

**Reevaluating the Urban Place in the Food System:  
An Ecological Economic View of Urban Agriculture**

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Fall 2003

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## ***Introduction***

Human cultures are remarkably diverse, but if there is any element that ties us all together, it is the need for food. Across all parts of the globe, in every climate, wherever people settle, the demand for food is highly inelastic. However, the settlement of humans is not always coordinated with the land's actual capacity to meet their food needs. This often means that food production and consumption are separated by large distances, which thereby increases the energy demands and reduces the sustainability of the food system as a whole. In industrialized regions, the most common method of bringing food to people follows a pattern where the country works for the city, and urban dwellers remain relatively detached from the food systems that support them, both physically and cognitively. This scenario produces unnecessarily damaging effects on ecosystem health, since large-scale agriculture has been known to apply strategies that neglect the goal of ecosystem sustainability in favor of economic efficiency. However, to promote overall food security, it is necessary to take a more ecological economic approach that would balance the human needs with ecological and physical realities.

Today, most cities are positioned at the end of the line in an open-loop food system<sup>□</sup>. The nutritional needs of urban populations must be imported, thus facilitating a consistent reliance on fossil fuels, and fostering reliance on productive capacities elsewhere. Cities receive inputs from great distances, consume what is needed, and generate wastes that are usually processed or amassed elsewhere<sup>□</sup>. Therefore, the urban landscape itself serves as neither the source nor the sink in the process of food consumption by most urban residents. By creating local food systems in these urban areas, the environmental impact that extends from these regions can be minimized.

This paper will explore the ways that urban agriculture presents a favorable alternative to the energy-intensive, import-dependent open-loop scenario toward achieving local food security. In particular, focus will be placed on the use of urban agriculture as a means to address the ecological economic concepts of sustainable scale, just distribution, and efficient allocation. By viewing the topic through this lens, it might be possible to develop feasible ecological, social, and economic incentives that could bring the solution of local food production into more common application. Urban agriculture gives city dwellers opportunity to make contributions toward meeting their own food needs, and provides a useful application for some of the city's wastes, all the while mitigating urban dependence on distant sources and sinks.

### ***Nature of the Problem***

Since the demand for food is so inelastic for humans, and thus will always require a consistent reliance on productive capacities, it is perfectly reasonable that governments view agricultural production as one among many sectors of their economies. However, if it is only understood in this light, then the equally important concepts of agriculture as a user of ecosystem services and as a sustainer of human populations do not receive the attention that they deserve. While the neoclassical interpretation of economic activity focuses mainly on promoting financial stability, ecological economics argues that a focus on true sustainability is more complex. Therefore, the fundamental purpose of any economic activity should include broader goals than economic growth alone. This is particularly true when discussing agriculture in terms of the commodities that it provides, as their use value significantly surpasses their exchange values<sup>□</sup>.

It is reasonably argued that economies provide a service to participating people and their communities that extends well beyond promoting consumption and maintaining financial security. Their value as a provider of public services must be re-instilled into peoples' consciousness, so that global sustainability has a greater chance of becoming a reality by reaching for it at the local level<sup>□</sup>. This idea is also applicable to idea of establishing global food security, meaning that the larger global goal requires the realization of local potential.

Historically, the advent of centralized, densely populated communities came as a result of peoples' ability to maintain a consistent surplus of food to sustain their nutritional demands. As analysis suggests that agricultural advances made cities possible, it would make sense that trends in the scale of agricultural production follow the upward trends toward a more urban geography. But as agricultural capacity has expanded, cultures have evolved in such a way that the reliance on local food production has become less of an immediate necessity, which has led to a separation of actual food production from the end use of such production in the populated regions that depend on the process. This separation has occurred on both a physical and a cognitive level, since most modern societies tend to be unfamiliar with the notion that local production is even necessary, let alone that it might provide benefits for the ecosystem as a whole.

However, despite the fact that food production has not been typically addressed as an issue for modern urban planners<sup>□</sup>, this should not imply that today's dominant food system is in any way impermeable to the influence of emerging alternatives. Some US cities, like Philadelphia, New York, and Boston, have taken steps to increase their agricultural productive capacities over the past 20 years, and some states have created

comprehensive urban food policies<sup>□</sup>. The push for urban agriculture also comes from organizations dedicated to research and promotion of such initiatives, including the Community Food Security Coalition in Venice, CA, the Urban Agricultural Network based in Washington, DC, and the Cities Feeding People project in Ottawa, ON, which researches potential for urban agriculture in various parts of the world<sup>□</sup>. The attention awarded from these participants helps to promote the both the economic and social feasibility of urban farming, as their programs could serve as a model for cities aiming to achieve similar goals.

