



House-lot gardens in Santarém, Pará, Brazil: Linking rural with urban

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Abstract. The division between rural and urban sectors of the landscape in many parts of the world is increasingly blurred. House-lot or homegardens offer a perspective on understanding rural-urban linkages since they are frequently a landscape feature in both settings and the exchanges of their products link the two. House-lot gardens are an under-researched component of the agricultural repertoires of smallholders in many parts of the world. Urban house-lot gardens in particular, have until recently not received much attention despite their critical importance to urban livelihoods. This paper presents findings from research on house-lot gardens in rural and urban zones of Santarém, Pará, Brazil, one of Amazonia's largest municipalities. The research demonstrates that garden products are important for household subsistence, but even more importantly product exchanges between rural and urban kin households help sustain critical social networks that subsidize urban life. Gardens are a link between urban and rural settings as products, germplasm, and household members move between the two. People are urban and rural at the same time which demonstrates that households can be multi-local.

Keywords: rural-urban continuum, homegardens, Amazonia, overurbanization, social networks

Introduction

The division between rural and urban sectors of the landscape in many parts of the world is acknowledged to be blurred. This has resulted in the term 'rural-urban continuum,' pointing to the fact that there is a gray zone between being fully 'rural' and fully 'urban.' What the term does not explicitly acknowledge, however, is that people can be both urban and rural at the same time. This blurred boundary has several implications. The first is to rethink the pervasive categorization of people into either rural or urban slots since in reality people can be both. Second is the need to rethink the household as a multi-local unit, since the household can be multi-local. This paper specifically explores house-lot gardens in rural and urban zones of a municipality in the Brazilian Amazon and demonstrates that garden product exchanges, mediated by social networks, tie together rural and urban zones.

House-lot gardens offer a perspective on understanding rural-urban linkages because they are frequently found in both rural and urban areas. Numerous terms have been used to describe house-lot gardens such as homegarden, housegarden, dooryard garden and kitchen garden (Niñez, 1984; Greenberg, 1996). Such gardens have been defined as

“assemblages of plants about a dwelling which reveal much of the cultur[al] history of places and of management decisions by individual holders. They satisfy some

requirements for food, fiber, medicine, and construction . . . [as well as] provid[ing] places for recreation . . . and aesthetic experiences” (Kimber, 1966).

Gardens in rural zones are part of a continuum of cultivation areas and take on many forms and functions throughout the world (e.g., Niñez, 1984; Landauer and Brazil, 1990). Gardens in the city bring the rural into the city (‘ruralization’), the benefits and drawbacks of which are debated among urban planners (Sanyal, 1985; Bibangambah, 1992). Urban gardens fall under the rubric of ‘urban agriculture,’ a term also encompassing berm cultivation and other non-garden agricultural activities (e.g., Freeman, 1991; Egziabher *et al.*, 1994; Linares, 1996). Gardens can be conceived as a transition zone between rural and urban, and also between traditional (peasant) and modern (proletariat) lifeways. They are places where householders can be both at once as they transition, and as they persist under changing socio-economic circumstances.

After a general discussion on gardens a case study is presented on house-lot gardens in the Municipality of Santarém, Pará, Brazil. Santarém is in the Brazilian Amazon, a region that is rapidly becoming over-urbanized.¹ Local smallholders, especially those recently ‘urbanizing,’ maintain households in both rural and urban locales. Their house-lot gardens represent a way of maintaining a link between the two, both physically and socially, and garden products are critical for urban survival. Urban garden products are important for household subsistence and food security, but more importantly these products are a means of entering and maintaining key social networks that offer access to a range of other goods and services.

The study of gardens

Research on house-lot gardens is remarkably partitioned into geographic regions, with little cross-fertilization of ideas and findings between the literatures from different continents (exceptions are Niñez, 1984; Landauer and Brazil, 1990; Drakakis-Smith, 1991). There are clear distinctions between the ‘African,’ ‘Asian’ and the ‘Latin American and Caribbean’ garden literatures (Table 1). Most authors list and discuss species found in gardens, but very few discuss the flows and networks that link gardens to the outside world (exceptions are Thomasson, 1994; Linares, 1996; Lerch, 1999; Howorth *et al.*, 2001).

