

Urban Agriculture: Issues for Public and Environmental Health

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National Collaborating Centre
for Environmental Health
Centre de collaboration nationale
en santé environnementale



BC Centre for Disease Control
le Centre de santé publique de la Colombie-Britannique

outline

- Introduction to urban agriculture (UA)
- Urban agriculture and public health
- Potential challenges of UA
- Environmental health issues
- Food safety and UA
- Role of public health professionals
- Discussion and questions

the many sides of urban agriculture

- Urban / peri-urban
 - Intersection of urban and rural
- Community gardens
- Commercial agriculture
- Backyards and balconies
- Temporary sites/'Guerilla' gardens
- Victory gardens
- Entrepreneurial gardens
- School gardens
- Educational farms
- Recreational farms



UA is everywhere

- Global south
- Europe
- North America
- Nova Scotia
- PEI



Where are we at and where are we going with urban agriculture in NS/PEI?

- NS
 - 11 in HRM
- PEI
 - Charlottetown



why urban agriculture?

- Local food supply
- Therapeutic, exercise
- Grow ethnic foods from home
- Social interaction
- Environmental
- Connection to nature/food



benefits of urban agriculture



- Food security & diet quality
- Community economic development
- Mental health
- Urban design & vibrant neighbourhoods
- Educational & skill building
- Local food
- Biodiversity
- Physical activity
- Productive vacant lots
- Beauty, nature

urban agriculture and public health

- Zoning & land access
- Air | water | soil quality
- Social stratification
- Agricultural pollution
- Food safety
- Animals & pests
- Safety & security



zoning & land

- Land access is the biggest challenge to urban farmers and community gardeners
- People will grow where they can find land
 - old industrial sites
 - vacant lots
 - railway lines
 - brownfield sites
 - private development sites
 - roadsides and boulevards
- Potential concerns re. traffic safety | air & soil pollution | fencing



air pollution

- Road traffic pollutes soil and plants:
 - Cd, Cu, Pb, Zn, Mo
 - Petroleum HCs (unburnt fuel)
 - PAHs (gasoline)
 - Variable – Depends on wind, distance, traffic, soil characteristics
- MITIGATION
- Pb particles can be washed off
 - Boundary crops can act as a protective buffer

water

IN

- Use of non-potable grey water
 - Household or rain water
 - lack of regulation
 - Microorganisms
 - Household chemicals

OUT

- Run-off from larger urban farms or those using chemical inputs or pesticides may contaminate surrounding properties or sewers
- Most community gardens have organic requirements

soil contaminants

Heavy metals:

- Pb, Zn, Cd, Cu, Hg, As
- Organic compounds:
 - PAHs, POPs, pesticides
- Pathogens
- Asbestos fibres



sources of soil contamination

- previous use of land (industrial, dry cleaning, photo processing)
- atmospheric deposition (esp. near roads)
- paint particles (Pb)
- contaminated fill
- water runoff
- composts and fertilizers
- pesticides
- sports and hobbies (e.g. airgun pellets)
- leakage of HCs (gas stations)
- wood preservatives (creosote, chlorophenols) in construction, raised bed frames, or rail lines
- waste disposal
- bonfires
- faeces
- burial of dead animals
- sewage sludge

a note about brownfields

- lack of access to land
- lack of awareness and resources
- private land ownership (e.g. property developers)
- gas stations and railway lines



soil contaminants



Photo: Wikimedia Commons

- Pathways of human exposure to soil contaminants
 - Uptake through plant roots
 - Deposition of soil particles on leaves, fruits, or roots
 - Consumption of soil by animals used for food, milk, or eggs

gardening on contaminated sites

- Site mitigation:
 - excavation & soil replacement (+/- geotextiles) – very expensive, fast
 - soil washing – expense
 - soil vapour extraction – very expensive
 - microbial remediation – low cost; <1 year
 - phytoremediation (+/- chelating agents) – low cost; 2–5+ years

gardening on contaminated sites

- Design solutions:
 - raised beds
 - impermeable barriers with landscape fabric
 - buffers between garden and roads



Photo: Wikimedia Commons



Photo: Inside Urban Green



Photo: City Farmer

gardening on contaminated sites

- Planting options:
 - grow low accumulators in contaminated soil
- Soil conditioning:
 - lime raises pH to minimize cation (metal) uptake
 - compost neutralizes pH, making Pb less bioavailable

factors affecting metal bioavailability

- pH
- organic matter (elements bind to it)
- CaCO_3 – keeps pH>7, decrease availability
- % clay size – metals sorb to clays
- % plaster & concrete – affects pH & sulphate
- Redox
- Form of metal (particulate, soluble, organic)
- Concentration of other contaminants

plant choices

Contaminant	Avoid	Plant
Cadmium	Lettuce Spinach Carrot Mustard	
Lead	Lettuce Onion Mustard Collards Mizuna Sunflowers	Spinach Pea French bean Squash Tomatoes
Dioxin	Root crops <i>Cucurbitaceae</i>	Above-ground parts
General	Leafy greens	Fruiting plants

