OF CABBAGES AND KINGS COUNTY
AGRICULTURE AND THE FORMATION OF MODERN BROOKLYN

Marc Linder and Lawrence S. Zacharias

University of Iowa Press  Iowa City
PART ONE
THE RISE AND FALL
OF KINGS COUNTY AS
VEGETABLE CAPITAL
OF THE UNITED STATES

If New York City is the active elephant’s trunk which
ministers to a whole nation, these five towns of Kings
County lay comparatively supinely on the Bay and
Harbor in the form of a huge turtle.

— Samuel McElroy, “Town Survey of Kings County,” 1875
2. KINGS COUNTY FARMS

It is an odd yet logical coincidence that some of America's most efficient and prosperous farms are those about to be liquidated by the city.
— Jean Gottmann, Megalopolis, 1961

Late-eighteenth-century travelers remarked on the picturesque juxtaposition of the rurality of the western end of Long Island, whose climate “is better suited to agricultural pursuits than that of the remainder of the State,” and the great city of New York. Kings County had long been an agricultural producer for New York City. Before the Revolution, farmers there, among the first in the United States to develop intensive agriculture and to use fertilizer, “found that often the richest returns per acre were to be obtained by growing crops for the tables of Manhattan.” In the 1790s, a British visitor remarked on the “rustics chiefly of Dutch descent whose chief occupation is... raising vegetables for the supply of the market of New-York.” The towering importance of farming in rural Kings County in the mid-nineteenth century was captured by Gertrude Lefferts Vanderbilt's observation in 1880 that: “The head of every family in Flatbush, with few exceptions, was a farmer, until within the last thirty years. They cultivated their land in the most careful manner, and were among the best farmers in the State.”

During the first three decades of the nineteenth century, Kings County as a whole remained rural and sparsely populated. In addition to the towns of Brooklyn and Bushwick, the county consisted, as shown in figure 2, of Flatlands, Flatbush, and New Utrecht, which had been settled by the Dutch in 1624, 1634, and 1652, respectively, and Gravesend, which an English woman, Lady Deborah Moody, founded in 1643. Despite the Netherlands’ surrender of its possessions to Britain in 1664, Dutch culture was of such overwhelming importance that the Dutch language remained dominant at least

until the revolutionary period in the 1770s. The postrevolutionary New York State legislature recognized the division of Kings County into these six towns in 1788.²

Farming in the New York City area, which had been devoted largely to grains and livestock, was transformed by the opening of the Erie Canal in
1825. On the one hand, the canal made it possible to transport grain cheaply from the Ohio Valley and other interior lands, where the cost of production was lower, to the city. As a result, maintenance of the traditional extensively cultivated farms in Kings County became increasingly tenuous. On the other hand, the canal helped spur the transformation of New York into the country's leading port and most populous city. The explosion of population there and in Brooklyn meant, as it did elsewhere, that a much larger proportion of a much larger population was no longer able to produce its own food. As fewer and fewer people had access to home gardens, a market — initially weighted toward classes with higher incomes — arose for vegetables, which specialized farmers produced on a large commercial scale. By 1880, market garden production dominated Kings County agriculture.3

LONG-TERM INDICATORS

So many and so radical have been the changes in modern commercial gardening during the last twenty-five years that a practical market gardener, of a quarter of a century ago, who, like Rip Van Winkle, should have taken a sleep from 1870 until the present, on awaking would find his profession . . . had passed away, his old-fashioned and pet methods having been so altered that he would neither recognize nor understand the ways and means in practice by his scientific successors.

— Burnet Landreth, Market Gardening and Farm Notes, 1892

A statistical overview of the whole sweep of Kings County agriculture for as long as census data have been collected — from 1820 to 1992 — is presented in tables 1a and 1b. Table 1a shows that the number of farms, though fluctuating, began and ended the second half of the nineteenth century at almost exactly the same level — about 360. Why the number rose during the 1850s and early 1860s, fell sharply in the latter part of the 1860s, and then increased again in the 1870s, though not to the peak achieved in 1860, is not wholly clear. Shifts in the extent of tenancy or the potential pool of tenants among whom owners could divide farmland may account for some of the fluctuations; part of the fluctuation in the number of farms (and acreage and output) around 1870 may be the result of an official undercount.4

The 25 percent decline in the number of farms between 1880 and 1890 (from 409 to 307) was interpreted by the commissioner of the New York State Bureau of Statistics of Labor as a reflection of the fact that “many” farms that “were formerly occupied and cultivated . . . are now lying idle in
the hands of real estate speculators.” But the 17 percent rise in the number of farms between 1890 and 1900 (from 307 to 360) while acreage was halved and the average size shrank by more than half (from 41 to 18 acres) casts doubt on that explanation; it appears more likely that new owner-speculators rented out smaller sections while waiting for the most propitious moment to sell or develop. However, 1900 unmistakably marked the turning point, as the number of farms declined by 70 percent during the next decade and was halved again (to 54) by 1920. In 1930 a low of 11 was reached, which the self-help needs of the Depression and the national mobilization of World War II temporarily reversed; the 65 farms recorded in 1950 were the most at any time since 1910. The new trend bottomed in 1969 when farming reached its theoretical nadir of one (three-acre) farm. Although this endangered species did not become extinct, by 1992 three one-acre (nursery) farms were all that remained of the county’s 350-year agricultural tradition.5

Total agricultural acreage, by contrast, declined almost continuously after the opening of the Erie Canal in 1825. Until the Civil War, Brooklyn accounted for most of this loss. This trend was reversed between 1870 and 1880, as acreage rose by about 12 percent during the decade of peak vegetable production. This increase may have been triggered by the steady profitability of vegetable farming, but it could also have been an artifact of the aforementioned possible undercount in 1870. During the 1880s, too, while Kings County remained a leading producer, the amount of farmland held relatively constant — total acreage increased slightly while improved acreage declined by 8 percent. Despite clear signs of suburbanization during the 1880s, the agricultural landmass was thus able to hold its own until 1890. Thereafter acreage plummeted until, by the beginning of the Great Depression, it had dwindled to fewer than one hundred acres.6

Average farm size generally followed the course of total acreage, although it rose more steeply between 1880 and 1890 and rose during the 1910s while acreage was in decline. At no point, however, did the average farm exceed the 57 acres recorded for 1850, the earliest year for which this figure can be calculated. Yet despite the completed transition from extensive grain cultivation and raising of livestock to vegetables and dairy by 1890, the average farm at 41 acres was marginally larger than its counterpart just before the Civil War (39 acres). In terms of improved acreage, it was slightly smaller.

The fragmentary series in table 1a show that the countywide value of farm products, first recorded in 1870, attained its high point of $1.2 million in 1879 before dipping to $1.1 million in 1889, at which point it held steady for
another decade. From 1899 to 1929, however, total value declined by almost 90 percent. The Great Depression and World War II, again, boosted output, which by 1944 had almost regained its turn-of-the-century level (in current dollars). Thenceforward the value of farm products again declined sharply. Since farm prices declined throughout most of the last third of the nineteenth century, the dip in the last two decades should be treated with caution; after all, the total value of farm products in all of New York State also declined between 1870 and 1890. Similarly, the average value of farm products per farm in Kings County evolved as follows: 1870 — $3,683; 1875 — $3,044; 1880 — $2,961; 1890 — $3,531; 1900 — $3,054. Total and average value of vegetable production, the mainstay of Kings County farms in the latter part of the nineteenth century, are discussed below, as are trends in grain production.7

The data in table 1b make clear that although the output of potatoes, a leading crop, peaked in 1880 and total acreage was higher in 1890 than at any time since the Civil War, by 1910 all indicators pointed to demise. The census data on milk production fluctuate so wildly as to raise questions about their accuracy — apart, perhaps, from the strong increase during World War II. Nevertheless, some trends are evident. Production peaked in 1855, whereas the number of cows, which peaked in 1865, declined steadily if not linearly, especially after the turn of the century; the industry died out during the 1960s. The periodic increases in output were a function of increased yields. The number of horses, the chief nonhuman source of energy on farms during the nineteenth century, also registered inexplicable swings until, like the number of cows, it peaked in 1865. Yet the number of horses remained relatively constant at the three federal censuses of 1860, 1870, and 1880; after a dip in 1890, the number of horses remained constant in 1900, at which point the precipitous decline set in. The trend in the output of oats and hay, which should have been closely associated with the trend in the number of horses, fell more steadily throughout the nineteenth century, virtually disappearing by the turn of the century.8

In the peak year of vegetable production, 1879–80, the total number of farms, total acreage, and average acreage per farm were distributed among the towns as indicated in table 2. The fact that Flatbush lost about half of its agricultural acreage between 1850 and 1880 whereas New Utrecht, despite fluctuations, retained its intact, indicates that suburbanization in Flatbush had begun earlier and developed faster. Nevertheless, across the four rural towns the average farm size was almost identical; only in New Lots, which
was characterized by many milk farms with little or no acreage, was the average significantly lower.