Research on house-lot gardens in Amazonia has been particularly limited possibly for two reasons. The first is that in this region there has been an overwhelming research emphasis on ‘wild’ vegetation such as forests and savannas. Gardens, rural or urban, as anthropogenic spaces, have been largely ignored. Ironically the ‘wild’ forests of the Amazon that receive so much attention may have been, and continue to be managed and ‘gardened’ by their keepers (e.g., Posey, 1985; Balée, 1989; Denevan, 1992; Cleary, 2001).

A second reason is perhaps due to the perceived lack of ‘land scarcity’ (Padoch and de Jong, 1991). Much of the garden literature has come from areas in Asia (especially Java), parts of Africa, and Caribbean islands, where land is scarce. Since gardens are often conceptualized as a form of agricultural intensification, their importance has not been considered in places dominated by extensive forms of land-use such as Amazonia (Netting, 1993).

Amazonian garden studies have been conducted by a limited number of researchers (Guillaumet *et al.*, 1988; Padoch and de Jong, 1991; Lerch, 1999; Slinger, 2000; Madaleno,

Table 1. The house-lot garden literature.

Region	Emphasis	Examples
African	Urban agriculture	Freeman, 1991
		Egziabher <i>et al.</i> , 1994
		Linares, 1996
		Phororo, 1999
		Howorth <i>et al.</i> , 2001
Asian	Horticulture	Terra, 1954
	Ecological structures	Stoler, 1981
	Rural gardens	Soemarwoto <i>et al.</i> , 1985
		Jose and Shanmugaratnam, 1993
		Hoogerbrugge and Fresco, 1993
Latin American and Caribbean	Botanical descriptions	Kimber, 1966, 1973
	Ecological structures	Works, 1990
	Form and layout	Brierly, 1991
	Cultural identity	Thomassan, 1994
	Aesthetics	Greenberg, 1996
		Keys, 1999
Amazon	Agroforestry systems	Guillaumet <i>et al.</i> , 1988
		Padoch and de Jong, 1991
		Balée, 1994
		Smith <i>et al.</i> , 1995
		Smith, 1996, 1999
		Lerch, 1999
		Slinger, 2000
		Madaleno, 2000
	Lima and Saragoussi, 2000	

2000; Lima and Saragoussi, 2000). Smith has been very active, calling attention to house-lot gardens in Amazonia with detailed lists of species found therein (Smith *et al.*, 1995; Smith, 1996, 1999). He argues that gardens are agroforestry systems and as such are critical for future sustainable use of the region. Recently he has called for the need for research on urban gardens in Amazonia since

“almost no work has been done on home gardens in urban areas, even though over half the region’s [Amazonia] populations now live in towns and cities. The potential of home gardens in urban centers for improving diets and incomes warrants further study” (Smith, 1996).

Overall, urban gardens receive less attention than rural gardens, in part because they have been thought to be ‘vestiges’ of rural traditions that need to be removed once people

became ‘modernized’ in urban areas (Sanyal, 1985). However, recognizing that urbanization is continuing at a rapid rate throughout the world, development agencies are turning their attention to urban food security. With this focus, the importance of ‘urban agriculture,’ which includes house-lot gardens, is increasing (e.g., Sanyal, 1985; Niñez, 1990; Vasey, 1990; Phororo, 1999).

Study area

Research for the case study presented was conducted in the Municipality of Santarém, located in the western part of Pará state, Brazil (figure 1). Santarém is the fourth largest municipality in the Brazilian Amazon with a population in 2000 of 262,672 (Prefeitura Municipal de Santarém, 2001). Of that total population, 186,518 people (71%) officially live in the urban zone of Santarém, the remainder in the rural zone. The municipality is the size of Belgium (24,154 km²), with only an extremely small portion of that being defined as ‘urban’ (40 km² or less than 1 percent of the entire municipality—*zona urbana*²) (Prefeitura Municipal de Santarém, 2001). The urban area is located along the mouth of the Tapajós River where it meets the main-stem Amazon River (figure 1). The specific rural zone discussed in this paper is an island in the floodplain of the Amazon River 30 km downstream from the urban area of Santarém but still within the Municipality of Santarém (figure 1).

