THE ECONOMIC DEVELOPMENT POTENTIAL OF URBAN AGRICULTURE AT THE COMMUNITY SCALE

by

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Submitted to the Department of Urban Studies and Planning on May 27, 1980 in partial fulfillment of the requirements for the Degree of Master of City Planning.

ABSTRACT

This paper examines the economic development potential of urban agriculture at the community scale in Boston, Massachusetts. The paper provides an overview of the food supply for Boston and Massachusetts and describes the food needs of the city of Boston.

The uses and value of open space, particularly as used for community gardening, are discussed and a brief history of urban agriculture in Boston is provided. A working definition of community economic development is developed and a potential urban agriculture system for Boston is described. Several case studies of an urban agriculture system are described, and, finally, the overall benefits of urban agriculture as an approach to community economic development are summarized.
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SECTION I: THE CONTEXT

INTRODUCTION

"Urban Agriculture" is a concept which usually evokes quizzical looks and a questioning response: "Urban what?" Especially in a city like Boston, situated in one of the most industrialized states in the country, the concept of growing food in an urban setting appears to many people to be a contradiction in terms. But what is the city of Boston "like?" What is the regional context of Boston's food supply? And how can Boston meet the new supply and demand conditions created by the energy crisis and accompanying high inflation and rising unemployment?

The first section of this paper, which explores the potential of community economic development based on urban agriculture, presents information about the status of agriculture in the State of Massachusetts and about the food needs in the city of Boston. Section II, "A Case for Open Space," argues that there are serious economic and environmental considerations for open space, which is often thought of purely (and wrongly, it will be argued) as an "amenity" for city neighborhoods. Section III provides "A Brief History of Urban Agriculture in Boston" in recent years and describes some of the factors which have led to increasing interest in urban gardening and related activities in Boston. Section IV lays out "The Economic Development Potential of Urban Agriculture at the Community Scale" in two parts. First is a discussion of the definition of "community economic development" used in this paper; second is an overview of the types of development that could take place in Boston. Section V provides a set of case studies describing some of the actual efforts on-going in Boston communities to develop components of what could become a multi-faceted urban agricultural system. The final section summarizes the potential benefits of such a system to Boston neighborhoods and the city as a whole.

THE REGIONAL FOOD SITUATION

It is now a well-known fact that Massachusetts imports at least 85 percent of its food. Recent figures indicate that it may be as high as 90.5 percent. It has also been estimated that Boston has only one week's supply
of food available at any one time (the 1978 blizzard and recent truckers' strikes brought us within narrow margins of this limit).

In 1979, the U.S. Department of Labor statistics show that for the Lower Budget Standard (based on 1964 U.S. Department of Agriculture estimates of an emergency diet for basic nutritional needs), Boston is fourth highest in the continental United States or $13,623 compared to an average U.S. family-of-four lower budget of $12,585. The cost of the lower budget increased 9 percent between autumn 1978 and autumn 1979. The average U.S. family of four restricted to a lower-scale budget paid $3,911 for food, $3,365 of that for food at home, or 31 percent of their family budget for food. In Boston a comparable family would pay $3,999 for food ($3,492 for food at home) or 29 percent of its budget. (Families on an intermediate budget paid 25 percent of their budgets on food nationally, while families on a higher budget spent 21 percent on food.) The cost of food in the lower budget rose 9.4 percent between 1978 and 1979.

Boston families on a lower budget pay 8 percent more on the total budget, 2 percent above the national average for all food, 4 percent more for food eaten at home. Families on an intermediate budget pay 15 percent more than the national average on the total budget and 8 percent more for food at home. For lower budget families, there are only six cities in the nation with higher costs for food at home. For the intermediate budget, only New York City and Philadelphia have higher food-at-home costs, and the difference is a mere $43 for New York and $52 for Philadelphia.*

One of the major causes of this increased expense for Boston residents, along with factors of energy costs and distance from suppliers, is the change in the use of Massachusetts land.

Land Use for Agriculture--An Overview

Massachusetts has an approximate land area of some 5 million acres. Currently, 1.5 million acres of that is in urban use, federally owned or covered by water bodies. The rest is in rural residential use, farming,
other agricultural use, forest (not all of which is actively "forested"), and miscellaneous other uses. Less than 6 percent, or 296,034 acres, are used for production of four major commodity groups—vegetables, fruits, animal products, and grains for human consumption.*

In 1880, a high point in Massachusetts agricultural history, over 65 percent of the state's land area was in farms, or 3,359,079 acres. At that time there were 38,406 farms operating in the state. After 1900, however, the number of farms and the amount of land in farming began to decline steadily. By 1910 the total land in farming was 2,875,941 acres, or 55.9 percent of the total, but the total value of all farm property was rising steadily, from $182,646,704 in 1900 to $226,474,025 ten years later. In 1910, Suffolk County, which contains the city of Boston, still had 10.5 percent of its land area (35,200 acres all together) in farms. But the cost of an acre of farmland in Suffolk County was up to $1,178.35 compared to $50 to $75 for an acre in neighboring Middlesex County.**

By the turn of the century, the land area in farms was down another 13.3 percent to 2,494,477 acres, while total farm property value had risen to $300,471,743; but the state still had just under 50 percent of its land in farming use. In 1929, the Massachusetts Supplement for the U.S. Statistics of Agriculture showed the statewide value of crops produced was some $43 million, over $30 million of which was attributed to field and orchard crops. Suffolk County, which by that time had approximately 27 farms still operating (only 4 percent of the county's land area, but still over 720 acres), was producing just under $90,000 worth of farm crops; but adjoining Middlesex County, which had 3,453 farms (over 200,000 acres), was producing $4,869,619 worth of crops. The dairy industry was another major sector of the farm economy, and statewide some $23,000,000 worth of milk and dairy products was produced ($3,393,359 in Middlesex County alone). Poultry was almost another $10,000,000 worth of production value for the state.

By 1951, however, the amount of land used for farming had fallen precipitously. In a 20-year period, farmland had been reduced to 692,300 acres,


or only 14 percent of the total land area. Over the next 20 years, the state lost an average of 13,000 acres of farmland per year, and by 1971, 33 percent of the tilled acres in the state had been lost to other uses.* Total acreage had plummeted to 432,300, or 8.6 percent of the state's total land area.

Food Consumption and Production

A recent study of Massachusetts' food-production capability has compiled some figures which outline the quantities of food consumed in the Commonwealth in four food types: vegetables, fruits, animal products and grains for human consumption. These four categories of foods, excluding foods that cannot be grown in Massachusetts such as tropical and citrus fruits, coffee, tea, cocoa, rice** and similar commodities, comprise 79 percent of the foods consumed by Massachusetts residents.

Table I-1 summarizes information about the quantities of these foods consumed.

If per capita consumption in these four groups is 1,630 pounds, then it can be calculated that total per capita consumption is 2,063 pounds, if the foods not included in this table are added.

Table I-2 displays figures which show the amount of foods in these four categories produced in the state, and the percentage of total consumption in those categories which local production provides. The table indicates that the state produces just over 30 percent of its fresh vegetables, but only 13 percent of all vegetables consumed in the state. The state produces over 100 percent of its fresh fruit consumption (due to the high per capita production of cranberries) but only 61 percent of all its fruit. Only 11 percent of the state's meat is produced locally, and a mere .1 percent of the grains consumed by humans is grown in the state.

* J.H. Foster, in "Self-Sufficiency for Food in Massachusetts?" Food and Resource Economics Extension Newsletter, University of Massachusetts at Amherst, September 20, 1976, Table 4, p. 8.

** It is useful to use some imagination in composing this list. South Korea produces considerable quantities of rice at a latitude comparable to New England, and Seoul, one of the world's densest and most urbanized cities, has rice fields along a river which cuts through the city, and bamboo and plastic "greenhouses" which grown green produce throughout the winter within a few minutes' drive of the city. (Field observation, February 1978.)
Table I-1. Quantities of Land-Based Foods Consumed in Massachusetts

<table>
<thead>
<tr>
<th></th>
<th>Fresh</th>
<th>Processed</th>
<th>Total (lbs/year)</th>
<th>Average (lbs/capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>855,070,600</td>
<td>1,124,552,400</td>
<td>1,979,623,000</td>
<td>327</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(20% of all food in four categories)</td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>150,545,400</td>
<td>214,613,000</td>
<td>365,158,400</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4%)</td>
<td></td>
</tr>
<tr>
<td>Animal Products</td>
<td></td>
<td></td>
<td>6,354,950,600</td>
<td>1,051</td>
</tr>
<tr>
<td>Grains for Human Consumption</td>
<td>1,152,367,600</td>
<td></td>
<td>191</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(12%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9,852,099,600</td>
<td>1,630</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4,926,049.8 tons</td>
<td></td>
</tr>
</tbody>
</table>

Source: Chickering, "Toward Greater Self-Reliance," Table 1, text, p. 29.

Table I-2. Percentage of Food Consumed Which Was Produced in Massachusetts

<table>
<thead>
<tr>
<th></th>
<th>Total Consumption (lbs/year)</th>
<th>Total Mass. Production (lbs/year)</th>
<th>Percent Fresh</th>
<th>Percent of Total</th>
<th>Acreage of this Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>1,979,623,000</td>
<td>265,780,495</td>
<td>31</td>
<td>13</td>
<td>17,341</td>
</tr>
<tr>
<td>Fruits</td>
<td>365,158,400</td>
<td>221,259,958</td>
<td>100*</td>
<td>61</td>
<td>21,196</td>
</tr>
<tr>
<td>Animal Products</td>
<td>6,354,950,600</td>
<td>682,269,425</td>
<td>11</td>
<td>257,600</td>
<td></td>
</tr>
<tr>
<td>Grains for Human Consumption</td>
<td>1,152,367,600</td>
<td>780,528</td>
<td>.1</td>
<td>497</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9,852,099,600</td>
<td>1,170,090,406</td>
<td></td>
<td>296,034</td>
<td></td>
</tr>
</tbody>
</table>

* Due to cranberry production

Source: Chickering, "Toward Greater Self-Reliance," Table 12, p. 30.
Using the figures in Table I-2, the total percentage of these commodities (which represents 79 percent of all food consumed in the state) produced in Massachusetts is 12 percent. That means that only 9.5 percent of all food consumed in the state is produced right here. In other words, Massachusetts must import 90.5 percent of its foodstuffs from other sources.

A more detailed, but less recent, set of figures is provided in Table I-3, borrowed from the 1974 Report of the Governor's Commission on Food, and shows the approximate percentages of local production for a broader range of specific commodities.

In summary, the only foods for which Massachusetts is nearly self-sufficient are apples, fresh strawberries, cranberries, sweet corn and fish and shellfish. (The Governor's Commission also collected figures that showed a dramatic drop of 49 percent in the landings of fish over a 10-year period from 1962 to 1972.*) Updated figures show that the state now also produces approximately 49.5 percent of its milk.** On a regional basis, New England is much closer to meeting consumption needs in egg production (89.9 percent) and more than self-sufficient in potatoes (209 percent).

Most of the fresh fruits and vegetables for Massachusetts, as much as 74.7 percent of what is purchased from outside the state, comes from beyond the New England area, however. Some 15.4 percent of the food imported into Massachusetts comes from the general New England region, including New Jersey. California alone provides 28.2 percent of the fresh fruits and vegetables imported into the state.*** The cost of transporting food such long distances has long been a factor in the high prices of food in Boston and the state. In 1973, before the cost of energy began to rise so dramatically, the Governor's Commission estimated that the cost of transporting food was about 8 to 9 percent of Massachusetts' total food bill, compared

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* Commonwealth of Massachusetts, "Final Report of the Governor's Commission on Food," June 25, 1974, Figure 21, p. 38, U.S. Department of Commerce data.

** "Self-Sufficiency for Food in Massachusetts (Part II)," Food and Resource Economics Extension Newsletter, University of Massachusetts at Amherst, November 29, 1976, pp. 4-5.
Table I-3. Massachusetts Food Production as a Percentage of Total Food Consumption

<table>
<thead>
<tr>
<th>Food Commodity</th>
<th>Mass. Production as Percent of Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>2.7%</td>
</tr>
<tr>
<td>Poultry</td>
<td>3.3</td>
</tr>
<tr>
<td>Eggs</td>
<td>30.1</td>
</tr>
<tr>
<td>Fish and Shellfish</td>
<td>88.1</td>
</tr>
<tr>
<td>Dairy Products</td>
<td>19.4</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
</tr>
<tr>
<td>Apples</td>
<td>92.8</td>
</tr>
<tr>
<td>Peaches</td>
<td>8.1</td>
</tr>
<tr>
<td>Pears</td>
<td>10.3</td>
</tr>
<tr>
<td>Strawberries</td>
<td>96.0</td>
</tr>
<tr>
<td></td>
<td>51.0</td>
</tr>
<tr>
<td>Cranberries</td>
<td>1,288.2</td>
</tr>
<tr>
<td></td>
<td>287.0</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>20.3</td>
</tr>
<tr>
<td>Lettuce</td>
<td>4.1</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>127.9</td>
</tr>
<tr>
<td>Asparagus</td>
<td>41.5</td>
</tr>
<tr>
<td>Snap Beans</td>
<td>25.4</td>
</tr>
<tr>
<td>Cabbage</td>
<td>32.9</td>
</tr>
<tr>
<td>Potatoes</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>37.2</td>
</tr>
</tbody>
</table>

to a national average of 5 to 6 percent.* 1972 figures also show that truck transportation even at that time cost anywhere from 5 to 13 percent more than rail transport of food.**

More recently, alarming figures have been compiled for a National Agricultural Lands study showing that by the year 2000 California will have lost 15 percent of its prime farmland. New Hampshire and Florida will have lost 100 percent of their prime food production land by the turn of the century. Vermont will have lost 43 percent of its best land, and Connecticut 70 percent.*** And Massachusetts' own farmland will disappear in just 27 years at its current rate of conversion to other uses.

Aside from the fact that the farmland which now supplies Massachusetts food long-distance is fast disappearing, a fact that indicates that food-producing states may need to put their own food needs above the needs of export markets, the cost of importing food will continue to rise. Diesel fuel costs rose by 65 percent (from 31 cents a gallon to 80 cents) between December 1973 and June 1979. The average long-distance hauling truck gets between 4 and 8 miles per gallon. A recent paper which considers "The Impact of Rising Gasoline and Diesel Fuel Costs on the Relative Competitive Position of New England Agriculture" provides a methodology for calculating the impact of fuel price increases of 50 cents per gallon on food prices. The result estimates a 1 percent per unit effect on the cost of food which, if passed on through two handlers each with a 50 percent mark-up policy, could amount to 2.25 cents per unit.† Assuming the unit to be a pound, it is estimated that with the average per capita consumption of 2,063 pounds,


** Commonwealth of Massachusetts, Governor's Commission on Food, "Final Report," Figure 13, p. 26.


a cost difference of $46.42 per year could be found for each person, or $185.68 for a family of four. The author concludes that the fuel price increase would have "a minor impact on consumer food prices," but a rough calculation shows that this amount adds up to almost $30,000,000 for Boston's population and over $280,000,000 for the entire Commonwealth. These figures also do not account for the fact that fuel costs are only 10-12 percent of total transportation costs by long-distance truck.*

In addition, further work needs to be done on the effects of continuing shifts from rail transport to trucking of foods. In 1974 rail transport was used for approximately 25 percent of meat imported and for 43 percent of fresh produce, or roughly 34 percent of all food transportation. In 1974, truck hauling was on the average 6 percent more expensive than rail.** Overall, transportation costs account for about 8 percent of the retail food bill.*** Using more current cost figures, the impact of further shifts to truck from rail transport should be estimated.

In short, Massachusetts, and its largest city in particular, may realistically face increasing difficulties in getting food at affordable prices. The next section takes a closer look at just what the food needs are in the city of Boston.

THE CITY OF BOSTON AS CONSUMER

Everyone needs to eat. Food eaten at home costs Massachusetts consumers some $4 billion per year. Using the statewide per capita figures, the population of Boston, assuming that everyone is able to eat the average amount of food, requires 1,318,257,000 pounds of food, or almost 660 million tons per year. But some sources of information indicate that in fact many residents of Boston may not be able to obtain all the food they need.

* Ibid., p. 16.

** Commonwealth of Massachusetts, Final Report of Task Force #3 of the Governor's Commission on Food, p. 6.

A recent feature article in the Chicago Tribune characterized Boston this way:

Poverty is the most pervasive problem. About one out of every six persons in this Metropolis of 639,000 receives some form of welfare assistance, and this is thought to be the highest such rate among big cities in the nation.*

Nor is this a short-term problem. "We have a lot of second- and third-generation white Bostonians on welfare," State Representative Barney Frank of Boston told the Tribune. In 1968 a special section of the Boston Globe examined the issue of poverty in the city and found that fully "twenty-five percent of the city is afflicted by poverty."** And a survey of low-income neighborhoods in 1970 by Action for Boston Community Development (ABCD--Boston's anti-poverty agency) found that among all races, 13.5 percent of the population earned incomes under $3,000, 22.3 percent earned between $3,000 and $5,999, and another 28.9 percent earned between $6,000 and $9,999. The current federal "poverty" standard is $3,790 for a non-farm family of one and $7,450 for a family unit of four.***

These family income figures become all the more astonishing when compared to national figures which show that the average per capita costs for food rose from $897 to $911, 11 percent more than in 1978. The national average percentage of income spent on food was 16.4 percent, or "just a little below the 1978 figure."† In 1973 the percent of income spent for food was 15.8 percent. Obviously for those families with lower incomes, the percentage of income spent on food is much higher, in fact a significant portion of the budget. What happens, undoubtedly, is that people eat less food, and less nutritious food, when they are faced with a choice between heating their homes, affording transportation to get to work, and

† Boston Globe, April 23, 1980.
eating a balanced diet.* There are several other indicators of the need for assistance with food costs, particularly the various food service programs in Boston including the School Lunch program, elderly meal services, the Women, Infants and Children Program, and food stamps.

Current figures show that some 64 percent of all the children in Boston public schools are receiving free and reduced-price meals in school. This is some 42,000 children (or 7 percent of the city's population), of which 40,000 are considered eligible for completely free meals at school.** Eligibility criteria are specified in terms of family income***:

<table>
<thead>
<tr>
<th>Size of Household</th>
<th>Maximum Gross Income for Free Milk and Meals</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>0 to $4,590</td>
</tr>
<tr>
<td>Two</td>
<td>0 to $6,040</td>
</tr>
<tr>
<td>Three</td>
<td>0 to $7,490</td>
</tr>
<tr>
<td>Four</td>
<td>0 to $8,940</td>
</tr>
<tr>
<td>Five</td>
<td>0 to $10,390</td>
</tr>
</tbody>
</table>

These income criteria are higher than those used by the Bureau of Labor Statistics to determine official "poverty" levels.

The State Department of Elderly Affairs, which is authorized to serve meals to anyone over sixty without consideration of income criteria, serves over 700,000 meals to 2,779 elderly people in Boston per year. An official of the program estimates that the program is "not really scratching the surface" of need among elders, but the program is limited by available funding.+

The Women, Infants and Children Program, established by Congress to assist women, infants and children found to be "at nutritional risk," is

* See article on the impacts of energy costs on the elderly, Gerry McMullen, "To Be Old, Cold, Hungry," *Boston Globe*, May 22, 1980, p. 28.

** Figures for all Boston public schools, October 1979; Massachusetts Department of Education, Bureau of Nutrition Education and School Food Services, "Report of Needy Children as of October 31, 1979."

*** Massachusetts Department of Education, Bureau of Nutrition Education and School Food Services Federal-state eligibility forms.

+ Personal communication, April 1980.
available to those who meet income guidelines which are 195 percent of the "poverty" standards established by the National School Lunch Program ($12,660 for a family of four in Fiscal Year 1979). Participants must also meet a rather rigorous set of medical and nutritional criteria. Statewide, the program serves some 34,000 people. Boston, which is ranked as 20th out of 345 cities and towns in the state in terms of need (that is, only 19 other cities and towns have a higher level of need), accounts for almost 44 percent of the state's participation, or 13,154 people per month.