**THE TRANSITION FROM EXTENSIVE TO INTENSIVE CULTIVATION: KINGS COUNTY’S RISE AND FALL AS A VEGETABLE PRODUCER**

There are two great problems which the successful market gardener must solve, namely: first, to grow garden products; and second, to sell them. . . . There are always plenty of people who appreciate a good article and are willing to pay for it. The producers of trash must find sale in the Italian or Negro quarters of the cities, and accept any price that this class of purchasers are willing to pay.


The “logic of crop transition” from extensive grain production to intensive vegetable production in the vicinity of a large urban market has long been a staple of economic location theory. Its most prominent exponent was Johann Heinrich von Thünen, a North German junker, who first presented it in 1826. Positing a very large city located in the middle of a fertile plain, he sought to explain how distance from the city affected agriculture. He hypothesized that in the vicinity of the city farmers would have to grow products that were heavy in relation to their value, occupied a large space, and whose transportation costs were too great to justify being supplied from more remote areas. In addition, highly perishable products that had to be consumed fresh would also be produced close to the city. At greater distances from the city, products would be produced that required lower transportation costs in relation to their value.9

Von Thünen’s scheme entailed the formation of sharply differentiated concentric circles around the city, each devoted to the production of a different set of agricultural products. Closest to the city would be grown the more delicate plants such as cauliflower, strawberries, and lettuce, which could not endure transport in wagons and therefore had to be carried to the city and sold in small quantities and very fresh. For reasons of perishability, milk was also assigned to this circle. Transportation costs meant that potatoes, cabbage, and root crops also had to be grown close-in.

The distinguishing characteristic of this circle was that manure was largely bought from the city and not, as in the remote areas, produced on the farms themselves. The possibility of securing manure from the city made it possible for the closest farms to sell products that more remote farms had
to keep to maintain soil fertility. The two major products of this type were hay and straw. Von Thünen also imagined that, because close-in farms could have little competition for their products, rents would be high — so high that land would not be permitted to lie fallow; moreover, unlimited purchases of manure would confer such fertility on the soil that fallowing was unnecessary. The border between the first circle and the next was determined by the distance at which it was no longer advantageous to acquire urban manure.¹⁰

Von Thünen further assumed that within each ring land would be cultivated at its highest use as embodied in the highest land rent. No matter how high land prices rose in the vicinity of the city, von Thünen understood that land values in the city itself would rise even higher. Thus, even if someone who wanted to build a house in the first circle did not have to pay more for a construction site than vegetable farmers, the much higher residential land prices in the city center were a function of the labor savings, greater comfort, and reduction of loss of time in the conduct of business that such locations afforded residents.¹¹

Some modern economic geographers have concluded that, because the prime mover of von Thünen’s analysis, the cost of transportation, has been fundamentally changed by technological advances (such as cheapness in relation to other agricultural costs, refrigeration and air-conditioning, pre-transportation processing, and large-scale production in distant, specialized regions), his predicted land-use patterns no longer conform to industrial realities. Whatever the validity of such conclusions for today, von Thünen’s description bears an uncanny resemblance to the developmental phases of nineteenth-century Kings County agriculture.¹²

Contemporary observers were acutely aware of the economic and aesthetic-environmental consequences of the transition from grain to vegetables in Kings County. In the mid-1880s, the local historian Stiles made a von Thünen-like commentary on the “radical changes” that had been made “in the system of agriculture, in the crops produced, fertilizers applied, machinery employed” in living memory in Kings County: The growing population of New York and Brooklyn increased demand for articles (vegetables, milk, hay, straw) “of a perishable and bulky nature as cannot be profitably transported long distances.” As a result, grain production declined “greatly” while stockraising was “mostly abandoned as a source of profit.” Because hay production was much more profitable than livestock, “the farmer could afford to buy stable manure, street sweepings, lime and ashes from the city to apply to his land. Guano and artificial or manufactured fertilizers have
been largely used with good results; but stable manure is the great staple manure for market gardeners, for they raise double crops each year, a draft no land can endure without constant manuring.”

Gertrude Lefferts Vanderbilt, writing of Flatbush in 1880, also noted that when the canals and railroads had made grain cultivation less remunerative on Long Island, the enlarged demand for market garden produce “by degrees changed the whole character of the farm work on this island. Flatbush farmers, being so near to the city, began to raise those vegetables which were to supply the markets of New York and Brooklyn. Where formerly wheat, rye, buckwheat, oats, corn, flax, and barley were the products of the farm, with only so much of cabbage, peas, potatoes, and turnips as were necessary for the family use, all this is now reversed; only so much hay and grain as the farmer needs are raised, while he depends upon his market produce for remunerative sales.” The shift from extensive to intensive agriculture meant that “the farms are not so picturesque as they were when the fields were waving with the graceful growth of grain. The market gardens and the great fields of potatoes and cabbage show signs of industry and thrift, but the farms are not so beautiful as they were before this change took place.”

The New York State censuses for 1845 to 1874 and the manuscript schedules of the national Census of Agriculture for 1850, 1860, 1870, and 1880, which coincide with the transition period, corroborate Lefferts Vanderbilt’s impressions. The decline in grain cultivation is striking. In Flatbush, for example, total corn, wheat, rye, and buckwheat acreage in 1845 amounted to 1,553; by the next state census a decade later, the total acreage (including oats) had fallen to 563; 20 years later, the total had declined further to 250 acres, almost all of which were planted to corn.

Table 3 shows that yields in terms of bushels per acre continued to rise on Kings County potato farms in tandem with rising output until both peaked at the Tenth Census in 1879. In corn and wheat, which were smaller crops, yields rose even as output fell sharply. The transition from extensive to intensive cultivation is also clearly reflected in table 3. If the two major grains, corn and wheat, are taken to represent the old agriculture and potatoes the new, then the latter’s predominance was secure by the early post–Civil War period. Total corn and wheat acreage declined almost as continuously as potato acreage rose. Whereas corn and wheat acreage (4,662) was almost triple that of potatoes in 1845, already by 1855 potato acreage was slightly greater; at the peak of potato production in 1879, its 4,172 acres were triple those of corn and wheat, and in 1890 almost ten times greater. If in 1845 the largest potato farmer in Flatbush harvested 2,500 bushels, by 1870
four-fifths of Flatbush farmers produced that quantity or more, with one harvesting four times as much. Some of the larger and more efficient farmers achieved significantly higher potato yields than the countywide averages, which in turn exceeded the state average.  

Changes in farm size are further evidence of the transition from extensive to intensive culture. In the late eighteenth century, one of the members of the Bergen family owned a 300-acre farm in the Gowanus section of Brooklyn — a size far in excess of any nineteenth-century Kings County vegetable farm. Even as late as 1850, 19 Flatbush farms, or almost one-fourth of all 82, encompassed one hundred acres or more. Ranging as high as 208 acres (the largest farm in terms of improved acreage embraced 190 acres, while 11 others included one hundred or more acres of improved land), these farms were owned largely by the most prominent old-line Dutch families. These included no fewer than four Vanderveers and three Lotts in addition to the following families: Bergen, Cortelyou, Ditmas, Duryea, Lefferts, Martense, Wyckoff, Van Sinderen, and Williamson.