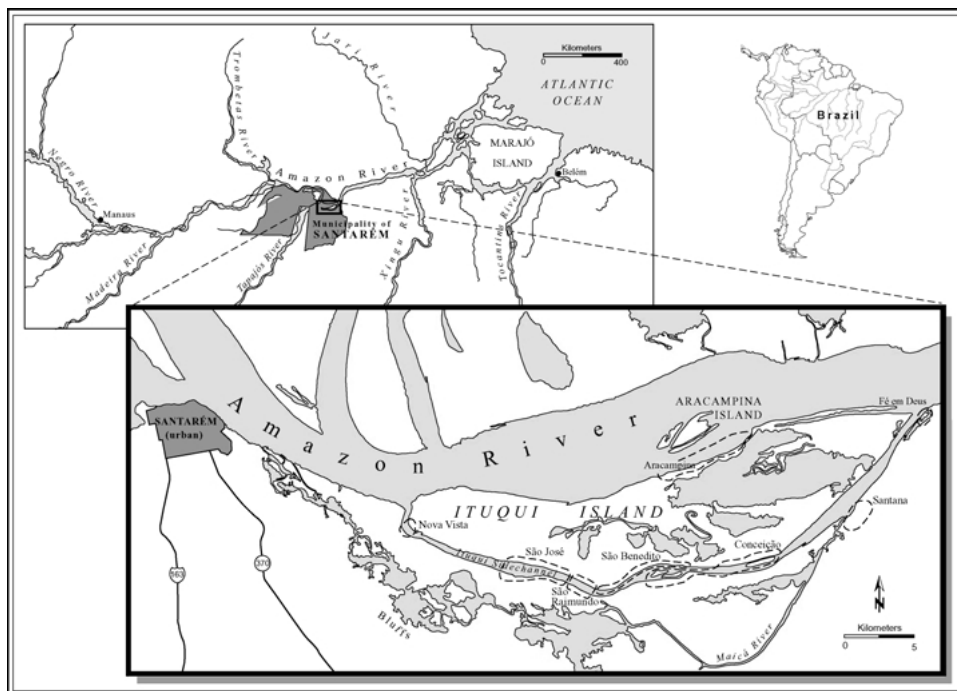


Figure 1. Study area. (Cartography by MSU's Center for Remote Sensing and GIS.)

Amazonia is not thought of as urbanized since the discourse about the region is dominated by a nature and wilderness oriented literature. Browder and Godfrey call this the “paradox of Amazon’s current urbanization” (Browder and Godfrey, 1997). In fact, the people of this region have been predominantly urbanized since 1980. Urbanization in Amazonia is driven by rural land concentration, land tenure issues, as well as the stagnation of the extractive economy and the inevitable lure of possibly better opportunities in the city (Slinger, 2000). In 1991, the population of the region was 58% urbanized, by 2000 it was 70% (IBGE, 2002).

The urban core of Santarém has been a settlement since Pre-Columbian times (Roosevelt, 1999). During the colonial era it was a river town, an emphasis and orientation that has continued to this day (Smith, 1879). Santarém was not a major player during the rubber boom, and has been somewhat peripheral to the waves of colonization and frontier development elsewhere in the Basin such as in Eastern Pará and Rondônia states. The Santarém-Cuiabá highway that connects Santarém with the Trans-Amazon (and hence the rest of Brazil) languished under forest re-growth after the decline of gold mining in the Tapajós Basin in the early 1990s. Only recently has the highway been reopened in anticipation of the much discussed soybean boom (Fearnside, 2001).

