# Potential Impact of Urban Agriculture in Vancouver:

Preliminary Analyses and Discussion Points

This paper was prepared by Mark Bomford, Program Coordinator, Centre for Sustainable Food Systems in the Faculty of Land and Food Systems at UBC. It is a draft document that has been prepared for discussion purposes only. While every effort has been made to ensure that source data and methods are up-to-date and accurate, this document has not been peer reviewed and should not be considered authoritative. It is not intended for general public circulation and does not represent the views of the Faculty of Land and Food Systems.

One objective of preparing this paper was to show the variance between different methodological approaches in quantifying the capacity of Urban Agriculture to feed an urban population. Regardless of the approach used, it is clear that a dense population such as Vancouver requires a substantial area of food producing lands outside its city limits.

## What does Vancouver Eat?

Statistics Canada produces data on “apparent” food consumption on an aggregate level for major metropolitan areas. The actual answer to this question is particularly elusive, however, and impractical to answer precisely. Different methodological approaches to the question of food consumption in a city tend to use aggregate national data. The Ecological Footprint is one such approach that relies upon aggregate data to make its calculations. This approach may lose many of the subtleties of the Vancouver diet and what is required to make Vancouver food secure. Culturally appropriate food for Vancouver, for example, may be significantly different – and with a significantly different ecological impact – than the “average” Canadian diet.

## What is food worth to Vancouverites?

While small-space agriculture can be extremely efficient in terms of per area yield, these high yields are dependent upon relatively high inputs of labour energy ("biological cultural energy inputs") per area. The high labour efficiencies of mechanized agriculture are not available in small, discontiguous, diverse urban plots.

In a modern, post-industrial, urban context, labour is valued very highly, and food is not: The average household expenditure for food in 2004 was $7,812, or a relatively slim 11.2% of the average total Vancouver household expenditures of $69,487 (CANSIM 203-0001).

This clearly creates a considerable distinction between motivations for UA in a city such as Vancouver and cities in the “Global South.” While pursuing UA for recreational, health, social, and other benefits seems a reasonable proposition in Vancouver, pursuing UA activities with purely economic motivations – considering relative values of food and labour – seems questionable.

A somewhat whimsical consideration of Urban Agriculture in a wealthy-country context is provided in a book entitled “The $64 Tomato,” where a relatively affluent city gardener tallies all of their garden expenses and inputs during a season. After careful economic consideration and amortizing capital expenditures, they determine that each tomato they produced cost them – as the title suggests – sixty-four dollars.

## Calories vs. Vitamins, or Quantity vs. Quality

The crops best suited to UA tend to be high-value, high-input vegetable, herb, and small fruit crops. While these can provide considerable amounts of vitamins and a wide range of micronutrients – “quality” in the diet, the majority of our calories come

from crops less suited to UA – grains, meats, and oils, representing "quantity" in the diet. For this reason, vegetable crops are shown separately in two the of accompanying area analyses.

## Soil in the City

Healthy, fertile soil is one of the most valuable natural resources provided by our ecosystem. Though its specific functions for supporting plant growth can be replicated in artificial systems – for example, using hydroponics – constructing them requires considerable input of energy, which increases their effective ecological footprint. Potential urban growing areas such as rooftops, reclaimed asphalt, and marginal soils (such as many of the acidic, stony forest soils which the city of Vancouver is built upon) often require that a soil or soil substitute be constructed or improved, at very real cost. In the absence of systems for effectively cycling municipal biosolids through food gardens, every harvest of food from an urban plot requires that nutrients be added to replenish the soil. These nutrients have to come from somewhere, a concept that is captured fairly elegantly in the ecological footprint concept.

While urban gardens can, in the long term, provide an excellent way to productively capture the flow of nutrients into a city, considering the quantity and origin of the initial and ongoing inputs of energy and materials required to construct healthy soils in an urban setting adds some considerable considerations to their net ecological impact.

## Arable Urban Acres

The following graphics compare Vancouver's Urban Agricultural capacity with the land requirements of its net diet, using three different types of analyses of the land requirements for producing this diet. In each graphic, three constant values are included as discussed below.