Ten years later, only a single farm in Flatbush fell into this size category.
To be sure, another seven farms in New Lots, which had been carved out of Flatbush in the interim, also reached or exceeded one hundred acres in 1860, although only three included that much improved acreage. In 1870 and 1880 there were no longer any Flatbush farms as large as one hundred acres, the 97- and 88-acre farm that William Allgeo rented from John A. Lott being the largest in 1870 and 1880, respectively. In New Lots, three farms in 1870 and two in 1880 reached one hundred acres, but only one (Stephen Vanderveer’s 109-acre farm in 1880) included more than one hundred improved acres. The trend in farm size was similar in the other towns. Flatlands’ eight farms of one hundred acres or more in 1850 (two each being owned by the Ditmas and Lott families) fell to only two (both owned by the Lotts) in 1870; by 1880, the 84-acre Lott farm was the town’s largest. In New Utrecht, the eight farms of one hundred acres or more in 1850 (Nicholas Conover’s 203-acre farm being the largest) fell to only one by 1870; of the two returned in 1880, one was operated by a tenant.18

This long-term decline in large farms, which, as chapter 4 reveals, was not driven by a lack of workers to support intensive agriculture, can also be
documented from the perspective of land ownership. According to the as-
sessment rolls for New Utrecht, for example, the number of taxpayers owning
one hundred or more acres of land also declined sharply during the
nineteenth century: whereas in 1830, 1840, and 1850, 10, 14, and 9 persons re-
spectively owned that much land, by 1860, 1870, and 1880 the number
dropped to 2, 3, and 4, respectively.19

The transition from extensive to intensive cultivation is also evident on
the production side. As late as 1842, the Kings County Agricultural Soci-
ety appointed a Committee on Farms and Grain, whose members (Garrit
Kouenhoven, Garrit Stryker, and Jeremiah Johnson, chairman and presi-
dent of the society) inspected numerous farms. The committee report fo-
cused on the yields of the wheat, corn, oat, and hay fields, stressing the
highly positive correlation between manure use and moneymaking. It made
only one brief mention of potatoes — which were being grown on 16 acres
of Dr. Adrian Vanderveer’s 181-acre farm, 124 of which were planted to
wheat, hay, oats, and corn.20

At the 1850 federal census, the enumerator returned only one farm in
Flatbush as having produced $1,000 in market garden produce — Adrian
Vanderveer’s 198-acre farm. Ten years later, 23 Flatbush farms produced at
least that much in vegetables; the largest producer, H. B. Van Wick, whose
140-acre farm was by far the town’s largest, manifestly did not require its
full extent to produce $5,000 worth of vegetables. As for the other towns in
1850, no farms in Gravesend, 1 in Flatlands, and 7 in New Utrecht produced
at least $1,000 worth of vegetables. The largest producer, J. Remsen Bennett
of New Utrecht, reported the market garden produce of his 82-acre farm to
be worth $6,000. By 1860, 85 farms in the five towns produced $1,000 or
more of vegetables. Bennett, whose farm had in the meantime shrunk to
33 acres, was still the county leader with $10,000 in produce. (In 1869, he
was still prosperous enough to have the 30th highest income in rural Kings
County.)21

These impressive figures — as well as the county’s overall increase in
market garden produce from $84,000 to $319,000 during the 1850s —
nevertheless represent a significant understatement. The 1860 enumerator
for Flatlands failed to collect data on the value of market produce; instead,
crossing out the rubric for hops, he entered, “Cabbages.” As a result, the
fact, which would otherwise be lost to posterity, is preserved that Flatlands
farmers produced 1,280,000 cabbages that year. The largest volume on any
one farm was 60,000; four Remsen family farms alone (embracing 230 acres)
produced 185,000 cabbages. The variety of vegetables produced in Kings
Kings County was amply on display at the Flatlands farm of John C. Bergen, who in 1865–66 sold several varieties of potatoes, cucumbers, tomatoes, cabbages, onions, pumpkins, and turnips. Flatlands farmers also grew asparagus and sweet corn — in 1875, for example, 13,000 bunches and 712,000 ears, respectively — carrots, parsnips, leeks, beans, peas, and celery. In the 1880s and 1890s, William Bennett and his son Edward marketed on their Gravesend farm tomatoes, sweet corn, squash, turnips, beans, sprouts, cucumbers, carrots, peas, pears, and cherries, in addition to their staples, potatoes and cabbages. New Utrecht farmers also produced large quantities of tomatoes and cauliflower.22

Market gardening had appeared as agricultural specialization in Kings and Queens counties as early as the 1820s. Adriance Van Brunt recorded in his diary from 1828 to 1829 that he had his “market truck” vegetables (peas, potatoes, corn, turnips, kidney beans, and cabbages) and fruits (cherries, raspberries, pears, and apples) transported from his farm in Yellow Hook (Bay Ridge) to market in New York daily during the season. By 1850, even before the transition to intensive farming was complete, one of the census enumerators inserted in a blank space at the bottom of one of the manuscript schedules these unique “Remarks — Most of the Lands of this County are very Fertile and Suitable for early Vegetables and eagerly Sought after by Gardeners and Marketmen.” During the latter half of the century vegetable farms at the western end of Long Island “simply grew in size until they swallowed up all the fields.”23

One influence that might have facilitated the transition to intensive market gardening among Dutch American farmers was its long tradition in the Netherlands: already highly developed in the seventeenth and eighteenth centuries as a result of urbanization and the presence of a relatively high-income stratum of consumers, market gardening became even more important there in the second half of the nineteenth century, eventually encompassing one-tenth of the agricultural labor force. Furthermore, like Holland’s farmers, who were by then both the world’s biggest users of artificial fertilizer per hectare of arable land and helping that country approach “the ideal of a ‘recycling economy’” by reusing waste productively for manuring, Kings County farmers had access to one of the principal inputs, manure, in large quantities and at low prices.24

Kings County’s transition from grain to vegetable production from about the 1850s was driven by advances in transportation, especially the opening of the Erie Canal, which shifted regional cost advantages and thus made
commercially possible the importation to the growing urban population of the New York City area of cheaper grains grown in upstate New York and the upper Mississippi Valley. In neighboring Queens County, too, wheat and flour had been the staples until the canal was built. Although the apprehension was "almost universal" that the canal "would depreciate all the farms on Long Island," it in fact turned Queens "into a garden, and added two or three times, and perhaps more, to the value of every tillable acre." What the president of the Queens County Agricultural Society said of his county's farms in 1852 applied, mutatis mutandis, to Kings County (which was only one-fifth its size): "Queens county cannot be interfered with in its prosperity, as long as there are in that metropolis [New York and Brooklyn] hundreds of thousands of mouths to be daily supplied, and hundreds of thousands of dollars to be expended for . . . fruits and vegetables. . . . But then gardens will come to have the dimensions of farms."25

Market gardening on Long Island was powerfully aided by another advance in transportation: the opening of the Long Island Railroad in 1836 enabled truck farmers to ship to New York "in a few hours produce that by boat had taken as many days." Potatoes in particular became "immensely profitable." By the early 1860s, the Queens County Agricultural Society could not only record the striking progress of vegetable production — on a territorial scale that Kings County farmers were foreclosed from duplicating — but also foresee its inevitable ousting by nonagricultural activity. Just a few years earlier Queens farmers had already sent market garden produce worth more than half a million dollars to "the all-consuming adjacent city." Nevertheless, the expansion of market gardening, especially in western Queens, could be gauged by the fact that "one single proprietor, the produce of whose farm a dozen years ago averaged but two wagon loads per week, now devotes to asparagus alone one hundred acres, to cabbages eighty acres." Soon, the society predicted, that part of the county "will assume the appearance of one vast market garden, which will drive before it to the eastward all farms of grain and hay, itself to be driven back in turn when the march of improvement shall demand the surrender of the soil to purposes of building."26

The force of the midcentury drive toward vegetable production was also highlighted from the perspective of Staten Island, Kings County's neighbor across the Narrows. At the Richmond County Agricultural Society's 1852 annual fair, Congressman Obadiah Bowne observed that New York City's proximity "would seem to impose it upon us almost as a necessity, to convert our farms into gardens." The proof that vegetable production was "a
most profitable system of farming” he saw in the fact that land in Kings County was “selling for gardening purposes at rates as high or higher than those obtained here in those localities best suited to the demands of taste or wealth.”