The municipality has grown significantly in the last several decades, from 60,229 in 1950 to 135,215 in 1970, 265,105 in 1991, and 262,672 in 2000 (Prefeitura Municipal de Santarém, 2001), particularly its urban zone. Various regional economic changes are steadily prompting people to move from rural to the urban zones. For example, since the late 1980s jute cultivation in the rural-floodplain zone collapsed due to extra-regional structural reasons (Gentil, 1988). Jute, a fiber crop used for sacking material, had been cultivated on the floodplain for about 50 years and subsidized life on the floodplain during the flood season (WinklerPrins, 2002). Jute’s collapse has prompted seasonal migration to official colonization regions in rural-upland sites (WinklerPrins, 2002), but part-time occupancy of a house in the urban zone is also increasingly attractive. In the urban zone fish processing, some timber processing, and several other minor industries offer some jobs. Santarém is, however, mostly a regional service town with limited employment opportunities. The reality of much of the population that has migrated to the city is un- and under-employment. As such most households maintain what Ellis (1998) refers to elsewhere as “split families with livelihood strategies straddling the rural and urban sectors.” Residences in both the urban environment and their rural antecedent are very common in Santarém (Nugent, 1993).

Stephen Nugent refers to this form of multi-local living as the “*caboclo*-complex”³ which represents

“an extensive form of resource use embracing agriculture, terrestrial and riverine extraction, small-scale mercantile activities, wage labour and the production of goods and services in the urban setting” (Nugent, 1993).

It is a regional manifestation of Ellis’s ‘livelihood’ in which “social and kinship networks are important for facilitating and sustaining diverse income portfolios” (Ellis, 1998).

The point is that *caboclos* use various sites of activity simultaneously, urban, rural-floodplain and rural-upland. A person is at once both rural and urban, and will move

between settings with great frequency, not uncommonly several times per week. There is a tremendous amount of fluidity between 'city' and 'country.' This makes census figures unreliable since people could be double counted or not counted at all.

Methods

The research presented here is a combination of work conducted in rural-floodplain and urban zones of the Municipality of Santarém. Fieldwork was conducted during 1995–1996, 2000, and 2001. In order to elaborate Nugent's '*caboclo*-complex' the focus has been on understanding the relationship between separate segments of households. This entailed research with the same kin (extended family) and community groups in both rural and urban zones in order to understand how families originally from the rural-floodplain zone sustain themselves now that part of the household is in the urban setting. Methodological approaches were ethnographic, qualitative and participatory (Schoonmaker-Freudenberger, 1994; Maxwell, 1998).

In the rural zone intensive research on agricultural and soil knowledge systems was conducted with 20 households in two communities, São Benedito and Aracampina (figure 1) (WinklerPrins, 1999). The methods used included modified Rapid Rural Appraisal (RRA) techniques such as transect walks, informal and semi-structured interviews, mapping, and calendar-making activities (Schoonmaker-Freudenberger, 1994). Extensive ethnographic fieldwork in the rural zone permitted social access to urban house-lot gardens of the same families. Fieldwork in the urban zone was timed so as to coincide with dominant urban occupancy during the flood season.

In the urban zone, gardeners in 21 households were interviewed using an open ended questionnaire in their gardens. The interviews were conducted by the author and a field assistant specifically chosen for the task. This field assistant had also participated in the rural research and knew the families well. She also had an excellent appreciation for the urban-rural link since she herself had recently 'urbanized,' born and raised on the rural-floodplain but now living in the urban zone.

Our objective was to obtain an understanding of how gardens link urban and rural components of households. Therefore, sampling was not random, but targeted floodplain families in different urban *bairros* (neighborhoods). Urban neighborhoods are those with hourly bus service, this factor delimiting the urban zone of Santarém. Key to selection was whether a neighborhood had households consisting of families or community members from rural-floodplain communities where previous research had been conducted. Additionally it was important that at least one member of each interviewed household was already known through previous research, or was known to other participants in the survey and selected through snowball interviewing. The neighborhoods were Prainha, Santíssimo, Jardim-Santarém, Aeroporto Velho, Mapiri, Livramento, Maicá, and Mararu (figure 2).

Interviews⁴ involved the completion of a questionnaire that served as a conversation guide, a tour of the garden with the person who was primarily involved in maintaining it, and the completion of a list of all locally identified plants in the garden. Tables of garden plants appear in the Appendix.