The federal Food Stamp program, administered by the state, was serving 38,285 households or 107,198 people (using the official multiplier of 2.8) in Boston in March 1980. Eligibility is based on an elaborate set of basic income guidelines and formulae for deductions for a variety of expenses which can be subtracted from income before it is declared. In March 1980, the basic benefits (that is, not counting the emergency cases handled on-the-spot as the need arises) amounted to $15 million statewide, with $3.3 million going to Boston residents during that month. This means that roughly $40 million is provided to Boston residents annually to assist with the cost of food. Since the average benefit is only $86.73 per household, or $30.97 per person, it is clear that food stamps are only a supplement to the family food budget and cannot allow a family to meet all of its food needs. The maximum benefits available to a family of four is $209 per month. While the U.S.D.A. considers Boston's needs met by $101%, an official in the state office administering the program estimates that, in fact, the program may be missing as many as 10 to 15 percent of people eligible and in need of assistance. The same official pointed out that all benefits are calculated according to national price figures, a process which ignores the higher costs of food in New England and Boston, and makes no allowances for ethnic preferences in foods which may not be included in the Department of Agriculture's calculations of a "basic nutritious diet."

What is clear from these figures is that 26 percent of the city's population, assuming minimum overlap among these programs, are receiving some form of assistance for food. A considerable portion of Boston's population, it appears, is struggling to feed its families. While Boston's

* Personal communication, May 1980.
average income is rising, from $7,200 in 1960 to around $10,000 in 1978 (Boston Redevelopment Authority figures), the number of families making less than $5,000 is at 22 percent citywide. In many neighborhoods it is well over that figure. (In Chinatown it is 48 percent, in Uphams Corner it is 29.8 percent, and in the Fenway it is at 30 percent. The North End and South Boston are at 25 percent, and a number of other neighborhoods did not have figures reported in the recent BRA neighborhood profiles.) One source from the Boston Redevelopment Authority shows that 16 percent of the city's families in 1970 had incomes below $4,000. In some neighborhoods (the South End and Roxbury) the figures went as high as 28 percent. Another 18.5 percent of all families in 1970 had incomes between $4,000 and $6,999* (the latter figure is below the official "OMB Poverty Guidelines" for 1980--$7,450 for a non-farm family of four--and just over the poverty level of $6,230 for a family of three). These figures are nowhere near the budget projections of the U.S. Department of Labor which estimates the cost of a "lower" standard budget for a family of four at $13,623.

One other important characteristic of "a city like Boston" is the condition of its neighborhoods. The tremendous amount of vacant land in Boston is described in detail in Section III, "A History of Urban Agriculture in Boston." The presence of this vacant land, which is currently a strongly negative force in local neighborhoods, should be seriously considered as we try to answer the question which these figures force us to ask: How will the people of Boston be fed?

SECTION II: A CASE FOR OPEN SPACE

WHAT IS OPEN SPACE?

The need for open space and the purposes of green places in the city have long been subjects of discussion among social and physical planners from the earliest days of Boston's history. Economically, open space was at one time an important factor in the general prosperity; the Boston Common was one of the earliest publicly-held open spaces which served to support the livestock which was a basic element in the local economy.

Open space has often been considered a luxury for the wealthy and the "better" classes; but it has also been considered an important element of the various antidotes to the poverty, illness and spiritual emptiness which have plagued the centers of cities from early times. Frederick Law Olmsted was one of the articulate advocates of open space for "the masses" as a direct influence on the physical and moral health of the society. His famous system of parks, which remains Boston's central open space resource, was modeled on his belief that all people should have access to the uplifting effects of natural areas and open air, even in the city itself. He also knew that open spaces would enhance the value of nearby properties provided with a view and easy access to a "country" environment.

The historical views of open space, however, have been altered and challenged by current conditions. Presently, the city of Boston, like many others, finds itself with an unexpected legacy of empty land in the city, the product of unfinished urban renewal which demolished more structures than it replaced, and the cycle of disinvestment in many city neighborhoods which left houses vacant and subject to arson and eventual demolition. As a result, Boston now has over 4,650 acres of land considered open space, vacant or "extractive."* The city may now have more "open spaces" compared to its land area and population density than ever before. Given the amount and availability of land as yet undesignated for other purposes, there is more "choice" about developing open space than at any other time in Boston's recent history.

* These categories include woodlands, wetlands, and meadows as well as quarries, abandoned wharves, utility rights of way, and land cleared for urban renewal or road construction. Boston Redevelopment Authority, Boston Urban Wilds, September 1976, p. 18.
At the same time, however, with tightening city budgets, the maintenance and upkeep of open space in the form of parks are more problematic than ever. City agencies are loath to develop new parks for fear that they cannot be maintained and will become problems to the local residents and to the responsible city agencies.

Before we proceed with this discussion, it is important to make a distinction between "open space" and "vacant" land. There are those who view any open land as potential space for a variety of activities; and there are those who view any open land, even land put to some recreational or social use, as "underdeveloped" and for all practical purposes "vacant." The distinction between open space and vacant land is critical to the definitions and rationale used by planners and policy makers. Debates about the "highest and best use" for land are a frequent point of contention between business, city officials and neighborhood residents, all of whom have different views about what is in their best interests. For the purposes of this discussion, "vacant land" will be defined as land that has no value in terms of aesthetic appreciation, social uses or economic uses by local residents or passersby. "Open space" is defined as any land which is utilized for any of those purposes. It is unlikely that vacant land will become valued open space without some form of investment, whether local effort or official efforts to make some improvements, especially in a city as old as Boston, where the natural landscape has been disturbed to the point that there is almost no natural growth other than the hardiest weeds and weed-trees.

THE USES OF OPEN SPACE

The term "open space" itself stands for a wide variety of land uses. There are three traditional forms of open space most often planned into cities. First are the familiar passive parks--benches, lighting, a fountain, perhaps, plantings, historical notations or monuments, paths and walkways. At their best, such spaces are restful, beautiful, and inviting. At their worst, such spaces become filthy, with broken fixtures and unkempt plantings, ill-used or used for purposes far from those intended.

* Thanks to co-workers Charlotte Kahn and Martha Martin for discussion which helped develop the following taxonomy of open space.
The second familiar form of open space is the active recreation area—a ball field or court, nets, hoops, lighting, observation areas, paving, and fencing.

The third type of open space, less common in cities and towns until recent years but now increasing with various land-purchasing programs ("self-help" in Massachusetts), is natural areas. These areas need tending, but contain much less visible equipment or physical additions to the natural landscape. These areas serve for more remote and quiet uses—walking, hiking, or sometimes picnics and family outings.

A fourth common sort of open space is not always immediately recognizable as such. Streets, sidewalks, parking lots and building perimeters are all often used for passive purposes (sitting, chatting, watching) or active recreation (games, ball playing, bicycles, skateboards and roller skates). (Into this category could fall the park-drives and sidewalks of the Metropolitan District Commission (MDC) parks and the Jamaica Way and River Way roads, which were, in fact, never meant to be the heavy traffic arteries which they have become.) The vistas provided by these spaces should not be overlooked. Frequently these stretches of open space are all that some areas of cities have for a view, and dramatic differences can be noted between streets with trees and plantings and those without.

City planner Kevin Lynch offers a general definition of open space as:

An outdoor area in the metropolitan region which is open to the freely-chosen and spontaneous activity, movement or visual exploration of a significant number of city people.*

He actually excludes ball diamonds and courts because "they are specialized facilities usable only in a particular formalized way, and therefore not open." He does include vacant lots in his definition.

In contrast to these conventional forms of open space, a new form of land use is appearing in cities, of which Boston is a leading example. In many communities, local residents have taken it upon themselves, with and without the assistance of government, to convert vacant land to open space which is not exactly recreational, not exactly social, and not exactly for

* Kevin Lynch, "The Openness of Open Space," pp. 108 to 124, in
economic or aesthetic uses. But the land used for urban gardening to produce food, fiber and flowers, is a unique combination of active and passive recreation, community social exchange, beautification, and economic value.

The most interesting differences between this sort of open space and others are important for users, planners, city agencies and local residents alike. First of all, this type of land use guarantees constant occupation of the land by people working in their garden plots. People sometimes work late into hot summer nights, or before work in early mornings. The maintenance of the land is provided by the users themselves who see the benefit of keeping the soil in good condition, and fences and water systems in working order. In addition, the land is used to produce food which is a supplement to basic income and can be considered an economic output. In some cases people are saving hundreds of dollars a growing season on plots as small as 10' x 20' or 20' x 30'.

The constant use, the local maintenance, the extra economic benefits to users provided by gardens, all contrast sharply to other planned open spaces which are often viewed as "the City's" rather than the users', and are often abused. Critics of conventional open space consider it superfluous and expensive for the "return on investment." Gardens, on the other hand, are self-maintaining and provide economic returns to the users.

Another contrasting benefit, more difficult to define, but visible to observers, is the cultural and social exchange that takes place on community gardens. People who have a common interest in gardening and share the common ground of the garden, seem able to communicate across ethnic, age and cultural barriers that deter interaction in other settings such as parks and playgrounds. All things considered, this "new" form of land use may contain some important clues about how other open spaces can be made more secure and useful to communities. A more detailed discussion of ways that open space can and should be developed in Boston will be presented shortly. First, however, it is useful to review some of the recent work which has been done to determine some of the more scientific values of open space.
THE VALUE OF OPEN SPACE

The uses of open space in aesthetic, moral and even recreational terms may actually be the least important of the functions of open spaces, particularly in a dense urban setting. The physical properties of trees and other greenery allow them to act as cleansers of air pollution, buffers against wind and solar radiation, temperature regulators, noise controllers, erosion reducers, and, in short, control systems for the extreme conditions found in most cities. The construction of tall buildings, densely placed structures, shadowing, pavement, auto exhaust and smokestacks, all contribute to the wind turbulence, fouled air, excessive runoff, sharply fluctuating temperatures, high noise levels and glare which characterize most city environments. Open spaces offset some of these conditions by providing locations where rain water can soak into soils, where grass, trees and shrubs can clean away carbon dioxide and produce fresh oxygen, where temperatures are modulated and wind is controlled.

In an extensive publication by the U.S. Department of the Interior, some impressive facts and figures are collected.* It would require, for instance, a greenbelt one-half mile wide alongside a highway to readjust air quality to acceptable levels.** Since most cities do not have that amount of open space available, it seems all the more important to develop open space at every opportunity. One tree's conversion capability has been calculated at 2400 grams of carbon dioxide per hour (for a beech tree with 1600 square meters of exterior surface). In the process 1600 grams of glucose are produced along with 1712 grams of oxygen. Roughly, such a tree can cleanse the carbon dioxide produced by two homes (500 cubic meters each) every day.

A leaf surface of 25 square meters can produce, on a sunny day, approximately enough oxygen for one person in a day; but since people breathe all night and through the winter, 150 square meters of leaf surface are needed to produce one person's oxygen supply. This converts to roughly 30 to 40 square meters of greenery per person. For a city of 600,000,


**Ibid., p. 50.
that's 18 to 24 million square meters or over 4400 acres! (This does not provide for commuters and visitors.) Studies have also shown that trees can make a significant difference in the levels of ozone present in the atmosphere, reducing this pollutant when it is too close to the zones occupied by humans. But studies have indicated that green spaces are not interchangeable with buildings. In other words, a tree cut down in the center of the city cannot be "replaced" by one on the periphery with the same purifying effect that the original tree had on the air in the central area. If it is remembered that the average life of a tree planted by the City of Boston is a mere eight years, it seems that a full-time tree-planting program would be necessary even to approach maintaining the level of greenery needed to keep the city's air relatively healthful.

Plants have also been shown to have a remarkable ability to reduce noise. Tree and shrub shields can significantly reduce the decibel level of noises by absorbing, breaking up and reflecting sound waves. A neighborhood like East Boston, which has suffered for decades now from excessive noise from the airport, could possibly benefit from a dense planting of a buffer zone around the airport, particularly along the areas where planes are positioning onto runways. The Boston neighborhoods along the new Orange Line Extension of the subway and commuter railroad should likewise be provided with carefully designed plant barriers to reduce the amount of noise which will result, even with the depressed track design.

Plants are also able to provide important protection from solar radiation and reflection, which can be serious problems in central cities where paving and building materials serve to increase absorption and reflection of radiation.

Trees, shrubs, ground cover, and turf, or even a combination of these, are effective in reducing direct as well as reflected solar radiation. They absorb the heat, provide shade for walls and ground surfaces, and create dead air spaces. Thus plants provide insulation for buildings and the earth, not only from the intense heat of solar radiation, but also from abrupt temperature changes. Plants absorb more of the sun's heat during the day and release it slowly in the evening--not only cooling the daytime temperature, but also warming the evening temperature and moderating it.*

* Ibid., pp. 72-73.
Wind is another problem which is exacerbated by the construction of city spaces. Tall buildings, sharp corners, and dense construction next to vast empty spaces such as highways and wide streets all contribute to the sometimes fierce winds that characterize Boston's weather. The wind-chill factor often makes a significant difference in perceived temperatures and gusts make walking unpleasant and even hazardous for pedestrians in many locations. "Surfaces of buildings will always produce turbulent airflow" which is unpredictable and difficult to control, states the Department of Interior publication.* Trees and shrubs, properly spaced and located, can make measurable differences in wind patterns, slowing wind speeds and redirecting currents. Researchers Bach and Matthews are quoted as follows:

Wind is one of the most important climatic elements in urban planning, since dispersion of air pollution and human comfort are largely dependent on it. Winds that are too strong cause the funnel effect in our canyon-like streets. This may locally lead to high air pollution potential through lifted street dust and strong wind fumigation from elevated sources. Winds which are too light may lead to stagnation conditions which may also produce high air pollution potential and in summer muggy conditions. The ideal ventilation system would prevent the funnelling effect but favor the country breeze, i.e., wind blowing from relatively cleaner and cooler country, suburban, or green areas. This could be achieved by a properly spaced system of green areas cutting through the entire built-up area.**

It is even possible to redirect snowdrifts around sidewalks, roads and parking lots with careful placement of plantings.***

Besides offering relief from and modification of wind patterns, plants can contribute to temperature control through their ability to retain moisture. By preventing evaporation of moisture from the soil back into the atmosphere, trees and shrubs stabilize temperatures by

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* Ibid., p. 73.


*** Ibid., pp. 93-94.
maintaining relatively high humidity. Temperatures under protective plant cover remain cooler during warm days and warmer during cool nights. Roots retain moisture longer in soil, aiding percolation and cleansing of the water and contributing to the replenishment of aquifers. It has also been estimated that a home well-protected by properly placed plantings can save 22.9 percent of its fuel bills while keeping a temperature of 70 degrees F. Imagine the fuel savings city-wide if more buildings were protected from wind-chill and radiation by plants.

In summary, the Department of the Interior publication states:

Manmade surfaces, then, exaggerate temperature extremes. Because plant materials absorb radiation and release it more slowly, plants are able to decrease temperature extremes. Highly reflective, manmade surfaces absorb heat to a large extent and release it rapidly, causing an overheated environment. Plant materials, on the other hand, absorb a greater amount of solar radiation during the daytime and release it slowly at night, reducing diurnal temperature variations. Plant materials, especially in the case of deciduous trees, interfere with solar radiation reflection, causing a temperature reduction, not only in the shade of the tree, but immediately adjacent to it.*

From the evidence that has been amassed, open spaces may be more important from the standpoint of environmental health than from any other. The use of land for open space, in this sense, may be the highest and best use in many situations, particularly if criteria designed to protect and maintain environmental quality are used. Open spaces should perhaps be evaluated less in terms of their beauty or recreational value, and more in terms of survival.

With the physical environmental health factors in mind, it is possible to reevaluate the conventional sorts of open space in a different way. It is quickly clear that the usual paved recreational space will be of little value, since the asphalt or cement paving has all the characteristics most detrimental to the environment. Unless concentrated plantings are incorporated into such areas, they will contribute little to the modification and purification of city conditions. Likewise, streets,

sidewalks and parking lots which are often appropriated as open spaces, are by their construction unable to contribute to temperature control, water retention and reduction of radiation. Natural areas and passive parks tend to be much more suited to providing these benefits due to the existence of grass, trees, shrubs and less intense use of pavement or fixtures. It appears that much of what is considered "official" open space is not contributing at all to the protection of the city's environment.

Community gardens, however, are a positive contribution, since they not only keep ground open to rain, but are planted with crops that contribute to the production of oxygen, prevent soil erosion and modify temperatures, and as a bonus produce food for the gardeners which is fresher than any available from stores.

There are other important uses for open space, which have been briefly mentioned, and should also be built into any set of criteria for the development of open space in the city. These may be grouped together as social and cultural uses and include the interaction of people in open spaces, group recreation, family and extended family events, parties, exchange of information, goods, services in both informal and formal ways, celebrations and meetings of concern to various interest groups. Often parks or playgrounds are too specific or too general in design to accommodate some sorts of cultural and social events. Streets and sidewalks are sometimes used for block parties, and parking lots can be converted for some sorts of celebrations or exchanges such as the farmers' markets which are becoming popular in Boston.

If we tried to take into account all the needs of people for open space and all the important functions of open space in a city setting, what sort of criteria could be developed to accommodate all these elements into open space for each neighborhood?

**CRITERIA FOR NEIGHBORHOOD OPEN SPACE**

Traditional planning "tools" for determining open space needs have been very one-dimensional and based almost entirely on population. Standards for recreational open space, both passive and active, are almost always offered as so many square feet or units per thousand population.
There is usually little effort to modify these standards to population density or age structure. Proposed standards range from 25 percent of a land area (suggested for the dense New York region) to the much-used "ten acres per thousand" proposed by the National Recreation and Park Association. Economist Marion Clawson has gone far beyond that amount to suggest 42 acres of regional open space per thousand population plus 36 acres of local open space per thousand people.

If we assume that various uses of open space require different types of open space, the problem of supplying every area of the city with all sorts of space types may seem large. But with some imagination, it should be possible to design various spaces which can serve multiple roles. Both the natural areas and the active recreation areas do not lend themselves well to combination with other uses. But passive recreation, gardening, and various cultural uses and some economic uses are more flexible. Passive recreation can be compatibly introduced at the perimeters of garden space. And concerts, picnics and farmers' markets, for example, could all happen on the same "plaza" style space in one area.

In Boston, the strong neighborhood identities and ethnic character of various neighborhoods offer some suggestions about the style of open space that will be most appreciated. But populations shift, ages shift, and space should also be designed with an understanding that uses may change over time. It is difficult to determine the best size unit to design the most desirable mix and location of open spaces, but it is safe to say that the current practice of arbitrarily dividing urban areas into units of population by size only is not the most effective for meeting actual needs. Certainly the largest unit that should be used for planning is the neighborhood, even though in Boston the neighborhoods range tremendously in size. Within some of the largest neighborhoods such as Dorchester, it will be necessary to determine sub-areas which are more akin to neighborhoods elsewhere in the city. Ideally, if at all possible, the minimum open space available to every neighborhood should be as follows:

**Active recreational area:** Paved ball playing area, tennis court, and turf area for soccer or other ball games. This area should be surrounded by plantings of trees and shrubs to maximize the oxygen production area available, to reduce glare and provide water retention, runoff control and temperature.
Active recreational area: (continued) modification. The ideal would be turf playing areas to obtain the benefit of open ground and the cooling effect of grass.

Passive recreational area: Benches should be placed in a wide variety of places to provide passive seating. One or more small pocket parks can offer the passive space desired by seniors, small children and passers-by. Seating and plantings should be located around all other types of open space.

Natural areas: Each neighborhood should have at least one area which is designated as a Natural Preservation Area and protected from development. This area could even be a once-vacant lot which is planted with a mix of wild flowers, native trees and shrubs which can be tended with a minimum of care for maximum "neatness." Areas which might be hazardous for building or prone to erosion or other types of degradation can be "reclaimed" in places where the original natural state has long since been destroyed.

Food-producing and aesthetic gardens: Each neighborhood should have sufficient area to provide 10 to 15 percent of the population with garden plots of at least 10' x 20'. In neighborhoods where a higher proportion of the residents are tenants without land available to them around their own homes, the space for community gardens should be increased. Likewise, neighborhoods with high proportions of families with low to middle level incomes should reserve proportionately more land for food production. The ideal situation would be to provide enough land for food-bearing trees, vines and shrubs and for blooming plants for increased food production and beautification. In addition, space for construction of a greenhouse or solar dome would insure some winter activity in food production, especially for older people.

