Feeding the City from the Back 40: A Commercial Food Production Plan for the City of Toronto

A section of the Toronto Food Policy Council's submission to the City of Toronto's Official Plan. November 1, 1999

277 Victoria St. Suite 203, Toronto, ON, M5B 1W2
tfpc@city.toronto.on.ca
Tel: 416-392-1107

Executive List of Recommendations

1. The City of Toronto should formally adopt an Urban Agriculture Development Strategy based on this report.

2. The City should implement full cost accounting for all urban development activities. As part of this accounting regime, all of the following recommendations need to go through an environmental cost-benefit analysis (ECBA) before they are implemented as official City policy. This will mean the identification and quantification of the economic, ecological and social effects/impacts of urban agriculture. A study of these effects would also be part of an environmental impact assessment study (EIAS). An EIAS can be thought of as the first phase of ECBA.

3. The City of Toronto should have an explicit agricultural land preservation policy. The City should investigate legislative mechanisms to help preserve urban agro-ecosystems. This investigation should consider an array of land conservation techniques including: agreements, leases, purchase-saleback, creative development, purchase of land and development rights, conservation real estate, land designation or dedication, community and conservation land trusts (private and public), purchase of conservation easements on title, and accepting donations for tax credit as per the Ontario Heritage Foundation.

4. Consistent with the New Official Plan, food production should be a recognized land use as part of economic and environmental reinvestment objectives. This should serve the function of keeping the present agricultural land-use designations of all the land so designated agricultural in the present Official Plans of the former municipalities.

5. Measures should be taken to ensure that Toronto retains zoning designations that permit food production. The City of Toronto should retain an agricultural land zoning designation in the Official Plan. This designation should include as allowed agricultural uses of lands: field, berry, vine and tree crops; nurseries; orchards; apiaries; grazing of livestock, greenhouses and mushroom farms, in addition to the use of land, buildings or structures for agriculture.

6. Land that has been in food production for the past 5 years and does not have agriculture, as a permitted zoning use should be re-designated agricultural to ensure food production is a permitted use.

7. The City should help create 10 urban food production pilot projects within 3 years. This would involve:

    a. Carrying out an inventory of potential public or private sector sites;

b. Negotiating with public and private sector owners to arrange beneficial lease arrangements and provision of hard services, such as access to water and energy;
c. Establishing an RFP process to attract entrepreneurs to produce food on the sites. In exchange for assistance with leases, the successful bidders would agree to produce food following organic or bio-intensive (Integrated Pest Management) practices, would fertilize their land with organic materials from within the City, and would sell their products within the City's boundaries.

8. The City should develop an action plan to implement a minimum of 10 food producing rooftop gardens on their public properties within the next three years. In the 10 pilot project sites, at least two should have with greenhouses or season extension technology. One other should include a significant rooftop composting system.

9. As part of its overall rooftop greening strategy, the City should develop an incentive program for food production on rooftops. Special funds should be made available to building owners willing to retrofit their rooftops for commercial scale food production.

10. In collaboration with energy companies and other partners the City's Energy Efficiency Office should prepare an inventory of potential greenhouse use of excess heat from all landfill gas recovery and energy co-generation projects.

11. The City should enter into at least three time-limited pilot partnership agreements with small greenhouse growers. One should be a millennial greenhouse resource efficient experimental design. Another should be a public social enterprise, and a third should be a small-scale commercial extensive operation. The results of these should be assessed in three years before another stage of the overall strategy is undertaken.

12. The City should analyze existing food procurement arrangements to identify potential products that could be sourced from an urban food production system. This analysis would require consideration of existing contracts, quality specifications, and the implications of having a more diversified sourcing base.

13. Based on this work, the City should enter into pilot partnership agreements with urban producers to procure their products with certain restrictions. Requests for proposals (RFPs) to entrepreneurs and community agencies to farm would require that food produced be sold/provided with the City boundaries; that farmers must use organic practices; and that food must be labelled as Toronto grown. In exchange, the City will negotiate:

    a. Long-term security at modest lease rates;
    b. City assistance with access to water, energy, other inputs and other business related services.

    For producers on non-agricultural lands, incentives for those currently producing food to attain long-term access to the area (buildings or lands).

14. The City should undertake a survey assessment of brownfield sites where urban agriculture might be practiced in the short or long terms. This survey should includes agricultural, horticultural and composting practices that can remediate brownfield soils, but also those local food production processes (aquaculture, hydroponics, areoponics) that do not depend on soil for their success. Current advances in phytoremediation, may create new effective strategies for clean up within the cities unused land space.

15. The City should commission a feasibility study for the development of a food eco-industrial park, similar in concept to the proposals of the Toronto Food Policy Council and such eco-industrial parks in pre-development stages in Plattsburg, New York and Burlington, Vermont. The example of the Buffalo Village Farms project should be closely assessed for any infrastructure, engineering, horticultural technical systems adaptable for a food eco-industrial park here. The brownfields survey, the energy inventory and the wet waste composting plans may all help determine a location for such an initiative.

16. The City should undertake an urban agriculture land-use review and assessment to see if there are areas that could produce food in the future and need to be part of future agricultural land-use designations. At least one area should be selected as a pilot project for an urban Community Shared Agriculture farm.

17. The City should implement its official action plan to expand community gardening and refine and integrate it into this strategy by consider sites where larger allotment plots of .25 and .5 hectares might be located. A pilot program of leasing allotment plots of this size should occur in at least 2 different wards.

18. The City should undertake a survey assessment of brownfield sites where urban agriculture might be practiced in the short or long terms. This survey should includes agricultural, horticultural and composting practices that can remediate brownfield soils, but also those local food production processes (aquaculture, hydroponics, areoponics) that do not depend on soil for their success. Current advances in phytoremediation, may create new effective strategies for clean up within the cities unused land space, and this should be investigated.

19. The City of Toronto should commit to full recovery of urban food and wet wastes. Toronto should completely capture its food wet waste stream. We should have a principle of no net loss of urban nutrient resources. These should be transformed into useful production as compost and other products to supply urban horticultural and agricultural production. This effort should be planned to be co-ordinated with the urban agricultural strategy. We support the federal 1999 organic agriculture standards. These regulations will not yet permit municipal bio-solids to be applied on organic farms. We take this as an indicator that municipal bio-solids are not yet of sufficient environmental quality to be used in sustainable food production.

20. As part of its Integrated Resource Management planning, and to support urban agricultural development, the City should establish a natural cycling process called a "Virtuous Cycle" outlined in Appendix 2.

21. The City of Toronto should negotiate directly with the federal government to be credited for reducing its climate change gas emissions under the Kyoto agreement through its urban agriculture strategy and practice. This negotiating should begin immediately and should also be integrated into the federal Department of Agriculture's comments and consideration of the Global Urban Agriculture Strategy currently under development by the World Food and Agriculture Organization, the UN agency based in Rome.

22. The City of Toronto should establish a Toronto Urban Agriculture Commission that would undertake agro-ecosystem planning and specialized food marketing. The Commission should include farmers, ranchers and other food producers in the City. In addition, citizen, business, cooperative, consumer, municipal, community, environmental groups should be represented on the Agricultural Commission. The Commission should have a budget for a staff complement and a capital pool.

23. The Toronto Urban Agriculture Commission should develop a strategy for urban agricultural extension, contracting with various levels of government, agencies, farmers, experts and academic institutions for this service to urban farmers.

Executive Summary

This document was generated in response to a request by the Environmental Task Force (ETF), to include food as a key sector of environmental action in the city. The report looks at urban agriculture as a cutting edge issue requiring policy development in the new millenium. We have submitted the recommendations to the Environmental Plan and will to the Official Plan also.

At the heart of Feeding the City from the Back 40 are 23 recommendations that promote the implementation of a commercial food production plan for the City of Toronto. This begins with an underlying policy and strategic framework that supports agricultural land preservation within the city boundaries. We are calling for the retention of all land zoned agricultural and the addition of new food producing lands and areas. We know this is controversial, but the context is having future foodlands for food security. Ontario farmland, the best in the Canada with the best growing season, is rapidly being paved over or fragmented beyond use (we are on course to lose 40% of Greater Toronto Area farmland, in the period 1976-2026). By supporting urban food production through recognized land use designations, we are protecting the only farmland that we as a municipality are able to.

If we combine this policy with appropriate economic and environmental reinvestment policies, urban agriculture can be a viable option for sustainability in Toronto. We also call for pilot projects based on examples that have succeeded in diverse areas around the world. In return for innovative proposals, the City could offer increased structural support to urban farms and greenhouses. On a larger scale, we note that industrial ecology systems and businesses such as Village Farms in Buffalo are high-tech food factories that sell fish into the Toronto market and vegetables to western New York. Other ideas include implementing a wet waste food composting program, as part of a resource recovery "Virtuous Cycle", and using brownfield remediation as a strategy for recovering unused land. The development of these innovative programs could create community economic development benefits, such as youth employment and job experience.