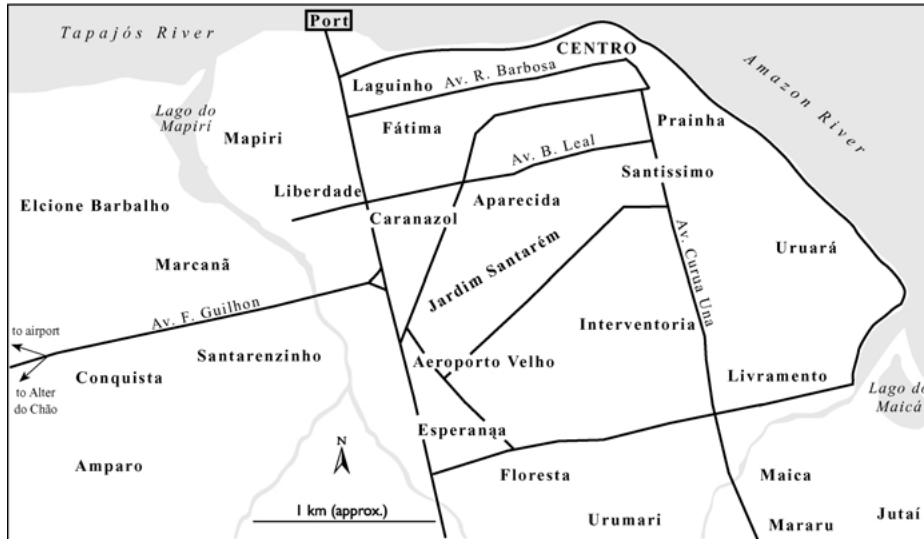


Figure 2. Santarém urban area.

Results and discussion

Size and location of gardens

One of the most striking visual aspects of investigating urban and rural house-lots is the similarity in architecture and lay-out. This can be seen in figures 3–6. These similarities form the first link between rural and urban. In both cases house-lot gardens are located about the houses.

House-lot gardens in different neighborhoods were of different sizes and were located at different distances from the *centro* or downtown portion of urban Santarém. Those with the largest lots were typically located the furthest from the city center, on average 7–10 km. For example, gardens in Maica and Mararu were as large as 10,000 m². Most house-lot gardens (85%) were located closer to the downtown area (within 5 km) and ranged in size from 350–600 m². In her study of homegardens in Belém, Madaleno found that 61% of households maintained gardens with a slightly smaller range of 50–500 m² per garden (Madaleno, 2000).

Some house-lots were multiple lots together, others were subdivided into sublots. These were occupied by different nuclear but related families or were rented out as an income source. Overall the ‘house’ part of the house-lot usually occupied no more than a third of the overall house-lot size. Similar lot divisions have been documented in Moyabamba Peru, where lots are increasingly subdivided, squeezing out gardening activities (Works, 1990).

In the rural zones gardens ranged in size from an estimated average of 500 to 1,700 m². Gardens there tend to blend in with surrounding forest and other land uses, making it difficult to delimit them (McGrath, 2002). Lot size from gardens in other rural regions



Figure 3. House-lot front in the rural-floodplain of Santarém.

varies considerably. In the Peruvian Amazon garden size was in the range of 300–700 m² (Padoch and de Jong, 1991) while Lerch (1999) found a range of 625–2,500 m² in a more rural zone. Clearly garden spaces are smaller in the more densely urbanized settings.

Who gardens?

In Santarém house-lot garden spaces are female spaces *par excellence* (Murrieta and WinklerPrins, 2003). In the urban zone 67% of the house-lot gardens were maintained by women, 19% by men, and 14% by minors (girls and boys). The latter's gardens were maintained communally and were rarely gendered. Of the men who were in charge, only one identified himself as actively gardening because he loved to do it. The others took on gardening because their wives were ill or had died. These figures are no different for the rural zone (Murrieta, 2000). In Belém women were in charge of gardens in almost 70% of surveyed households (Madaleno, 2000). Others have found gardening in Latin America and the Caribbean to be dominated by women as well (e.g., Thomasson, 1994; Greenberg, 1996; Keys, 1999; Lerch, 1999; Lok, 2001). Findings are more mixed elsewhere in the world (Linares, 1996; Phororo, 1999).