Social-cultural space: Every neighborhood should have at least one open space which is designed to handle relatively large groups of people for concerts, neighborhood parties, farmers' markets, bazaars, fairs and similar events. The space does not need to be large so much as visually defined, attractive, with informal seating available on walls and curbs and access for trucks and vehicles. Ideally, the entire area would not be paved but bricked or cobbled to provide maximum drainage into the soil; again plantings should be abundant.
Streets, sidewalks, and other "found" open space:

All streets and sidewalks should be treated as the visual and physical open space that they are. At a minimum, plantings should be frequent, in the form of trees, shrubs or planters. Medians should also be planted wherever possible to reduce noise, glare and auto pollution. Ideally, any available empty open space, such as the ugly chainlink fences surrounding parking lots, should be planted with vines such as honeysuckle, which require minimum care but would contribute to the general greening and oxygen production capacity of the city as well as populations of helpful insects such as honey bees. The more dense the population, the more important the use of these spaces for green space becomes.

Open space of these types would insure that every citizen has a range of open space to meet different needs. Lynch insists that

Choice must be within reach. Open spaces, particularly those for daily or weekly use, should be physically proximate to their users, and connected to them by visible easy paths. Thus a network of relatively small spaces, well distributed within the urban system, may be more useful than the large tracts which look so well on land use maps. This is true as long as an open space is large enough to establish its special character (a size which may often be astonishingly small).*

Lynch also asserts that:

As a matter of public priority the system should first be designed to open up choices for groups now most deprived of choice. The opposite often occurs in city park systems, where wealthier, less dense areas get the lion's share of public open space. Of course these areas are the most influential, and also most vocal and consciously aware of the advantages to be gained.**

The implementation of such an open space system for the city of Boston would be no small chore. However, closer examination may reveal that it would be less costly than it might first appear. The one kind of


** Ibid.
open space which has been rather consistently developed has been the active recreation areas which are the most expensive to prepare. Although there may not be enough active recreation area in every single neighborhood unit, especially where population density has been ignored as an indicator of need, it is not likely that there will be an overwhelming need for more such facilities. Plantings and other improvements would be needed at almost all existing sites, however, since most are minimally landscaped at best.

Passive recreation areas in the form of parks are also well-supplied in Boston, if not well-maintained. That issue will be addressed in a moment. Again it may be additional landscaping which requires most attention in these areas to enhance their value environmentally and aesthetically.

Garden space and cultural space are the two least common types of open space found in Boston neighborhoods. Both of these, however, can be developed at relatively low cost on vacant land that is currently idle and ugly.

Natural areas are also scarce in city neighborhoods, but there are low-cost ways to restore otherwise idle space; and for the few valuable natural areas still existing, there are now federal and state matching funds to assist city acquisition.

The argument that utilizing currently "vacant" land for open space is removing land from the tax rolls has some validity, but there are ameliorating factors. The land is currently not bringing in much revenue, and indeed costs the city considerable funds for cleaning and maintenance. The budget for "open space management" (vacant lot cleaning) for the City of Boston was over $1.8 million (counting in-kind CETA funds) in fiscal year 1979, for only one-third of the city's neighborhoods. In addition, many of the lots are too small for commercial or residential rebuilding under current zoning laws. Considering the environmental value of open space, the health of the city will be directly affected by use of land for permanent open space. Particularly in the case of garden space and social space which can be used for economic ventures like markets, the open space can actually generate "income" for local residents, something a vacant lot will never do. (Section IV provides more detailed information on the potential economic benefits of gardens.)
Finally, there is no way to measure the indirect or subtle effects that increased and improved open space can have on a city. Pride and neighborliness can be restored (we have seen it happen), valuable cross-cultural and cross-age exchange can be encouraged, and increased activity in a neighborhood can actually discourage crime and vandalism. Kevin Lynch articulates several other values of open space which gardens in particular seem particular suited to providing. In addition to providing a "meeting ground for social contact," Lynch states that open space should offer ways to "extend the individual's choices" in relation to the environment, and "convey a sense of the web of life, of the intricate interdependent system of living things."* Open space is no panacea, particularly when the economy is becoming so tight and unstable; but in all its dimensions, it can provide the basics for a healthy neighborhood.

**OPEN SPACE MAINTENANCE**

The subject of implementation of an open space system, and the accompanying issue of maintenance of what is developed, deserves considerably more space. But there are several points that should be mentioned at a minimum. Involvement of users is critical at each stage of development. Local people know their own needs. Planners and designers will need sharp negotiating skills to mediate among cultural differences in neighborhoods with mixed populations and age groups, but their work will be made easier and more successful if they will spend the time understanding the vision of the city that many neighborhood residents have in their minds' eyes. There have also been some convincing experiences to show that involving local residents in the actual construction of open space such as parks, as was done in Somerville, can have surprising and positive results. Caretaking and use of the park space in that case was greatly enhanced because those who had worked on the construction felt it was truly "theirs." Community gardens which have been constructed with the help of the gardeners and local residents are often well organized in the process. Again the caretaking is improved and even though vandalism may occur, neighbors tend to be watchful and protective of a garden everyone has worked on. The costs of such construction is also lowered, even if

most of the labor is unskilled. However, there is a need for people skilled in organizing, specific construction skills, and management of a complex task to carry out such a plan. Skilled local people often "surface" in the course of a project, but often "professional" organizers and implementors can be helpful as well. These people may be critical in areas which have an especially high need.

Finally, the maintenance of gardens is minimal--none for the city government--unless a few basic materials are replenished on an annual basis. For trees and other public plantings, the idea arrangement is to have a family or individual or business "adopt" each tree and take on the specific responsibility for keeping it in good health. Although such a plan would require administrative help, it could lower overall costs by improving the "success" rate or life span of plants. With minimal assistance, sponsors could provide all but the most major maintenance more effectively than the central city departments.

The skills required for this organizing and cooperative approach to open space development and management are quite different from those generally required for city planners and other city officials. The major deterrent to such an approach is not so much a lack of willingness as a lack of direct experience with such methods. In addition, there is limited perception of open space as a positive, distinctive, healthy land use in its own right. Open space must be understood not only as a complement to other land uses, but as a necessity for the overall health of the city ecosystem. The Boston experience has demonstrated how much work can be done with donated labor, materials and the determined vision of city folk who want to create a livable city.

Boston faces some tremendous problems with its "excess" vacant land. It also faces a tremendous opportunity. The next section will describe how some Boston residents have responded to the challenge, and following sections will describe in greater detail how the present opportunity can be seized.
SECTION III: A BRIEF HISTORY OF URBAN AGRICULTURE IN BOSTON

Boston, like other cities in this state and elsewhere, has a reputation as a "Port of Entry" for people of all origins, nationalities, and ethnic groups. Its wealth of human diversity makes Boston a virtual storehouse of traditions, cultures and skills which are often overlooked in the wonted descriptions of cities and inner city neighborhoods as "repositories of the poor" or "dumping grounds" for the more undesirable people of the society. The "unskilled" label so often applied to city residents is a relative term; it may be accurate as far as certain norms of industrial and technical skills, or fluency in English or general literacy are concerned. But in terms of a wide range of other skills, particularly agricultural know-how, many migrants to the city are abundantly skilled. In a sense, the city has become a warehouse of knowledge and experience with rural and agrarian settings, as during the later periods of migration predominantly rural people have come to urban centers seeking work. Once in the city, which commonly has no physical attributes which allow them to exercise their agricultural skills, people put their agrarian abilities in "storage."

For a time in the early history of the city, agriculture was not so distant from the center of city life. The Boston Common was established as common grazing land; the agriculturally productive areas of Roxbury and nearby areas of Belmont, Watertown and Brookline were used for orchards (home of the Roxbury Russet Apple) and vegetable and dairy farming. More recently, even as the agricultural periphery of the city was giving way to residences and other types of business, the agricultural capability of the city proper was demonstrated with the victory gardens of World Wars I and II. As late as World War II, Copley Plaza in front of Trinity Church in Boston's Back Bay was still unpaved and plowed for food production. The city's longest-lived "community" gardens were started in the Fenway (part of Olmsted's Emerald Necklace park system) during World War II and continue to this day, tended by some 500 gardeners.

For consistency, the term "urban agriculture" will be used to refer broadly to the myriad horticultural activities taking place in cities--from window boxes, front, side and back yards, and roof tops, to street
medians, sidewalks, parks, greenhouses and also community gardens. Urban 
agriculture, it should be noted, refers not only to the broad range of 
methods and locations of cultivation, but also to the variety of products 
grown, including trees for fuel, fruits and nuts; bushes and vines for 
fruits and seeds; row-crops; even grasses, wildflowers and other greenery 
which contribute to the vegetative productivity of the city.

("Community gardening" refers specifically to the growing of food using shared resources, including the land, fencing and water supply. Most often the land in community gardens is divided into plots tended by individuals or families, although occasionally in Boston a garden will have a "community" plot whose produce is shared by all.)

The Victory Gardens were the first examples of "community gardens" in Boston, and in some areas of the city, notably parts of Roxbury and North Dorchester, the concept of growing food in the city was kept viable and ongoing by individuals who tended vegetable patches on the small amounts of land available. The Roxbury Beautification Center, headed by the late Augusta Bailey, was one of the few organizations that brought 4-H activities to the heart of Roxbury for city children and sponsored feeding programs as well as several gardens. Other less organized efforts were taking place in various Boston neighborhoods as people took advantage of vacant parcels of land and applied their native cultivation skills.

By the mid-1960's, the amount of vacant land in the city began to increase dramatically. The increase was due to a variety of interlocked factors including major clearance of land scheduled for urban renewal projects, an interstate highway, and the accompanying cycle of disinvestment, deterioration, arson and vandalism that led to the demolition of thousands of units of housing in Boston over the past 15 years. Many of the originally scheduled urban renewal projects were left incomplete as funds for housing and redevelopment dwindled, or as citizen opposition halted or modified some plans.

There has been a dramatic decline in the density of urban neighborhoods in Boston as Census figures show. The Boston Redevelopment Authority has compiled data which show that in the period between 1950 and 1970, the average decline in density of Boston neighborhoods was 20% (See Table III-1). The decline for individual neighborhoods is astonishing: 52 percent for Charlestown; 60 percent for the South End; 42 percent for Roxbury
### Table III-1. Population Density for the City of Boston by Planning Districts: 1950-1960-1970

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as a whole (82 percent for one of its component neighborhoods—Lower Roxbury); and 49% for Downtown. Only Roslindale, West Roxbury and Hyde Park gained population; these neighborhoods are all outlying suburban-like areas which have been traditionally closed to the populations of color which were the hardest hit by the demolition and degradation of housing in the neighborhoods closer to the central city. While not all this population decline was caused by urban renewal plans, the net result of the population shifts has been large amounts of vacant land in these neighborhoods.

A survey from the Federal Census compiled in 1970 provides estimates that there are some 4,650 acres of "vacant" land in the city of Boston. In many neighborhoods the vacant land became the dominant, unsightly landscape over the past 15 years and remains so today. Most of the lots are covered by the remains of housing rubble, huge weeds grow unchecked, and it takes concerted and constant citizen pressure to determine the owner, get lots cleared, fenced and routinely maintained. Often the lots serve as dump sites for building contractors and others who find them a convenient, free alternative to paying a fee at the nearest legal dump. Dumping increases the rat population and invites vandalism and other abuses in the surrounding neighborhood.

GOVERNMENT AND LOCAL RESPONSES

The Revival Program

In 1975 in an effort to retrieve a few of these sites for more positive use, the City of Boston launched the Revival Garden program, supported by funds from the U.S. Department of Housing and Urban Development (HUD). At one time, HUD was one of the largest landowners in the city. Recently, however, the agency has divested much of its property.) In the course of four years, and an expenditure of well over $500,000, the Revival Program developed 30 gardens, 28 of which remain organized and in operation.

The Massachusetts Gardening Act

Interest in gardening was developing apace in other directions as well. In 1974, at the suggestion of Puerto Rican constituents concerned about the high and increasing cost of food and the vast acreage of vacant land along the Southwest Corridor, State Representative Mel King (D-Boston)
filed legislation to establish "the policy of the Commonwealth to encourage individual residents or groups of residents to use vacant state- or city-owned public lands for the purpose of gardening."* Any vacant land held by "state or local city or town agencies, subdivisions or instrumentalities" for which there are no immediate use or plans for use within a period of six months, should be made available for gardening. "Priority in the allotment of vacant land shall be given to elderly, low-income, and youth, respectively," states the legislation. In the following year, the Division of Agricultural Land Use was created and funded to carry out the work of allotting and overseeing the gardening program statewide. One of the largest gardens in the city is located on state-owned land at the Boston State Hospital grounds in Mattapan and provides some 400 families with land for gardens.

South End Garden Project

In 1976 the South End Garden Project was started with the assistance of the South End Project Area Committee, the citizens review group for urban renewal in that community. Long concerned with the vacant lots left in their neighborhood, staff and board members of SEPAC sought a small grant to begin gardening activities on vacant land. By the following year, eight gardens had been established with begged and donated resources including tools, seeds, fertilizer and labor.

Boston Urban Gardeners

In late 1976, a group of gardeners began to express their concern and dissatisfaction with the resources and supports available to urban gardens in the city. At a meeting in the living room of a Roxbury gardener, the concept of a coalition of gardeners and interested groups to advocate for urban agriculture and seek adequate resources for the gardens was developed. One of the most pressing needs was for topsoil. Volunteers from the South End Garden Project located a supply of soil at a site owned by the State's Metropolitan District Commission with the help of State Representative Mel King. The MDC agreed to donate the soil if the gardeners could provide

transportation to and from the site 25 miles outside Boston in the town of Marlboro. After a vote of the town, which has an ordinance stating that soil cannot be removed from its boundaries without such deliberation, gardeners, including the group which had begun discussions about a city-wide coalition, organized a cavalcade of twelve National Guard trucks, including drivers and a large front-end loader, to bring the soil into the city. For two "Earthmoving Days," and then again in the fall of the same year, volunteers worked with the Guardsmen hauling the soil and dumping it at sites around the city. The effort brought some $25,000 worth of topsoil (1977 prices) into the city. The model of cooperative effort and direct problem-solving was one that would be used repeatedly by the coalition which was formed soon thereafter. Meetings began weekly in the spring of 1977 and by July, the group, which included representatives of some ten state, city, and community agencies and organizations, became incorporated as a non-profit corporation known as Boston Urban Gardeners, Inc. or "BUG."

With a small grant raised for educational purposes, including a newsletter and workshops for gardeners, Boston Urban Gardeners began the work of locating resources for gardens, and, increasingly, taking on the issues of concern to gardeners which were bypassed, ignored or beyond the scope of capabilities of existing programs and groups. The weekly meetings continued (and still do as of this writing) as a forum for any interested gardeners or related agency staff or community groups who wish to make use of the group. Still functioning as a loose-knit coalition, Boston Urban Gardeners uses a cooperative process which encourages each group member to contribute whatever resources it has available to the solution of the problems or the accomplishment of the goals which are set by the group. In the past six months, the staff and budget of BUG have expanded as the organization has taken on larger work plans, such as the physical improvements of gardens, in addition to facilitating the joint efforts of members of the coalition.

Open Space Management Program

At about the same time that BUG was forming in response to the lack of city support for gardens, the City of Boston launched a new program to deal with vacant lots on a more comprehensive basis. The Open Space Management program, located under the Boston Redevelopment Authority, using Community
Development Block Grant funds, is charged with clearing, fencing and "treat- ing" vacant lots in eight city neighborhoods in one of several ways, including the spreading of pine bark mulch, gravel, herbicides to stop weed growth and three to six inches of loam. Residents of an area can request the treatment they prefer so that land can be used for parking, a garden, a play area, or will at least be less ugly to look at.

Since the start of the program in 1977 over 135 lots totalling over 560,000 square feet, or roughly 12.8 acres, have been provided with loam. Of all the vacant lots treated by the program, 51 percent are owned by some department of the city and 43 percent are privately owned. Only 4.3 percent of all the lots treated during the past three years were provided with loam; almost five times that many were covered with bark mulch.* For the first three years of its operation, the Open Space Management program was budgeted $1.4 million dollars, excluding an almost equal amount of funds provided through CETA labor for the work crews. For its coming year of operation (which at this writing is not yet approved), the requested budget is a full $1.1 million, since CETA will not be available. In the designated neighborhoods, the BRA estimates that there are still almost 6,000 parcels which have not been touched, 79 percent of which (4,617) are vacant lots. The mean square footage of these lots is just over 4,700 square feet, indicating that there is a total of 21,836,394 square feet, or some 500 acres of vacant land in these neighborhoods (which are roughly a third of the city's neighborhoods). Again, 35 percent of this land is owned by some city agency. Another interesting fact is that the mean size of these lots is under 5,000 square feet, which is now considered the minimum "buildable" size given zoning changes in recent years. This suggests that many of these lots should be maintained as open space.

It is not accurate to count the vacant lots provided with loam under this program as "gardens," since there is no accompanying effort to organize a sponsoring garden group and resources are still lacking, including sufficient topsoil and a water supply. But the Open Space Management program has attempted systematically to address the problem of vacant lots in the

* All data on BRA Open Space Management program from 1980 BRA records and personal communication with BRA staff.
city and has brought to light both the tremendous cost of one-time clean-up efforts (no maintenance can be provided) and the tremendous potential for development of various types of open space in Boston's neighborhoods. Unfortunately, given the difficulties of managing contractors and the lack of local organization to follow up on the cleaning, the Open Space program often raises hopes which cannot be fulfilled by that one program, and eventually causes frustration as residents watch the lots go back to weeds and trash. For the time being, the Open Space Management program is merely turning over fertile ground for the garden movement in the city, ground which is all too often reclaimed by neglect.

In neighborhoods which start out with strong local organizations, however, the Open Space Management program has been the source of the "critical mass" of resources which has resulted in new gardens. The several new gardens developed by the Mission Hill Gardeners are an excellent example of what determination and creativity can do; the gardeners rigged up alternative water supplies, obtained free manure and other soil amendments to supplement the sandy and nutrient-poor soil provided in that instance by the city, and are now moving determinedly toward planting cash crops, and are experimenting with a wildflower seed mix to hold and improve soil in areas that they do not have time to garden yet. In the meantime the group has incorporated and is in the process of establishing a community land trust to purchase the gardens for permanent community use.

Other Support for Gardens

Among other supporters of urban agriculture in Boston over the past few years are agencies such as the State Department of Communities and Development (formerly the Department of Community Affairs) which has a small program (one and a half staff) to provide technical assistance and information to community gardeners, food co-ops and other efforts at food self-sufficiency; Action for Boston Community Development (ABCD) which has a two-person staff and a small budget which has provided a much-needed source of funds for physical improvements to start or improve gardens; the Tenants Policy Council of Boston which has provided largely organizational help to start gardens in Boston's numerous public housing projects (home to 10 percent of the city's population); and the Suffolk County Extension
Service which receives over $100,000 of federal and county funds to run a traditional educational extension program for urban gardeners.

An ever-increasing number of local sponsors, community organizations and institutions alike, have also become involved with community gardens, including groups such as WE CAN, Inc. of Dorchester, the Central Roxbury Land Trust, Dorchester House (a settlement house), the Dorchester Neighbors Organizing Neighbors; and many others, many of whom see gardens as a short-term but integral element of their long-range plans for community redevelopment.

WHO GARDENS?

It is difficult to determine the number of gardens now active in Boston. Some gardens started under the Revival program two or three years ago have had their water systems break down or fences broken and have lost their active gardening group in the long wait for help from the city or, more recently, from BUG which took on a contract to provide repairs and improvements with the last bit of funds allocated to the Revival program. Some gardens have never quite gotten activated after some of the basic resources, but not all, were obtained by the first interested group. People have moved away or lost interest or become too frustrated to continue in the face of difficulties. Some new gardens have quietly been started without help from the existing network of supporters and so are not on any lists or actively involved in network activities. The number of potential gardens on sites prepared by the BRA Open Space Management program is still undetermined. The most recent list compiled by the State Department of Food and Agriculture, Division of Agricultural Land Use lists over 60 gardens in Boston with a conservative estimate of 30 acres. Assuming that perhaps ten percent of the lots treated by the BRA in the last three years have active garden groups, another 13 to 15 gardens (another five acres or more) may be active. The gardens are located in almost every one of Boston's 18 neighborhoods, and there are many other gardens which are not accounted for by any of these lists.