A startling interpretation of the transition stemmed from the New York State assessors. Created by the state legislature in 1859 to equalize taxes among counties, the assessors in their first annual report divided the counties into three “natural agricultural divisions” based on the “productiveness of . . . soil”: those in which winter wheat was the staple crop; those adapted to spring grains and to grazing and dairy; and those devoted chiefly to grazing and dairy. Because location could make land “of inferior soil” more valuable than the best land, the assessors classified Kings County (together with Queens, Richmond, Suffolk, and Westchester) in the first group because of their “easy access to the great consuming market of the continent.” The assessors excepted Kings and Queens from the subgroup of counties that did not “compare favorably” with those possessing the best soil, and characterized them as “among the most valuable in the State,” but they nevertheless faulted the two counties for not being “the most productive and populous.”

Market-oriented modernizers who could abide no land use that did not generate the highest possible income and, derivatively, assessments, the assessors attributed the failing to “the proprietors or occupants. It is credible neither to the patriotism or [sic] intelligence of the people, who, refusing to sell, keep a large body of the most desirable lands in the State in a barren waste.”

In his 1863 Report on the Agricultural and Other Resources of the State of New York, senior assessor Theodore Peters informed the legislature that “Kings county can no longer be regarded as an agricultural county, being almost entirely occupied by a city, or urban and suburban population.” To be sure, Peters’ view was crucially shaped by the assessors’ understanding that real farms raised winter wheat, other grains, and cattle: “Farming, as understood and practiced in other portions of the State, would be an unprofitable occupation” in the New York City area. Nevertheless, he was persuaded that: “The lands can be most profitably occupied as market gardens, and all its agriculture tends to that direction, and will be profitable.” The requisite heavy manuring would have rendered this type of cultivation infeasible or unprofitable elsewhere in the state, but market garden farms maintained their prosperity by paying for the manure by selling back to New York and Brooklyn the vegetables that it made possible. But even given this bias, the assessor’s prognosis was astonishing: Peters denied Kings
County agricultural status on the ground that “its available surface is occupied for city or village purposes, or as a market garden. It derives its principal value from this cause, and in a very few years will be occupied by only an urban population.” Ironically, despite the nonagricultural position that the assessors accorded it, Flatbush in the 1870s was still plagued by “Street Cattle Nuisance,” which allegedly caused injury to real estate valued at $100,000 in addition to compelling women to walk in the street to avoid cows on the sidewalk.29

Peters’ assessment of Kings County’s future is particularly ironic in light of his admonition that: “Our farmers should remember that there is only one law which admits of no exceptions, and which everywhere produces the same results, that is the law of markets.” If market gardeners were obeying the ubiquitous law of markets by making a flawless transition to the currently and prospectively profitable production of vegetables — Peter’s own figures showed that the value of agricultural products per acre in Kings County vastly exceeded that of any other county in the state — it is unclear why Peters was so certain that Kings County had to become urbanized (and even more rural Queens County suburbanized). Such a prediction in the midst of the Civil War, when Kings County had yet to complete its meteoric rise to the peak of national vegetable production, seems counterintuitive. If Peters’s perspective was not merely idiosyncratic, it may have implied this reasoning: old-line Dutch farmers regarded profitable market gardening as a stopgap measure to tide them over until the inexorably spreading city of Brooklyn created enough demographic pressure to make any agriculture in Kings County either impossible or financially inferior to the prospective profits that conversion to residential real estate would generate.30

To other observers, however, it was apparent that market gardening would endure as a profitable business. By the late 1840s, the New York market could absorb “vast” amounts of vegetables “cultivated on a scale truly astonishing.” In the aftermath of the Civil War, however, population, demand, and supply all jumped to considerably higher levels. Peter Henderson (1822–1890), a large New Jersey market gardener and the author of “the first and most valuable practical work . . . then available to the American market gardener,” described the scope of vegetable farming in the New York area in 1865. Some might imagine that supplying “a population of a million inhabitants daily, throughout the year, with fresh vegetables . . . require an immense tract of land.” In fact, however, he doubted whether more than 4,000 acres were devoted to green vegetables, three-fourths of which was occupied with corn, peas, and beans. The finer early
vegetable crops—asperagus, beet, cabbage, cauliflower, cucumber, lettuce, onion, radish, rhubarb, tomato, and turnip—were all raised on no more than 1,000 acres by market gardeners on farms of five to fifty acres, the average being about ten acres. Long Island, which became the country’s most concentrated area of potato production—as well as “the cauliflower garden of the United States,” an especially lucrative crop the supply of which never met demand—was the best example of intensive agricultural specialization.31

The Dutch farmers of Kings County did not falter when faced with the decision whether to leave behind “the great diversification of products characteristic of subsistence agriculture.” An entrenched subsistence way of life did not become a serious obstacle to their determining “the relative advantages of producing or purchasing products for their own use, as well as the crops that might be advantageously produced for sale.” They rationally accommodated larger national economic pressures to abandon grain production.32

Nevertheless, a farm newspaper editor who noted in 1861 that “any farmer having a proper soil, and being within the proper distance of the New York market, may raise large quantities of cabbage with great profit,” also knew of many farms within ten miles of the city raising grains in competition with western farmers on land “the interest on the value of which is as great as the fee simple of western farms. In our own neighborhood . . . many farmers . . . do not realize two percent upon the value of their farms, while market gardeners in their midst are realizing comparative fortunes.”33

The Real Estate Record and Builders’ Guide, in an 1869 article on “Farms Near New York,” commented that whereas grain farmers could not pay more than $80 per acre, “market gardeners in the immediate vicinity of the city can afford to pay over one hundred dollars for land, and, by dint of hard work, make out of it a fair living. . . . Hence we find that farming is falling into decay in all the country immediately adjacent to New York city, except, of course, where vegetables or choice fruit is raised.” A horticulturist noted at the beginning of the 1870s that individual farmers were planting more cabbage than whole townships had fifteen to twenty years earlier: “It is no longer a rare sight to see, in the vicinity of large cities . . . fields of five, eight, or ten acres exclusively devoted to Cabbages.” Two decades later, a New Jersey horticulturist added that: “In our large commercial and manufacturing cities where wealth has concentrated, and where abound families who live regardless of expenditures, fabulous prices are freely paid for vegetables and fruits to please the palate or adorn the table.” By 1890 truck farmers
were growing vegetables on more than 100,000 acres in the New York–
Philadelphia area.34

Table 4, which presents the value of Kings County vegetable production,
reveals the explosive growth in the fifteen years after the end of the Civil War
followed by an even sharper reduction between 1879 and 1890, although
some of this decline may be more an artifact of incomplete reporting. A
deep plunge in vegetable production then took place during the 1920s,
when the value of output fell from $263,000 to a mere $29,000 as the acre­
age planted to vegetables dropped by 84 percent. By the 1950s, commercial
vegetable production disappeared as the handful of remaining agricultural
entities had become nurseries.35

An examination of market-gardening acreage and output on the town
level discloses a remarkable fact: until the mid-1850s and perhaps even as
late as the 1860s, the city of Brooklyn was the biggest vegetable producer in
Kings County. Although some uncertainty stems from radically different
data generated by the state and federal censuses, both sets of data under­
score how late the transition to intensive vegetable farming took place in the
rural towns. Nevertheless, farmers undertook this transformation before
significant land sales for residential suburbanization had occurred. This se­
quencing casts strong doubt on the possibility that the conversion was
merely a conscious stopgap strategy to secure a continued livelihood for the
old Dutch farming families until the most propitious moment arrived for
selling off their land to developers and speculators.36