Average age of gardener was 43 years old, but the range was 18–80 for both rural and urban zones. This age range indicated that gardening is still an 'active' part of most household activities, unlike findings elsewhere that document the aging of the gardening



Figure 4. House-lot front in the urban zone of Santarém. Note the similarity in house construction between figures 3 and 4.

population and the consequent decline of this type of activity (Works, 1990; Westmacott, 1992; Thomasson, 1994; Keys, 1999). These researchers found a shunning of gardening by younger members of households who saw the activity as no longer relevant in their lives. In contrast, in Santarém gardening is done by young and old, a situation that parallels finding in the Peruvian Amazon (Padoch and de Jong, 1991).

Agrobiodiversity

The agrobiodiversity of gardens can be significant. Smith (1996) has stressed the importance of gardens as agroforestry systems and their importance as development potential. The Appendix lists all of the plants documented in the gardens. Table 2 summarizes the agrobiodiversity found in urban house-lot gardens in Santarém. A total of 98 species were identified in the 21 urban gardens surveyed.⁵ In the urban zone the dominant groups were fruit trees and shrubs (34%) and ornamental plants (average of just under 10 per household). Vegetables, which were mostly condiments, made up only a small proportion of the plants encountered (13%) likely due to a lack of culinary interest in vegetables (Murrieta, 2000). In contrast large numbers of medicinal plants were encountered in the gardens (45%). Averages can be deceptive however, since some households had no vegetables or ornamentals at all (see ranges), while others had very large numbers of those plants. It was clear that some gardeners



Figure 5. House-lot backyard in rural zone of Santarém.



Figure 6. House-lot backyard in urban zone of Santarém.

Table 2. Summary of agrobiodiversity in the urban gardens.

Plant category	Total number of species	Average number of species/garden	Range of number of species/garden
Fruit	33	10	2–21
Vegetable	13	2	0–6
Medicinal	44	7	1–20
Ornamental	Not recorded ⁺	10	0–40
Other	8	<1	0–4
Total/Overall	98	5	0–40

⁺The number of ornamental plants per garden was recorded but not their individual names. The names of ornamentals are frequently not even known to the people who plant them.

were ‘ornamentalists,’ while others served as local sources of pharmaceuticals. Fruit trees, however, were ubiquitous, with every household having at least two fruit trees or shrubs, usually a mango tree and one other. Madaleno found that in Belém 95% of garden space was devoted to fruit trees, 67% to medicinals, and 22% to vegetables (Madaleno, 2000).

Agrobiodiversity in the rural-floodplain zone is similar, though limited by flooding which is the ecological ‘sieve’ that limits perennial fruit tree growth in the rural-floodplain zone (Smith, 1996). Vegetables were grown in gardens and as crops in fields (WinklerPrins, 1999). Herbs for condiments as well as medicinals were cultivated in the rural-floodplain zone predominantly in raised beds (figure 7). Given differences in enumeration techniques between the urban and rural zones, direct comparison of species counts is not possible. However, McGrath documented a total of 331 species in house-lot gardens on Ituqui Island (McGrath, 2002). In other Amazonian settings a range of species have been documented such as Guillaumet *et al.*’s 61 species (1988), Padoch and de Jong’s 168 (1991), Smith’s 77 (1996), and Lerch’s 136 (1999).

Germplasm for urban gardens came from a variety of sources. Most came from rural-floodplain gardens, or from gardens belonging to family, neighbors and friends who sometimes occupy different environments. For example, family connections from the rural-upland zone could supply an urban household with *cupuaçu* seeds since these trees are quite numerous in the upland area. Gifts of seeds, pits, and cuttings were often exchanged during women’s social interactions (Murrieta, 2000). A gift of germplasm is as important for the maintenance of the social network as were gifts of garden products themselves, and are critical to women’s networks in particular (Murrieta, 2000; Murrieta and WinklerPrins, 2003). Extensive exchanges of germplasm have been documented in other gardening societies as well, for example Thomasson for Montserrat (1994), Lerch (1999) for the Peruvian Amazon where she points to the importance of germplasm exchanges as active management of agrobiodiversity conservation, and Linares (1996) in Senegal.