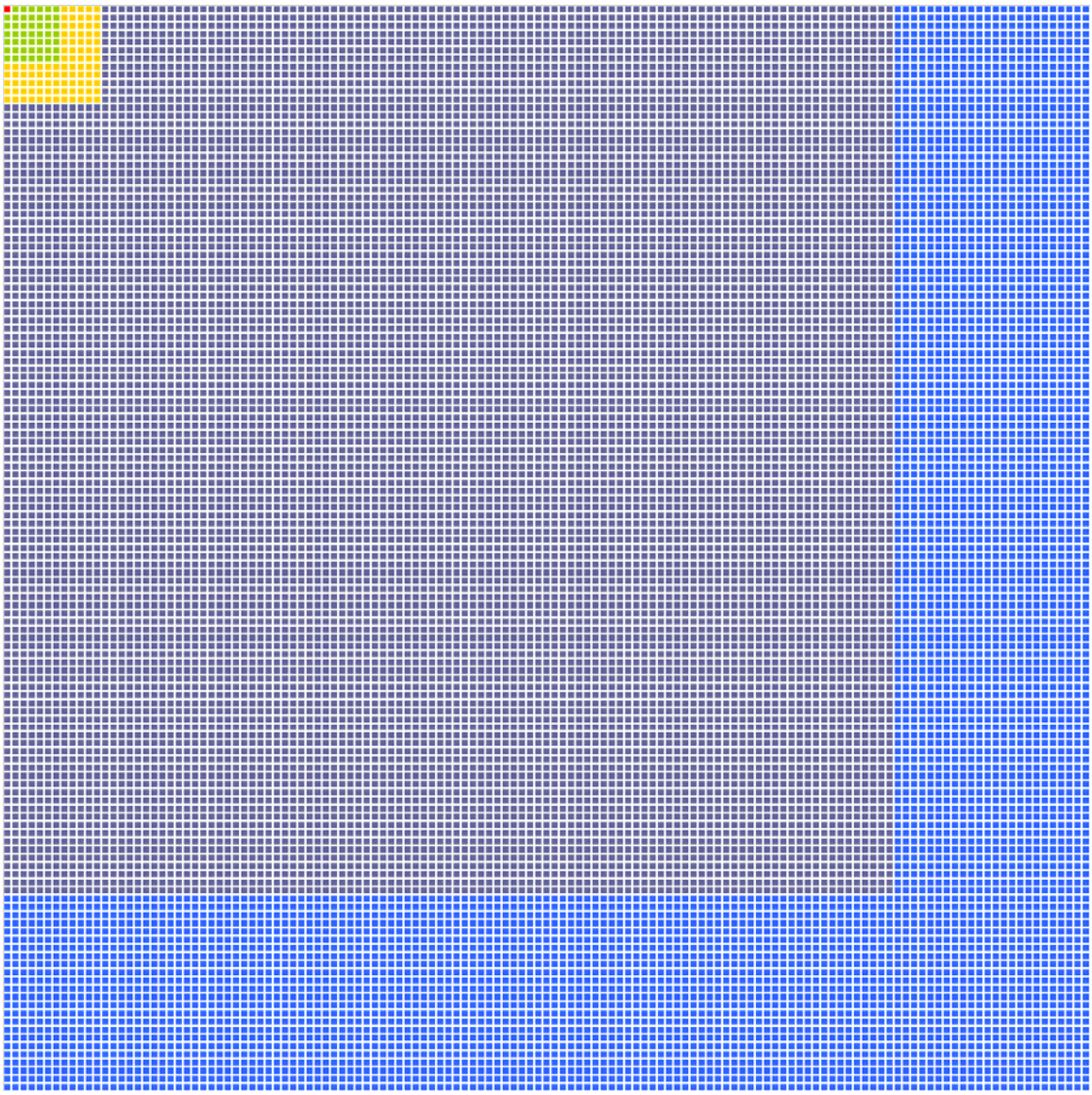
| Description | Value | Notes |
|---|---|---|
| Total area of City of Vancouver | 11,467 ha | As currently recorded on the City of Vancouver's website |
| 1976 Est. of total arable land in the city | 4,378 ha | This analysis was conducted by a city planner in 1976 and appears on the City Farmer website. At this time, Vancouver's population was 423,332, roughly 73% of its current value. The analysis provided a speculative inventory of all arable land in the city, including private (yard space) and public (hospital grounds, cemeteries, boulevards, etc.). It does not include rooftops or non-arable land. |
| 2006 UA Inventory | 81 ha | This analysis was conducted by a SCARP student in 2006. The aggregate value shown here was calculated for purposes of this discussion paper and includes the total area of the 77 sites that were listed in the study. It is likely that Vancouver's current UA capacity is somewhere between the 1976 figure and the 2006 public lands figure. The SCARP students currently assessing this question may arrive at a more accurate value to use for future analysis. |

## Graphic 1: Potential Impact of Urban Agriculture in Vancouver:

The Ecological Footprint View: Carrying Capacity

EF data are Canadian aggregate, calculated using 2006 source data by the Global Footprint Network.

| Label | Description | Area (ha) |
|---|---|---|
| | Total Ecological Footprint Associated with Food | 1,450,027 |
| | EF associated with Food, excluding CO2 emissions | 978,392 |
| | Total area of City of Vancouver | 11,467 |
| | 1976 Est. of total arable land in city, including public and private space | 4,378 |
| | 2006 Inventory of Public lands with UA Capability | 81 |