The manuscript schedules of the Census of Agriculture make it possible
to observe changes in the individual towns during the crucial decade for
Kings County agriculture, the 1870s. From 1870 to 1879, the value of market
garden produce grown in Flatbush increased fourfold — from $32,360 to
$137,882. Whereas market garden produce accounted for only 31 percent of
the $104,854 of total output that 29 farmers produced on 1,472 acres in 1870,
by 1879 market gardens contributed 85 percent of the $161,034 total output
that 47 farmers produced on 1,666 acres. Whether the 31 percent decline in
average farm size from 51 to 35 acres in association with the 62 percent rise
in the number of farmers was a function of the spread of tenancy is unclear
(the 1870 census did not collect data on tenants), but the almost exclusive
reorientation toward the kinds of vegetables that were contributing to the
-growing urban population’s more varied diets was underscored by the fact
that while market garden production soared, potato output was almost un­
changed in the two census years (133,200 and 135,350 bushels).37

In Flatlands, the value of market garden production rose almost fivefold
to $203,200; whereas in 1870 it accounted for only 25 percent of total output, by 1879 this share had climbed to 80 percent. Farmland acreage also expanded by about one-fourth. New Lots, the largest and most urbanized of the towns as well as the one closest to being annexed to Brooklyn, offered a deviant course of development: its market gardening increased only 19 percent during the 1870s and actually declined as a proportion of total production from 91 percent to 68 percent. Not surprisingly, farm acreage also contracted. The censuses of 1870 and 1880 implausibly credited Gravesend (which had produced a small amount of vegetables in 1860) with no market garden production at all, but it was a significant potato producer — although low fertility in Gravesend “requires a great deal of enriching by manures to yield crops of any kind.” During the 1870s, farm acreage there fell by more than a fourth. The gains in New Utrecht during the 1870s were outsized, though the data are methodologically suspect. Vegetable production increased 2.6-fold, reaching $287,035; market gardening had gained absolute dominance by 1879, accounting for 95 percent of all farm output compared with 52 percent in 1870. Farmland also doubled during the 1870s in New Utrecht, expanding from 1,680 acres in 1870 to 3,024 (or, including untilled land, 3,403) acres in 1880.38

The extraordinary achievement of Kings County vegetable producers in their peak year, 1879–80, merits closer scrutiny. That the vast majority of farmers produced vegetables that year is the clearest indicator that the transition to intensive farming had been effected. Bracketing the classification of potato cultivation, only 31 of Kings County’s 409 farms did not report market garden production; almost all of these nonproducers were dairy units in New Lots. Market gardening would have been officially almost universal if the enumerators had not excluded potato production from the value of market garden produce sold. This definition especially affected Gravesend, where no farm reported vegetable cultivation, but 63 of 64 produced potatoes. As a share of the total value of production, market gardening doubled from 36 percent in 1869–70 to 70 percent in 1879–80.39

The national importance of Kings County vegetable or market garden production is quantified in table 5, which rank-orders counties at the federal censuses from 1850 to 1900. Kings County rose from 12th position in 1850 — “[o]wing to the prevalence of the Cholera of 1849 the early vegetables . . . were suffered to decay in the fields and necessarily showing a small account in market produce” — to 8th in 1860; after slipping to 9th in 1870, it catapulted in 1879 to 2nd place behind Queens, which was the first or second largest vegetable producer at every federal agricultural census from
1850 to 1900. After reaching its high point in 1879, Kings County’s market garden output fell enough to displace it to 23rd in 1890; other counties were pushing forward so fast that even another significant increase in output in 1899 could not prevent Kings County from plummeting to 40th place. Vegetable production’s demotion was forcefully signaled by the fact that in 1899 sales of flowers and ornamental plants in Kings County — at $518,733 the fifth highest after Cook, Philadelphia, Middlesex, and Hudson counties, four other large metropolitan vegetable producers — was twice as great as the value of market garden produce.40

The other leading market garden counties during this period were also largely located in the vicinity of the large eastern cities (Boston, New York, Philadelphia, and Baltimore). Despite its larger population, however, New York, cut off by water on three sides, was not surrounded by the largest agricultural hinterland. In 1850, the total improved acreage as well as the value of the land and improvements in the counties within a fifty-mile radius of New York City amounted to only two-thirds of those around Philadelphia; by 1900, the farmland near New York and the value of its products reached only about three-fifths of the levels around Philadelphia.41

The course of New York City’s own position as a vegetable producer is also noteworthy because it underscores how late market gardeners were able to hold on even in the country’s largest city. It ranked seventh in 1850 and, by more than tripling its output, rose to sixth place by 1860. Although New York disappeared from the list of the 12 leading counties by 1869–70, its output fell only marginally below that of the 12th to $256,530. Manhattan market gardening’s demise occurred during the 1870s when output fell by more than 94 percent to a minuscule $14,350. Kings County did not register such a rapid descent for another half a century: not until the 1920s did the value of its market garden production plummet by 89 percent.

At the peak of their recorded vegetable production, in 1879–80, Kings County farmers could claim the leading position with respect to farm value, value of implements and machinery per farm, fertilizer per farm and acre, yield per acre, and output per farm. Tables 6a and 6b highlight these crucial variables. Kings County’s status as the country’s second biggest vegetable producer is, as seen in table 6a, all the more remarkable in light of the fact that (with the exception of Hudson County, discussed below) it had the fewest farms with the smallest acreage of the 12 leading counties. The value of Kings County farm output per acre was (again with the exception of Hudson) four times greater than that of its closest competitor; on a per farm basis, its output far exceeded that of the other leading counties.

□
Some of the factors explaining how Kings County farmers, despite their small numbers and acreage, attained their leading position are displayed in table 6b. First, Kings County farmers were the most specialized in market gardening, which accounted for 70 percent of their output by value. Only Hudson County, New Jersey, which was undergoing more explosive population growth in Jersey City and Hoboken and whose already small acreage was more than halved by the time of the 1890 census, was more specialized.42

Second, Kings County farmers used more implements and machinery than any of their competitors: the $549 per farm average was 40 percent higher than that of the next most capital-intensive county (Philadelphia) and about 170 percent higher than the average of the other 11 leading counties. These figures strikingly confirm the memoir that Daniel Tredwell wrote of Flatbush in 1879 without the benefit of census data: “The original farmers of Flatbush had large productive farms with all modern appliances through which they had attained to wealth. . . . No farmers in the country were better equipped than they for obtaining the best results in their line of agriculture.”43

A much better sense of the kinds and quantities of equipment that Kings County farmers maintained in the 1870s and 1880s can be gleaned from the notices published in the Rural Gazette in the 1870s and 1880s for auction sales of the farm stock of farmers who had died, retired, or gone into another business. An administrator’s sale of the stock, utensils, and seeds of the late Henry T. Van Pelt, a member of one of New Utrecht’s most eminent Dutch farm families, took place in November 1875. At the time of the 1870 census, Van Pelt, then 45 years old, produced $5,000 worth of products, $4,000 of which were market garden produce, on his 21-acre farm. Although his output was average, the $2,000 that he estimated his implements and machinery to be worth was considerably above average for all of Kings County. The auction notice listed, in addition to the “usual amount of Tools to carry on the business of Market Gardening”: 1 bay colt, 3 horses, 2 cows, 2 market wagons, 2 farm wagons, 1 rockaway, 1 buggy, 1 wood sleigh, 1 cart, 300 hotbed sash and frames, 2 wheelbarrows, 3 sets double harnesses, 2 sets single harnesses, cart harness, 275 shutters, 100 baskets, lot straw mats, 3 barrels vinegar, lot pea seed, lot chickens, 2 straps bells, 3 wagons covers, 3 harrows, 1 hay cutter, 12 plows, 1 road scraper, 1 cider press, 1 roller, 1 grind stone, 75 loads manure, bone dust and guano, hotbed soil, corn stalks, 2 bushels cucumber seed, lot other seeds, early rose potatoes, blankets and robes.44