The ethnic mix of gardeners is also difficult to determine exactly; there has never been a "Gardeners Census," although the Department of Communities and Development and the Department of Food and Agriculture
estimate that there are 3,000 to 4,000 low-income gardeners eligible to receive free seeds in the Boston area. But the gardens are predominantly located in low-income neighborhoods with ethnic populations. A very rough estimate would place the number of Black gardeners at 40 percent; Chinese at 8 percent; Spanish at 20 percent; and other ethnic (Lebanese, Haitian, Portuguese, etc.) at 10 percent. Many of the gardeners, probably as high as 25 to 30 percent, are elderly citizens.

DEVELOPMENT OF GARDENS

At this point in the history of urban gardening in Boston, it is possible to point out a general pattern of development that occurs in most gardens. The first stage is basic resource collection. People spend most of their time locating and collecting the basic resources--land, fencing, soil, water, seeds, tools--which are essential to starting a garden. Often this stage will take even more than one growing season, since it is possible to start without adequate resources. Over roughly the same time period the garden will also go through a stage of preliminary organizational development, as the garden finds a coordinator, determines a land allocation process, sets out its basic rules of operation and tries its first season. Eventually, usually in the second and third years of its existence, a garden will go through a period of making improvements, particularly in the physical state of the garden--a border of flowers and eventually landscaping, a hedge or a pathway--and then typically a garden will consider expansions of various sorts--more land, solar technology to extend the growing season, sponsoring a farmers' market, and similar extensions of the garden itself. Often by the second year gardeners begin talking about how great it would be to have a greenhouse for year-round gardening. There will be discussion of a harvest festival, a block party or some other way of opening the garden to friends and neighbors beyond the plots within the fence. After a garden is working well enough for the gardeners to consider extensions and expansions, it will begin to go through another stage of organizational redevelopment, a period when the garden will consider becoming permanent, obtaining fundings from various sources, and findings ways to become self-supporting and self-sustaining.
Gardens now exist in Boston at all these stages of development. Some, of course, have not followed this pattern of development exactly, but have started at different points depending on the history of each site.

In summary, the history of urban gardening in Boston has been that of a largely grass-roots effort, aided at times by governmental programs, but more often than not, struggling to get adequate and minimal basic resources. Officially, the urban gardens sponsored by government programs have been considered an "interim" use for vacant land in the city. Community gardens for food have not been an integral part of a serious open space development program—"open space" as defined in Section II, rather than the euphemistic term used by city officials for vacant lot clean-up. Rather, they have been an effort by local residents tired of looking at the vacant land in their neighborhoods, concerned with the degrading effects of such land on their communities, and worried by the constantly increasing prices for food. But the gardens are also the product of the vision of neighborhood residents, people who carry with them images of their greener homelands, of a city which can sustain their families in a healthful and more beautiful environment. For the gardeners the gardens are very serious business, and more than a symbol or an intermediary solution to the vexing problem of the failure by the city planners to shape the neighborhoods as they desired.

CURRENT TRENDS AND THE FUTURE OF THE GARDENS

In some sense, the gardens are also a bellwether for change taking place in many of Boston's inner-city neighborhoods. As the energy crisis is felt more deeply by commuters (80 percent of Boston's downtown jobs are held by people living outside the city*), and as the city of Boston becomes increasingly dominated by large corporations desiring attractive housing for their executives and managers, the pressure on inner-city real estate is increasing. With interest rates at all all-time high, most housing in Boston's central neighborhoods is now beyond the reach of the average working household. The city's redevelopment plans have been completed in more desirable areas such as the South End, near the Prudential Center and

* 1978 BRA report cited by Boston Jobs Coalition staff during personal communication.
the North End along the waterfront. Long-time residents have been pushed from their homes (Table III-1 points to the drastic reduction in population in many of these areas) and cannot afford to relocate within the same community. Condominium conversions are increasing the pressure by consuming even the renter's domain with enormous sales prices unit by unit.

The increasing pressure on city land makes the existence of the gardens all the more precarious. A high proportion of the gardens, probably 90 percent, are on city-owned land which is available only on loan from various city departments. Many of the lots are owned by the City's Real Property Department, which is charged with selling its properties to obtain the highest possible return to the city in tax revenues, and which is the only city department that actually brings funds into the city coffers.

The heated real estate market is coinciding with the third stage for many of the gardens. Gardeners are beginning to realize that all the sweat equity they have invested in the gardens is only considered "payment" for past use, not for any sort of future security. At the same time, gardens are more organized and beginning to see the potential for food production and neighborhood benefits far beyond their individual plots. The result is intense interest in land trusts and other methods of securing the gardens for future use. Among various approaches to security being considered are obtaining long-term leases from city agencies, having garden land transferred to the permanent open space status of land held by the city's Conservation Commission (a state-authorized agency), and purchasing the land outright. Among issues that community groups and gardens must face include tax assessments and payments, incorporation and tax-exempt status, ongoing maintenance and responsibility for gardens once they are under community control. In response to the tremendous interest among the gardeners in long-term use of the gardens, a consortium of garden and community development groups have been meeting with The Trust for Public Land of New York City, with the support of the Boston Natural Areas Fund, a private fund closely tied with the City's Conservation Commission which seeks to raise funds to protect conservation lands in the city. The Fund has shown interest in garden land as a new definition of green and open space in the city beyond their original concern with parks and "wild" areas. Several of the groups which have been involved in the training series are in the process of taking the reorganizational steps, from
incorporating and seeking tax-exempt status to filing petitions to purchase land to negotiating long-term leases (no longer than five years at this time, however), necessary for obtaining greater security for garden land.

The outcome of some of the ongoing negotiations will determine the future of the gardens and the urban agriculture movement in the city. There are serious concerns among some garden organizers now that gardens organized two or three years ago for low-income people in some city neighborhoods are being taken over by the newcomers, the so-called gentry, who have flocked back to the city in the wake of the energy crisis and renovations made in some of the more desirable sections of downtown neighborhoods. After years of scrounging for resources and making do with the minimal resources to grow some of their own food, gardeners find that there are lists of new residents who also want to garden, as an "amenity," not as a matter of survival. The gardening movement may have in fact helped to attract some of the very people who are beginning to crowd the original participants in the gardens. As the cost of living in these neighborhoods increases, people who have lower incomes may find that they cannot afford to stay—even homeowners who find that constantly increasing taxes are the last straw for already overburdened budgets.

The serious assessment of the economic value of the gardens is a critical element in the steps that need to be taken to secure city land for future food production and a livable environment.
SECTION IV: ECONOMIC DEVELOPMENT POTENTIAL

INTRODUCTION

For many observers, the idea that "urban agriculture" could be in any way linked to "economic development" is practically a contradiction in terms. As Jerome Rappaport, one of Boston's long-time developers (creator of the Charles River Park development which replaced Boston's West End) said at a conference on open space, "Frankly, I think that all your community gardening is insignificant." Next to the typically massive schemes for urban renewal, now taking new shapes with federal Urban Development Action Grants, and the large-scale efforts by state and local government to lure multi-million dollar business investments into the Boston area or convince them to stay rather than moving to potentially more profitable areas, the amount of food grown in Boston on small, scattered sites hardly looks like a basis for measurable economic effects.

For the people who use the gardens, however, their economic value is not a theory or an abstraction. It is impossible to understand the potential for urban agriculture using conventional definitions of economic and community development. To provide a context for understanding the proposals for developing urban agriculture which will be presented in the remainder of this paper, this section will develop a set of working definitions and a perspective on the meaning of community economic development.

WHAT IS THE PURPOSE OF A CITY?

Murray Bookchin, in his small book The Limits of the City, is profoundly critical of the "modern metropolis" which he finds an exaggeration to the point of perversion of the original purposes and potential of cities of long-past eras. "This book tries to show," he writes, "that the city must be viewed not only as a special arena for human sociation called 'urban'...but also as the product of distinct social relations and modes of social development."* "We are slowly losing a humanistic conception of

the very meaning of the word 'city.' Paradoxically, we live in a world marked by rampant urbanization—but one that lacks real cities."*

What is a "Real City?" A definition that is at once prehistoric and futuristic, but, unfortunately, not current, is the following: A social and economic system which functions to provide opportunities for meeting all the basic human needs of its residents: food, shelter, energy supplies, work (both to earn income and to satisfy the human need for constructive participation), education, health, and caring relationships.

The dictionary (Funk and Wagnalls Standard College) says simply that a city is "a place inhabited by a large, permanent, organized community" (emphasis added). Perhaps, because the cities we know personally have grown so far beyond that simplistic definition and have developed in directions so contrary to meeting the human needs of its residents, there is an increasing tendency among those who discuss cities to do so in terms of "communities," a term which seems still to retain more distinct character and more definitive form and dimensions.

The city as we know it began to deviate from its original forms with the early change from the medieval economy to capitalism. One of the more exhaustive chronicles of this transformation is Mumford's The City in History. He writes:

The new forces favored expansion and dispersal in every direction, from overseas colonization to the building up of new industries, whose technological improvements simply cancelled out all medieval restriction. By the seventeenth century, capitalism had altered the whole balance of power.**

And:

The final result of capitalism was to introduce the modes of the marketplace, in a universal form, into every quarter of the city: no part of it was immune to change, if this could be brought about at a profit.***

Like Bookchin, Mumford finds that the transformation of the city threatened its humane purposes:

* Ibid.


*** Ibid., p. 411.
In relation to the city, capitalism was from the beginning anti-historic; and as its forces have consolidated over the past four centuries, its destructive dynamism has increased. The human constant had no place in the capitalist scheme: or rather, the only constants it recognized were avarice, cupidity, and pride, the desire for money and power.*

Bookchin offers one example from very early urban experience which illustrates the importance of these human constants.

(W)ithout a highly dedicated, socially responsible labor force that alone could have provided the intensive cultivation required by maize and by a technology that had not advanced beyond the hoe and human muscle power, it is doubtful if the substantial material surpluses needed to sustain large cities would have been available in Mexico and Peru. Indian food cultivation on such a scale was possible only under social conditions in which people related to each other as kinfolk rather than isolated urban citizens.

The change to capitalism not only obscured some of the more basic human purposes of the city, but also changed the basic power structures and the degree of control by citizens over their economy. As Mumford describes it:

...the development of capitalism was, in part, a necessary effort to overcome the serious limitations of the medieval economy.... Instead of accepting the traditional products of the regional economy as relatively fixed and limited, the new merchant adventurers sought to expand production and widen the market: they furthered technological improvements like the knitting machine, and they drew widely on overseas areas alike for raw materials and for finished products. The shipment and interchange of these goods formed an increasingly large part of the activities of prosperous cities; and with this more and more of the economic life escaped the control of the municipalities.

Thus capitalism, by its very nature, undermined local autonomy as well as local self-sufficiency, and it introduced an element of instability, indeed of

* Ibid., p. 413.

** Bookchin, The Limits of the City, p. 12.
active corrosion into existing cities. In its empha-
sis on speculation, not security, upon profit-making
innovations, rather than on value-conserving tradi-
tions and continuities, capitalism tended to dismantle
the whole structure of urban life and place it upon a
new impersonal basis: money and profit.*

More visibly, the dominance of capitalism brought about changes in
land use and altered the city landscape. Writes Mumford:

...all land that had escaped feudal tenure and was
subject to unlimited sale was considered, more and
more, as a means of making money.... When land became
a commodity, not a stewardship, it passed out of any
kind of communal control.**

And:

...capitalism of the seventeenth century treated the
individual lot and the block, the street and the
avenue, as abstract units for buying and selling,
without respect for historic uses, for topographic
conditions, or for social needs. Except where
ancient feudal rights or royal prerogatives slowed
down the process, the municipality lost control of
the land needed for its own proper development.***

The inevitable result, says Mumford, could be seen in the physical design
of the city.

If the layout of a town has no relation to human
needs and activities other than business, the pattern
of the city may be simplified: the ideal layout for
the business man is that which can be most swiftly
reduced to standard monetary units for purchase and
sale. The fundamental unit is no longer the neighbor-
hood or the precinct, but the individual building lot,
whose value can be gauged in terms of front feet++.+

This new perception of land as commodity and city as financial factory led
to what Mumford calls the "quick parcelling of the land, a quick conversion
of farmsteads into real estate, and a quick sale,"++ and

** Ibid., p. 416.
*** Ibid., p. 421.
+ Ibid.
++ Ibid., p. 422.
brought about the demolition of old buildings and the effacement of playing fields, market gardens, orchards, and villages that stood in the way of the growing city. No matter how venerable old uses might be, or how salutary for the existence of the city itself, they would be sacrificed to fast-moving traffic or to financial gain.*

The city as we know it continues to go through cycles of investment and disinvestment, decay and renewal, depending on the profitability of various courses of action by investors. Many of these cycles have been deliberately planned, again without adequate regard for the effects upon people, because planners deeply believe that capitalism works, and eventually will produce benefits for everyone in the society even if they are excluded from direct participation in the process of production.

If one starts from the opposite end, however, with the human needs to be met rather than an economic structure which might eventually meet them, some very different sorts of planning are required. The economic structures must be built in order to meet the needs of the people participating in the system.

In terms of the image of the city as foremost a provider for the basic needs of its residents, what is a definition of "community economic development?" To develop this definition we need to delve more deeply into the meaning of the words and the social and economic structures they imply.

The dictionary definition of "economic," just for the record, is "of or pertaining to the development and management of the material wealth of a government or community" (emphasis added). "Economics" is defined as "the science that treats of the production, distribution and consumption of wealth and the means of supplying the material needs of (hu)man kind" (emphasis added). "Wealth in economics is defined to mean: "All material objects having economic utility; all property possessing a monetary value." More broadly, wealth is defined as "a great abundance of anything."**

"Community" is defined as: "A group of people living together or in one locality and subject to the same laws, having common interests,

* Ibid., p. 414.

** All definitions from the Funk and Wagnall's Standard College Dictionary.
characteristics, etc. Community is also related to "common ownership or participation, identity or likeness." A synonym is "commonalty." Most residents of a community, no matter where located, have common interests of all sorts related to the condition of their locality. But most observable communities now have all too few vestiges of common ownership or of participation in the factors related to their common interests, whether land and local resources or local government. Centralized government and the dominance of profit-oriented modes of production and management of resources run counter to such local initiative, involvement and control.

One more fundamental definition will help formulate the meaning of "community economic development" which will be used in this paper."Develop" means "to expand or bring out the potentialities, capabilities, etc., of." And, more ambitiously, "To cause to evolve to a higher stage... to advance from a lower to a higher stage; grow; evolve."

All too often the conventional use of "economic development" stops after the first word of the dictionary definition: "expand." Growth, unlimited and undefined, has become the catchword of many proponents of "economic development" who claim that if the pot of stew simmering on the national economy is simply enlarged, more cups can be ladled out. What we all know, however, is that some people rise from the table with bloated bellies, having obtained a disproportionate share of the increased stew-pot, while other people wait, empty stomachs growling, outside the dining room. The larger pot may "reach" more people by wafting the cooking smells farther, but it will not, in practice, provide food for many more people.

Gaining maximum profits from any one economic venture is a capitalistic tradition which blocks all thoughts of "development" as enhancing capabilities, encouraging potentialities or contributing to evolution toward higher forms. As Mumford points out, the action which will maximize profits at the moment, such as dividing land into the smallest possible parcels or building housing cramped together may cause one of those curious contradictions when capitalism "overreaches" itself* and makes its product undesirable and therefore unable to provide the basis for long-term exploitation. The excesses of such efforts to exploit the city, however, have

time and again short-circuited the possibilities of healthy growth and development.

Biological analogies are irresistible at this point: think of the development of any living organism which may involve growth, but never unplanned, unlimited growth. Each new cell is added on systematically, suiting the capacity of the organism to obtain sustenance, to manage its wastes, to be compatible or successfully competitive in its living space. Each bit of growth is related to the whole in terms of functional dimensions; all parts are proportional to their functions so that the total system does not become imbalanced. The logic of interlocking, interdependent biological systems and their components is much to be envied and emulated in our communities, and the cities for which they are the building blocks.

For a "Real City" which is based on human relationships and is structured to meet human needs, "community economic development" would mean local ownership and control of the resources (wealth), and careful nurture (stewardship in the sense of managing that which belongs to others--in this case the community as a whole) of those resources (including people) to reach their highest possible level of production and development for the benefit of the community as a whole. Management of the wealth developed would include equitable distribution to all neighbors, and presumably some "savings" of wealth to supply future investment funds, support and capital for the community's own developmental needs. The specific activities on which community economic development should be based are those which will provide basic necessities: food, shelter, health care, education, recreation and developing other productive work which can be "exported" from the community and provide jobs and income for those who are not employed in the other basic areas.

We could define "community economic development" as: The enhancement of a community's ability to provide for its own basic needs through the development of physical resources (land and buildings), human skills, and local organizations and institutions which can be used in exchange, purchase, trade and production to increase the vitality and strength of the community and the larger economy of which it is a part.
This definition, obviously, is absolutely contrary to the widely accepted visions of urban renewal and other forms of "economic development" which are predicated on the clearance of local resources (people and structures), making way for projects characterized by their large scale, their relatively uniform purposes and dedicated to the concentration of wealth and control of wealth under ever more consolidated corporate structures. This type of renewal has no interest in utilizing and developing local skills and capabilities, unless these can be bent to the purposes of corporate profit acquisition. In fact, diversity and human complexity are dysfunctional for these "developers" who desire the least possible friction and resistance to their plans. And meeting basic human needs is not their concern, since the cardinal rule is that people who dutifully work at the jobs available earn the income to get their needs "met" in the mythical free marketplace.

The definition offered here is based on the concept that diversity provides the basis for healthy communities and the belief that the city must be treated as a "renewable resource" rather than as a disposable material for profit-production. Jane Jacobs in The Economy of Cities argues that the "disappearance of variety saps the life of the community."* In fact, she finds, diversity functions as the well-spring of new work, innovation, and growth based on further diversification. New work is often added to old work, she observes, conserving the older skills, but applying them in new ways that open added dimensions of production and development. She sees the need to view cities as a combination of uses, not as isolated uses or functions. It is important to understand the city as a whole composed of many parts that function separately but that are also interdependent. In her mind, the real question is how to generate enough diversity to keep developing new work and successfully "reproducing" the conditions that meet human needs through useful work. "The fact is," she writes in The Death and Life of Great American Cities, that big cities are natural generators of diversity and prolific incubators of new enterprises and ideas of all kinds. Moreover, big cities are the natural

economic homes of immense numbers and ranges of small enterprises.*

Unfortunately, much of the "redevelopment" of big cities has been dedicated to removing just the sort of small enterprises and diverse populations which she finds so essential to neighborhood and city health.

Another of Jacobs' theories is that a city's most "explosive" growth will come as it goes through the process of beginning to replace goods that it previously had to import with local products. Eventually the growth stimulated by this cycle of development can generate new exports which provide economic flexibility and potential for developing more new work. But in hard times, she notes, when export business is lost due to disruptions of war or severe economic conditions, it may be local production of replacements for basic imports that sustains the local economy through the difficult period. (See The Economy of Cities, pp. 150-154.) Hence an emphasis in the definition of community economic development offered here on the development of local capacity to produce basic needs such as food which are currently met to an alarming extent by imports.

Jacobs also warns that there is the equivalent of "too much of a good thing" in booming city economies. When profit is the driving motive, a successful, diverse area of a city will attract an increasing number of investors, creating intense competition for space. Winners of the competition, which tend to be a narrow segment of the most profitable type of business, force out other users, and eventually create a monotonous sameness in an area that originally attracted the business because of its diversity. In this way diversity can bring about its own self-destruction.

This process is called "un-building" by Mumford. "In un-building," he explains, "a more advanced form of life loses its complex character, bringing about an evolution downward, toward simpler and less finely integrated organisms."** This concept has disquieting implications for the disintegration of a city like Boston into hostile and armed ethnic and economic groups which seem increasingly impossible to reconcile.


Mumford links un-building to the technology of mining, which both literally and figuratively began to dominate industry and urban forms during the transition to capitalist economies. Significantly his discussion of "mining" contrasts the effects of treating the city (or any other resources) as disposable to the results of carefully managed renewable systems such as properly practiced agriculture.