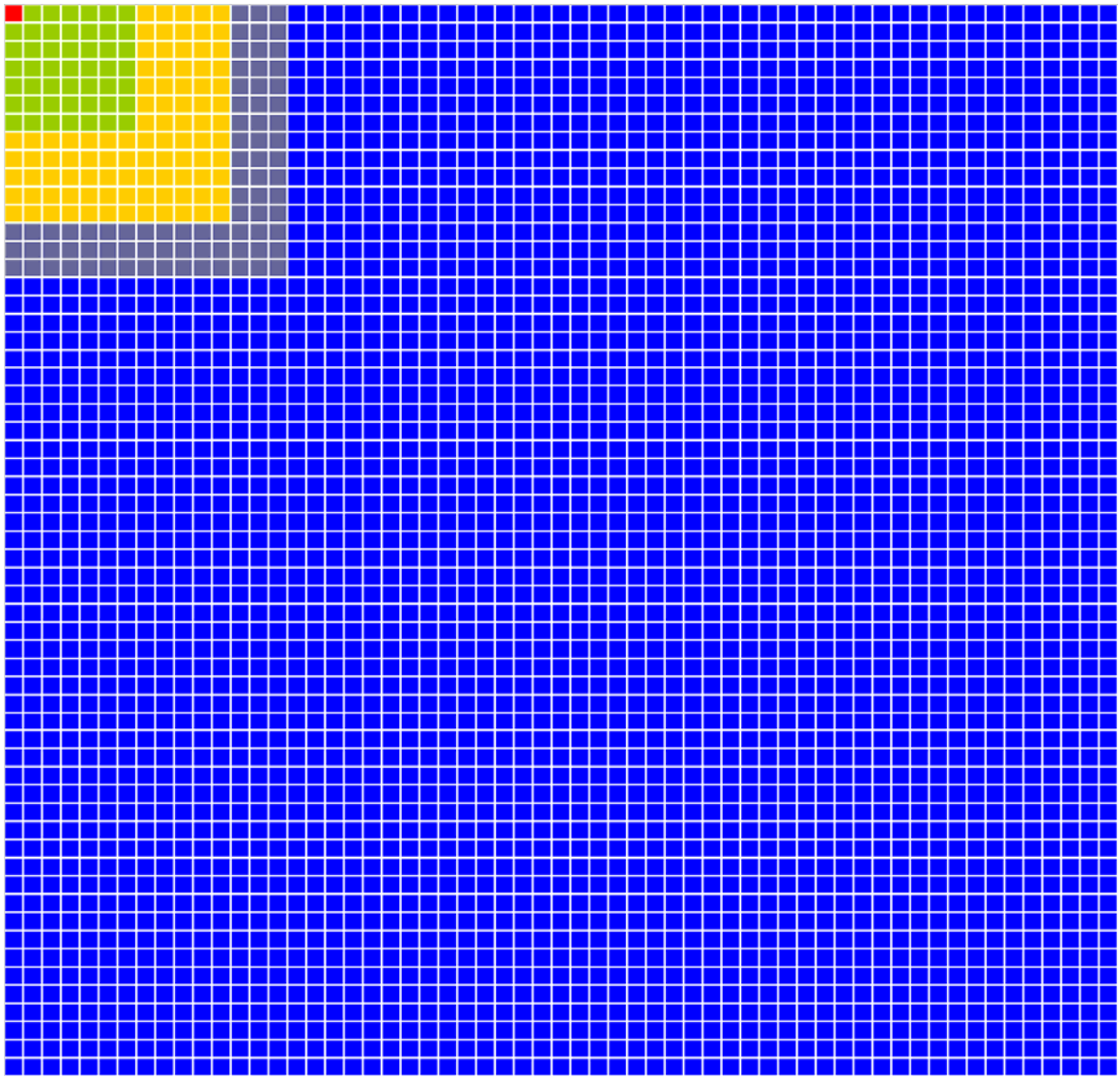


## Graphic 2: Potential Impact of Urban Agriculture in Vancouver:

The BC Ministry of Agriculture and Lands View: Current Land use

Productivity data come from 2007 BCMAL report regarding BC's food self-sufficiency. All data refer to exclusively the growing area, with no associated "appropriated carrying capacity" lands which are addressed in the EF analysis. These data use current BC productivity figures for a complete diet as suggested by the Canada Food Guide.

| Label | Description | Area (ha) |
|---|---|---|
| | BCMAL calculated area to produce Vancouver's diet | 289,021 |
| | BCMAL calculated area to produce fruits and vegetables for Vancouver | 19,018 |
| | Total area of City of Vancouver | 11,467 |
| | 1976 Est. of total arable land in city, including public and private space | 4,378 |
| | 2006 Inventory of Public lands with UA Capability | 81 |



## Graphic 3: Potential Impact of Urban Agriculture in Vancouver:

The “Bio-Intensive” view: a radical alternative

John Jeavons’ “Bio-Intensive” method relies upon very high labour inputs in a small scale. It claims extremely high yields which have often been used in urban agriculture productivity forecasts. For point of comparison, the areas shown below represent the amount of land theoretically required to sustain the population of Vancouver with a nutritionally complete vegan diet for one year (no animal products) and the vegetable portion of this diet (no high-starch foods). It should be noted that these values are based upon claimed yields in California and not upon recorded productivity figures for Vancouver’s climate.

| Label | Description | Area (ha) |
|---|---|---|
| | "Bio-Intensive" estimate: complete diet | 28,902 |
| | "Bio-Intensive" estimate: vegetables only | 2,890 |
| | Total area of City of Vancouver | 11,467 |
| | 1976 Est. of total arable land in city, including public and private space | 4,378 |
| | 2006 Inventory of Public lands with UA Capability | 81 |