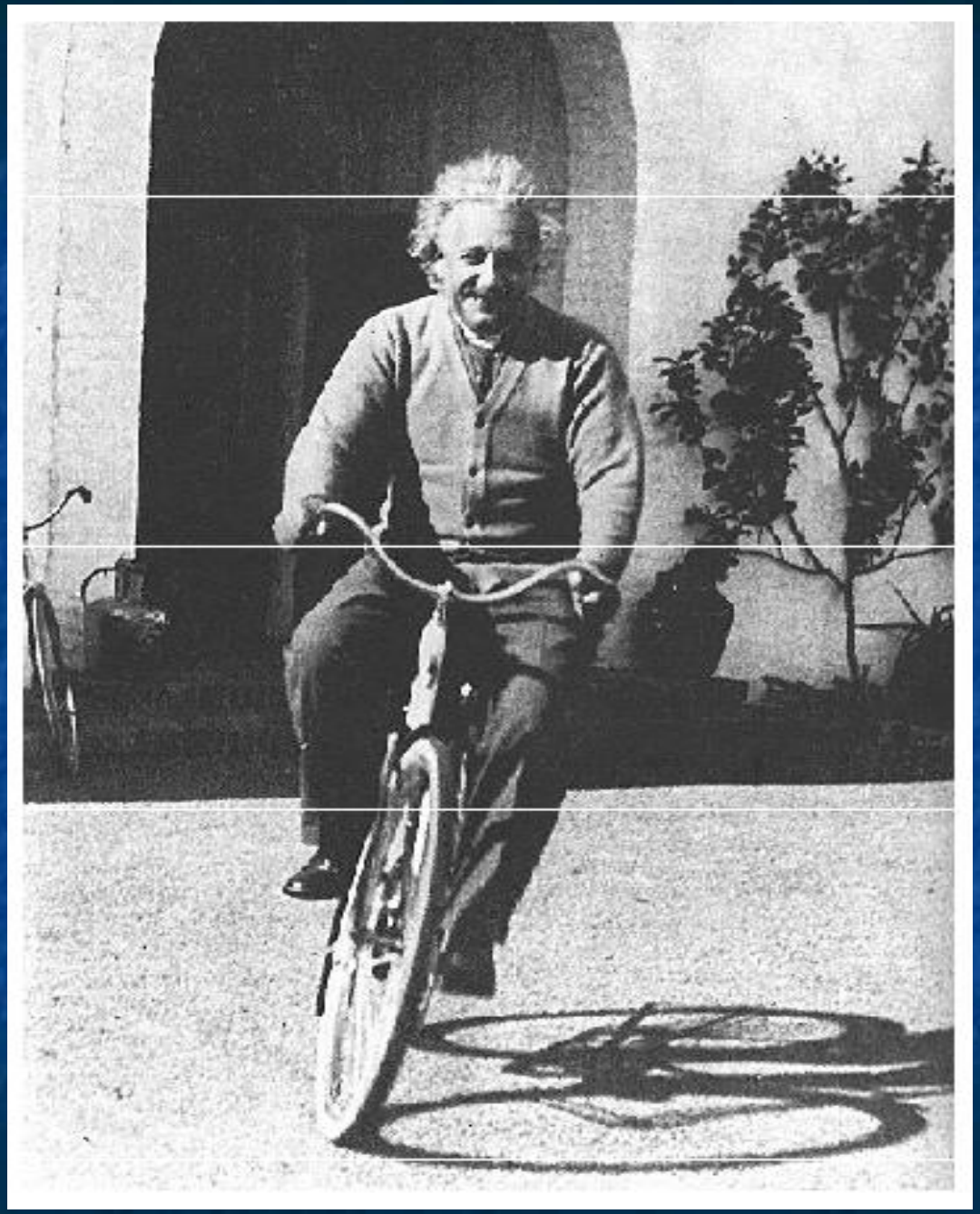
is a direct reflection of our world view and notion of what it is to be human

a new, sustainable agri-food system represents an excellent vehicle to demonstrate and cultivate new ways of understanding and being

The path forward?

Credit: Michael Marrapese via Farm Folk/City Folk

30 years ago, who would have thought?



"The significant problems we face cannot be solved at the same level of thinking we were at when we created them."

Albert Einstein