Agriculture creates a balance between wild nature and man's social needs. It restores deliberately what man subtracts from the earth; while the plowed field, the trim orchard, the serried vineyard, the vegetables, the grains, the flowers, are all examples of disciplined purpose, orderly growth, and beautiful form. The process of mining, on the other hand, is destructive: the immediate product of the mine is disorganized and inorganic; and what is once taken out of the quarry or the pithead cannot be replaced. Add to this the fact that continued occupation in agriculture brings cumulative improvements to the landscape and a finer adaptation of it to human needs; while mines as a rule pass quickly from riches to exhaustion, from exhaustion to desertion, often within a few generations. Mining thus presents the very image of human discontinuity, here today and gone tomorrow, now feverish with gain, now depleted and vacant.*

Bookchin also notes this phenomenon and charges that the "massified" city of today is guilty of "reducing the individual from a microcosm of the whole to merely one of its parts."**

Any program which treats the city or its people as a "raw material" to be mined and reformed to suit the investor rather than as complex living organisms which require maintenance and skillful support and management, cannot be called community economic development. It is the obliteration of community for the sake of economic gain, but it is in no sense the "development" or evolution toward higher forms which sustains a community. Unbuilding happens ethnically, racially, and economically among populations, as well as among businesses, physical structures and land uses, and politically as centralization of government blots out more diverse patterns of participatory governance.

* Ibid., p. 450.

** Bookchin, The Limits of the City, p. 78.
The purpose of community economic development, in light of these arguments, is to build, not to un-build. It should promote diverse uses of land and other resources by diverse populations. It should support and encourage diverse economic ventures which are designed to supply basic commodities which will help replace expensive imports and strengthen the base of economic activities from which new economic activities can be generated. Above all, community economic development must respect the individual as a valuable contributor to the building process, both as an individual and as a member of the larger community in cooperative action with many other community-builders.

Thus, community economic development, for the purposes of this discussion, specifically means the following process:

- Building interlocking systems, based on local ownership and control of resources, designed to meet basic human needs including food, housing, clothing, education, health care, environmental balance, recreation and participation in community-building.
- Developing systems designed to distribute resources and wealth equitably.
- Developing systems designed to maintain and provide sustenance for on-going community development, including financial institutions which can accumulate funds for future community investment.
- Fully utilizing available space, resources and human skills in the diverse, multi-purpose systems listed above.

The result would be akin to Bookchin's vision of "the truly human city," which he defines as:

(A) way of life that fosters the integration of individual and society, of town and country, of personal and social needs within a framework that retains the integrity of each. A new synthesis is to be achieved which makes the fulfillment of individual and urban needs complementary to the fulfillment of social and ecological needs.*

URBAN AGRICULTURE AS COMMUNITY ECONOMIC DEVELOPMENT

Urban Agriculture is the antithesis of the un-building of the city. The vacant lots in the city are the result of exploitation of the land, the people and the city's resources as profitably expendable items. Urban agriculture assumes a totally different relationship among the people of the city and its physical resources.

Fundamentally, urban agriculture provides a healing process for the scarred city landscape. The gardens that exist provide a mere preview of what could happen in the city if there were a conscious effort to utilize available space for maximum food production and environmental enrichment. Urban agriculture is one of those intricately complex activities which embody the opportunities for choice (as described by Lynch) and invention or creativity (as described by Jacobs) which should characterize a city. The cross-connections among food production, recreation, cultural skills and socio-economic groups are myriad and lend richness and stimulation to the already satisfying experience of taking control over a portion of the family food supply, and interacting on an intimate level with natural processes. Urban agriculture "organically" (that is, "pertaining to the fundamental structures," and "characterized by systematic coordination of parts") combines several basic urban functions: economic production, but also human nurture, social contact, environmental cohesion, and community-building. Inherently, urban agriculture is designed to utilize otherwise neglected human skills. It provides a means for passing on human skills that would otherwise be left unexercised and eventually eradicated by today's city life, rather than being passed on to succeeding city generations. Urban agriculture is protective of diversity because of the diverse cultural origins of the gardeners who grow the produce with the methods of their native cultures—Chinese, Caribbean, Southern Black, Puerto Rican, Lebanese, Italian, and many others.

Perhaps even more important than the ability of urban agriculture to unite so many functions while producing a basic necessary commodity, are some of the less overt characteristics of this activity which could have important implications for "economic development" at the community scale. Currently, given the allocation of space in the city, community gardens have developed in a cooperative manner that is uncommon for this society,
whether in urban or rural areas. The necessity for sharing what resources there are, combined with the love of gardening and enhanced by the fact that small-scale agriculture is very responsive to intensive production techniques, has created an opportunity for developing social skills which are sorely lacking in most other settings. The same skills can have applications in alternative economic ventures and, ultimately, could help strengthen the democratic foundations of the society. The ability to make collective decisions about community economic development goals and methods is critical to a successful revision of the definition and practice of community economic development.

And, urban agriculture has considerable promise for providing locally-produced foods which can reduce imports from distant suppliers. The potential for forward and backward linkages from urban agriculture, briefly sketched in the following section, could provide a basis for a variety of small economic ventures which would be compatible with the definition of community economic development provided above.

It is clear that urban agriculture will not lead the city to "self-sufficiency." This overused term is unrealistic as far as how much and what types of food can be produced. It may also possibly be a misleading goal for any community which values the diversity and interaction which connections to other groups and economies can provide. More to the point, urban agriculture has characteristically developed "self-reliance," a state of confidence, energy and skill development that allows someone or some group to take initiative rather than waiting for outside responses to needs. Self-reliance is a condition sorely needed by urban communities which have been abandoned until new opportunities for profit-making arise, and it is a prerequisite for any community which hopes to increase its level of community control.

Urban agriculture is both literally and figuratively a model for community economic development activities which can build interlocking basic resource systems, promote local ownership and control of community resources including land, and, eventually, provide some sustenance including financial support for related and unrelated economic ventures. While urban agriculture is only one of many approaches, and one that is most useful as a complement to other efforts at community economic development, the growth of neighborhood food gardens is also contributing to the healthy
growth of community. The next section provides an overview of some of the basic components which could provide the basis for a city-wide urban agriculture system in Boston.
AN URBAN AGRICULTURE SYSTEM FOR BOSTON

The work of the Boston urban gardening network over the past four years has indicated the potential and the need for the development of an entire system of agricultural operations, some of which could potentially become small businesses, to serve the needs of city residents who desire to produce more of their own food and to gain greater control over their environment and food supply in particular.

The components of this system can be divided into primary and subsidiary activities. Primary activities are those which are either (1) essential to the continuation and success of urban agriculture or (2) logical foundations for other activities which may develop after primary activities are well established.

Subsidiary activities are those which are natural adjuncts or outgrowths of primary functions, and which may or may not eventually provide an increase in net production of the entire system but which provide a useful support or enhancement to other components.

The development of these components may progress in a "lumpy" way; there may not be a natural and simple sequence of one component after another. Some activities may have to be initiated simultaneously in order to realize economies. Others may start outside of a logical sequence because energy, resources or initiative may exist regardless of other factors.

Table IV-1

<table>
<thead>
<tr>
<th>Primary Components</th>
<th>Subsidiary Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compost facility*</td>
<td>Other recycling (home heating)*</td>
</tr>
<tr>
<td>Nursery*</td>
<td>Production of garden support materials*</td>
</tr>
<tr>
<td>Landscaping*</td>
<td>Greenhouse/flower production*</td>
</tr>
<tr>
<td>Garden Production</td>
<td>Canning center</td>
</tr>
<tr>
<td></td>
<td>Garden supply co-op</td>
</tr>
</tbody>
</table>

Adjunct
Farmers' Markets
Support Services

* Potentially capable of producing income.
The primary components of this system as noted in Table IV-1 are a large-scale compost operation, a nursery, a landscaping business, and the basic food production of community gardens. Subsidiary components include the recycling of wood and other useful materials which can be attached to the compost operation; the production of garden supports such as window boxes, cold frames, solar pods, plant stakes and possibly wooden fencing; a combination greenhouse and flower production operation; a community canning center; and a garden supply consumer's cooperative. Two adjunct components of the system are the farmers' markets, which are a unique link to the rural areas of the state and provide both quantities and varieties of crops which both gardeners and other city residents may desire; and a service-support component, such as the advocacy and assistance provided by the Boston Urban Gardeners coalition.

The total system envisioned is presented in Figure IV-1. Each of the major components is discussed below.

Soil Production

The greatest single need for improving and expanding urban food production at this time, other than the all-important issue of land-use and control by city residents, is soil. The city of Boston has suffered massive disturbance of its basic geological structures. During its early history parts of Boston such as Fort Hill were being leveled to provide fill for the ambitious reshaping of the city's natural contours. In later years, the city became increasingly built up and paved over as business and residential patterns took precedence over the use of city land for grazing, for instance. As population expanded and pushed beyond the central settlement, the once-suburban orchards of Roxbury and other areas were cleared for housing construction and other uses of the growing population.

All of these changes meant that the topsoils of the Boston area have long ago been radically disturbed, in most cases entirely removed. Those few areas which have long been deliberate open space such as the Olmsted parks may have relatively undisturbed soils, but they have not been maintained in any way and such soil is not available for replenishing the vast amount of unplanned "open space" which has resulted from urban "renewal" or disinvestment. The new wasteland of vacant land in the city would require
Table IV-1. Components of an Urban Agriculture System

Supply Co-op

Nursery-Propagation

Landscaping

Give-away bulbs, seeds, cuttings

Organic wastes

Wood Recycling

Other Recycling

Production of garden-support products: cold frames, window boxes, etc.

Home and Community Garden Production

Compost Production

Community Canning-Storage Center

Support Services

Farmers' Market

Primary Components
tremendous amounts of soil to revitalize the earth's capacity to produce anything more than hardy weed crops.

Although considerable amounts of public funds have gone into the development of some of the gardens (approximately $250,000 on 30 gardens, perhaps a quarter of the gardens which currently exist), the soil purchased under such programs was often of poor quality (in some cases seriously contaminated with heavy metals or totally devoid of nutrients and organic matter). The disheartening discovery that heavy metals (particularly lead and cadmium) are a serious problem in both urban and suburban soils, making it difficult to locate soil even to import into the city without contributing to pollution, further emphasizes the need for a "clean" source of soil.

Large quantities of topsoil (over 180 cubic yards per 5,000 square feet or one house lot size) are needed to cover the average sized community garden to the depth of one foot of soil. Both new gardens (demand for new garden space has not yet leveled off in Boston neighborhoods) and established gardens require soil to maintain soil quality and support continued productivity. It has been estimated that the current number of gardens in the city of Boston requires 25,000 cubic yards of topsoil simply to bring gardens up to a standard of one foot of soil covering the entire garden.*

What topsoil that does exist for import to city gardens is either very costly (up to $20 per cubic yard or $3,600 per garden) or of limited quality (as little as $5 per cubic yard). In both cases, the soil must be transported from long distances which suggests that as energy costs increase, the cost of soil will also rise. Use of soil from the current market is undesirable for several reasons. First, it is a natural resource which, if exported, can cause serious ecological disruption and damage. Laws in many jurisdictions now require that removal of topsoil be approved by a town meeting, an indication that some towns realize the value of their native soils. Second, the current price for good quality soils contains the high cost of long-distance transportation, an energy intensive process which is increasingly costly and environmentally and economically imprudent. All these factors, coupled with the economic profile of most urban gardeners

and inner-city neighborhoods which need soil replenishment the most, suggests that other less costly sources of soil, closer to the point of use, need to be found.

On the basis of these needs and conditions, a considerable amount of research has been done within the Boston urban agriculture network on the feasibility of large-scale composting to produce humus, or decomposed organic matter which is an excellent soil base. The attractions of composting are many. First, it is an energy efficient process even using the newly developed "static" methods which require small amounts of electricity to move air through large piles of organic material. Second, the raw ingredients for compost are organic materials which are currently considered "waste" in the urban ecosystem, and are disposed of at great (and increasing) cost to taxpayers and businesses. As land-fills are closed due to lack of land or unsound environmental conditions, and as the costs of incineration continue to rise as do the costs of fuel to burn wastes and of transporting waste to such incinerator disposal sites (it is not clear whether incineration is actually a method of disposal, since the resulting ash must then be disposed of somewhere), waste disposal is becoming a very pressing problem for the Boston municipal area. Composting can help alleviate some of the pressure by reducing the waste stream. Third, composting actually converts waste into a useful product which can then contribute to increased economic and environmental productivity of urban areas. Fourth, preliminary studies show that there may be a market for compost beyond the urban gardens themselves, making a composting operation of sufficient size a potential small business which can not only support itself, but also possibly generate income for other aspects of the urban agriculture system.

A full-scale composting system could not only provide topsoil needed by urban gardens, but also function as the "anchor" for other primary and secondary activities which require either topsoil as a basic ingredient or funds.

The compost project has several stages to go through before it can play such a function in the entire urban food production system, however. The preliminary stages of feasibility and basic design have been completed through the work of two members of the city's agriculture coalition. Still
to be undertaken are fundraising for start-up capital, site search, and actual initiation of operation. The first two of these efforts are already in motion. The initiation phase includes the negotiation of contracts with suppliers, appropriate preparation of the site and fine-tuning of the production process.

Other Recycling Operations

There are several other types of recycling efforts that could naturally be attached to the compost operation once there was a site dedicated to the soil production operation. One of these is wood recycling, utilizing the material which is a by-product of the compost operation itself. Composting as developed during the feasibility and test stages requires wood chips and brush chips as bedding, cover and bulking material to mix with the vegetable wastes which form the major portion of the compost pile. During the test project chips were obtained from a number of municipal and private tree-trimming and removal services which also often had large logs of tree trunks in their trucks. The project had to reject the trunks as unusable since there was no way to chip such large pieces at that time. But those logs could be retrieved and cut to size for sale as cordwood to city dwellers using wood for heating. Given the prices of cordwood and the increasing number of households using stoves for some portion of their space heating, such a supply would be welcome particularly for low and moderate income families who cannot afford the current prices. Another advantage of taking the trunks in that haulers would be saved a second trip to dump the remainder of their load at a land-fill site, a necessity which might discourage them from utilizing the compost site in the first place (even though they would probably save in dumping fees).

Another similar source of recycleable material is wooden pallets which are often included in the truckloads of vegetable waste. These pallets are made of burnable oak wood which is also strong enough to be used for other purposes such as constructing garden-related products like window boxes, cold frames and fencing.

During the past several years of work in urban agriculture, many sources of other garden-related materials which are discarded by other users but could be recovered for use in city gardens have been located. These
include the greenhouse which regularly threw away hundreds of plastic 3- to 5-inch pots; the perfect tomato-stake size pieces of wood thrown away at Chelsea Market as part of the packaging of bulk food; the thousands of seedlings thrown away by nurseries each spring or early summer when they want to clear their inventories (we rescued several truckloads of such seedlings last spring, all donated free for the taking). The existence of a compost site which would be large enough to accommodate several of these adjunct recycling efforts could not only support the compost project and make its function smoother by reusing materials which are not directly useful in the compost, but could also provide additional sources of income if these materials were sold to urban gardeners at a reasonable price. The site would enable people to collect material which now goes to the incinerator because there is no central place to store and redistribute such items. It is even feasible that such a site could be extended to collect the give-away plant materials which are readily available from suburban sources, homeowners, garden clubs, nurseries and plant collections. Currently these materials are not systematically collected, again because there is no central location for their proper handling.

(These recycling operations might be particularly suited to utilizing volunteer labor and the many youth employment programs which now have no way to occupy their youth workers.)

Urban Nursery

Most of the existing urban community gardens were started with the minimum of landscaping because the resources available were so limited. Plantings of protective and beautiful hedges which can reduce pollution from vehicle exhaust, discourage intruders (both dogs and the two-legged variety), particularly if the plants used are climbing thorny roses, and enhance the appearance of the gardens have been left for later. Similarly the plantings of decorative bulbs, fruit trees or food-producing berry bushes and vines have never been accomplished because so much effort went into obtaining the most basic resources such as fencing and topsoil.

The need for more plant materials at affordable costs, however, is great. The gardens could look much better, providing a stronger sense of pride for the gardeners, and contributing more to the physical appearance
of the local neighborhood. In addition, many of the gardens are still not contributing as much as possible to the overall greening of the city in terms of oxygen production, water retention, and temperature modification, simply because they have not been planted carefully with perennial varieties of plants which can take up the edges, corners and fences which often go underutilized in many gardens.

On the opposite side of this need is the potential supply of such materials, which has been found to be extensive. Institutions such as the Arnold Arboretum have offered to donate stock of a wide variety of plants, including some exotics which may prove to be peculiarly suited to urban conditions. Members of the urban agriculture coalition have also located several collectors of plants such as roses or rhododendrons who are more than willing to provide cuttings, seeds, seedlings and other materials which can be used for propagation of plants for eventual use in landscaping. Many of these materials would be suitable for neighborhood use in general, street trees, yard beautification, playground and traffic island greenery and similar uses which are not confined to community gardens. All of these materials could be obtained at low cost and with a proper location and tending could be nurtured into nursery stock for use in landscaping or for sale to the public. Suburban garden groups and many greenhouses are willing to provide cuttings, excess stock, thinnings and the like for the use of non-profit groups. All this material could be utilized in a nursery situation.

Given the proper site, it would also be possible to obtain bulk orders of materials from wholesalers which could then be kept safe and healthy until needed for landscaping or until sold to gardeners in the city. The major lack is a site and the organization to operate such a facility.

Greenhouse and Flower Production

A natural extension of a nursery-propagation system is a greenhouse which could be used to protect some of the more tender plants during early stages of propagation and, in addition, to broaden the propagation efforts to produce seedlings for sale. One solar-heated greenhouse is now functioning on a community garden, and seedlings will be produced for sale to the gardening community.
An additional use of a greenhouse (which the existing facility is not large enough to handle) would be off-season and seasonal flower production. Most of Massachusetts' flower supply is imported from as far away as California and Hawaii, distances which are not only energy-wasteful but which may soon be making imports prohibitively expensive. (As it is now, flowers are a luxury.) Although Massachusetts does produce a variety of cut flowers during the growing season, only carnations have been produced year-round in a greenhouse setting. It is conceivable that a community greenhouse could finance some of its operating costs through raising and selling cut flowers for the urban market.

Both the nursery and greenhouse production could be tied to the development of a landscaping business which is discussed as the next component of the urban agricultural system possible in Boston.

**Landscaping**

Landscaping services are another type of import into the city. Boston is scheduled to move into one of the largest construction/development periods in its history and many of these developments will need attention to landscape design and maintenance. One community development corporation in Boston is currently considering the possibility of starting a landscape contracting business based in Roxbury. The plant production components and the soil production operation described earlier could all provide support to such a business.

For a period of time it is foreseeable that community groups will be able to obtain funds from various governmental sources to purchase services from a landscape contractor for the maintenance and design of landscaped areas in communities. The redevelopment of the Southwest Corridor is another example of a massive project which could utilize a local service rather than "imported" services from outside the city.

The City of Boston currently has a severely limited budget assigned to the maintenance of green spaces and the growing environment. Street trees planted in Boston survive for an average of eight years due to neglect and lack of maintenance. It is conceivable that this investment could be protected, and that in fact overall costs could be minimized by investing other funds in proper landscaping and maintenance contracts in the
beginning. The City's "Open Space" (vacant lot) Management program also needs landscaping contractors. The program is currently seeking a $1.16 million budget for the coming year to make minimal improvements on the city's thousands of vacant, underutilized lots. Over the past three years, $1.4 million, matched by an equivalent amount through CETA programs, have been expended for this purpose.

Horticultural Supply Cooperative

The last three components described, the landscaping business, the greenhouse production and the urban nursery, will all need certain general horticultural supplies, such as bulk soil amendments, seeds, flats and pots, fertilizers and pest control substances, in considerable quantities. It is possible that member groups could form a cooperative supply network to obtain these materials at wholesale prices in order to reduce costs. This arrangement would be similar to the many farmers' supply cooperatives which have operated for years to reduce costs for supplies and basic materials. Models for such a co-op exist in Boston at the neighborhood level—both food co-ops and a building supply co-op have been operating successfully for several years. It is also possible that such a co-op could supply community gardening groups which want to make bulk purchases of some materials at the start or close of a gardening season.