The use of urban agriculture presents a solution to a diverse array of problems that afflict a variety of cities throughout the world. For instance, in many Third World nations, communities take the initiative to farm for themselves and close the food loop because they lack resources to meet their local needs otherwise. This contrasts with the situation in the First World, where people search for ways to close the loop of their consumption due to a lack of waste sinks on the global scale<sup>□</sup>. According to estimates reported in the United Nations' Development Program's first global survey of urban agriculture, over 800 million urban farmers throughout the world harvest 15% of the world's food. The bulk of such activity occurs in less developed nations that explore the option of utilizing local resources out of necessity.

It is helpful to look at the role of food production in an ends-means spectrum, in order to gauge the appropriateness of the full agricultural system's functions. The ultimate ends would have to be global food security. The means, then, are whatever steps a society takes to achieve this goal. In the US, the means are typically built upon the use of a very large-scale agricultural system, which receives inputs and exports its product all

over the world. However, the means that are exercised in a more localized fashion throughout world, although they are not as highly profit generating, can still serve the purpose of meeting people's dietary needs.

The dominant paradigm employed throughout the First World, touted for its economic efficiency, loses some of its merit when compared to the increased sustainability of alternative approaches elsewhere. Since ample evidence exists to demonstrate the feasibility of local food production in diverse climates throughout the world, it becomes questionable whether the end goal of widespread food security really justifies the means associated with meeting this objective. Nor are other elements associated with these means, such as the concentration of power and control within the food system<sup>9</sup> and the homogenization of nutritional and dietary options<sup>10</sup>, justified as a necessary requirement of the food system toward the fulfillment of the ends.

In order to recognize urban agriculture as an ecological economically sound solution, it is necessary to coordinate its discussion with the fundamental pillars of ecological economics. If the modern widespread agricultural paradigm does not measure up to the standards of sustainable scale, equitable distribution, and efficient allocation, then alternatives that do a better job of establishing these goals, including urban agriculture, need to be explored.

### ***Scale***

If consideration is given to Herman Daly's definition of scale as the size of the economic system relative to the size of the ecosystem that both contains and sustains

economic activity<sup>11</sup>, urban areas overstep the boundaries of what can be considered sustainable on many counts. Since the demands in cities for many of the activities that occur within their physical boundaries extend far beyond the available resources that actually exist there, it is clear that urban economies must operate at a considerably higher scale than they would if they were to rely exclusively on their own resource supplies. In physical terms, urban regions cover only about 2 percent of the earth's surface, but their use of the world's supply of sources and sinks combined is estimated to be up to 75 percent<sup>12</sup>. While these figures do not refer to agricultural consumption alone, the scale of the urban economy on the whole could be dramatically reduced if efforts to bring food production to a more regional level became a more conscious pursuit in urban policy.

However, this concept is much more easily said than done, as there are some significant blocks to realizing such a goal, which are directly linked to the very nature of today's dominant large-scale agricultural system. As this system has developed over time, its scale increases have been extensively promoted by numerous government subsidies to the agricultural sector, which serve to make the prices of goods produced by the system artificially lower than they would be if consumers actually had to pay the full price covering the activities employed throughout the production process. Thus, the idea of developing local food initiatives is not particularly appealing to either consumers or city officials, since the large-scale model can meet food security needs with little effort or financial sacrifice.

Certainly, if subsidies did not cover costs that would otherwise be dealt to consumers, then there would be a much higher incentive to explore local options. However, these government subsidy payments represent a complex issue that is deeply

embedded in a separate political sphere. While they are inarguably relevant to the urban agriculture conversation by representing a deterrent to small-scale and local food systems, the overall breadth of the issue is beyond the scope of this paper. Let it suffice to say that the costs consumers pay for agricultural products that are produced by the large-scale system in the US are not likely to cover the full production costs, including those associated with a high dependence of chemical inputs, the use of non-renewable fossil fuels, or the environmental damages linked to these activities. Subsidies have the operational effect of fostering input dependence for food production, and further maintaining society's dependence on a centralized food system.