1.0 Introduction

By 2025, two thirds of humanity will live in cities. Many experts question where the food will come from to feed some five billion urban people. The answer may well be that it will come from cities themselves. Food growing in cities, although historically common, has recently been called urban agriculture (UA). One definition of which is of "an industry that produces, processes, and markets food and fuel within a town, city or metropolis on land and water dispersed throughout the urban and peri-urban area[1].

Urban agriculture as a system is concerned with urban culture, natural resource use, land-use planning, food production and security, education and leisure, social relationships and income generation. Urban Agriculture might be thought of as a continuum from backyard gardens to community gardens to commercial production at small, medium and large scales.

Compiled together, household scale production makes quite an impact. Researcher Ken Dahlberg finds that backyard harvest in the USA is $17 billion or the equivalent of the massive corn crop produced in that agricultural super power[2]! The difference between urban agriculture and community and backyard gardening is the amount and value of what is produced is larger in urban agriculture. In this report we are focussing on commercial scale urban agriculture because of the environmental and economic strategic role that the development of a local food production sector can play.

1.1 Global Context

With the exception of 70 hectares of farms in the City of Burnaby, BC, producing a total of 10% of all vegetables in the Fraser Valley[3], little food production is generated in Canadian cities. In other parts of the world, however, cities are major producing areas. Modern cities such as Singapore, Shanghai and Tokyo have already taken steps to secure a significant portion of their food supply from urban farming. China has had a tradition of urban farming for many centuries and in 1960 its government laid down a specific strategy for urban self-reliance in food. Indonesia's small island of Java feeds a hundred million people largely with locally grown food [4].

Many densely populated cities of the developing world provide up to 30% of their food requirements

from within city boundaries. Even in the USA, the 1990 Census determined that 40 percent of the dollar value of U.S. agricultural production is produced in metropolitan areas (up from 30 percent in 1980) [5]. Please refer to Appendix 3, Global Food Trends and Appendix 4 Emergency Measures Planning for a discussion on how these cities are providing a practical buffer to the food shocks of the global food system.

1.2 Benefits of Urban Agriculture

Cities considering the strategic possibilities of local food production are looking for systems synergies, efficiencies and cost-savings. The potential benefits of urban agriculture can be broadly classified into several inter-linked categories: environmental, social and economic benefits. All of these benefits must be considered in benefit-cost analysis. Because the field of accounting for environmental and social well being is under construction we are asking you to refer to Appendix 1: Full Cost Accounting; Environmental Benefit-Cost Analysis, for further discussion of this key issue.

1.3 Environmental Context

At present, most cities are highly unsustainable. Although they only cover 2% of the earth's surface, cities consume 75% of its resources. The social, environmental and economic impact of a city, country or even an individual upon world resources has been described as its "footprint". For example the City of London in the UK has total footprint that extends to about 125 times its surface area of 159,000 hectares, to nearly 20 million hectares. Home to only 12% of Britain's population, London nevertheless requires the equivalent of the entire productive land area of Britain to sustain itself. Urban agriculture, however, has a conservation function that can reduce a city's ecological footprint.

- Energy and climate change gas emissions savings through shortening the distance between the points of production and consumption and by reducing savings in storage and transport.
- Improving the local micro-climate.
- Balancing the CO2 deficit by farming in organic soils, which act as carbon sinks.
- Increasing environmental biodiversity.
- Using urban wastes (solid organic waste and wastewater) as a productive resource (i.e. compost, biogas production).

1.4 Social Context

On the social side, UA can mean provision of employment, the opportunity for integration of diverse systems, support for cultural diversity of the community, and often the provision of a greenspace with scenic, lifestyle and recreational value. USA researchers note

" A new trend is for urban-based non-profit organizations (and some private ventures) to use city sites

to grow food and other products, such as fish, for local market sale. These projects take different forms, and are initiated by non-profits with various community agendas. Typically, start-up funding is pieced together from an assortment of grants, and volunteer labor and other forms of pro bono support often accompany the actual work. A handful of small government programs (such as the Community Food Projects program of the U.S. Department of Agriculture, and the multi-agency Urban Resources Partnership model operating in various cities) support urban agriculture, but are spread across different levels and different agencies, reflecting the multiple social benefits of urban agriculture. These benefits include improving the appearance of blighted neighborhoods, small-scale local organizing around city farming, providing some income for the older and younger segments of the inner-city population, developing business skills and entrepreneurship within the community, and improving access to fresh, nutritious food[6]."

1.5 Economic Context

Economic multipliers are lower in import-export food economies relative to those where the full food system cycle is optimized. Studies of regions where more local and sustainable food economies are being re-established reveal that a greater percentage of the value of production remains in the community, and greater long-term financial benefits might result from more local and sustainable systems, particularly as production methods improve[7]. A study of 4 communities in the Midwest USA found the communities with more sustainable agriculture practitioners had a greater capacity to mobilize community resources for local development, including more active participation in local government, the creation of new community economic development structures and additional new businesses[8].

1.6 The Canadian Food System

Canada, of course, has a highly productive agriculture sector. It's productivity, however, masks a number of significant problems:

- Canada's agriculture sector takes little responsibility for ensuring the adequate nourishment of the population. In urban areas, where poverty tends to concentrate, this disconnect between the food and health systems becomes apparent.

- The Canadian food system is highly energy inefficient and is a major contributor to greenhouse gas accumulation and climate change[9]. In Toronto between 50-60% of all produce consumed is imported, mostly from Florida, California and Mexico[10].

- Ontario had annual food flow deficit in fruits and vegetables of $2 billion in 1992, and this has risen to $3 billion in 1998; 50% of this food could be grown here if storage issues were resolved. In addition, Ontario's food production employment continues to decline.

All Canadian farmers confront many hurdles to success beginning with the artificially low prices of food products because of the cheap food policies pursued by government in many Western countries to

benefit the urban consumer through such mechanisms as subsidies and deficiency payments[11]. The structure of the dominant food system in Canada, the most oligopolized food system of any country in the western world, is that a small number of powerful players control many sectors of the food economy[12]. The situation has been referred to as "the Agro-Industrial Complex"[13]. For further discussion of this topic please refer to TFPC paper # 4, Setting a New Direction: Changing the Agricultural Policy Making Process.

Urban farmers face all these structural and business challenges and in addition, extremely high land costs. They have more access to labour than many farmers do, but these workers might not be skilled and experienced agricultural labour. They often have good access to irrigation water, however the price may not be low. For further discussion of the issues facing small scale niche producers and processors please refer to TFPC paper # 5, Stories of Micro Food Enterprises and Implications for Economic Development.

2.0 Case Studies of Successful Food Producing Cities

What have other cities done to respond to the food security challenges that may lie ahead and reap some to the benefits of urban agriculture? Below is a snapshot of the dynamic ways in which cities in different regions of the world, faced with very different circumstances, have addressed the issue.

2.1 Buffalo, New York USA[14]

One might not expect to see an eighteen-acre greenhouse in downtown Buffalo, New York, where the **Village Farms, Inc.,** greenhouse is using a combination of hydroponic growing and aquaculture to produce fish and vegetables. The main crops are tomatoes and red peppers. The greenhouse operation has created one hundred full time jobs and thirty-five part time jobs. Former welfare recipients who live in downtown Buffalo have filled many of the jobs.

The capital cost for the Village Farms development was $US 15 million. A Toronto firm arranged the venture capital. The complex is on a brown field site of the former Republic Steel Company. The City of Buffalo wanted this development and negotiated a five-year lease to purchase with the land valued at $11,000 US per acre. The City paid $860,000 US for soil remediation, and also agreed to tax concessions. Village Farms does not pay for the thermal energy they receive from a nearby cogeneration plant and they enjoy a discounted price for electricity. The combination of hydroponic and aquaculture technologies is synergistic ? the thermal mass of the water used in aquaculture provides cooling in the summer, and heating humidity in the winter. The fish are mainly sold in Toronto.

2.2 Singapore[15]

The super-modern island republic of Singapore is entirely self-reliant in meat production, consuming some 140 pounds per person per year. The city is 25% self-sufficient in vegetables, producing on 7,000 ha. The Singapore Primary Production Department of the Ministry of Agriculture licences 10,000

horticultural and mari-culture farmers. There are many other part-time producers. Organic wastes feed both sea and land farms.

2.3 Sydney, Australia[16]

The New South Wales Ministry of Agriculture recently released the "Sustainable Agriculture in the Sydney Region Strategic Plan" stating that economic returns from highly productive lands benefit local, state and national economies. The annual farm gate value of regional agricultural production is at least $A1 billion, with flow-on effects to the economy of $A2 billion to $A3 billion. In addition, regional agriculture produces a reliable supply and availability of fresh produce to the residents of the Sydney region. For example, 85% of mushrooms, 70% of tomatoes and 95% of spring onions produced in NSW are grown in the Sydney region. It is hoped that this plan engenders inter-sectorial co-operation and co-ordination with 'whole of government' (Ministries of Health, Agriculture, Regional Development, Transport and Tourism, Education, Environment Protection, Land and Water Conservation).