Garden Production

Another major component of the urban agriculture system being proposed is the collective output of the community gardens in Boston's neighborhoods. Although no comprehensive data have been collected on the amount of food produced on these gardens, some rough numbers can be calculated. It is estimated by agencies serving Boston's community gardens that there are some three to four thousand community gardeners in the city. There are probably between seventy-five and one hundred and twenty community gardens each with multiple plots serving from ten to five hundred families. One survey indicated that the average gardener saved about $50 on food costs in the growing season. However, in several cases gardeners who have saved considerably more than that have documented their production. One gardener has records to show that she produced over $700 worth of vegetables.
Julia Brown, coordinator of a garden in the South End-Lower Roxbury area of downtown Boston, produced the following quantities of food in 1979 on a plot measuring 10 feet by 20 feet:

- **Cabbage**: 2 rows, 41.75 pounds
- **Colbaga**: 1 row, 49 pounds
- **Collards**: 3 rows, 41 pounds
- **Beets**: 1 row, 20 pounds
- **Eggplant**: 1 row, 27.75 pounds
- **String beans**: 1 row, 19 pounds
- **Kale**: 6 plants, 8 pounds
- **Squash**: 1 row, 17.75 pounds
- **Tomatoes**: 2 rows, 130 pounds
- **Okra**: 1 row, 8 pounds
- **Rutabaga**: 1 row, 16 pounds
- **Hot peppers**: 1 row, 18 pounds
- **Bell peppers**: 1 row, 7.33 pounds
- **Broccoli**: ½ row, 6 pounds
- **Sweet potatoes**: 2 rows, 50 pounds
- **Blackeye peas**: 1 row, 6 pounds
- **Cabbage collards**: 1 row, 15 pounds
- **2nd planting of string beans**: 1½ rows, 18 pounds

Total: 498.4 pounds

On this minimal size plot she produced 498.4 pounds of food which she estimates is a savings of $725.00 or more, according to the sample pricing she did in the inner-city stores where she shops. "I will have vegetables until the next harvest of 1980," reports Mrs. Brown. "I buy no vegetables all winter. I wish everybody could save as I do from the garden. If I didn't have a garden I couldn't afford some of these vegetables."

Even taking the lowest numbers—$50 per gardener and 3,000 gardeners— the community gardens are producing $150,000 worth of food for city families. For the low- and fixed-income people who utilize the gardens, this is money saved for other important uses. The number of other gardeners in

* Personal communication with Mrs. Julia Brown, March 1980.
the city--using backyards, side and front yards, and container gardens--is unknown, but if the city is following national trends, which show that 50 percent of all households produce some of their own food now, there is a large number of people other than community gardeners who are growing food of some value. Gardens for All, the National Association for Gardening, estimated several years ago that with an investment of less than $20 the average backyard gardener would recognize $300 in savings on food costs. Applying this figure to the estimated number of home gardens nationally, 32 million at approximately 600 square feet each, the Association found that gardening could be producing an astonishing ten billion dollars worth of food a year.* This was based on 1976 food prices. 1979 and 1980 market price data show that a gardener producing 500 pounds of vegetables could save between $235 and $335 at average market prices.** For inner-city residents who may be subjected to higher than average prices, this amount of course would be greater. Julia Brown was able to produce 500 pounds on a plot one-third the size estimated by Gardens for All.

It is clear from the wide range of productivity, however, that there is tremendous potential for increasing food production in the city.

If gardeners could achieve the level of production of an intensive gardener like Mrs. Brown, the value of food produced would be significant indeed. Fifty acres of open space could provide 10,890 garden plots of 10 feet by 30 feet; 7,260 plots 15 feet by 20 feet; or 3,630 plots of 20 feet by 30 feet. At the lower range of production--500 pounds from 600 square feet valued at an average of $285, the 50 acres could produce $1,034,550. At the higher production of 500 pounds from 200 square feet, 50 acres could produce $3,103,650 worth of vegetables.

An interesting comparison is the value of these crops compared to the average tax revenue per square foot in the city of Boston. Rough estimates of 1979 real estate tax valuations and tax bills citywide in Boston are as follows:

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* Gardens for All, the National Association for Gardening, Shelburne, Vermont 05482, Press Release, 1976, using U.S.D.A. and Gallup Poll data.

** Massachusetts Department of Food and Agriculture, Division of Markets, "Food Buyer's Guide," Volume 59, #1, #14, #27, #40, 1979, and Volume 60, #4, #6, #12, #17, #20, 1980.
<table>
<thead>
<tr>
<th>Type of Property</th>
<th>Tax Revenue per square foot*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family residential</td>
<td>$ .27</td>
</tr>
<tr>
<td>Two-family residential</td>
<td>.30</td>
</tr>
<tr>
<td>Three-family residential</td>
<td>.44</td>
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<tr>
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<tr>
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<td>.01</td>
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<tr>
<td>Vacant land</td>
<td>.12</td>
</tr>
<tr>
<td>All types, all wards</td>
<td>.63</td>
</tr>
</tbody>
</table>

Using the 500 pound production rate and the lower valuation of $285, a 600 square foot plot is producing 47.5 cents per square foot. A 200 square foot plot which produces 500 pounds is yielding $1.43 value per square foot. The former figure is more than the 27 cent, 30 cent or 44 cent return for residential one- to three-family units, and over half the amount produced by industrial square footage. The latter amount, $1.43, is higher than all land uses but the two most tax-productive, mixed residential and commercial at $1.54 and commercial at $1.60. Either amount of production is significantly greater than what the city is now getting from its vacant land (12 cents per square foot).

These figures, rough as they are, suggest an entirely new valuation of land used for food production in the city.

The increased local production of crucial materials such as compost and plants, and increased supply of other materials through co-ops could assist with improving production simply by making basic ingredients such as soil amendments, mulches and hardy growing stock more readily available at affordable costs. More generally, the availability of landscaping materials--in particular food-bearing bushes, trees and vines or ground covers such as clovers or wildflower mixes which will support bees and other advantageous elements of the ecosystem--could increase productivity in the

* Commonwealth of Massachusetts, City of Boston FY 1979 Fiscal Assessors' Real Estate Valuation, as of January 1978.
most elementary sense of increasing greenery which will diversity the local ecology as well as increase all the moderating effects of plants.

Past experience has shown that most urban gardeners produce no more produce than they themselves can use, so it is not anticipated that most gardens would market the food that they produce. However, in at least two cases, community gardens in Boston are exploring the potential of raising "cash crops" (herbs, flowers and vegetables) which would be sold to provide funds for other work that the gardens are undertaking (including developing land trusts which will be in the permanent control of local residents). For now probably the most important economic aspect of garden productivity is to increase the yield for the average gardener, using increased availability and quality of materials and supplies, and appropriate technologies where possible (cloches, heavy mulching, rain catching systems, trenching for irrigation, etc.), and extending the garden season wherever feasible with cold-hardy crops, storage facilities such as communal root cellars, and cold frames. The results can make a significant difference in the food budgets of Boston families.

Community Canning Center

Another possible component of the system which would make maximum use of garden production is a community canning center. Food preservation is one major way that people in a climate like Boston's can extend the value and utility of the food that they are able to raise during the growing season proper. Canning, drying and freezing crops can provide food for a family that will last long into the winter.

Studies on the economics of canning centers, however, have shown that the average community-based facility must be subsidized to stay in business. It is possible that as food prices have continued to rise cost estimates may need to be reevaluated, but the possibility that such a facility cannot be self-sustaining remains. Nevertheless, if other elements of the urban agriculture system can be developed to generate income for related components of the system, a canning center which would also have facilities for drying and perhaps communally freezing foods (in food lockers, for instance) could be supported and greatly enhance the utilization of crops long past growing season limits.
Farmers Markets

One other component of the food system envisioned is actually a link to broader production circles. Farmers markets have been on-going in Boston for the past two summers, through the joint effort of the State Department of Food and Agriculture and local groups. Farmers from Massachusetts farms have been invited to bring their produce directly to the heart of five Boston neighborhoods. By and large the response has been very positive and both farmer and local buyer benefit from the arrangement. This type of component is important in the overall system for several reasons. City people will never be able to raise some foods in sufficient quantities, and farmers can provide many items which gardeners cannot easily produce (such as corn which requires large areas for proper fertilization and kernel formation). On the other hand, Massachusetts farmers need the direct support of the urban market if they are going to be able to survive until national economics force a more systematic return to regional farm production. It is also possible that developing an urban market will encourage increased production of food in the perimeter areas of the city which as recently as five to twenty years ago produced considerably greater quantities of food than now. These suburban and semi-suburban areas have tremendous potential for food production, both private gardening and larger scale commercial farming. A ready market structure could influence the development of this potential.

Support Services

Another dimension of the system of garden-related operations is the somewhat less tangible "business" of providing certain services to gardeners. Among the services which are now provided to the urban agriculture network in Boston by several different groups and agencies include the following, above and beyond the provision of the basic physical resources and services already described:

1. Coordination of efforts among various groups to reduce duplication, competition and confusion;

2. Sharing of information about resources, materials, ideas, funding sources, methods and opportunities;

3. Development of programs and project design on the basis of needs and resources;
4. Advocacy for the general concept of urban agriculture and on specific issues as the need arises;
5. Organizing of new garden groups and organizational support services to newly-organized groups until they are prepared to continue on their own;
6. Networking to introduce people and groups with similar or complementary interests and skills so that coordination, cooperation and organizing are accomplished more easily;
7. Technical assistance on such diverse matters as incorporation procedures and tax laws and negotiating disputes of various types;
8. Advice and support on issues of management;
9. Direct training and educational services;
10. Assistance with finances through group fundraising or sharing of tax-exempt status and financial management ability as a conduit for funds to other groups.

Most of these services are now supported through private donations, foundations and public funds in the form of grants, contracts or government-supported agency programs. But those people who have been working through the medium of non-profit corporations to support urban agriculture in these ways are now beginning to see the limitations of such funding sources. The grants-writing process is, for one thing, grueling and time-consuming. The uncertainty of such funds, which vary in amount, availability and type from year to year, is another disadvantage. The tremendous amount of paperwork, bookkeeping and contractual limitations (such as insurance requirements) often required by government grants is many times beyond the ability of small non-profits. And although there is a supply of funds from private foundations for distinctive projects, the most difficult sort of money to raise is operating funds which can be used to support the more general and diffuse "services" which are needed regularly by garden groups. Relying on funds through these sources can in fact divert considerable amounts of time and energy from the central work of a small community group or non-profit corporation.

There are two questions to answer about this component of the urban agriculture system. First, are these services needed by the system for the foreseeable future? And second, if so, are there other ways to support this dimension of the system's work in order to reduce the dependence on grant-type funds?
The answer to the first question is complicated. It is very possible than if advocacy and service groups such as Boston Urban Gardeners, Inc. disappeared in the next year that many gardens would continue to operate successfully. But it is also clear that in many cases, the initial start-up efforts at organizing and development are not enough and that at some point additional "investment" in the garden will be required. From experience, the cycle of organizing effort required (or conversely, the cycles of energy available without significant organizing efforts) at any given time to carry out a project such as a garden might look like this:

There are periodic cycles of need for organizing input or "start-up" energy which can often be supplied by a "service" entity. Another important point is that even if a garden project is well established, that is only the first step that can be taken toward full development of potential production and related economic opportunities. It has been the case that the first two years of a garden's existence have generally been devoted to obtaining the basic materials and resources necessary to grow some crops. As the gardeners' experience and knowledge grow, both as a group and as individuals, there are signs of interest in more ambitious efforts--fruit trees, roses and other perennial plantings to beautify and protect the gardens, landscaping, greenhouse or cold frame construction to extend the growing season, and so forth. Interest in canning and food preservation also grows along with a greater interest in crop varieties and nutrition.

* This version collapses several dimensions into one.
information. And land ownership frequently becomes a topic of concern as gardeners realize that all their hard work might be displaced or disrupted if they are not owners of the land on which they are working. All these escalating interests in larger dimensions of the gardening system will require similar cycles of energy investment by the local sponsors and, possibly, a service group which can offer support, advice and technical assistance.

With this on-going need in evidence for the time being, at least until the current system grows through another stage of development, it does appear that a support service component will be useful and should be built into the financing and organizational structures which are constructed for the system.

Other sources of funding to support such work can include both the income from the business components of the system, and in some cases, a direct effort to obtain payment for the service from the users. An example of the latter is the BUG Newsletter which costs about $2,600 to produce, not including labor costs. Currently the Newsletter is supported through a grant, and sent to some 600 subscribers for a nominal fee of $1.00 per year. If the price of subscribing were raised to $2.00, and the Newsletter circulation could be expanded to 1,300 subscribers, it could just about break even—ignoring inflation, of course. If circulation were increased to 1,500, ten full days of staff time to produce the six yearly issues could also be paid for. In this case it looks worth the effort to improve circulation and attempt to have the Newsletter become self-sufficient.

It is likely that the service component would never be entirely liberated from the need to pursue grants; but it does appear that there are untapped resources and undeveloped approaches to financing which should be seriously pursued.
SECTION V: CASE STUDIES OF POTENTIAL ECONOMIC DEVELOPMENT VENTURES

This section presents three case studies which present in greater detail some of the economic development potential outlined in the preceding description of an urban agriculture system for Boston. The first case is a large-scale compost facility, the second a community garden with a solar greenhouse, and the third is a potential landscaping venture.

LARGE-SCALE COMPOSTING OF URBAN WASTES

Background

Since the summer of 1978, Boston Urban Gardeners, Inc. and the Massachusetts Department of Food and Agriculture, Division of Agricultural Land Use have been collaborating on the development of a large-scale year-round composting facility to produce humus (or decayed organic matter) from vegetable produce waste in the Boston area. This project, which was named the HUMUS (Help Us Make Urban Soil) Project by the first summer's staff, has gone through several stages. The first summer's research was a preliminary feasibility study which set out to collect a variety of information, including the sources of organic wastes in the city, the available composting technologies currently in use, the potential market for compost in the city's urban agriculture network and among other potential users as well, the present disposal methods for organic wastes in the city, and the potential costs of composting particularly compared to current disposal practices. The second phase, carried out during the summer of 1979, included both an actual pilot project which tested composting technology, and continued research on a variety of topics such as sources of organic materials, sites, environmental protection issues, potential corporate structures, funding sources and more detailed economic calculations for the full-scale development of such a facility. Work continues at this time to raise funds for the final stage of project development and the capital required to begin full operation.

To date, the HUMUS Project has been supported by funds from the Massachusetts Department of Food and Agriculture, the New England Regional Commission, the Audubon Intern Program, the Responsible Agriculture
Internship project and several university and college internship and work-study programs.

The Concept and the Need

The central concept of this project is "Conversion." Using a relatively new version of the ancient process of composting, organic materials now considered a "waste" can be converted into a material which has new value as a soil amendment and conditioner. The attractive idea of solving one problem, the need for soil in the city, by solving another, the increasingly troublesome disposal of wastes, is made even more interesting by the comparison of costs for current disposal practices and for the conversion process.

The need for soil has become a major problem facing the urban gardeners in the city of Boston. In the city's earliest days there were tremendous disruptions of the native topsoil and subsoil structure as hills were leveled and bays were filled in to accommodate the growth of the city. As recently as World War II, areas such as Copley Square were farmed for Victory crops, but such spaces have more recently been paved and reshaped into modern landscapes. Many of the spaces currently vacant throughout the city were once covered by houses or other construction which was demolished in the onslaught of urban renewal in the sixties or left in the wake of disinvestment, abandonment and arson in many neighborhoods in the past decade. What little soil there may have been to start with in these areas has long since been removed, pushed aside, or reduced to dust after years of being paved over or covered by buildings. Worse, the past several decades have been a period of unprecedented pollution of the environment, particularly in dense urban areas where for generations homes have been painted with lead paint, automobiles have deposited leaded fuel exhaust residues, and other potent pollutants such as cadmium, arsenic, and other widely used industrial materials have found their way into urban soils. The result is soils that are not only functionally infertile, but in some cases, actually carriers of poisonous pollutants.

It is estimated that there are now over 100 community gardens which accommodate anywhere from ten to 500 families. Most of these gardens were started with less than nine inches of topsoil, and in many cases the topsoil
which was imported was of poor quality. The average lead count in the roughly 1000 samples tested from community gardens in Suffolk County was 1,600 parts per million. A group of scientists which has conducted studies on lead in Boston's soils has agreed that any level over 500 parts per million is considered dangerous for human health. While lead can be absorbed by some plants (particularly the leafy greens and root crops) the inhalation of dust from polluted soils may be a major source of potential poisoning particularly for children whose small bodies absorb a greater proportion of the lead inhaled than adults. Since lead is so inert and does not travel readily (unless it is volatilized through the burning of lead paint, for instance), there is no convenient form of remediation. The most effective method of reducing the dangers of lead contamination is simply to cover up the lead-bearing soils with "clean" soils and to use mulch, grasses and other ground covers to reduce the level of dust and erosion which could once again expose the lead.

Considerable research into this question by Boston Urban Gardeners under contract with the National Center for Appropriate Technology, and by scientists from the U.S. Environmental Protection Agency and the University of Massachusetts Suburban Experiment Station in Waltham, Massachusetts, has made several points clear. First, lead and other heavy metals are a serious pollutant of urban soils. Second, these toxic elements are present in the urban environment from a tremendous variety of sources, including scores of household products and everyday items as well as automobiles and industrial processes. Third, the answer to heavy metals pollution is not to abolish gardens, which provide considerable benefits, but to control and reduce the problem at its source.

The need for clean soil is thus urgent, not only to improve productivity of gardens with insufficient soils, but also to minimize the effects of lead in soils. Unfortunately, both the supply and cost of topsoil are increasingly prohibitive barriers to the solution of the problem.

At the same time, the problem of solid waste disposal in Boston is becoming severe. The City of Boston disposes of some 319,500 tons of household refuse a year, material which is hauled to dumps by contracted collectors.
The City spent $5,165,000 in FY 1979 on the contracts to collect waste and another $2,370,000 to dispose of the household refuse at various sites. The disposals costs, however, only accounted for a portion of the waste, because several of the city's sanitation districts were disposing of wastes in the city's own landfill site. This site will be closed as of July 1, 1980, making it necessary to send that waste elsewhere. At current costs, an additional $2,520,000 would be required for disposal. Currently the city pays between $11.75 and $16 dollars per ton for waste dumped at landfills or the large commercial incinerator 20 miles north of Boston. Staff of the City Public Works Department indicate, however, that costs are expected to rise to roughly $20 per ton when new contract bids are received in May of 1980.* The annual costs of disposal only will then soar to $6,390,000.

There remain, however, huge quantities of waste which are not collected by the city but which must be disposed of privately by businesses such as grocery stores, restaurants, produce handlers and other commercial businesses which do not utilize the municipal service. This waste must be collected and hauled to dump sites by private carters who are contracted by the individual businesses. There are no municipal estimates on the amount spent annually by these businesses to dispose of their own wastes. With the costs of hauling and incineration climbing, and with the increasing difficulty of locating any other sites for new landfills with the tightening environmental regulations and the concerns of citizens who have learned of the hazards of improper disposal of wastes in the past, the City faces a serious problem indeed.

The remainder of this section will discuss the ways that the process of converting organic wastes to humus can help meet both the needs for alternative methods of waste disposal in the city and for clean soil amendments for urban agriculture and city health.

Findings

The findings of the research and pilot projects so far will be summarized and then discussed in greater detail for the following topics:

* Boston Department of Public Works, Sanitation Division, personal communication with staff, May 1980.
Sources of materials, the technology of forced aeration, results of tests during and after composting, markets, estimated costs of composting, preliminary recommendations on sites, and corporate structure. The final report of work conducted in 1979 also contains information on permits and regulations, and financing which will not be included in this summary.

Findings of the study can be summarized as follows:

Sources of Materials

1. There is sufficient organic waste in the Boston area which is relatively uncontaminated with plastics, containers, packaging and other undesirable material and is suitable to supply a composting facility which takes in 40 cubic yards per day, five days a week.

2. This supply is primarily from large-scale sources of vegetable waste from the wholesale markets which are the transfer points between long-distance haulers and processing and retail distribution; grocery stores (less desirable because of contamination from packaging); and occasional sources of "industrial" food processing waste such as apple pomace from cider pressing.