But, despite the fact that subsidies encourage high inputs, food production at a local level would reduce the demand for these inputs, because human labor can be employed to meet similar productive needs. Switching from chemical intensive to labor intensive food production would thereby reduce the scale of the food system as a whole. Also, fossil fuel inputs could be diminished to a greater extent by minimizing the transport distances that food travels to cities. Also, can curb the threat to biodiversity, since the practices that lead to this effect Since a The current mode of meeting urban food security relies on The modern paradigm of agricultural production and trade on the global level poses many problems regarding sustainability, since its applications tend to impose a much higher level of exploitation of natural resources than is necessary. Modern large-scale agriculture relies heavily on inputs from nonrenewable energy sources, and these demands increase with an increased distance between the production and consumption of agricultural products<sup>13</sup>. While it would be difficult to completely close the loop with local food production, there is much potential to decrease the overall scale of these

systems if action is taken to utilize the ecosystem services that facilitate agricultural production at the local level. By closing the loop of agricultural production, or at least by making the effort towards greater use of local resources,

Tying up the other end of the loop would require putting wastes to use, rather than exporting them to be dealt with elsewhere. Despite the fact that our culture is not currently so comfortable with the idea of recycling human excretory wastes, this is actually a valuable fertilizer resource that could enhance the success of urban food production, while simultaneously lighting the strain on water treatment systems. Other wastes could also be employed in food production as well, particularly in the cultivation of mushroom colonies. Effective ecological design uses such practices as these to close the loop in cycles that serve a variety of purposes, often combining food production with water treatment and waste mitigation<sup>14</sup>.

### ***Distribution***

In North America, the gradual revitalization of urban agriculture, which originally coincided with the acceleration of the Green movement in the 1970's, has been fueled more by the desire to protect environmental and social interests than to establish food security, as is most often the fueling factor in developing countries<sup>15</sup>. However, in both cases, urban agriculture should be recognized as a tool that promotes sustainable development, even if this is more so in qualitative terms. The social benefits that extend from urban agriculture are numerous, and include elements of building stronger local communities, creating jobs for unemployed or underemployed urban residents, strengthening local economies, and contributing to the overall sense of purpose and

responsibility among its participants<sup>16</sup>. These same benefits of local food production for local use could also be achieved in rural agricultural communities, which often do not see very good returns locally on the products that they export to urban and suburban consumers.

Meanwhile, these consumers, particularly the urban poor, face minimized options for fulfilling their nutritional needs. The food that is most economically accessible to them is that which is produced by the subsidized large-scale agricultural system, and it typically has lower nutritional value than its equivalents produced for local consumption. This is simply because in large-scale production, the goal of cost efficiency usually takes precedence over that of achieving nutritional standards. For this very reason, the application of urban food production initiatives would bring yet another benefit to the urban poor in particular, insofar as it brings about the option of having access to a more healthful food supply at an affordable price<sup>17</sup>. Furthermore, by purchasing food from a local source, the urban poor make additional contributions to their own welfare by keeping the money that they spend on food circulating within the local economy, ensuring that the benefits of these financial resources have a greater chance of serving their needs locally.

The emergence of this agribusiness controlled food system in the US has incorporated some distinct changes in how food prices are distributed among participants in the productive processes. In *Short Circuit*, Richard Douthwaite reports that “in 1910, for every dollar Americans spent for food 41 cents went to farmers and 59 cents went to marketers and input providers; now 9 cents goes to farmers, 24 cents to input providers, and 67 cents to marketers”<sup>18</sup>. Alternatively, in a local food system, there is much greater

potential for agricultural profits to be directed to the appropriate individuals who actually contribute value-adding components to production. It has been suggested that urban agriculture could open up an entire range of local industries in addition to the production itself, from compost management, to seed distributing, retail outlets, or restaurants<sup>19</sup>. This then extends the benefit to the persons who might be employed anywhere in the local food economy, and perhaps to the community at large, if by reducing employment among the urban poor, other social objectives, like crime mitigation are also achieved.

The figures above actually tell a two-part story about the nature of industrial agriculture's progression. One part is about the decline in the relative wages of farmers as compared to other jobs in the industry, and to the industry's profits on the whole. But, it can also be read to illustrate the relative decline of farming individuals to actual generated output of food. This is because their roles have gradually been filled by mechanized replacements and chemical applications, which make the humans who once performed comparable field-work more expendable. In this way the agricultural treadmill has had the effect of undermining the security and stability of once vibrant rural communities, while it utilizes their productive capacities to further industrial gains<sup>20</sup>. Urban agriculture presents a solution to this model that strips jobs from capable people, in that it is intentionally a labor intensive, and therefore employment generating alternative.