2.4 Shanghai, China[17]

Since the 1950's, the Shanghai municipal government has planned and managed food production in the municipal region to effectively satisfy the food demands of a population that now exceeds 14 million people. The governments objectives have been to create local food self-reliance within the urban region and to reduce transportation, storage and fuel consumption. The urban region is divided according to the type of production for which it is most suited - farming, forestry, fisheries or animal husbandry. An integrated urban food policy and a technology research, assistance and extension programme are geared to local needs.

The city supervises the collection and usage (for farming) of solid and liquid waste, including night soil. Until recently, the system supplied all of Shanghai's fresh vegetable demand. It also supplies a significant percentage of the grain, pork, poultry, fish and other food demands. However, loss of land combined with booming populations have gradually led Shanghai and other Chinese cities away from self-sufficiency, with an increasing reliance on imported agricultural products.

2.5 Berlin, Germany[18]

In 1990, community gardens accounted for about seven percent of the total area in West Berlin (about 3,500 community gardens on about 150 hectares). Community gardens are located on private lands, public institutions, churches, and large companies. In 1996, about 78,000 Berlin. Allotment gardeners belonged to the state-wide allotment holders union. This represents one allotment garden for every 45 inhabitants in the city of 3.5 million[19].

2.6 Havana, Cuba[20].

Following the collapse of the Soviet Bloc, Cuba embarked upon a massive redesign of the food and

agricultural systems to reduce dependence on imported agricultural inputs and food. As part of this the City of Havana has implemented a comprehensive urban food production plan. Forty-two percent of the land area of this city of 2.2 million is now devoted to food production. The city has approximately 900 gardening groups with about 17,000 members, all involved in growing for their home needs and selling surplus to neighbours and through garden vegetable stands.

In addition, there are 450 larger commercial production units employing 10-12 people each. This city also contains 83 sapling nurseries for distribution of 18 million trees by 2002, the majority of them fruit trees. There is also significant egg, chicken and rabbit production within the city, and small areas of rice production. A team of 70 agricultural extension agents provides support to the growers. This is the most extensive use of urban agriculture in the Americas.

3. 0 Urban Agriculture Profile of Existing Food Production in Toronto

3.1 Number of Farms

It is difficult to build an accurate agricultural profile of the City of Toronto, partly because of administrative changes affecting the statistical reporting protocol of various agencies. For example, under the Statistics Canada Census of Agriculture, the City's agricultural information is now lumped in with Vaughn and York Region and it is difficult to separate out information. None-the-less we have estimates.

- According to 1996 Statistics Canada Census of Agriculture the total number of farms in Toronto went up from roughly from 25 to 42 between 1991 and 1996.
- 14 farms have been assessed through the City's Department of Finance on the property tax rolls.
- The 1996 Metro Toronto Employment Database found that the City of Toronto had 21 Farms and 6 food production businesses (with a total of 93 jobs).

3.2 Farm Area

Estimates from Statistics Canada Census of Agriculture 1991 indicates that there were approximately 718 hectares of land in farms in the City. Of that 718 ha. 526 ha of land were in crops, (over 70%) while the rest was used for pasture, grazing, or other farm requirements.

3.3 Farm size

There is a diverse spread of farm sizes in the City. They start at less than 2 ha. And the majority were smaller than 51 hectares. Only a handful of farms were larger than51 hectares.

3.4 Farm Ownership

Farmers themselves owned only 158 hectares. Approx. 559 ha. was rented or leased. Of this, some 335 ha. was leased from different governments.

3.5 Farm Type

Most Toronto farms describe themselves as "Miscellaneous specialty agriculture" and "small grains ", as well as cattle, fruits, vegetables, poultry and livestock combinations farms.

3.6 Crop Variety

- Estimates are that the most common varieties of grain crops was corn on some 170 ha. in 1991. Farms also reported growing (in descending amounts) tame hay, wheat, oats, alfalfa, and flaxseed.
- Soybean production took up 180 ha and dry beans were also recorded.
- Fruit crops included apple trees, berries, grapes, pear, plum, prune and apricot production
- The most common vegetable crops were; sweet corn, tomatoes, cucumbers, gherkins, green peas, green or wax beans, cabbage, peppers, squash, zucchini and pumpkins. Other crops that reported with less frequency include; cauliflower, broccoli, Brussels sprouts, carrots, beets, radishes, dry onions, green onions, shallots, celery, and lettuce.

3.7 Nursery, Floriculture and greenhouse production

In addition to field agriculture, out of the 25 reported farms in 1991, 6 farms reported greenhouse flower activity, and 2 reported use of vegetable transplants. There were approx. 7,700 sq. metres of total greenhouse area.

3.8 Livestock

Estimates from 1991 indicate limited livestock production on less than 10 farms. In descending order according to farms producing livestock, animal production included; cattle, chickens, chicken eggs, horses, goats, sheep, pigs, other poultry, rabbits and bees[21].

3.9 Farm Expenses

In 1991, estimates for total farm machinery and equipment capital costs utilized in Toronto approached $1.3 million dollars. Total farm capital equipment costs ranged from under $50,000 to over $1.5 million dollars. 15 of the 25 farms surveyed fell into the range between $200,000 and $1 million dollars of capital expenses. Other operating costs for farms located with the city boundaries (including wages, rent/leasing, and utilities) approximated $1.5 million dollars. Total rent and/or leasing expenses for all farms were estimated at over $200,000 in 1991. As of 1997, the total expenses for tax purposes for agriculture in the city rose to almost $8 million dollars (with a marginal error of approximately $1.5 million dollars) (Alain Bertrand).

3.10 Current Value Assessment

It is difficult to get tax assessment information for agriculturally zoned land in the City of Toronto.

However in the former municipality of Scarborough, which has the most agricultural land in the city, has an assessed value of $11 million for land in this category.

3.12 Farm Income

The majority of farm in Toronto had gross farm receipts of $2,500 dollars or more, with a wide spread of farms reporting between $10,000 and $250,000 gross farm receipts. Research aided through the Agricultural Taxation Division at Statistics Canada approximates total operating revenue of gross farm receipts in Toronto was valued at over $6 million dollars in 1997 (with a marginal error of $1 million dollars).

3.14 Farm inputs and practices

In terms of farming practice, conventional tillage was the dominant response of the sample, while only 1 farm reported no tillage practices

3.15 Other

The city also hosts factory based food production facilities. One innovative company, Annex Organics, raises sprouts inside a warehouse and has a rooftop greenhouse ant the only certified organic crop farm in the city on an experimental 1,000 square foot roof garden in downtown Toronto growing specialty crops. In 1997, using a hybrid hydroponics system, they grew approximately 500 lbs. of saleable tomatoes. These were sold at $2.00 /lb. ($0.75 - $0.50 above the market price of other organic tomatoes), and the business grossed about $1.00 /square foot. There are four other sprouting and specialty operations in Toronto.

4.0 Agricultural Land Zoning Designation in Toronto

The former municipalities of North York, Scarborough and Etobicoke all have existing agricultural land zoning designations. The former central city has zoning permitting market gardens.

- North York's agricultural zoning permits uses of agricultural lands including field and berry tree crops, nurseries, orchards, apiaries and mushroom farms under its G and RR zoning designations. In North York, agricultural zoning is identified either as Rural Residential (RR) or Greenbelt Residential (G). As of February 1999, RR sites are located along the northern boundaries (i.e. Finch and Steeles Avenues), in relatively small areas. Greenbelt zoning is substantially larger, and runs along riverine systems.

- The former municipalities Scarborough has the most agricultural land preserved with a majority of this located in the Upper Rouge Region. A Minister's Agricultural Order is the over-riding zoning for the Rouge. This zoning allows agricultural uses in land, buildings and structures and mentions as examples, field crops, orchards, and livestock. Scarborough zoning also identifies areas of permitted agricultural use with an Agricultural Holding by-law. The Upper Rouge area designation as a Minister's Agricultural Order has emphasized the preservation and protection of farming for cultural

and heritage value over production agriculture.

- Agricultural areas designated in Etobicoke are classified as A.8, A4, and A.2, referring to the actual acreage of the respective plots; i.e. A4 is at least four acres. There are several sites zoned agricultural located South of Steeles Avenue, between Islington Avenue, and the West Side of Hwy 27.

4.1 Land Use in Agriculturally Zoned Areas

Even if the land is zoned for agriculture, it is not always used for food production. Several sites in Etobicoke, which are zoned for food production, are not being used in this capacity. Existing functions include a cemetery, a hospital and open space areas. School sites in North York and Scarborough are on agricultural zoning sites.

In North York, while agriculture is permitted in several zoning designations, many areas are heavily wooded park areas. Scarborough allows some agricultural designation in the Tapscott Employment area (South of Steeles Avenue, between Bellamy and Markham Roads) and a parcel of land on the northwest corner of Neilson Road and McClevin. Agricultural designations here are considered by some for land holding only, not intended for actual usage. This same situation held in lands south of the 401 and almost all of these lands have recently been re-zoned and built upon commercially.