Third, despite its miniscule size, Kings County was the 12th largest user
of fertilizers as measured by total expenditures of all counties in the United States. As a result, on a per acre and per farm basis, Kings County farmers used far more fertilizer than their counterparts elsewhere. They used more than four times as much per acre as their closest competitors (apart from those in Hudson County) in Queens; $519 worth of fertilizer per farm was 130 times more than farmers in Hamilton County (the seventh largest vegetable producers) used, and almost six times more than the average for all the other 11 leading counties. Although this gap is exaggerated by the fact that a much smaller proportion of farmers in the other counties produced vegetables or used any fertilizer at all, it is large and real. The extensive advertising for fertilizers, adapted to individual crops such as cabbages and potatoes, in publications that they were bound to read — in 1884, for example, issue after issue of the *Rural Gazette* contained large advertisements dominating the front page — strongly underscores that Kings County farmers were large and steady customers.45

Kings County's yield was more than three times higher than the next highest county's, but these ratios significantly understated market garden yields because the Tenth Census did not collect data on market garden acreage. The state censuses of 1855 and 1865, however, did publish the relevant data: Kings County farmers produced, on average, $193.46 worth of vegetables on each of 1,414 acres in the former year and $226.87 on 1,110 in the latter. In 1879, Kings County ranked far above all other counties in fertilizer expenditures per improved acre: $21.29 compared to $0.08 to $4.88 for the other counties (except Hudson County, which averaged $13.35). At the 1889–90 census (but without specific data on vegetable acreage), Kings County's per acre yield at $105.05 remained far above that of any other county (except Hudson). Its yield was almost three times higher than that of neighboring Queens, the second biggest producer ($38.41), while its per acre fertilizer use ($13.60) was not quite twice as high (Queens farmers used $7.31). The yield in the biggest producer, Middlesex County, was only one-fourth that of Kings County, but its fertilizer use was less than one-tenth as high. In terms of total value of farm productions per farm, Kings County farms in 1889 still recorded the largest output among the leading market garden counties. At $3,531 they produced more than twice as much as their leading competitor ($1,653 in Camden) and three times more than the average among the 12 biggest market garden counties.46

The census of 1900 also published data on vegetable acreage by county. Even at that late date, when Kings County farms were already in eclipse and had fallen to 40th place in total output, they yielded on average $135 worth
of vegetables on 1,936 acres — only slightly behind the two leading producer-counties, Queens ($144) and Middlesex ($164), and 11th-ranked Philadelphia ($152), and considerably ahead of the other top 12 counties. In 1899, the surviving Kings County market gardeners still used far above average quantities of fertilizer per acre of vegetable, but they no longer led the country. They used $44.28 worth compared with the $29.11 required by their counterparts in Queens, who underwent an extraordinary shrinkage in total improved acres from 130,242 in 1880 to only 21,865 in 1900; farmers in Nassau County (the fifth largest producer), formerly the western part of Queens (created after Queens became part of New York City in 1898), used almost as much as Kings County farmers ($40.21) to produce $78.24 worth of vegetables per acre. Significantly, among the largest producers, Norfolk used fertilizer most intensively ($46.71 per acre); nevertheless its $106.71 per acre yield remained considerably below that of Kings County.47

The meaning of Kings County’s persistent outlier status as fertilizer user is ambiguous. It does not necessarily indicate inferior fertility. Because Kings County farmers in 1879 cultivated the fourth most valuable farmland in the country, they may have had an incentive to farm more intensively. If Kings County market gardeners’ transportation costs to market were lower than average, it may have been rational for them to use part of the savings to crop more intensively. The fact that the leading counties’ per acre fertilizer use tended to converge over time — with Kings County’s falling and the others’ rising — suggests that diminishing fertility in Kings County was not a significant cause of the decline of agriculture there. Finally, although the precise quantitative proportions are unknown, the fact that “some vegetables require an enormous quantity of fertilizer, while others will thrive on much less,” may, depending on the degree of regional crop specialization, have accounted for different levels of use.48

The labor intensity of Kings County vegetable farming is indicated by the fact that in 1879–80 its per farm average of $735 in wage payments was greater than the per farm value of total (including non-market garden) production in one of the other leading 12 market garden producing counties and not much inferior to that of five others. Of the 288 Kings County farms with market garden sales (excluding all farms producing only potatoes), 275 paid a total of $211,674 in wages to hired labor. Given the large number of sons and other family members working on the farms, wage-intensity is not, however, a wholly reliable indicator of labor-intensity. Indeed, variations in wage-intensity among Kings County towns suggests that the availability of unwaged family labor may have varied.49
The wage- and fertilizer-intensity of market gardening in Kings County may be compared with the cost structure given by Hudson County horticulturist Peter Henderson. In two editions of his *Gardening for Profit* published in the mid-1870s and mid-1880s, Henderson offered average cost and revenue figures for the previous ten years on his own farm in Jersey City Heights, which are reproduced in table 7. The total wage bill of Kings County’s 288 market gardeners amounted to 25 percent of the total value of market garden production, while total fertilizer expenditures ($166,123) amounted to 20 percent. The combined total of 45 percent approximated the 47.5 percent that Henderson calculated. This almost identical proportion, however, conceals two widely deviant subshares: Henderson’s wage and fertilizer bills amounted to 39 percent and 8 percent, respectively, of his receipts. The below-average wage bill and above-average expenditure on fertilizer in Kings County may in part be explained by the availability of more unwaged family labor and the use of much more fertilizer.

The low wage-fertilizer ratio on Kings County farms may mean that farmers either were heavily reliant on unpaid family labor or used a far above average amount of fertilizer. Although they did lead the nation in fertilizer expenditure, their $21 per acre outlay was only one-fifth of the amount mentioned by Henderson. The $29 per acre average wage cost, however, was barely one-twentieth of Henderson’s figure. Alternatively, the discrepancy between census data and Henderson’s reports may in large part be explained by the fact that Henderson was literally referring to a single acre, whereas the census figures are averages based on total acreage, some or most of which may not have been planted to vegetables (but rather to hay for the draft animals) or any crop at all. Inclusion of the other acres obviously lowers per acre yields as well as per acre expenditures. This alternative explanation is supported by other contemporaneous accounts of typical expenses, which reported that vegetable farmers spent $72 to $150 per acre on manure. Moreover, Henderson himself noted that market gardeners in the New York vicinity were so convinced of the adverse impact of continuously cropping land that, even on land worth $500 per acre, “when twenty acres are under cultivation at least five acres are continually kept in grain, clover, or grass.” Because the market gardeners of Hudson County, whose land was limited and rented for $50 per acre, could not “well afford to let their lands lay thus comparatively idle,” their crops became inferior to those on Long Island.50

The large differences in wage and fertilizer expenditures among Kings County towns are also worth examining. Since many market gardeners also produced output other than vegetables, total production will also be ex-
amined. New Utrecht was the largest vegetable producer. Of 103 farms returned at the 1880 census, 101 were market gardens (the other two produced potatoes) accounting for 34 percent of total county market garden output. New Utrecht farmers’ position as the county’s leading capitalist vegetable producers was signaled by their wage payments: they accounted for 47 percent of all wages paid by market gardeners, and their per farm average of $984 was also the highest. New Utrecht’s wage bill, in turn, amounted to 35 percent of the total value of its output — almost one-half higher than the next most wage-intensive town, Flatlands (23 percent). New Utrecht had been the biggest user of fertilizer in 1874, when the state census first collected data on the subject, accounting for 48.5 percent of all fertilizer purchased; by 1879 its use was only average. Nevertheless, total wage and fertilizer costs amounted to 54 percent of total market-garden value in New Utrecht, the county’s highest — only 2 percent higher than in Flatlands, the next biggest producer, but fully 20 percent higher than in New Lots and Flatbush. Flatlands farmers, all of whom were market gardeners by 1879, were the biggest users of fertilizer in 1879 both in absolute expenditure ($58,100) and as a proportion of output (29 percent). That Flatlands’ wage bill was much lower than New Utrecht’s may be linked to the fact that Flatlands had by far the highest proportion of owner-farmers: Dutch farmers’ sons and other relatives may have contributed enough unwaged labor to lower wage costs; the tenants who operated many farms in New Utrecht may have faced greater obstacles in persuading their families to forego industrial employment to cultivate cabbage on rented land.51