soil testing resources

- **Soils and Crops Branch**, Nova Scotia Department of Agriculture and Fisheries
Box 550, Truro, NS, B2N 5E3
(902) 895-4469
<http://www.gov.ns.ca/nsaf/qe/analytical/soilsamp.htm>
- **P.E.I. Soil and Feed Testing Lab**, P.O. Box 1600,
Research Station, Charlottetown, PE, C1A 7N3
(902) 368-5631
<http://www.gov.pe.ca/af/soilfeed/index.asp>

agricultural pollution

- Pesticides
 - drift from peri-urban agriculture
 - untrained hobby farmers and gardeners
 - pets and children
- Fertilizers
 - improper use
 - pets and children
- Water runoff

UA and food safety

- Pesticide residues
 - Most backyard and community garden plots use organic methods
 - Community based growers using pesticides may not have adequate training
 - Poisoning risk
 - Runoff
 - Pets
- Sale of produce
 - Farmers' markets, shops, CSA, "farm" gate
 - Value-added products (jams, pickles, etc)
 - Fruits and veg, eggs, meat

urban livestock

- Regulations vary by municipality
- Some cities allow backyard chickens
 - Victoria, Burnaby, New Westminster, Vancouver
 - New York, Seattle, Portland, LA, Chicago + others
 - Halifax, Toronto don't allow
- Goats, guinea pigs, rabbits
- Land use and/or animal control by-laws

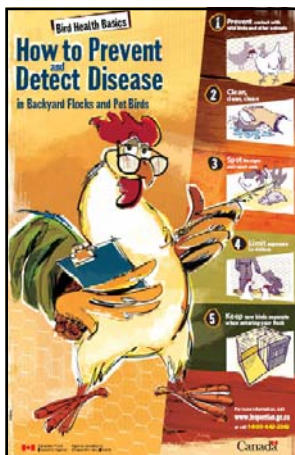


- In North America, other animals generally not permitted



health concerns with backyard animals

- Avian influenza
 - Not a health risk
 - Control with proper hygiene
- Noise – only roosters
- Pests
 - rats, mice, etc.
- Cruelty to animals
 - not unique to food animals
- Predators
- Excrement and waste



CFIA

1. Prevent contact with other animals and wild birds
2. Clean barns, tools, litter – keep food sealed
3. Report early signs of disease
4. Keep birds away from visitors
5. Segregate new birds for 30 days

pests



Photo: CityFarmer

- Compost
 - rodents, flies
 - odour
- Animals
 - predators
 - odour
 - flies
- Generally from poor management or neglect, although rodents always a possibility
- Perception can be a problem

composting



- Put wire mesh under compost bin for rodent protection (prevents burrowing)
- Keep compost covered
- Bury food scraps well with soil and dry brown matter to kill fly larvae and minimize odour
- Avoid putting fatty foods and meat in domestic compost
- Vermicompost

www.cityfarmer.org

social issues

- Stratification / property values
- Community improvement
- Perception and aesthetics
- Conflicts over land use / access



safety and security

- tools and machinery
- syringes, glass
- physical strain, back injuries
- locked or not??
- access and lighting



Photo: Brian Latta Photography

role of public health

- Educate gardeners and public about:
 - proper handling, storage, preparation of fresh foods
 - food preservation (e.g. safe canning practices)
 - egg handling and animal hygiene (where permitted)
- Work with land owners to ensure soils are safe
 - Choice of crops
 - Barriers and creative garden planning
- Provide safety education for tools & chemicals
- Proper pest management practices
- Sales and processing (CSA, farm market, value-added)

gaps

- Food sales regulations
- Actual contaminant levels – soil testing
- Effective, low cost remediation



UA resources

- Resource Centres on Urban Agriculture & Food Security www.ruaf.org
- Centre for Excellence in Brownfields Remediation www.cemrs.qc.ca
- US EPA Brownfields and Land Remediation www.epa.gov/brownfields
- Canadian Council of Ministers of Environment www.ccme.ca
- McGill School of Environment Brownfields Guide http://mse-research.mcgill.ca/envr401_2002/brownfields/guide.pdf
- American Community Gardening Association www.communitygarden.org
- City Farmer | www.cityfarmer.info
- Halifax Garden Network www.halifaxgardennetwork.com

summary/conclusion

- UA is increasing for many reasons
- Regulations and guidelines are lacking
- Problems with perception, fear, aesthetics
- Major health issue is soil contamination
- Potential for chemical use in urban ag



Thank you!

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questions

- What are the major public health concerns regarding urban agriculture in NS and PEI?
- Is there much commercial/mid-scale agriculture in or near urban areas, or mostly small personal or community gardens?
- Is urban agriculture being promoted by governments or organizations?
- Has there been soil testing?
- Are private developers including gardens on their land?
- Brownfield gardens? Railway line gardens?