4.2 Agricultural Land Use Status

RR and G designation in North York are mirrored in the history of agricultural land use status. In addition to the RR assignment, a secondary specification exists (i.e. R2 – residential density 2, or R4 – residential density 4), and has been in effect for at least 10 or 11 years. This indicates that a RR designation may be regarded as something of a transitory state, given the existence of these additional classifications. Over the past 10 years of the RR distinction, two sites have been rezoned into greenbelt residential, housing, and open space areas

Although there has been little development in Scarborough's Upper Rouge area, a significant transition is a zoning change from the 1986 designation of Open Space, to today, where it is currently under Minister's Agricultural Order.

4.3 Food Producing Lands not Zoned Agricultural

There does not appear to be a lot of land in this category, however the informal gardens under power lines that are not in community gardens should be assessed for their production levels. We are presently unaware of extensive lands that need to be re-zoned for agriculture although there are some producing

farms in Etobicoke that are in uncertain designations.

5.0 A City of Toronto Urban Agriculture Development Strategy:

We propose an urban food production strategy for the City of Toronto. Key to this is having a combination of suitable land available in the city for production. For Toronto's long-term food security we propose the redevelopment of Toronto's urban food production, processing and distribution systems. The only academically significant study we know of has attempted to quantify the potential for Canadian cities to produce food is Van Bers[22], who estimated that cities could produce, using organic growing techniques, 20% of their fruit and vegetable requirements from within their boundaries. Based on this Canadian estimate, we propose that Toronto could be supplying 25% of its vegetable production from within its borders by the year 2025. Think of **25% by 2025!**

Recommendation

1. The City of Toronto should formally adopt an Urban Agriculture Development Strategy based on this report and refinements made to it by the Environmental Task Force.

2. The City should implement full cost accounting for all urban development activities. As part of this accounting regime, all of the following recommendations need to go through an environmental cost-benefit analysis (ECBA) before they are implemented as official City policy. This will mean the identification and quantification of the economic, ecological and social effects/impacts of urban agriculture. A study of these effects would also be part of an environmental impact assessment study (EIAS). An EIAS can be thought of as the first phase of ECBA.

Strategy 1: Retain Land in the City Zoned Agricultural

At the centre of any urban food production strategy is having a combination of suitable land available in the city for production. The new city of Toronto has land zoned for agriculture within its new boundaries this should be preserved. There are also other sites where food production is going on, but where other zoning designations are in place. The City should assess this land to decide if it should be zoned for agriculture. Consider the land preservation efforts of Seattle, which is not untypical. Portland Oregon also has vigorous efforts in this arena:

Greater Seattle

In Seattle, agricultural land preservation efforts are over 20 years old. In 1985 a comprehensive plan identified agricultural production districts in King County. A $50 million bond was used to buy development rights to 12,800 acres, about one-third of the eligible acreage. This has resulted in job retention and environmental services [23]. The farms preserved are smaller than average and this means it is a challenge to keep them productive and protected. The county has decided it must help the farmers and thus King County is spending $400,000 on an agriculture-extension and marketing campaign asking

restaurants and grocery stores to identify locally grown produce as “Puget Sound Fresh”. It has appointed a County extension agent as "farmbudsman", to help new farmers and existing farmers get to the market. This has helped farming make a comeback in the Puget Sound area. While large, single-product farm operations are disappearing; speciality farms are thriving, often on 10 or fewer acres. Catering to the region's tastes, growers are producing an astonishing variety of products, often organically.

Recommendations

3. The City of Toronto should have an explicit agricultural land preservation policy. The City should investigate legislative mechanisms to help preserve urban agro-ecosystems. This investigation should consider an array of land conservation techniques including: agreements, leases, purchase-saleback, creative development, purchase of land and development rights, conservation real estate, land designation or dedication, community and conservation land trusts (private and public), purchase of conservation easements on title, and accepting donations for tax credit as per the Ontario Heritage Foundation.

4. Consistent with the New Official Plan, food production should be a recognized land use as part of economic and environmental reinvestment objectives. This should serve the function of keeping the present agricultural land-use designations of all the land so designated agricultural in the present Official Plans of the former municipalities.

5. Measures should be taken to ensure that Toronto retains zoning designations that permit food production. The City of Toronto should retain an agricultural land zoning designation in the Official Plan. This designation should include as allowed agricultural uses of lands: field, berry, vine and tree crops; nurseries; orchards; apiaries; grazing of livestock, greenhouses and mushroom farms, in addition to the use of land, buildings or structures for agriculture.

6. Land that has been in food production for the past 5 years and does not have agriculture, as a permitted zoning use should be re-designated agricultural to ensure food production is a permitted use.

Strategy 2: Create a City Program to Encourage Urban Agriculture

Once lands have been protected for, cities often have a role to play in promoting and facilitating urban food production, processing, and distribution and searching for environmental and social benefits that with local economic development partnerships engender. Consider the examples of:

San Francisco, USA

More than $2 million in commercial crops were harvested in San Francisco in 1998. This represents: wheat grass farmed in the Mission District, orchids on a Bay-view hillside, designer lettuce in an

industrial park and honey harvested in practically every neighborhood[24]. San Francisco's farmland is often run or sponsored by two major non-governmental agencies, the Garden Project and the San Francisco League of Urban Gardeners, that have strong financial, political and personal links to City Hall. The citizens of San Francisco have passed bond measures on the local ballot backing the work of these groups. SLUG works with community gardens and youth farms. The Garden Project employs recently released inmates from the County Jail to work its half-acre market garden. Veggies from the Garden Project also end up at the Ferry Plaza Farmers Market and at exclusive restaurants such as Chez Panisse.

Trenton, USA

In the capital of New Jersey, Isles, Inc., a community based non-profit organisation with City backing in is developing a 5-acre community farm on a community college site on the outskirts of Trenton where residents of inner city neighbourhoods are the farmers. By using federal and state employment training funds the farm hopes to increase the supply of affordable, nutritious food to low income households while creating spin-off economic development opportunities.

Recommendation

7. The City should help create 10 urban food production pilot projects within 3 years. This would involve:
a. Carrying out an inventory of potential public or private sector sites;
b. Negotiating with public and private sector owners to arrange beneficial lease arrangements and provision of hard services, such as access to water and energy;
c. Establishing an RFP process to attract entrepreneurs to produce food on the sites. In exchange for assistance with leases, the successful bidders would agree to produce food following organic or bio-intensive (Integrated Pest Management) practices, would fertilize their land with organic materials from within the City, and would sell their products within the City's boundaries.

Strategy 3: Create a program to encourage rooftop gardening

Rooftops are under-utilised areas that function like urban deserts. If greened, however, they can give significant environmental benefits[25] and create growing space for food and horticultural recreation. Many European municipalities, particularly mid to large-size cities have incorporated roof and vertical greening into their bylaws and planning regulations. As a result of government policy and program support, a new green roof industry has been created. In Germany, by 1989, 1 million square meters of roofs were 'greened'. By 1996, this number had ballooned to 10 million square meters[26]. In Germany, France, Austria, Norway, Switzerland and other European states, green roofs have become a commonly accepted feature.

Green roofs can produce a variety of fruits, grains, and vegetables (either in containers, or as field crops). By placing a portion of the roof under glass (with greenhouses or coldframes), food production

can also extend into the winter season and could be combined with water collection, treatment, or filtering systems for the building.

Recommendations

8. The City should develop an action plan to implement a minimum of 10 food producing rooftop gardens on their public properties within the next three years. In the 10 pilot project sites, at least two should have with greenhouses or season extension technology. One other should include a significant rooftop composting system.

9. As part of its overall rooftop greening strategy, the City should develop an incentive program for food production on rooftops. Special funds should be made available to building owners willing to retrofit their rooftops for commercial scale food production.

Strategy 4: Incentives for Commercial Greenhouses in the City

Some cities have realized the potential for assisting the development of private or private/public commercial greenhouse operations in different scales and dimensions. Consider:

Large Scale extensive commercial greenhouse operations.

There are several examples of this scale of enterprise. Hartford Farms, a 13,000 square foot greenhouse has been growing hydroponic lettuce in Connecticut since 1983. Hartford Farms was originally a community economic development partnership, and was spun-off and privatised in 1989. Gooseberry Farms, a 70,000 square foot greenhouse has done likewise in Westport, Massachusetts since 1987.

The scale of the Village Farms aquaculture\vegetable project in Buffalo, mentioned in the first section, is larger than these and we understand that their corporate parent of is trying to interest City of Chicago Economic Development officials in a 40-acre greenhouse aquaculture complex proposal in Pullman, IL. This is a complex twice the size of the Buffalo project.