The fact that wage and fertilizer costs bulked largest in the two biggest producing towns, New Utrecht and Flatlands, does not necessarily mean that profits there were lowest. Because the Census did not collect data on other costs such as rent, seeds, transportation, and marketing, it is possible that the smaller producing towns’ profits were unusually burdened by them. Nevertheless, since wages and fertilizer made up 72.5 percent of Henderson’s total market gardening costs, it is at least plausible that New Utrecht’s and Flatlands’ total costs were higher too. Why the biggest producers would not have been the most profitable is unclear. Interestingly, in 1880 New Utrecht vegetable farmers on average used implements and machinery worth 30 percent more than their Flatlands competitors ($642 and $492, respectively). Whether some technological relationship was embedded in the negative correlation between the use of tools and fertilizer in the two towns seems unlikely since New Lots market gardeners spent the most on fertilizers ($817) and used the most expensive equipment ($822).52
Table 8 summarizes the crucial indicators collected by the Census of Agriculture for 1879–80 for the individual towns. New Utrecht and Flatlands produced the most vegetables, but the average farm there was on the small end of the spectrum, market gardeners in New Lots and Flatbush being the largest. New Utrecht farmers produced almost exclusively vegetables: 97 percent of the value of their output was market garden produce. All Flatlands farmers were market gardeners, their market garden produce being, on average, less than half as large as that of their counterparts in New Lots; in addition, only 80 percent of the value of their output was vegetables.53

The transformation of agriculture in nineteenth-century Kings County was integrally linked to several central features of the period’s urban history. The agricultural absorption of horse manure from city streets and stalls, for instance, was entwined with the emergence of municipal sanitation measures, which in turn contributed to the rise of professional urban planning. Also, changes in agricultural methods and crops paralleled shifts in urban strategies for preserving the benefits of country life for its citizens; as agriculture became increasingly labor- and manure-intensive, advocates of the city beautiful and healthy abandoned their love of the farm in favor of city parks and landscaping. In time, the role of agriculture itself became a distinguishing feature among campaigns for reshaping suburbanization, as planners and developers drew on competing visions to mend the social and cultural fissures between the ever-expanding city and the increasingly remote country.

Despite the ongoing creation of waste and its implications for fertilizing local agriculture well into the twentieth century, urban planners gradually dismissed local agriculture from their list of concerns. From the start of the nineteenth century, the city’s immense collections of waste, supposed to be the incubator of epidemic disease, led to a variety of municipal sanitation measures. As New York City grew, pressing problems such as hazardous construction, dense traffic, and mass poverty multiplied; still, the waste problem remained very much in the forefront. Near the end of the century,
urban sociologists addressed the problem of decongesting the city without turning the urban fringe into more of the same. Sanitation and the possibilities for preserving an urban-agricultural waste and production cycle receded from the forefront of urban problem solving in this context.54

A central feature of these changes is the farmer's role in relation to the city. During much of the nineteenth century, Kings County farmers performed a useful service to the city by absorbing the mountains of waste produced by the city's growing population of horses as well as persons. Manhattan, Brooklyn, and Long Island "became a huge recycling system... Often, the very same boats, and later trains, which carried hay, produce, and fuel wood westbound to market, returned loaded with manure. Horse-drawn railroads during the 1870s and 1880s frequently placed advertisements — "Manure! Farmers, Attention!" — offering to sell their unwanted by-product on an annual or other basis. While Brooklynites, as the Rural Gazette noted in 1873, "are, no doubt, glad to get rid of their filth (and the Board of Health will compel them to do so) our farmers are glad to obtain means with which to enrich their lands, and to pay a fair price for such materials" — even if some farmers were too proud to think of being seen "seated on the top of a load of manure driving out the great city of churches."55

The sale of the Lefferts farm in Brooklyn's 21st Ward in 1873 shed interesting light on urban manure problems. From a practical real-estate perspective, the Brooklyn Daily Eagle reported that one of the greatest drawbacks to prosperity was the condition of vacant lots: "to the disgust of residents and visitors, the city railroad has accumulated an immense mountain of manure and built it up along the so-called sidewalk." Little wonder, then, that in the 1870s Scientific American pronounced "the problem of the conversion of the excremental waste of towns and people... into useful materials" as "engaging as much of the attention of intelligent minds throughout the world as any social question."56

Emblematic of the centrality of manure to Kings County farmers' operations is the scene that the Rural Gazette portrayed in January 1875 of the Bay Ridge section of New Utrecht: "All the farmers are hauling the manure for their lands from boats which land near the beach, and the carts are driven into the water (wagons could not be used) up to the boat and filled." The crucial role played by manure in maintaining market gardens' fertility and value is underscored by the provision commonly found in farm leases requiring tenants to "work in a good and thorough manner the said farm, putting on the necessary manure for the crops as is usual." John Lefferts, one of rural Kings County's richest residents and largest landowners, at-
tested to manure’s importance in his will as late as the 1890s by bequeathing to his son James “all manure on the farm at the time of my decease.”

If city residents sometimes forgot the salutary role played by market gardeners, they were forcefully reminded of it when farmers who had over­loaded their wagons on bad roads had to leave part of their load on the roadside, “as no one desires a lot of manure dumped in front of their premises.” By 1882 complaints grew more insistent that farmers were daily violating an ordinance requiring them to cover up their manure wagons. Flatbush residents were concerned that the heaping of manure on lots in Brooklyn near the city line would not only affect their health, but “depreciate the value of property . . . in every section of the town.” Farmers’ public health role continued through the end of the nineteenth century, but at the same time its significance receded from popular consciousness and the imagination of urban planners and sociologists.

Meanwhile, new questions arose about farmers’ usefulness along the city’s urban fringe: If the use of horses in urban transportation would eventually be supplanted by electric and gasoline-powered vehicles, and if agricultural products of all kinds could be imported from distant sources without extraordinary cost, what point was there to low-density, agricultural land uses so close to the city? It was in this context that the farmer’s significance in relation to the city became the subject of a search for new urban values.

The first part of this story grows out of the transformation of agriculture itself — discussed earlier in this chapter — from extensive grain production to more intensive land use for vegetable production. Kings County’s wheat output, the hallmark of extensive agriculture, peaked in 1850. Long Island farmers, reputedly the first in the state to grow wheat, had turned to it because it was more remunerative than other crops. Yet in part because wheat also deprived the soil of nutrients and thus required huge amounts of fertilizer, farm voices throughout Long Island by the late 1840s complained of its relative unprofitableness.

A major focus of discussion was the relative cost and availability of manure. In Suffolk County, for example, heavy outlays for manure made the wheat crop “by far the most expensive and least profitable of our whole system of agriculture.” In the 1840s: “Long Island in all its length and breadth, particularly in its western counties, depends essentially upon a supply of manures, from the cities and towns on the North and East Rivers, which is brought by water and railway to the nearest points where it is required; and the farmers of this county . . . have proceeded for years, upon the principle,
that it is better and more profitable to sell the corn, the straw and the hay, for cash in the market, and with it, to purchase the manures required for the growth of their crops."  

Even in the late 1820s, Adriance van Brunt, who produced vegetables for the New York market, devoted much of his attention to inspecting and buying large quantities of manure, which were often transported by boat and which his employees spent many days unloading, cutting, and spreading. Throughout Long Island, farmers, who probably spent more on manure than in any other part of New York State, by the 1840s no longer tried to increase their "home manufacture" of manure, but generally kept "as little stock to consume the produce of their farms as possible, selling their hay and grain at New-York and Brooklyn, and buying their manure in return." They took all the stable manure made in Brooklyn, "[a]lmost all" made in New York, and "a considerable portion" of Albany's. Farmers in the immediate vicinity of Brooklyn carted that city's street dirt to their farms in their own wagons. Little wonder that the Kings County Agricultural Society reported that the "farmer who uses the most manure and cultivates his land best, makes the most money."  

