Toward a Viable 21st Century Agri-food System

Yukon Agricultural Association
Whitehorse, YT
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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
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
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
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

CANADA
FARM RECEIPTS, EXPENSES, NET INCOME AND DEBT, 1971 - 2008
(millions of dollars, adjusted for inflation by FPPI)

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.
“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?
"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.)

- Total consumer expenditures
- Marketing margin
- Farm Value


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.
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 State 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
Spinach- according to USDA

- 1948- 158.0 mg/ 100g
- 1965- 28.0 mg/ 100g
- 1973- 2.2 mg/ 100g
Concern over obesity/diabetes

**Obesity Trends* Among U.S. Adults**


(*BMI ≥30, or about 30 lbs overweight for 5’4” person*)

Source: Behavioral Risk Factor Surveillance System, CDC.
Youth Body Mass Index (BMI), by gender, 2005 (percent)

Neither overweight nor obese:
- Boys 12-17 years: 66%
- Girls 12-17 years: 77%

Overweight or obese:
- Boys 12-17 years: 34%
- Girls 12-17 years: 23%

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

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.”
Global trends and factors with very real regional implications
Hubbert’s Peak: Global Oil Depletion

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. 

B.C. provincial government mandate—all municipalities must reduce GHG emissions by 80% by 2050.

Moreau et al. 2011
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 adaptability
- 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
“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...”
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

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

Credit: Michael Marrapese via Farm Folk/City Folk
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.
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 within the bio-regional system
- Building a bio-regional agri-food system model - a roadmap
Eco-regions generally equate to bio-regions
S.W. British Columbia and adjacent bio-regions
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”
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?
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