Small–scale intensive commercial greenhouse operations

Advanced Greenhouse Systems (AGS) is a Toronto-based firm, and should have its first operating greenhouse in Toronto this year. They have claimed to have combined four innovative greenhouse technologies to dramatically increase yields and improve produce quality. AGS? greenhouse technology can be used with various growing medium, including, aeroponics, hydroponics, growing in pots, growing in soil, sub-irrigation, etc. The ideal system is a combination of hydroponics and aeroponics because these systems provide the greatest degree of control over growing conditions. A wide diversity of crops can be grown using the system,

An advantage of AGS for urban agriculture is the relatively small size of the operation ? one to two acres is said to produce the same amount of food as a twenty-acre conventional hydroponic greenhouse. AGS has a solar greenhouse design that could benefit from the thermal and electrical energy produced by a cogeneration plant. AGS offers significant environmental advantages by using excess CO_2 as a plant growth accelerator.

Small- scale extensive Commercial greenhouse operations

There are several urban greenhouses of this size in the USA including in the Bronx. There is, however a developing category of lightning quick "guerrilla greenhouses" that are able to set-up and move crops and equipment quickly and grow without soil on vacant industrial land. One example is Greensgrow Farm, a ¾ acre outdoor farm growing speciality hydroponic lettuce, tomatoes, herbs and flowers in Philadelphia. It is at present a two-person operation located on an EPA clean up site that used to be a galvanised steel plant[27].

Public-Social Partnership in Urban Greenhouses.

- Farm City Link in Milwaukee is giving year round organic horticulture instruction to over 200 young people from central city organisations. They sell at the River West Organic Farmer's Market. They are growing vegetables and flowers in greenhouses, city gardens and nearby farmland. There is also processing of food as a value-added component to extend the programs effectiveness.

- The Chicago Coalition for the Homeless operates 4 solar heated greenhouses where clients grow vegetables organically year round. Some of the produce is sold in stalls on the city's Navy Pier, a festival and market place venue.

- The City of New Britain Connecticut together and a Community Based Development Organization are in the process of rehabilitating 40,000 sq. ft of greenhouse, 10,000 sq. ft of retail space and 5.5 acres of land into an organic farm. The Farm will be owned and operated by the neighborhood that it is in one of the poorest and densest in the city[28]. It will also have four satellite sites located throughout the city again in depressed neighborhoods.

The Toronto Food Policy Council has requested, through the Environmental Task Force, that a report be prepared by Toronto Works on the feasibility of using excess energy generated from burning methane at the Beare Rd and Keele Valley landfill sites for electricity. This energy would be used to heat food producing greenhouse or aquaculture operations that would be run by non-profit or for profit operators under an agreement with the City. We believe that the energy from other processes such as the Dufferin Transfer Station and the Toronto Hydro \ Boralex cogeneration project could potentially be used for food production.

Recommendations:

10. In collaboration with energy companies and other partners the City's Energy Efficiency Office should prepare an inventory of potential greenhouse use of excess heat from all landfill gas recovery and energy co-generation projects.

11. The City should enter into at least three time-limited pilot partnership agreements with small greenhouse growers. One should be a millennial greenhouse resource efficient experimental design. Another should be a public social enterprise, and a third should be a small-scale commercial extensive operation. The results of these should be assessed in three years before another stage of the overall strategy is undertaken.

Strategy 5: Link Urban Farmers with Commercial and Community Markets in the City

Many cities now facilitate connections between urban farmers and urban community and commercial markets. For example,

- An alliance of 5 organizations have formed a project called *City Farms* project which aims to improve the availability of fresh food in New York City low-income neighbourhoods by expanding the capacity of urban growers to produce healthful, nutritious food and distribute it through established food sites. The City Farms projects is promoting community-based entrepreneurship and economic opportunity through food production, processing and marketing, and building more public support for preserving open space for food production. They grow on more than five sites in NYC, and partner with everything from food banks to commercial caterers to distribute the harvest.

- The Tahoma Food System in Tacoma, Washington links community gardens and a 10-acre urban farm to Community Shared Agriculture (CSA) marketing mechanism.

- Started in 1991, The Boston Food Project is recognized locally and nationally for its success in bringing together teens from the city and the suburbs to grow and distribute 60,000 pounds of produce each year. The youth run two farmers markets and serve their produce at shelters and soup kitchens throughout Boston.

Recommendations:

12. The City should analyze existing food procurement arrangements to identify potential products that could be sourced from an urban food production system. This analysis would require consideration of existing contracts, quality specifications, and the implications of having a more diversified sourcing base.

13. Based on this work, the City should enter into pilot partnership agreements with urban producers to procure their products with certain restrictions. Requests for proposals (RFPs) to entrepreneurs and community agencies to farm would require that food produced be sold/provided with the City boundaries; that farmers must use organic practices; and that food must be labelled as Toronto grown. In exchange, the City will negotiate:

    A. Long-term security at modest lease rates;
    B. City assistance with access to water, energy, other inputs and other business related services.
    C. For producers on non-agricultural lands, incentives for those currently producing food to attain long-term access to the area (buildings or lands).

Strategy 6: Incorporate Food Production into Urban Design

The city has an the opportunity for developing a sustainable urban food production and distribution system, using the new concepts of industrial ecology (or eco-industrial parks) as the center piece of larger food economy clusters development strategy. The city of Toronto could develop a food-processing district with an environmental state of the art modular secondary processing facility. Toronto has some history of food clusters, notably the Stockyards District, South Etobicoke in the general vicinity of the Ontario Food Terminal, and in North York between Weston Road and Dufferin Street. However, none of these districts exhibit the characteristics of a green economy food cluster. In 1993, as part of discussions about the future of the Ontario Stockyards District, the Toronto Food Policy Council outlined the basic framework for an urban food cluster consistent with industrial ecology practice.

The facility is designed to accommodate medium scale processors who share infrastructure, including water treatment and recovery, waste recovery, bulk and returnable packaging, and heating/refrigeration. The facility would buy some of their supply from food producers within the urban boundary, including urban farms and intensive ground-based and rooftop gardens, greenhouses (which could be co-located with the processing facility), and factory sprout and mushroom operations. These processors, and food producers, would sell directly, within the urban boundary, to retailers, restaurants, community food projects, and public institutions (e.g., hospitals, school food programs, day cares, and senior's facilities). Organic waste generated by the facility would be composted or otherwise recovered and used in intensive garden and greenhouse operations. The facility could also potentially take organic waste from other urban sources and ship it to other food producers within the City boundary.

To our knowledge, no existing facility in OECD countries has the integrated food processing dimensions we describe above. However, several are in pre-development stages. For example, The Village Farms project in Buffalo is the breakthrough urban aquaculture production project. It is not exclusively an aquaculture project. It is a precursor of an industrial ecology park. We are aware of two Massachusetts examples, Aquafuture, a 45,000 square foot aquaculture business raising striped bass in Turners Falls,

and, BioShelter, a 40,000 square foot aquaculture facility raising basil and Tilapia in Amherst.

In addition examples of this design thinking, the plans for the Plattsburg Eco-Industrial Park focus on linking the facility with regional agriculture. Agriculture is seen to present several opportunities for targeted eco-industrial development, including: dairy processing; apple processing; small scale farm equipment manufacturing; use of agricultural by-products in secondary manufacturing; alternative uses of agricultural products and technologies; floriculture; and aquaculture.

The Riverside Eco-Park in Burlington, Vermont will comprise 10,000 square feet of business incubator/office space and 50,000 square feet of greenhouse. There are plans for facilities for processing value-added food products, greenhouse space for organic agriculture, 'living machines' for processing organic waste into fertilizer and fish food, and a fish farming facility and incubator space for small business growth. The project will be located in and exchange with Burlington's Intervale Project which has 700 acres of primarily agricultural land with over 130 community garden plots, market gardens, community supported agriculture gardens, a biomass research project and extensive composting activities. For example a local hospital sends its wet waste to the Intervale and buys fruits and vegetables from the same. This is a resource efficient and healthy cycle.

The Village Farms project in Buffalo is the breakthrough urban aquaculture production project. It is not exclusively an aquaculture project. We are aware of two Massachusetts examples, Aquafuture, a 45,000 square foot aquaculture business raising striped bass in Turners Falls, since 1987 and, BioShelter, a 40,000 square foot aquaculture facility raising basil and Tilapia in Amherst, started in 1986, significantly expanded in 1996. In addition Sea Change, a Philadelphia private public partnership, is investigating urban aquaculture.

Recommendations:

14. The City should undertake a survey assessment of brownfield sites where urban agriculture might be practiced in the short or long terms. This survey should includes agricultural, horticultural and composting practices that can remediate brownfield soils, but also those local food production processes (aquaculture, hydroponics, areoponics) that do not depend on soil for their success. Current advances in phytoremediation, may create new effective strategies for clean up within the cities unused land space.

15. The City should commission a feasibility study for the development of a food eco-industrial park, similar in concept to the proposals of the Toronto Food Policy Council and such eco-industrial parks in pre-development stages in Plattsburg, New York and Burlington, Vermont. The example of the Buffalo Village Farms project should be closely assessed for any infrastructure, engineering, horticultural technical systems adaptable for a food eco-industrial park here. The brownfields survey, the energy inventory and the wet waste composting plans may all help determine a location for such an initiative.