3. The sources are currently disposing of the organic waste through private contractors who must dump the waste at a private land-fill or an incinerator at a cost of $10 to $20 per ton.

4. There appear to be sufficient sources of bulking materials (needed to improve the flow of air in a compost pile) to match the organic waste at the necessary three-to-one ratio (bulking material to waste).

5. The primary sources of bulking materials are brush and wood chips from municipal and private tree-care and landscaping operations. These chips are also currently disposed of in landfills or incinerators at a cost of roughly $2.50 per cubic yard.

6. A source and delivery system could be set up that would not compete with existing disposal companies and haulers but that could in all likelihood save on the cost of fuel, time and labor by diverting portions of the waste system to the compost facility.

Technology

7. The forced aeration technology designed for composting sewage sludge works very successfully on vegetable wastes, producing finished compost in four to six weeks without turning.
Test Results

8. Laboratory tests showed that the finished compost contains only traces of undesirable heavy metals or pesticide residues. All pathogens were successfully destroyed by the temperatures achieved during the composting process (55-75 °C). Some unexpected levels of coliforms were found, indicating the need for "fine-tuning" the compost process (particularly more thorough shredding and mixing) to promote even temperatures and decomposition throughout the pile.

9. The compost product can be utilized either screened (to remove remaining wood chips) or unscreened, although the unscreened material is more suitable as a mulch than as a soil amendment.

Market

10. Estimated need for humus to supply the 100 to 120 community gardens (roughly 40 to 50 acres) in Boston with 12 inches of topsoil (based on a representative needs assessment, fall 1979) is approximately 25,000 cubic yards. The annual production of the larger proposed facility would be 7,500 cubic yards of screened compost.

11. In addition to this need by gardens, there appears to be a number of other potential users, including social service gardening programs, the city's vacant lot management program, the city parks department, the Metropolitan District Commission, and possibly local growers and landscape businesses. (See Landscaping Case Study.)

Site

12. Site needs for the proposed facility include one to two acres of land, storage space for equipment, level and preferably paved areas for mixing materials and building piles, secure fencing, lighting, and a drainage system.

13. While not specifically covered by existing regulations in Massachusetts, the composting facility would have to conform to the environmental standards for waste disposal and resource recovery systems.

Costs

14. Estimated start-up costs including purchase of all equipment, wages, site improvement and acquisition costs are between $165,055 and $339,280 depending on the size of the facility and the number of workers. Estimated annual operating costs are between $61,699 and $159,178,
excluding income from tipping fees. With tipping fee income included, annual operating costs range from $23,449 to $60,553.

15. The average cost of composting each cubic yard of raw waste received, excluding the potential income from tipping fees, would range from approximately $15.88 to $29.19 depending on the size of facility.

16. The average cost of producing humus, taking into account the potential income from tipping fees would be approximately $5.40 for the larger facility with three workers.

17. Estimates of costs and income for the first three years of operation indicate that by year three the compost operation could break even at a sales price of $4.55 per cubic yard of humus.

Sources of Materials

The most concentrated and abundant source of organic waste material located by the compost study teams was the group of businesses which form the Chelsea Market Terminal in Chelsea, Massachusetts, a small town adjacent to Boston. The Terminal area, which actually has several segments, is where the bulk of the produce imported into the Boston area is offloaded from long-distance trucks or railroad cars for distribution, packaging and wholesale purchases by local retailers. The work day at Chelsea begins in the dark hours of the morning and by noon most of the transactions are long since settled as buyers from retail chains, local wholesalers, processors, food co-ops and others have come to look and drive away with their purchases for the day or the week. At least once a week, according to the Market Masters interviewed by the compost staff, whole carloads of goods that have spoiled en route to the terminal will arrive and have to be disposed of. Added to these sources of waste are the broken, bruised, and damaged produce from each crate or load, and the outer leaves or tops from many of the vegetables. A number of small, in many cases family-operated, processors are also located right at the Terminal, and the wastes from their packaging and packing operations also go into the disposal dumpsters.

One advantage to the wastes from Chelsea, besides the sheer volume, is the relative lack of packaging present. Wooden crates, wooden pallets, and cardboard boxes are the most prevalent kinds of packaging. Although these additional wastes are bulky and cumbersome and do require sorting before
the composting process, they are easier to retrieve from the wastes than the plastics and smaller units of packaging which characterize food wastes from grocery stores.

The large grocery store chains in Boston--Stop and Shop, Purity Supreme and Star Markets--all dispose of considerable quantities of organic material weekly, particularly at the week’s end as produce counters are cleaned out. Of the stores talked to during the compost studies, Stop and Shop was the most receptive to the idea of contributing its wastes to a compost operation. The volumes of this source are considerably smaller than Chelsea, and the wastes have often been stored for a number of days before the contracted hauler removes it, making the waste more odorous because of partial decomposition. The other drawback of this waste source is the much greater quantity of packaging which is included, particularly plastics and tightly sealed wrappers or containers which are difficult to shred and can inhibit composting.

There are other sources of organic wastes found by the compost teams which were not explored as thoroughly, but which could be promising supplies for a full-scale facility. These included the byproducts from such food processing operations as apple pressing, cranberry juicing, and some canneries or packagers. Manures from dairy and egg farms is another possible source although most farm operations utilize their own wastes to advantage. Preliminary inquiries into the availability of fish wastes from the Boston area processors indicated that these byproducts are already recycled for such industries as catfood production.

Each of these supplies is somewhat seasonal, as the volume of imported fresh foods varies according to the foods on the market and the time of year. But combined as necessary, the study teams found that there should be sufficient waste to supply a compost operation which takes in 40 cubic yards per day, five days a week.

The Technology

Composting is an age-old method of converting organic materials into the basic component of soils, humus. The concept is very simple: wastes are handled in ways that promote the decomposition of the materials. What has been learned in more recent times is that the process can be modified
both to hasten decomposition and to insure that the pathogens which may reside in the decaying material are destroyed by the heat naturally generated during decomposition. The general method of decomposition utilized in this process is aerobic, that is, in the presence of oxygen, utilizing bacteria which thrive in an oxygenated environment and which produce considerable quantities of heat in their own process of growth as they decompose the materials. As the heat in a compost pile increases, the original strains of bacteria are replaced by other strains which can tolerate the even higher temperatures which are produced by their biological processes (up to 160+ °F).

The traditional method of composting has been "windrows," or long piles of organic material which are periodically turned to mix the wastes and increase oxygenation. The main drawbacks to this method are that extensive land area is required to build the piles and maneuver the machinery for turning, and large machines, either front-end loaders or machines expressly designed for turning compost piles, must be used. A more recent technological variation is the so-called "static pile" method in which no turning is required because oxygenation is provided through "forced aeration." First tested in this country at the U.S.D.A. laboratory in Beltsville, Maryland, with the object of composting sewage sludge which has become a major municipal problem as U.S. Environmental Protection Agency regulations have become more stringent on other methods of disposal, the forced aeration method involves laying a perforated plastic (or other) pipe on a bed of wood chips or similar material, heaping a mixture of organic waste and a "bulking" material such as wood chips (to provide air spaces for circulation of oxygen) on top of the pipe, covering the entire pile with another layer of cover material to screen out odors and retain the heat, and then activating a small fan which draws air through the pile. The air provided by the fan provides oxygen without the need for turning, and the temperatures generated are so intense that there is no need for repeated mixing to assure uniform decomposition. Although the mixing and pile building must be done with a front-end loader, the total amount of time required with the use of this machinery is considerably less than the windrow method which includes both more extensive building and repeated turnings.
So far as the study team knows, the demonstration project conducted during the summer of 1979 at the University of Massachusetts Suburban Experiment Station in Waltham was the first time that the forced aeration method of composting had been applied to vegetable wastes. The success of the method with three large test piles (between 48 and 130 cubic yards each) was clearly documented during the summer, with finished compost produced in four to six weeks and an additional week of drying time to make the material more suitable for screening.

The piles were monitored twice a day throughout their compost cycle, with measurements for temperature being taken in four places at each time, and oxygen measured at two locations in each pile. Samples of the raw material and the finished compost were subjected to a series of tests for biological organisms, pesticides, heavy metals, and other undesirable contaminants. The laboratory tests showed minimal levels of pesticide residues (DDT and derivatives), complete destruction of pathogens such as Salmonella and negligible levels of heavy metals. In several samples, the level of coliforms was above what was expected, a circumstance which the consultants for the project, Energy Resources Company of Cambridge, Massachusetts, attributed to incomplete mixing and possibly insufficient shredding of the organic materials before the piles were built. As a consequence, some coli may have survived because the pile temperatures were not entirely uniform.

The Costs of Composting

During the study project of 1979, the projected costs of developing and operating a compost facility were figured to the extent possible with preliminary data and the uncertain national economic conditions which are playing havoc with interest rates and many of the cost factors. While the estimated costs may be significantly increased in the next year, it should be remembered that all comparative costs for other methods of waste disposal, and for transporting topsoil from sources outside the city, will rise proportionately. The tables attached show calculations for the total start-up costs for two sizes of operations—15 cubic yards of waste taken in per day and 40 cubic yards per day. The equipment listed is based on recommendations by the consultants modified by the experience of the summer’s project. The total capital, excluding site costs, required to
launch a 40 cubic yard per day compost operation would be approximately $82,000, depending on several variables. The expense of acquiring a site, either leased or purchased, and the cost of improvements to meet the engineering specifications for a successful composting operation could be as much as $135,000 for the larger facility. Annual operation and maintenance costs would be between $82,000 and $122,000 depending on the number of workers and size of facility. Wages have been deliberately kept at a level which should help insure the quality of work and commitment to the project which will be necessary to cope with the many variables and potential complications of launching a new enterprise. The accompanying tables show the variation in cost depending on the amount of labor used.

Another factor which is at this point in the project unpredictable is the actual amount of income that can be obtained through tipping fees. If the haulers who currently hold the contracts for wastes from the major sources, particularly the large market terminals and the large supermarkets, are willing to utilize the composting site as an alternative to the incinerator or dumps that they now use, the compost facility should be able to charge near market rates for the right to drop loads. If the site is within the city limits of Boston, or in an adjacent town, the haulers should actually save on transportation, energy and labor costs, making the compost alternative an attractive one. From discussions and interviews with haulers who now hold contracts with the Chelsea and Everett terminals, the Boston police stables and the Stop and Shop stores, it should be possible to divert portions of the waste stream from its present path to the compost facility without disrupting existing jobs of haulers. One other variable is whether the suppliers of wood chips are willing to pay a tipping fee. Further investigation is needed to confirm the information provided by several haulers who thought that local nurseries and tree trimming services are in need of new sites to dump their waste products. Wood chips have never been as noxious a problem as vegetable wastes, however, so that the business of disposal of these "wastes" is not so firmly established nor so much of a problem since there are a variety of uses for wood chips. In all likelihood, though, the compost facility can utilize much of the brush and waste wood which is not very marketable for other purposes.

Other variables over which there can be no control include the cost of equipment, materials and interest rates on loans for starting the
Table V-1. The Costs of Composting

<table>
<thead>
<tr>
<th>Facility I</th>
<th>Facility II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing 2,800 yd$^3$ humus/year</td>
<td>Producing 7,500 yd$^3$ humus/year</td>
</tr>
<tr>
<td>$ total</td>
<td>$ total</td>
</tr>
<tr>
<td>15 yd$^3$/day intake</td>
<td>40 yd$^3$/day intake</td>
</tr>
</tbody>
</table>

**Capital Costs**

| Equipment | $42,600 | $82,000 |
| Site Costs | | |
| Land | 7,500 (lease cost) | 15,000 (lease cost) |
| Development | 74,425 | 119,990 |
| **Total Site Costs** | $81,925 | $134,990 |

**Operating Costs**

| Labor* | 20,040 (1 worker) | 40,080 (2 workers) |
| 30,060 (1.5 workers) | 60,120 (3 workers) |
| 40,080 (2 workers) | 80,160 (4 workers) |
| Materials, utilities, transport, etc. | 20,490 | 42,130 |
| **TOTAL COSTS** | 165,055 (1 worker) | 299,200 (2 workers) |
| 175,075 (1.5 workers) | 319,240 (3 workers) |
| 185,095 (2 workers) | 339,280 (4 workers) |
| Income from Tipping Fees | 38,250 | 98,625 |
| **NET COSTS** | 126,805 (1 worker) | 200,575 (2 workers) |
| 136,825 (1.5 workers) | 220,615 (3 workers) |
| 146,845 (2 workers) | 240,655 (4 workers) |

* Including fringe and overhead.
Table V-2. Net Costs for Operation of Facility
Assuming Interest Costs of 17%

<table>
<thead>
<tr>
<th></th>
<th>Facility I</th>
<th>Facility II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net costs</td>
<td>$23,449 (1 worker)</td>
<td>$20,473 (2 workers)</td>
</tr>
<tr>
<td></td>
<td>33,469 (1.5 workers)</td>
<td>40,513 (3 workers)</td>
</tr>
<tr>
<td></td>
<td>43,489 (2 workers)</td>
<td>60,553 (4 workers)</td>
</tr>
<tr>
<td>Net cost per</td>
<td>$ 8.37 (1 worker)</td>
<td>$2.73 (2 workers)</td>
</tr>
<tr>
<td>cubic yard of</td>
<td>11.95 (1.5 workers)</td>
<td>5.40 (3 workers)</td>
</tr>
<tr>
<td>humus</td>
<td>15.53 (2 workers)</td>
<td>8.07 (4 workers)</td>
</tr>
</tbody>
</table>
operation. The figures showing operating costs estimated for the first three years of operation are based on loans at 17 percent interest, a figure which is only barely realistic now. Much depends on how quickly funds can be raised and the operation started.

Calculations of costs assuming capitalizations through loans show the larger facility, employing three workers, would be able to produce humus at the price of $5.40 a cubic yard. This would be the facility which could employ the largest possible number of people and still produce compost at a price below current market rates. (See Table V-2.)

Site Specifications

The proposed compost facility would require approximately one acre of land for efficient operation. The site needs to contain enough room for an unloading area; a mixing area; area sufficient for building one pile per day (16.5 cubic yards) for a 26-day cycle (using the "shoulder to shoulder" method which reduces space needs); a storage facility for equipment; an office space; stockpile areas for both bulking materials and finished compost; and space for screening, loading and shredding materials as they come into the site.

In order to provide the option for expanding the compost operation in some of the ways outlined in the section on a system for urban agriculture, it would be preferable to obtain a site which contains enough room to house a landscaping operation, a nursery, adjunct recycling operations (see Section IV) and possibly even a greenhouse which can be heated with the waste heat from the compost piles (a steady 55-75 °C year-round). These operations might require another acre to a half for optimum operation.

Most important for the compost site is level space with good drainage which can be monitored for runoff, at an acceptable distance from any residences which might be disturbed by noise and occasional odors, and with easy truck access which does not disturb residential neighborhoods. Such a site will not be easy to locate; the one site which more than meets these requirements is a closed MDC skating rink facility which is in the town of Belmont, a suburb near Boston. Although it is still within the radius considered advantageous to haulers, it is some distance to haul the
finished product into the city gardens, and it would require commuting for any city workers used on the operation. Other sites are under investigation, with special consideration being given to the legal hurdles involved in acquisition (the MDC site requires a vote of the Massachusetts Legislature for permission to change its use, a considerable barrier even though the MDC commissioners have provided their approval), the cost and the length of time it may take to gain access. Other potential sites include land owned or planned for purchase by Boston community development corporations, the closed land-fill for the city of Boston in West Roxbury, and a large state-owned parcel in the Mattapan area of Boston (Boston State Hospital).

Funds are currently being sought to retain the staff and consultants to complete a final site search, engineering specifications, and planning for acquisition and site preparation.

Corporate Structure

Boston Urban Gardeners, Inc., is particularly interested in forms of organization and management which promote worker control. Whether this means a worker-owned and managed business, a producer co-op, or a collectively operated venture is not yet clear. It is a difficult question partially because of the skills required to utilize these alternative methods of business development, and the generally cool response of government agencies and private and public funding sources to such ventures. The importance of worker ownership and management, however, is entirely in keeping with many of the other goals of Boston Urban Gardeners and members of the urban agriculture network who seek to place land for food production in the control of neighborhood residents. The skills for ownership, management, maintenance and job development are all linked and related to the needs of low-income communities in general for providing for their own needs. While it is likely that the compost operation will be established first as a non-profit activity of Boston Urban Gardeners itself, efforts to explore the possibilities for turning the operation over to community ownership and management will be on-going. Consistency on this point is an essential building block for the entire urban agriculture system.
A COMMUNITY FARM--CASE STUDY OF GREENHOUSE AND CASH CROP PRODUCTION

The Southwest Corridor Community Farm, Inc. is a non-profit corporation formed in June 1977 with a CETA grant of $210,000. The Farm was formed during the early days of the revival of interest in community gardening which had begun in earnest two years before in several Boston neighborhoods. An important aspect of the Farm concept was the planned redevelopment of the so-called Southwest Corridor, a swath of several miles which had been cut through the South End, Lower Roxbury and Roxbury during the mid-sixties in anticipation of the extension of Interstate 95 into the city of Boston. After years of well-organized and adamant community protest, the highway project was permanently halted by then Governor Francis Sargent in 1973. Although the communities were then protected against the impacts of highway construction and traffic, they were left with the destruction which had already taken place when the State had acquired land for the project, razing homes and practically dismantling the neighborhood of Lower Roxbury altogether. The State sought funds for redevelopment and began an extensive planning process.

The land on which the Southwest Corridor Community Farm was to be located was slightly removed from the main path of the highway, but had been purchased by the state as part of its massive holdings for the highway development. The redevelopment plans called for large-scale development of park space and greenspace along the Corridor. It was anticipated that the Farm, which would be staffed by CETA workers under Title VI, could provide a training site for community people who might then be qualified to obtain jobs related to the Corridor greenspace development.

Some of the goals of the CETA-funded project were the following:

--Promote productive use of vacant and blighted land;
--Promote gardening as a way of coping with soaring food prices;
--Train local residents in land management in preparation for the development of the Southwest Corridor parkland;
--Provide information and assistance in the areas of nutrition and environmentally sound, small scale technology.*

* Southwest Corridor Community Farm, Inc. pamphlet, 1980.
During the course of the CETA project, an 18 foot by 36 foot passive solar greenhouse was constructed on the acre of land devoted to family gardening plots and demonstration sites. The tremendous difficulties of managing a large CETA grant—which came with insufficient funds for management, administration, supervision and supplies and materials to run a project to employ and train 20 people, some with severe career and skills problems—prevented the Farm from considering another year of CETA-funded work. When the CETA grant expired in June of 1978, the community gardeners using the Farm began running the facility on a volunteer basis. For over 18 months the farm was run by volunteers, and the greenhouse languished for want of finishing touches and good maintenance and management. The amount of energy needed to do full-scale organizing to keep the family plots well-organized is considerable and the lack of funding for a staff person to take on this responsibility was a serious limitation to the full potential of the Farm site. In the interim, the Farm Board of Directors, elected by the gardeners, submitted a proposal for Community Development Block Grant funds which were awarded in the fall of 1979. The funds are sufficient to pay one full-time staff person who will concentrate on developing the site as a community education and demonstration center which will provide weekly workshops for youth, elderly and other neighborhood groups. Among other topics the workshops will cover are container gardening, methods to extend the growing season, organic pest control, nutrition, food preservation, and detection and abatement of heavy metals in garden soils.

At the same time that these activities become organized, however, the Farm Board and staff realize that survival of the Farm concept must go beyond the one year of Block Grant funding. "To insure the Farm's survival," states a Farm brochure, we are planning activities that will produce income while promoting the Farm's goals. For the 1980 growing season, we plan to grow and sell vegetable and flower seedlings, herbs, straw flowers, tomatoes and other vegetables. We will also sell gardening supplies and fruit dried in our greenhouse, and rent our dump truck to gardeners and gardening organizations to use for hauling manure, topsoil and other gardening materials.

In the future, we would like to expand our activities to include aquaculture, wastewater recycling, and principles and practical applications of solar energy.
The projected income from these activities for the 1980 growing season is the following:

5,000 seedlings @ $.20 each*          $1,000
Vegetable and flower seeds          500
500 lbs. dried fruit @ avg. $1.50/lb.  750
Produce grown in 800 sq. ft. cash crop bed  500
1,000 houseplants and container vegetable plants @ $2.00 each  1,500
Classes and workshops, 4 sessions/year, 4 classes per session, 10 people/class @ $5/person  800
Dump truck rental                     1,500
                                          $6,050

Actual costs, both in time and funds, for this plan have been calculated for the production of seedlings, seed sales and the cash crop bed.