Indeed, the large city was rapidly becoming a "manure factory" in the service of nearby agriculture. As the city's population grew, so too did its horse traffic. The resulting growth in the supply of urban manure and night soil rendered the farming of vegetables, which were so crucially dependent on fertilizer, the more feasible. The fast growing cities on the East Coast experienced powerful incentives to expand their recycling relationship with their agricultural hinterland, of which that between New York–Brooklyn and rural Long Island was the most highly developed:

The intense market gardening around these cities required far more manure than could be produced on the farm. The demand for hay, the principal energy source for urban transportation systems, created even more dramatic demands for manure. . . .

. . . Even if all the hay and produce had been fed to animals, there would not have been enough manure produced to maintain the fertility. . . . Moreover, the city's profitable market for hay and produce tempted most farmers within reach to keep as few animals as possible and to ship the maximum amount of their produce into the city. These two factors combined to create a demand for manures unequalled anywhere else in the country. . . .

For farmers on the western end of the island, the solution was to im-
port the large quantities of manures produced in New York City, which was a veritable manure factory. The large number of horses that powered the city's transportation system provided immense quantities of dung...  Much of it was deposited on the streets along with garbage and the excrement of numerous hogs that roamed New York's streets eating the garbage. Dairies located in the city produced still more, and the human population contributed its share...

Removal of these wastes was essential for the cleanliness and health of nineteenth-century New York. Fortunately, the agricultural market for manure provided considerable incentive for the owners of dairies and stables to have their manure removed. Sometimes they sold it directly to farmers, but often they sold it to dealers who carted it to the outskirts of the city where they composted it... to produce a light, friable manure for which farmers were willing to pay premium prices.62

Just as the city required an outlet for its waste, so too did farmers require guarantees for a stable source of that waste. As was the case throughout Long Island, the various soil types of Kings County shared the geologically caused characteristic of relatively shallow soil. This shallowness had a two-fold impact on crop growth: first, it limited root development to horizontal spreading, thus leading to crowding among long-growth crops planted close together; and second, it also limited storage reserves for maintaining moisture. Although both effects tended to lower yields, for the shallow-rooted crops typical of market gardening in Kings County, the loams and sandy loams were sufficiently deep and moisture-retentive. To counteract such tendencies toward low yields, however, the intensive application of manure was required not only on Hempstead loam — which covered most of Flatbush and parts of Flatlands and New Utrecht — but also on the much deeper Miami stony loam, which covered the Fort Hamilton and Bay Ridge sections of New Utrecht for as far as two miles inland from the coast. Of this latter soil, which was usually classed as a general farming type producing grasses and grains, which the proximity of New York City had prompted farmers to appropriate for more intensive cultivation, the U.S. Bureau of Soils wrote: "The majority of the crops are produced by the fertilizer rather than by inherent fertility of the soil."63

As early as the 1840s, U.S. farmers had been made aware of the specific chemical compositions that rendered different fertilizers effective for various vegetable crops. Kings County farmers bought specialized commercial fertilizers for various crops such as potatoes, cabbage, and corn. One histo-
rian has gone so far as to argue that: "By purchasing large amounts of fertilizers, farmers had become businessmen, buying raw materials and selling finished products. . . . This transition from self-contained recycling to purchasing raw materials may have been a more important step toward the commercialization of agriculture than the decision to grow crops for the market."64

The large-scale supply of manure had become so vital to farmers in New York and its environs that in 1864 the state legislature enacted a statute incorporating the Farmers' Protective Union of Kings, Queens, Suffolk, Westchester, Richmond, and Rockland counties. With a capital stock of not less than $200,000, the association's object was "to protect and the better to promote the business and interests of those engaged in the pursuit of agriculture, and especially for the purpose of procuring, purchasing and selling manures, ashes and other fertilizers of the soil." By 1873, the organization was "practically confined" to Kings and Queens, where it was recognized that the "best producing land . . . is undoubtedly that which is manured the best." Kings County farmers continued to figure prominently among the organization's directors into the 1880s.65

That market gardeners around large cities annually used 100 tons of manure per acre was "appalling to the average farmer," who applied as much to 50 acres as a vegetable farmer did to one, "but every one who has had experience in growing vegetables or fruits knows that the only true way to make the business profitable is to use manure to the extent here advised." Little wonder that "[g]angs of men . . . hard at work hauling out manure and spreading it" were a common sight in Kings County. By 1903, the U.S. Bureau of Soils reported that throughout western Long Island nature was yielding to technique: "The influence of natural soil fertility upon crop production . . . is rapidly decreasing in effect through the employment of large amounts of commercial fertilizer and stable manure, and through increasing intensity of cultivation."66

Closer examination of Manhattan and Brooklyn as sources of supply and of the relative levels of consumption of fertilizers by the farmers in neighboring counties suggests the extent to which the farm-city supply cycle determined local agricultural patterns. Until the end of the century, Kings County farmers had access to horse and human manure from both cities. In Brooklyn, the U.S. Census Office observed in 1878, the city's 75,000 houses were associated with 25,000 privy vaults: "Night-soil to the amount of 20,000 cubic feet per annum is taken to farms and gardens outside the city, where it is utilized as fertilizer." In 1880, Brooklyn and New York counted
150,000 to 175,000 horses; ten years later, after the advent of the electric streetcar, 22,000 horses and mules still pulled streetcars in those two cities. With a horse estimated as dropping on average 15 to 30 pounds of manure daily, the aggregate amounts were prodigious.67

Meanwhile, market gardening in Kings County expanded and contracted with the use of manure. In analyzing the census results, the Rural Gazette opined in 1882 that Kings County should no longer be regarded as agricultural because farming there “is conducted under exceptional circumstances, and the product of the land would not afford a fair basis for comparison with that of ordinary farming lands. It would not be practicable, as a rule, to manure lands as heavily as is done in the farming portions of Kings County, because these lands are within easy reach of a great city, and its wastes are turned to account by the farmers adjoining the city.”68

The shift to more manure-intensive vegetable farming overlapped with the expanded use of horse-drawn transportation in Brooklyn and New York City as the superabundance of cheap accessible horse manure became a foundation of post–Civil War market gardening. Some have linked the decline of market gardening to the disappearance of manure associated with the displacement of horses in cities, but Kings County’s decline as a vegetable producer began before any loss of manure supplies could have become relevant. There is no evidence that decreasing availability of manure became problematic for Kings County farmers. The Brooklyn City Railroad, for example, recorded a tripling between 1864 and 1883 in its income from the sale of horse manure, from $4,430.99 to $11,135.40. As late as 1890, when Kings County farming was beginning its steep decline, animal power still accounted for 81 percent of rapid transit mileage in Brooklyn and 75 percent in New York City. Ultimately, electrification of transportation, construction of sewerage systems, and manufacture of cheap commercial fertilizers toward the end of the century reduced both the supply of and demand for urban manure.69

Rural Kings County itself was an East Coast center of fertilizer production from menhaden. In the 1870s Barren Island in Flatlands boasted four factories, which still earned the island the epithet “odoriferous” in the 1890s, and the smells of which were “as fragrant as ever” in the first decade of the twentieth century. The Barren Island fertilizer industry, which by the 1880s was capable of processing up to 1.5 million fish daily and employed 500 workers including those in the fleets, began in the 1840s when 2,000 tons of fertilizer were produced annually from dead animals carted there from Brooklyn and New York.70
Even as local transportation systems weaned themselves of animal power, manure suppliers apparently faced little market or other pressure to make the recycling process more efficient. In 1897 the USDA, in an effort to help city officials and make farms more productive, discovered that only 60 of 354 cities used street sweepings for fertilization. Despite pleas from sanitation experts, conservationists, and agrarians that cities were wasting a treasure, not until the 1920s did a few U.S. cities begin selling their sewage sludge as organic fertilizer materials.71

By 1910 the USDA confirmed that commercial fertilizers were “extensively used in the production of truck-crop potatoes, particularly on the Atlantic seaboard.” This shift was not without risks: contemporary agronomists warned of the adverse impact on the soil of the continued use of commercial fertilizer, especially in connection with single-cropping designed “to get the greatest possible return in the shortest time, regardless of consequences.” They stressed how fortunate it was that the cities consuming the products of intensive agriculture could amply supply the manure needed to restore proper soil conditions.72