Strategy 7: Future Agricultural Production Areas

Urban areas such as Downsview, which is held as a federal government Land Trust, could consider urban food production models as part of their sustainable development plans. Activities there could include aquaculture, Community Shared Agriculture[29] (demonstration - teaching farms, mid-scale quality composting operations, greenhouse development- horticultural production, edible landscaping (substitution of fruit and nut trees for ornamentals), agro-forestry (forestry that supports some food species. The City of Chicago is supporting projects that involve community husbandry of small livestock.

There are also horticultural project that employs at-risk youth, and post-offenders, to train in agricultural skills to produce speciality products. These are marketed to restaurants on partnership basis of supporting the specific horticultural therapy project. These and other creative initiatives are being tried and working in various combinations in the USA. They could be tried here in areas we have yet to consider, at Woodbine Racetrack, or on little used utility lands.

Recommendations

16. The City should undertake an urban agriculture land-use review and assessment to see if there are areas that could produce food in the future and need to be part of future agricultural land-use designations. At least one area should be selected as a pilot project for an urban Community Shared Agriculture farm.

17. The City should implement its official action plan to expand community gardening and refine and integrate it into this strategy by consider sites where larger allotment plots of .25 and .5 hectares might be located. A pilot program of leasing allotment plots of this size should occur in at least 2 different wards.

Strategy 8: Brownfields Remediation and Re-adaptation

As the result of widespread phenomena – suburbanization and de-industrialization recently accelerated with world trade agreements and the shift of global manufacturing, has resulted in emptying industrial areas in Toronto. The same phenomenon, much more extensive, has been seen in many cities of the USA. The term "brownfields" now designates these areas referring to some amount of soil contamination as a result of past industrial practices. The redevelopment potential of brownfields has become evident in recent years, and they are now the targets of attention by the public and private sectors. This has brought a new focus on vacant land in older neighborhoods within the urban core[30].

This new focus has resulted in one major urban agriculture project we have referred to in this report, that of Village Farms in Buffalo. Others are more modest, but could have cumulative effects of cleaning

up some soils or being able to operate in the environment of a brownfield with no ill effect, bringing back production and employment to these areas. This is a trend in the USA where "A handful of small government programs (such as the Community Food Projects program of the U.S. Department of Agriculture, and the multi-agency Urban Resources Partnership model operating in various cities) support urban agriculture[31] ".

Advances in science, such as the research into horticultural phytoremediation (lemon geraniums) of soils at the University of Guelph, along with Solar Aquatics, Living Machine, and Living Wall eco-technologies being pursued by Canadian scientists such as John Todd and Wolfgang Amelung are creating new effective strategies for urban environmental clean up within the cities. These agricultural, horticultural and composting technologies should be investigated and implemented as part of over-all brownfields redevelopment opportunity in the City.

Recommendations

18. The City should undertake a survey assessment of brownfield sites where urban agriculture might be practiced in the short or long terms. This survey should includes agricultural, horticultural and composting practices that can remediate brownfield soils, but also those local food production processes (aquaculture, hydroponics, areoponics) that do not depend on soil for their success. Current advances in phytoremediation, may create new effective strategies for clean up within the cities unused land space, and this should be investigated.

Strategy 9: Food Waste Recovery – Composting

Compost is the power source for urban food production. We can obtain a valuable soil amendment by recycling food waste into a composted nutrient resource. Ontario municipalities have responsibility to plan for sustainable waste management policies. Toronto Works Department numbers indicate that food waste makes up 15.3% of the solid waste stream. Other reports put the figure at 20%. An ecosystems approach to food waste management could contribute to maintaining the ecological integrity and carrying capacity of our region32. The City's wet waste recovery planning should be co-ordinated with it's urban agricultural strategy.

The provincial document, "Diverting Organic Wastes to Agriculture" notes that the compost market for horticultural, greenhouse and landscaping industries is not met by the existing supply.[33]. This infrastructure must be planned for and start has been made. An Ontario composting industry is developing expertise in the area of mid-scale wet-waste resource recovery. The province has conducted 30 experiments at provincial prisons, hospitals and institutional cafeterias. In the ICI sector, restaurants and mass catering food businesses need incentives and an infrastructure to recover food

wastes properly and comprehensively.

According to a 1999 report from the Composting Council of Canada, the City of Toronto will be conducting trials at the Dufferin Transfer Station using an anaerobic digestion process that could turn 100,000 tonnes of mixed wastes into compost and biogas that could be sold as steam or electricity. This should be considered a full-scale project and it is a prototype of industrial ecology. At the same time, the cities of Guelph and Halifax have proven that wet waste source separation by citizens is very possible.

Organically farmed lands need organic inputs. City farmers could use city compost and contribute sustainably to our economy. Some cities are paying farmers for environmental stewardship services[34]. We should consider why they are valuing wet wastes recovery as an environmental service.

Recommendations

19. The City of Toronto should commit to full recovery of urban food and wet wastes. Toronto should completely capture its food wet waste stream. We should have a principle of no net loss of urban nutrient resources. These should be transformed into useful production as compost and other products to supply urban horticultural and agricultural production. This effort should be planned to be co-ordinated with the urban agricultural strategy. We support the federal 1999 organic agriculture standards. These regulations will not yet permit municipal bio-solids to be applied on organic farms. We take this as an indicator that municipal bio-solids are not yet of sufficient environmental quality to be used in sustainable food production.

20. As part of its Integrated Resource Management planning, and to support urban agricultural development, The City should establish a natural cycling process called a " Virtuous Cycle" outlined in Appendix 2.

Strategy 10: Urban Agriculture as a Climate Change Mitigation Strategy

The City of Toronto has again reconfirmed its commitment to reduce carbon dioxide emissions by 20% by 2005. However, the Intergovernmental Panel on Climate Change (IPCC) representing the United Nations, has recommended a 60-90% reduction in CO^2 emissions by 2030 in order to stabilize concentrations of carbon dioxide in the atmosphere.

Policy change in this area is urgent. We note that the City of Toronto Public Health Division has found that " global climate change is expected to increase the number of people who die each year from heat waves in Toronto from 20 in the 1980's to 290 by the year 2020…an even larger number of Toronto residents are expected to contract allergic lung disease, chronic lung disease and heart disease…. increases in death and disease could also result from extreme weather events such as tornadoes and flash floods that are difficult to predict[35]."

In the City of Toronto, climate change mitigation strategies have previously focused on promoting energy efficiency and landfill gas recovery. One potentially innovative area to reduce greenhouse gases lies in the interaction between the food and agriculture system and the transportation sector. When examining the various component parts of the modern food system, a common theme is the consumption of fossil fuels. The North American food system has historically benefited from the massive direct and indirect public subsidies to the fossil fuel industry, which has distorted that actual price we pay for the food supply. The term fossil fuel foods refer to this reality. Please consider:

- The food system uses an estimated 15%- 20% of USA primary energy use [36].

- In Toronto in 1998, approximately 500 million kilograms of food crops were imported from the United States alone[37].

- The average food molecule in North America must travel more than 3000 kilometers in order to reach the table[38].

- The total amount of energy used to transport our fresh produce is 10 times more energy than the calories we actually receive in nutritional benefits[39].

- Research from Britain places the food and agricultural sectors global contribution to greenhouse gas emissions (including transportation) at almost 25% of total emissions.

- Significant amounts of methane and nitrous oxide are emitted from agricultural activities, including excessive emissions from overly stocked animal production units, and high levels of synthetic nitrogen fertilizers promoting the volatility of nitrous oxide.

Once again, the distortions and imbalances of a heavily subsidized food market could be redressed by incorporating environmental, social and economic costs of fossil fuels in the price of energy and transportation. Then local agriculture could compete on something resembling a level playing field. If we could get international credit for reducing the climate change gases associated with trucking food from so far a-field, we could make a positive impact on the revolutionary task ahead requiring us to meet the Kyoto Accords and beyond.

Recommendation

21. The City of Toronto should negotiate directly with the by the federal government to be credited for reducing its climate change gas emissions under the Kyoto agreement through its urban agriculture strategy and practice. This negotiating should begin immediately and should also be integrated into the federal Department of Agriculture's comments and consideration of the Global Urban

Agriculture Strategy currently under development by the World Food and Agriculture Organization, the UN agency based in Rome.

Strategy 11: A City of Toronto Urban Agriculture Commission

We need lands, areas and policies to market a re-designed urban agriculture. These policies could including agricultural land preservation, environmental stewardship operations, assisting new farmers to take over from retiring ones, local labeling, incentives for greenhouse growing, an aquaculture industry and specialty organic niche production. We need to develop partnerships in innovative marketing such as Community-Supported Agriculture (CSA), and direct-from-farm marketing schemes. In addition urban food production areas could become sites for clean and flexible recovery of urban nutrient wastes, such as animal feed, mid-scale composting, larger scale windrow composting, and bio-fuel development.