### ***Allocation***

Without being subsidized by government expenditures, the costs of maintaining an urban agricultural system will almost certainly be higher than those of maintaining

their conventional equivalents<sup>21</sup>, but an ecological economic analysis tells a more complete interpretation of overall costs and benefits. On the whole, the agricultural system serves the function of allocating the nutritional wealth that is produced by the ecosystem over to humans to fulfill their needs. If this is truly the purpose of the system, then the current large-scale model miserably fails in meeting its goal in much of the world. Instead, it manages to allocate food to those who can afford it, while allocating monetary resources from the public that go to support big business. Industry might have the only perspective that would consider the current means of feeding people to be efficient, because in terms of their financial contributions versus returns, the system does prove to be economically efficient and productive.

However, as described earlier, much of the actual costs of large-scale agricultural production are paid for by government subsidies. This circumstance begs the question of whether the system would even prove to be economically efficient if the price supports were absent from the equation.

But the biggest embarrassment concerning the efficiency of large-scale agriculture is in physical terms. It has been estimated that, with all of chemical inputs, mechanical harvesting techniques, processing and transportation of agricultural products, the ratio of hydrocarbon inputs to carbohydrate outputs in the modern agricultural system are in the neighborhood of 10:1<sup>22</sup>. Most of the food that society consumes has traveled more of the world than the people who eat it ever will. Even though some foods are genetically modified to make them more resistant to the shipment that they will have to endure before reaching consumers, there is still a considerable loss in the process to spoilage and other damage.

Some literature points out that great separation between cities and their food supplies may have contributed to the demise of earlier civilizations. The example of the Roman empire is cited as an example, as it relied heavily on agricultural production that took place in North African territories during the time of Caesar's rule. As food was transported to Rome from Africa, the soils on the agricultural lands suffered an immense loss of nutrients, as soil replenishment simply did not occur due to all of the yield being cultivated and shipped away. Thus, the Empire suffered as its food supply from North Africa withered away as a result of exploitation by distant urban centers<sup>23</sup>.

### ***Economic Feasibility***

The economic feasibility of implementing an urban agriculture program varies depending on the specific conditions of different cities. The feasibility increases in cities that have land available in the form of vacant lots, or an underutilized work force, which is characteristic of cities plagued by high unemployment rates<sup>9</sup>.

### ***Applications of Urban Agriculture in Real World Settings***

-Examples throughout the world: Shanghai, Singapore, Hong Kong [5-6% of city land dedicated to agricultural production; and nearly half of all vegetables consumed by city residents are grown within the city limits<sup>10</sup>, Vancouver, Hartford, etc.

-Roof-top gardens,

-“Farms that are close to people are less likely to rely on chemical fertilizers and pesticides, as neighbors have a vested interest in non-toxic production”<sup>11</sup>.

-Shuman on CSAs – members pay a fee up front for weekly produce throughout the growing season; members share the risk of failure with the farmer.

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<sup>9</sup> Gutman (year?)

<sup>10</sup> receive what is needed, export wastes

<sup>11</sup> Daly & Farley 2003. Chapter 12: “Macroeconomic Concepts: GNP, Welfare, and Money”.

<sup>12</sup> Wackernagel & Reese 143

<sup>13</sup> Van Wijngaarden

<sup>14</sup> Shuman 59-60.

<sup>15</sup> Shuman appendix.

<sup>16</sup> Meadows, Meadows, & Randers 1987

<sup>17</sup> concentration of control

<sup>18</sup> homogenization of nutritional options

<sup>19</sup> Daly & Cobb 1994.

<sup>20</sup> Garnett 1996.

<sup>21</sup> energy demands of distant production

<sup>22</sup> Todd & Todd 1994.

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- <sup>15</sup> van Wijngaarden, p 106.
- <sup>16</sup> Numerous social benefits
- <sup>17</sup> affordable healthful food supply for urban poor
- <sup>18</sup> Douthwaite
- <sup>19</sup> Garnett 1996
- <sup>20</sup> Shuman 2001
- <sup>21</sup> Davidson 2000
- <sup>22</sup> Günther (year??)
- <sup>23</sup> O'Meara
- Shuman, Smit & Nasr.
  - Shuman 59
  - O'Meara 33