In addition, the Farm collects a $1 membership fee and $4 plot fee, providing an additional $235 income. The plot fee, however, is used for such common expenses as water.

The dilemma for the Farm, as with so many other urban agriculture efforts in the city, is how to produce enough income in a year to sustain the Farm's operation, both labor and maintenance, upkeep, and purchase of basic materials for income-producing projects. One answer may be in the network which has been forming in the Boston neighborhoods. Boston Urban Gardeners, for instance, contracted with the Farm for use of its truck in the summer of 1979 during the Compost Project, for a total of $505.00. The funds received by the Compost Project were thus recycled one more time through community channels rather than being siphoned off to a large rental agency outside the network.

The challenge to the Farm is to determine those activities and build those connections which will allow it to continue developing the Farm's potential through projects that utilize the existing facilities and membership.

* All unit prices are after expenses.
"METROSCAPE"--AN INNER-CITY LANDSCAPING BUSINESS

A third component of the overall support system for Boston's urban agriculture network is being developed by the Greater Roxbury Development Corporation, a community development corporation which emerged from economic development efforts in Boston's Black community in the 1960's. GRDC is proposing to establish a "landscape contracting firm" based in Boston which will work in the five counties of the Boston SMSA. Its initial work is expected to be

...general lawn and garden maintenance, bermuda sprigging, planting, mowing, spraying, and fertilizing of private lawns and gardens. It will also perform lawn service for the maintenance of cemeteries, golf courses, and highway center strips and edges. The venture will also do miscellaneous horticultural and landscaping services, including arborist services such as the planting, spraying, pruning, bracing, trimming, and surgery of shrubs and trees. The firm will also offer services to keep public utility lines clear by trimming the trees near them.

A business plan for the proposed venture states:

In subsequent years, the firm is expected to broaden its services and engage in diversified construction activities, as well as establish a nursery, and later a garden center. The firm does also plan to engage in services such as landscape architecture, garden and landscape planning, and horticultural advice and counseling.*

The proposed venture grew out of a successful nonprofit landscaping and vacant lot development program sponsored by GRDC with funding from the U.S. Department of Housing and Urban Development in early 1978. The Greater Roxbury Improvement Program (or GRIP as it became known), employed 80 youth workers between 16 and 20 years of age who were trained in basic trade skills such as the seeding and sodding of lawns, planting of trees and shrubs, pruning of shrubs to control size and shape and to repair wounds, and the removal of dead and dying trees. The project served low-income residents and non-profit agencies in the project area.

The GRIP experience made several things clear. First, there is a shortage of landscape contractors providing services to the inner city. At the same time a number of trends in city development indicate a growing market for such services. There are efforts by the City of Boston to improve the care of the famous Olmsted park system which runs the length of the city. There is a major new project underway to make improvements along the Blue Hill Avenue Corridor which was once a link from Franklin Park in the heart of Boston neighborhoods to the Blue Hills reservation in the nearby suburb of Canton. The Southwest Corridor development is in some sense an extension of the Olmsted system, with many pedestrian ways and park areas designed into the current plans for relocated public transit lines, major streets and other new developments. And there is a trend of new homeowners returning to the city who are restoring both the homes and gardens of older Boston neighborhoods. All these developments are cited by GRDC as indications that it is a good time to initiate an inner-city landscaping service.

With the termination of HUD funding at the end of the two-year demonstration project; GRDC began to explore ways to provide landscaping services in the context of its general concerns with community economic development. 1974 data show that landscape and horticultural services was a $39 million business in Massachusetts. A best estimate of the Boston SMSA portion of the market is roughly 65 percent (65.9) or $25.8 million.* Most of this business went to landscaping firms outside the city of Boston. It is the plan of the GRDC to develop a minority business in the hopes of obtaining minority contract set-asides on local construction projects funded with public funds. There is only one minority firm in Boston. This firm and the other major landscape contractors in the Boston area have been assessed as potential competitors, and the GRDC business plan is optimistic that a new community-based enterprise can successfully compete without damaging existing minority businesses.** Most of the firms doing business in the Boston area are from outside the city proper and in some cases come from as far away as Hartford, New York City and Washington, D.C. For several of

* Ibid., p. 23.
** Ibid., pp. 26-27.
the larger firms from out of state, landscaping appears to be a rather minor side business attached to heavy construction operations or other specialties such as paving.

As proposed, the project would be developed in phases, building in size and capability as the venture gains strength and working capital. The first phase would be the development of a "base site," 22,000 to 45,000 square feet of space used for the basic operations of a landscaping business, including storage of stock and equipment, office, and possibly a cold house for holding plants in dormancy. The second phase would involve acquiring and developing a nursery site, possibly as much as five additional acres, for the propagation and care of landscaping stock. The third phase includes developing increased design capability within the business so that landscape architectural services will not always have to be contracted for separately, as is planned for the first two years of operation. The fourth phase of expansion should also occur during the third year—the development of more diversified construction capability, including the installation of benches, walk and patio construction, drainage and irrigation works, and more specialized tree work. The final phase of the operation as conceived would be the development of a full-scale yard and garden facility on the site of the nursery. The garden center would allow for expansion of the nursery business into retail markets. Expansion to a garden center was not included in the business plan prepared by GRDC, however.

As planned, the Greater Roxbury landscaping project would employ two full-time people, including an overall manager (given the title President in the business plan) and a foreman, and part-time bookkeeping assistance and estimating expertise as needed. In addition, the business would employ two landscape crew members whose employment would be seasonal (probably nine months of the year). At the peak period of business, the project would employ the equivalent of 8.68 full-time workers in its first year. The seasonal employees would be the equivalent of 2.16 full-time workers. By the third year, employment would be the equivalent of 9 full-time employees. The plan is to develop and expand the skills of employees, so that rather than increasing the size of the work force dramatically as the operation grows, the jobs will be broadened and made more permanent.
The necessarily seasonal nature of landscaping work, it is anticipated, could be offset by developing one or more of several complementary areas of business. One is interior landscaping, or providing greenery for offices, homes and businesses. Detailed information about the market for this service is not offered in the business plan. Two other possibilities are also mentioned as types of work that could round out a year: snowplowing and selling cordwood. Both of these services, while not elaborated on in the prospectus, could utilize the machinery and equipment such as trucks which the landscaping business will have on hand, with only minor adaptations, such as a plow, to be converted to additional jobs. The cordwood, in fact, could possibly be an economical way to "dispose" of the wood left from dead or dying trees, which the landscaping company must remove from the premises of a job site. Particularly during the first year, when the site for base operations may not be as fully utilized, there may be adequate room to store wood as it is retrieved from job sites, until it can be cut, dried and eventually delivered.

The benefits to the local community are summarized in the prospectus as being minor purchases of hardware and other supplies, but the report notes:

However, most of the supplies (seed, nursery stock, heavy equipment, etc.) are not available from local vendors. Thus, we do not anticipate very significant impact through local purchases in the impact area.*

We will return to this issue in a summary discussion of the connections among all these proposals for community economic development ventures related to urban agriculture.

Finally, the financial details of the proposed operation are still being reworked. With inflation and the economy, particularly interest rates, so unstable, accurate estimates are hard to produce. Estimates, however, are that the business at the size set forth could be launched for around $85,000 in the first year, and a total of approximately $120,000 capital invested over the three-year initial period. Recent revisions have included increasing the interest expected to be paid from 16 percent to 20 percent, which increases costs by some $7,000; an additional $12,000 for

* Ibid., p. 66.
financial consulting assistance during the start-up period; and increased working capital to cover a more extended period of receivables than original calculations allowed. In all, an additional $50,000 or so may need to be added to the budget. The prospectus prepared by GRDC includes computer-calculated cash flows and a variety of other financial summaries. The volume of business for the first year is estimated at $150,000,* and the second year double that, or $300,000.

Currently, the project is in search of a site and funding which will allow Metroscape, Inc. to become a reality.

CONNECTIONS

Each of these proposed community business ventures has been developed to date without any awareness that related efforts were taking place. The brief cases collected here demonstrate that many of the components of the urban agriculture system envisioned in Section IV are in fact more than theoretical possibilities and are being seriously pursued as business ventures by several different community-based groups.

What is more, the potential linkages among these enterprises clearly offer possibilities which go far beyond the capability of any one business. One of the clearest potential links is between the compost facility and the landscaping business. Topsoil and mulching material are two basic ingredients for landscaping, and the compost facility could provide the source which, according to the business plan for the landscaping project, is now absent. The funds which would have been spent on soil imported from suburban or out-of-state suppliers could be spent with the compost facility to obtain material which will be lower priced and locally available, reducing the need for long-distance hauling.

Another clear possibility is that the greenhouse could contribute to the stock needed by the nursery. A group like the Southwest Corridor Community Farm could become the holding site for stock and a propagation center for some varieties of plants. Perhaps a bit more distant in the future would be a greenhouse complex on the compost site itself. (The Southwest Corridor Community Farm is more than likely going to lose its

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* Ibid., Table II-4, p. 29.
site in the next several years if plans for the long-term development of the site, which is owned by the State, are followed.) The waste heat from the compost piles offers a constant, low-cost source of temperature control for a greenhouse which could then be used for year-round propagation and plant holding, as well as the sorts of seedling production for sale which the Farm is practicing this current year. The experience gained by the Farm’s work over the next two growing seasons will provide the evidence and expertise for future projects such as a larger, compost-heated greenhouse.

The possibility for using the larger pieces of wood dumped at the compost site for cordwood would also fit nicely with the projected operations of a landscaping firm which would handle firewood as an off-season product. At the same time, the brush trimmings and smaller branches of the landscaping project could be chipped at the compost site and used as bulking material. In fact, a site could be shared with the compost and landscaping operations, if space can be found which could accommodate the equipment and supplies of both. The site needs of both ventures are very similar and it is possible that economies would be possible through a joint location. It is even possible that as the businesses grew in volume, they might be able to share additional pieces of equipment such as another truck at a more reasonable cost together than independently.

Differences among the projects should not be discounted, however. Any joint ventures will have to be preceded by considerable amounts of discussion on issues such as financing, cooperative fundraising, marketing, insurance and other responsibilities and the actual management of the projects. Probably the largest difference in conception of the projects is in the management structure. While there is some interest in having the composting operation eventually become a worker-owned and managed enterprise, the landscaping business is conceived in more traditional terms. Although the proposal mentions use of an Employee Stock Ownership Plan, the Plan is proposed to increase productivity and free cash for company use, not to involve workers in management and decision-making. The Southwest Corridor Farm project is currently financed by grants, and the amount of income which it expects to generate through staff activity will not cover another year of staff time and expenses. Careful thought needs to be given to how
such a venture can hook into the developing system in a way that contributes to the whole while helping the Farm grow, without draining the resources of self-financing ventures. Accountability of the projects must also be discussed. The compost project must answer to the Boston Urban Gardeners Board of Directors as long as it remains under the non-profit wing of the group. The landscaping proposal, as now written, would have to be responsive to the Greater Roxbury Development Corporation. The Farm has its own Board and local constituency as well. Considerable discussion must be held about the long-term goals and intentions of the various sponsors of these ventures. Are the projects intended to become independent, self-sustaining services for the community? Or are they meant to be subsidiaries of the sponsors, possibly returning income for support of the parent group? Answers to questions such as these will determine the extent to which these proposed projects can actually become a supportive system of ventures as opposed to a set of separate and unconnected businesses.
SECTION VI: CONCLUSIONS

This preliminary examination of the potential for community economic development based on urban agriculture has presented information about the status of food production in the state of Massachusetts and about the food needs of the residents of Boston. This information suggests that there is cause for serious consideration of ways to develop a more secure and affordable food supply for the city. The state's food production capacity has decreased dramatically over the past few decades, leaving Boston residents with some of the highest food costs in the nation and a statewide dependency on food supplies imported from distant sources. The continuing crisis of energy supplies indicates that there will be no short-term relief from this situation as long as the state is dependent on food which is produced with energy intensive technology and which must be transported long distances.

The percentage of people of Boston now receiving some form of assistance with food is at least 25 percent, and possibly considerably higher. Boston's average family income levels are strikingly lower than federal guidelines for a "lower" level family budget; 55 percent of the city's families earn less than the $13,600 which the Bureau of Labor Statistics suggests as the lower level budget for a family of four. Thirty-five percent earn less than $7,000 or roughly half of that amount. At least 22 percent of the city's families are earning below $5,000 which is considerably less than the official poverty standard for a family of four. Food expenditures account for 29 percent of the average Boston family's income. Given these facts, it is clear that there is a serious need for a short-term and long-term effort to reduce the cost of food or provide other sources of food for families which cannot afford current prices. While helping to preserve what farmland the state has left and to encourage wise management of these lands, city people must go farther to develop other supplementary means of securing a local food supply at prices they can afford.

Further work needs to be done to document in detail the food needs of Boston residents, and to determine the likely effects of further changes in energy costs on local food prices. And additional efforts must be made to alert city residents to the importance of their support for protecting farmlands in both the near suburbs and the western region of the state.
Information has also been compiled which shows that urban open spaces have a role and a value in the city which is severely underestimated by conventional discussions and planning for open space. Open spaces provide green plants which produce oxygen and modify some of the harsh characteristics of a heavily built urban environment. A city the size of Boston requires over 4000 acres of green space simply to keep its air supply healthful. In addition, open space provides opportunities for physical and psychological relaxation, ecological diversity, beautification, and protection of basic environmental conditions. The view of open space as a nice addition to the city, rather than a necessity which is an integral part of the infrastructure which keeps the city functional, is short-sighted, inaccurate, and, ultimately, suicidal. The city of Boston needs more wholehearted, inventive, and foresightful action by its government and residents to increase, enhance and maintain the city's open space.

Additional information on the positive effects of greenspace on the city environment, particularly on the potential for reducing energy expenditures, needs to be compiled. More detailed analysis of the amount of greenspace or potential greenspace that exists in yards, side yards, current park systems, medians, and possibly even rooftops, should be undertaken to help plan ways that the city can obtain a healthful quantity of space which can provide the benefits of plantings. Such information can help municipal programs and local groups make a more conscious and deliberate effort to "green" Boston.

In Boston urban agriculture has been a spontaneous activity in many neighborhoods. Community gardens are the most predominant type of urban agriculture evident at this time. The gardens are a peculiar hybrid type of open space use which is a cross between recreation and beautification and economic and social activity. In large part, the city's gardens are a result of the multi-cultural nature of the city, the agrarian heritage of many of its residents, and the accidental availability of vacant land left idle by disinvestment. The gardens now provide one strong element of what could become a combined open space policy and food action plan for the city. Garden groups need help, however, documenting in more detail the costs of gardening and developing more secure approaches for obtaining the materials, resources and assistance they need and for improving their ability to be self-sustaining.
"Community economic development" is an elusive term, one which means many things to different people. The definition used in this paper is contrary to many commonly held concepts of economic development primarily because it is assumed that meeting basic human needs is the chief purpose of economic systems and that control of basic resources should be held by the local community and used to meet the basic needs of the entire population. In this sense, urban agriculture is an activity that contributes in various ways to local economic development because of its inherent conservation of diverse skills, its curious multi-purpose nature, and its potential for replacing imports and providing a foundation for numbers of related economic ventures. It is also a natural docking point to help secure the future of rural and suburban agriculture in the state and to support a broader food system for the state and region which can make significant contributions to the economy of the Commonwealth.

Some of the likely components of a full-fledged city food system based on community enterprises, including community gardens, solar greenhouses, compost production, resource recycling, nurseries, supply co-ops, landscaping and various support services, are already established or are being developed by community-based groups in Boston. A tremendous amount of work remains to be done on the most appropriate form for such enterprises, particularly community-based producer co-operatives for vegetable and fruit production, fishing, food processing, forestry, commercial flower growing, nursery and gardening supplies, and consumer co-operatives for distribution of products produced locally and regionally. The cooperative mode needs to be assessed particularly from the aspects of worker and community control, and the economic strength which could result from control of ventures that produce basic products and income which can be recycled to support additional ventures. The potential linkages to co-operatives of all sorts, statewide and regionally, should be closely examined.

The economic status of urban agriculture itself also deserves more attention. Preliminary information collected for this paper indicates that the economies of converting vacant land to food-producing areas may be more positive than conventional wisdom would allow. The average garden plot may in fact produce an amount of food that can make a significant contribution to a family food budget. In fact the average garden can produce food that
has greater retail value per square foot of land than the tax returns on all city land uses except commercial, industrial and mixed commercial-residential. For areas where those land uses are not feasible or desirable, garden land, which requires little if any support from the city, unlike conventional park land, is a sensible choice. Citizens should remember during any discussions about whether gardens will reduce city tax revenues that the gardens are producing what amounts to income supplements for the gardeners, at little cost to city government. Even if gardens were taxed at the negligible agriculture rate, they would still be producing economic benefits for city residents. It is even possible that gardens contribute toward lowering city expenditures by reducing clean-up and maintenance costs for vacant land. If other components of the proposed urban agriculture system become operational, such as a composting and resource recycling facility, the costs of waste disposal would be reduced as well. It would be interesting as well to calculate the multiplier effects of the food savings for the average gardener. Any further work on the economics of gardens should also consider the long term effects of community land trusts which could hold land under non-profit and possibly tax-exempt community corporations.

In order to maximize the return on the energy currently being spent on establishing various components of an urban agriculture system, these effects should be more closely coordinated and integrated to build a strong system. Cooperation at this point could help ensure the greatest possible job development, income production and development of community resources.

In summary, urban agriculture in all its forms can contribute an array of benefits to city life.

**Food Production:** Potentially millions of dollars worth of food can be grown by gardeners in yards and community gardens. Garden crops can help reduce dependence on imported food, as well as lower the cost of food to the gardener. This food could make an important difference in the budget of a low- or fixed income resident of the city.
Healthful Environment:

Increased open spaces which are used in various forms of urban agriculture will also help improve the quality of the physical environment in the city. Potentially, well planned green spaces could make significant contributions to reductions in energy consumption as well as protecting water supplies, cleansing and replenishing oxygen supplies and modifying harsh effects of wind, noise and glare.

Economic Development:

Gardens and other urban agricultural ventures support the concept of community economic development as defined in this paper. The existing gardens provide a base for a variety of other economic ventures. There are multiple linkages possible to other important sectors of a state-wide food system including the farms of western Massachusetts and the suburban districts, the few food processors still in the state, as well as distributors and consumers. The urban gardening system of Boston has been the source of direct marketing projects to support local farmers and provide city residents with a greater variety of fresh foods. Since there are at least several thousand low-income gardeners in the city, and almost all the basic supplies for gardening must now be imported, there are numerous opportunities to establish small businesses which will serve this market while contributing to the economic strength of city neighborhoods.

Community Cohesion and Skill Development:

The urban agriculture experience is helping neighborhoods develop a wide variety of skills which strengthen the community's social cohesion, and at the same time encourages communities to venture into new types of social and economic development. The gardens have fostered self-reliance and
promote social and cultural interaction. There appears to be great potential for community gardens to support the development of more democratic social and economic systems at the community level.

In many ways the past five or six years of development have been just the beginning for Boston's urban agriculture system. The gardens which started as community projects are now moving into more ambitious and sophisticated stages of development which include serious attempts to capture the economic benefits of urban agriculture in a systematic way. The potential benefits of these efforts are far greater than has yet been recognized by people outside the immediate network of gardeners. While there remains a tremendous amount of additional work, including considerable research, idea development, fund raising and skill acquisition before all these benefits are realized, the existing gardens and related activities in Boston have put down hardy roots. The city as a whole will share in the harvest.


10. The Commonwealth of Massachusetts, Department of Food and Agriculture, Division of Markets. "Food Buyer's Guide." Volume 59, #1, #6, #10, #14, #18, #23, #27, #33, #36, #40, #47, 1979; Volume 60, #4, #6, #12, #17, #20, 1980.


26. Southwest Corridor Community Farm. A brochure. 46 Chestnut Avenue, Jamaica Plain, MA 02130, 1980