An Urban Agriculture Commission should be created for policy development in all the areas commented on above. The Commission should have a budget for a staff complement and a capital pool to be used in a variety of programs, beginning with urban agriculture extension.

Recommendations:

22. The City of Toronto should establish a Toronto Urban Agriculture Commission that would undertake agro-ecosystem planning and specialized food marketing. The Commission should include farmers, ranchers and other food producers in the City. In addition, citizen, business, cooperative, consumer, municipal, community, environmental groups should be represented on the Agricultural Commission. The Commission should have a budget for a staff complement and a capital pool.

23. The Toronto Urban Agriculture Commission should develop a strategy for urban agricultural extension, contracting with various levels of government, agencies, farmers, experts and academic institutions for this service to urban farmers.

6.0 Conclusion

We hope the report will result in new partnerships and alliances in our community. We hope these recommendations will stimulate debate on our capacity to feed ourselves well and contribute economic, social and environmental benefits. We believe that if full-cost accounting is applied to these activities, creative local food production can challenge global food system in a sustainable fashion.

APPENDIX 1: Full Cost Accounting:Environmental Benefit-Cost Analysis[40]

The economy is an open sub-system of finite, closed, non-growing ecosystem. The concept of true cost accounting, taking in the environmental and social effects of our actions is not yet an easy equation and cost/benefit economists are now trying to calculate true costs [41]. To evaluate the real benefits of urban agriculture to the city environment, we need to account for the hidden costs of such factors as the transportation of food, food- packaging, use of fossil fuels, the costs of disposing waste and need to redefine economic efficiency to include ecological and social factors[42]. If this is not possible, an attempt to value ecological and social costs and benefits in non-monetary terms should be made. An environmental cost-benefit analysis (ECBA) can be used in an attempt to internalize these ecological and social costs. The ECBA can be divided into two main phases:

a) Identification and quantification of the economic, ecological and social effects/impacts of urban agriculture (compared to other forms of land-use) in physical terms.

b) Distinguish market or non-market effects or immediate or long-term effects. A study of these effects would also be part of an environmental impact assessment study (EIAS). An EIAS can be thought of as the first phase of ECBA.

Effects should be evaluated in money terms as far as possible. Since there are, for example, no markets available for using the environment, other valuation methods are required to value the environmental or ecological costs and benefits of urban agriculture. Some costs and benefits of urban agriculture can be identified:

Benefits of urban agriculture:

- Direct economic benefits: production (agricultural produce, production of compost), both marketed and non-marketed (home-consumption).
- Indirect economic benefits: education, recreation, waste-management (avoided costs of waste disposal), use of under-used resources (rooftops, roadsides, water bodies), economic diversity/stability, changes in economic value of the land, and multiplier effects (business attracted by urban agriculture, such as input services or restaurants)
- Social benefits: food security, improved nutritional status, leisure, community cohesion and well-being (health)
- Ecological benefits: improved hydrology (reduced run-off), air quality, soil quality, improved CO2-balance, biodiversity, and energy-savings through local production

Costs of urban agriculture:

- Direct costs: use of natural resources (land, water; rented or purchased); labour (family, paid or voluntary); capital, raw materials (machinery, tools, fertiliser and pesticides, seeds) and energy (electricity, oil)
- Indirect costs: pollution and waste (impacts on water, soil and air pollution; waste disposal) , negative effects on human health (as a result of pesticide-use or pollution of crops by industry)
- opportunity costs (for example, family labour),
- interest and appreciation/depreciation (increased value of land, decreased value of machinery).

Appendix 2: An Urban Virtuous Cycle:

Environmentally sound food systems are designed as production - consumption - recycle semi-closed loops. Unfortunately, current food systems are not cyclical, but linear and long-distance, with the focus on production and consumption. Consequently, they use vast quantities of synthetic fertilizers (to replace unused organic matter) and non-renewable fuels to move food around. Canadian cities have largely divorced themselves from the food system cycle, focusing on processing and distribution (largely the consumption phase) and ignoring production and organic materials (fertilization) recycling, leaving that largely to rural areas. In Canada, the average food molecule travels at least 2000 km, so these rural production areas are frequently far away. We can adopt a more sustainable development model that mimics the energy pathways and cycles of nature. A virtuous cycle might have some elements of the following:

1. Urban Organic Agriculture as a Carbon sink.

There is mounting evidence that agricultural lands that are farmed organically represent a carbon sink that is very effective in tapping C02, the major climate change causing gas [43]. City Farms can be more effective than city trees in trapping greenhouse gases. In addition to the carbon sink equation, energy use in sustainable agricultural systems may be reduced by up to 60%, depending on the region and production method[44], thereby producing less C02 to begin with.

2. Food Import substitution cuts off Greenhouse Gas

City farms produce food that can displace imported food, thereby cutting down on the massive environmental impact of the food transportation system. If we began to cost account for the climate change impacts of importing so much food from so far, we could compare the ensuing greenhouse gas

emission reduction to our international Kyoto commitments.

3. Stop Methane Gas and Toxic Leachate release

The practice of dumping food wastes into landfills is a major contributor to the release of methane gases, the most potent climate change gas. Food wastes are also a major problem in providing a liquid base for toxic landfill leachate. If we can prevent food waste from going to landfill in the first place, then we limit a lot of methane released to the atmosphere, and save money on toxic leachate prevention and treatment. We could even lengthen the life spans of expensive landfills.

4. Food Waste Composting

The annual cost of soil degradation (erosion) in Ontario associated with food production is over $500 million[45]. Composting can help reduce this cost. Besides avoiding the production of methane gas, we can obtain a valuable soil amendment by recycling food waste into a composted nutrient resource. By composting locally, we can also save money, energy and reduce harmful atmospheric emissions by not transporting food waste too ever more distant locales. Compost is the power source for urban food production

5. Use the Compost Here in the City

Organically farmed lands need organic inputs. Studies consistently show that farmers do at least as well financially, if not better, following the transition to sustainable agriculture[46]. This is primarily due to reduced input costs, and sometimes-premium prices for their products. City farmers could use city compost and contribute sustainable to our economy. Some cities are paying farmers for stewardship services. In Wessex UK [47], and Munich Germany, the city is paying a subsidy for farmers to farm organically to preserve water quality.

6. Food is Health

Consumption of local organic food results in better health of the population[48], which saves billions of tax-funded medical costs. We should use the City agencies and schools as institutional buyers of certified organic City food. ***Return to Step 1.***

Appendix 3: Global Food Supply Trends [49]

As a consequence of urbanization, what were once local, cyclically integrated ecological food production systems have become global horizontally disintegrated throughput systems[50]. Food is vital to survival yet can we continue to assume that we can increase agricultural output in coming decades with

the same facility as in the post-war period[51]? Will it be possible even to maintain production at historic highs in the world's major food producing regions? Consider:

- Global food production seems to be stalling even as demand and prices rise at a rate unprecedented in the post WW-II period. Despite rising demand, per capita grain production has actually been in decline since at least the mid-1980s as has the area of grainland available per capita. 86 million ha. of severely degraded land has been lost.
- Most potentially arable land on Earth is already under cultivation[52]. Global fish catches also seem to have peaked in 1989 at about 100 million tonnes [including by-catch] and have been steady or in decline ever since (this catch level is near the theoretical maximum sustainable yield of present fisheries).
- World population growth. The addition of 90 million people per year suggests a tightening relationship between global supplies and demand for food.
- Evidence that global climate change is underway and studies showing that ozone depletion is affecting the productivity of southern oceans, increase the already considerable uncertainty associated with global food production.
-

APPENDIX 4: Food Emergency Measures Planning

Many possible emergency situations present themselves to urban planners. Even though the global food system is very productive at present there are always emergency situations. Cities are exposed to turbulence in the global food system and physical earth changes. The average North American City only has a three-day food supply [53]. The Ice Storms of 1998 in Montreal should give us pause to review our own food supply lines, which reach across the globe. Urban Agriculture capability should be assessed as a possible Emergency Measure. The food system has also been moving to just-in-time inventory systems, meaning that for many essential foods, only a few days supply exists in the City at any one time. All this leaves cities more vulnerable to food shocks - disruptions of these long supply lines resulting from crop failures, weather-induced transport difficulties, and transport-related strikes.

Emergency planning for urban food production, while often a condition of wartime, has recently been used in former USSR and its dependencies in Eastern Europe and Cuba. In Romania, where nation-wide measures were taken in the seventies to use available urban spaces for agriculture, the share of self-produced food in total food consumption by employee and pensioner families rose from 25% to 37% between 1989 and 1994. In Russia, town dwellers produced 88% of their potatoes, 43% of their meat, 39% of their milk and 28% of their eggs on urban household plots. This important share of production is generated on plots of 0.2 to 0.5 ha, which together constitute only 4% of the total amount of agricultural land in Russia.

ENDNOTES

---

1. Smit, J. et al., Urban Agriculture: Food Jobs and Sustainable Cities, **United Nations Development Program,** New York, 1996.

2. Dahlberg, K., "Foodsheds, Food Systems and Food Security" unpublished paper, **University of Western Michigan**, 1997. The monetary values of household (backyard) urban food gardening are difficult to quantify. In Canada the value per household is about $177, (from Bollman, R., Statistics Canada, 1997). This figure is at the low end of estimates of the monetary harvest of a typical community garden plot, (20' x20') which range from $200-500 per year. If the average community garden has 25 plots, and we take an average value of $250 per plot then an average monetary value is $6,500 per community garden.

3. City of Burnaby, Official Community Plan for Burnaby, Burnaby, B.C., 1987

4. Schurmann, F. "Can Cities Feed Themselves? Worldwide Turn to Urban Gardening Signals Hope" Jinn: An online zine from **Pacific News Service**. 06-03-96

5 Kaufman, J. & Bailkey, M. Research proposal for Urban Agriculture Caucus, Community Food Security Coalition, August 16, 1999.

6 Ibid.

7. Lockeretz, W. 1989. "Comparative local economic benefits of conventional and alternative cropping

systems". American J. Alternative Agriculture 4:75-83.

8. Flora, C.B. 1995. "Social capital and sustainability: agriculture and communities in the Great Plains and Corn Belt". Journal Paper #J-16309, **Iowa Agriculture and Home Economics Experiment Station,** Ames Iowa.

9. Garnett,T. "Growing Food in Cities". **The National Food Alliance and the SAFE Alliance**, UK, 1996.

10. McCarney, M., "Report on the Distribution of Toronto's Fruit & Vegetable Supply", Ryerson Centre For Studies in Food Security, 1998.

11. Bryant, C.R.& Johnston, T.R.R., Agriculture in the City's Countryside, **University of Toronto Press,** Toronto, 1992.

12. Cf. Coffin, H.G. "Concentration in the food system and implications for farmers in PEI, in: Competing in the Marketplace: more than just luck". PEI Dept. of Agriculture. Charlottetown, 1987. Warnock, J., Profit Hungry: The Food Industry in Canada, **New Star Books**, Vancouver , 1978.

13. Warnock, J., ibid; Winson, A. The Intimate Commodity**, Garamond Press**, Guelph, 1992. Canadian government policy has in recent years consistently favoured the largest players in any food systems sector. In farming, it is recently evident in Canadian government support for intensive livestock operations. Quebec and Ontario, for example, have seen an influx of large-scale, intensive hog operations, part of a North American trend. The evidence of environmental and health problems resulting from such operations continues to mount, and the pork market for small and medium sized farmers has collapsed.

14 Christianson, R,. Toronto Hydro\ Boralex Cogeneration Greenhouse Feasibility Study, Rhythm Communications, Toronto, 1999

15. Smit, J et.al, op cit.

16. Mason, D., Sustainable Agriculture in the Sydney Region Strategic Plan, **Ministry of Agriculture New South Wales**, May 1998.

17. Smit, J et.al, op cit.

18. Groening, G. "Politics of Community Gardening in Germany", paper presented at the Conference of The American Community Gardening Association, September 26 - 29, 1996, Montreal, Canada.

19. Ibid.

20. Fuster, E, Chief of Urban Agriculture, Havana. Presentation to the Community Food Security Coalition, Pittsburgh, October 24, 1998.

21 In 1991, Livestock and Poultry holdings within the city of Toronto were estimated at $120,000 dollars by Statistics Canada Census of Agriculture.

22. Van Bers, C. and Robinson, J. "Farming in 2031a scenario of sustainble agriculture in Canada" Journal of Sustainable Agriculture. 4:41-65, 1993

23 Knack, R.E., "Small is Fruitful", Planning magazine, **American Planning Association**, June 1999.

24 (AP) San Francisco, "Urbanites Enjoy Life 'Down on the Farm' ", 1999.

25 Roof gardens reduce rainwater runoff, lower temperatures, displace air conditioning, save energy, lessen glare, cut noise, slow winds, and create habitat for avian wildlife.

26 This tremendous growth was stimulated by state legislation and municipal government grants of 35 - 40 Deutsche Marks per square meter.

27 The system last year consisted of a gourmet lettuce operation selling direct to local restaurants (approx. 125 3#cases per week). They hope to add heirloom tomatoes (bag culture) and culinary herbs

(sand culture) and cut flowers (raised beds/automatic H2o) this year. The hoophouse and plastic season extenders that they use are highly modular and mobile. Greensgrow are looking for ways to extend their season.

28 Ken Malinowski, , Commission on Community and Neighborhood Development City of New Britain, 27 West Main Street New Britain, CT 06051

29 Where customers pay farmers up front for a later crop and agree to share all risks of crop failure with the farmer - there are 500 plus CA farms in North America.

30 Kaufman, J. & Bailkey, M., op. Cit., 1999. The scale of the vacant land issue represents a significant policy problem for urban governments. Chicago and Detroit each have an inventory of 100,000 vacant parcels.

31 Ibid.

32. J.K. Weedon and B. Lovell, "Diverting Organic Wastes to Agriculture" OMAFRA November 27, 1993. Strategy Team for Wet Waste Reduction, "Diverting Wet Wastes from Disposal: Progress and Action", MOEE. Ontario 1993.

33 Areas to be investigated would include waste volume audits, tenders for the appropriate technology systems, labour standards and safety, true-cost accounting analysis, potential markets studies and partnership operating agreements.

34 New Farmer & Grower, Wessex Water to launch organic 'grant scheme', Bristol, UK, Issue 58. Summer, 1998 In Wessex UK, and Munich Germany, cities are paying a subsidy for farmers to farm organically to preserve water quality.

35 Perrotta, K. "Environmental Health Issues in the City of Toronto", Toronto Public Health, Sept. 1999.

36 Pimental, D., et al, "Interdependence of Food and Natural Resources" in Pimental, D., Hall, C. eds. Food and Natural Resources**, Academic Press**, San Diego, 1989 uses a 17% figure for USA primary energy direct use in the food system. Also Whitney, E.S. & Rolfes, S. R. Understanding Nutrition, 6th ed. West Publishing, New York, 1993, pp 651-656. Claims that 20% of USA primary energy goes to agriculture.

37 Bass, Brad. Results from the Environmental and Adaptations Research Group at the University of Toronto, Oct. 1999.

38 US Dept. of Energy. "US Agriculture Potential Vulnerabilities" report prepared by Stanford Research Institute, Menlo Park, CA. 1969.

39 Hendrickson, J. "Energy Use in the US Food System: a Summary of Existing Research and Analysis". Sustainable Farming, Fall 1997.

40. Adapted from Nugent, R.A., "The Significance of Urban Agriculture" Department of Economics, Pacific Lutheran University, Tacoma, WA, 1997

41 The Ontario Round Table on Environment and Economy, „Restructuring for Sustainability", Toronto, 1992.

42 Rees and Wackernagel, "Urban Ecological Footprints: Why Cities Cannot be Sustainable and Why They are a Key to Sustainability", Environmental Impact Assess Review 16:223-248. 1996.

43 Canada's National Action Plan on Climate Change includes measures currently being taken by agricultural producers that either reduce GHG emissions or increase carbon fixation in soils. These measures include use of conservation tillage practices, reductions in summer fallow, increased lands in

forage production and higher crop yields. Current estimates suggest that the sector will be able to reduce Canada's GHG emissions by an estimated 14 million tonnes of carbon dioxide equivalent by the year 2000.

44 Many producers use older, sometimes rare, crop cultivars and animal breeds because they find them more appropriate in their production systems. Diversified crop production systems, windbreaks, and the more diversified landscape associated with sustainable agriculture systems often contribute to improved and varied wildlife habitat.

45Task Force Report on Agriculture and Food of the Ontario Round Table on Environment and Economy 1992. Reports that soil erosion soil degradation and organic matter loss in agricultural soil are a serious concern. It calls for addition of compost to build the living soil resource.

46 Lampkin, N. and Patel, S, eds.The Economics of Organic Farming.**CAB International**, Oxon, UK, 1994.

47 New Farmer& Grower, Issue 58, Summer, 1998, op. Cit.

48 Kirby, A. "Organic food 'proven' healthier" BBC News, 3 January, 2000, London, UK.
49. Rees, W.E., "Why Urban Agriculture?" Paper for the IDRC Development Forum on "Cities Feeding People: A Growth Industry, Vancouver, BC, 20 May 1997.

50. Garnett, T. op. Cit.

51. Rees, W.E., Ecological Footprints and the Imperative of Rural Sustainability, in: Ivonne Audirac (ed). Rural Sustainability in America. New York: **John Wiley and Sons.** 1997

52. Brown, L., State of the World: 1997. **Worldwatch Institute**, Washington. 1997. Gardner, G., Shrinking Field: Cropland Loss in a World of Eight Billion. Worldwatch Paper 131, Washington: Worldwatch Institute. 1996.

53 Carsely, W., Ontario Food Terminal. Personal communication with Tracy Lue, August 1999.