Garden soils and their management

In both the urban and rural zones fruit trees and shrubs were planted directly in the ground. Even in the rural-floodplain zone this was done, despite the risk of flood loss. In



Figure 7. Raised bed garden in rural-floodplain house-lot during flood season.

both urban and floodplain gardens vegetables were frequently cultivated in raised wooden beds with manure-based anthropogenic soils (figure 7). Medicinals and ornamentals were kept in standing or hanging containers as well as directly in the ground. Many homes had ornamentals gracing their front entrances as hanging plants on porches and windows (figure 8).

Soils in the urban gardens were predominantly described as ‘sandy.’ Different colors and textures, however, were apparent when pit latrines were dug. Gardeners reported finding *barro amarelo* (yellow clay) or *terra preta* (black earth) soils. These findings are commensurate with soil information of the area (Prefeitura Municipal de Santarém, 2001). Additionally, some gardens had sand in most areas, but *terra preta* in the back of the lot. The existence of *terra preta* is important given current interest in these soils for a number of reasons, especially archaeologically, agronomically, and for their role in carbon sequestration (Woods and McCann, 1999; Sombroek *et al.*, 2002). A soil management process known as *terra quemada* may well be contributing to the creation and existence of *terra preta* soils.

Terra quemada—burned earth, is the dominant form of garden management in the urban zone, undertaken by 67% of households. Garden managers sweep their gardens daily (there is little to no grass), an activity that is so common that most do not mention this as ‘management’ at all.⁶ This garden debris is collected in one particular place within the house-lot, where it is burned approximately once per week. The ashes and combusted remains of the



Figure 8. Hanging plants grace the front of a house in the rural-floodplain zone of Santarém. The presentation of self as expressed through gardens is very important to local people, especially women.

leaves and twigs gradually mix in and darken the sandy soil of the garden. This mixture is then placed around favored trees to act as fertilizer. Periodically, on the order of several years, the burning site is moved and a specific tree or shrub planted on the old site. Madaleno documented the same process in Belém's gardens (Madaleno, 2000).

Other management activities in urban gardens included additions of manure (24% of households). Chicken manure was frequently available within the garden itself or from a neighbor with chickens. Urban house-lots were also enriched with cow and horse manure from the rural zone, usually an exchange within a household or within a kin group. Conscious watering of garden plants was documented by 24% of the urban households. Unconscious watering also occurred in many households, especially those where plumbing is outdoors and household wastewater simply runs off into the garden (61% of homes in Santarém (Prefeitura Municipal Santarém, 2001)). Similar processes have been documented in Honduras (Lok, 2001).

In the rural-floodplain zone soils are of alluvial origin with a predominantly silty texture. These are considered to be of good quality and regarded as inherently fertile. Every flood cycle 'refreshes' the soil with a new layer of sediment derived from the nutrient rich slopes of the Andean highlands (WinklerPrins, 1999). Little is done to enhance this natural fertility.

In the rural-floodplain zone sweeping is also very common, burning less so. Organic debris is simply swept out of the house-lot into non-cultivated spaces. The next flood cycle then carries any undecomposed material away (WinklerPrins, 1999).

Garden animals

Less than half (43%) of the surveyed urban households held domestic animals in their households. Of the households surveyed 33% had only chickens, raised for their eggs and meat, 19% had only ducks, and 14% had some of each. Ducks were sold by some households for use in a regional specialty dish. Chickens were either strongly liked or disliked, the latter due to their destructive tendencies in raised beds and other containers used for vegetables, ornamentals, and medicinals.

Of note was that several urban households maintained chickens that were 'country' chickens and only came to the 'city' during the annual river flood. These chickens frequently belong to family members who lived primarily on the floodplain, but who could not keep the chickens as the river flooded their land. In return for keeping the chickens, eggs and an occasional one for the pot were payment. Ducks persisted on the floodplain with greater ease.

Gardens products and exchange networks

Thus far the links between urban and rural have been home structure similarity and the flows of germplasm, manure and chickens between the rural/urban split of households. The most important exchanges between urban and rural however, are those of garden products such as fruit, vegetables, and condiments.

Interview information about the flows of garden products provided direct evidence of the critical importance of the extensive social and exchange networks that link urban with rural, especially amongst kin. Although the vast majority (86%) of households indicated that the garden was 'very' to 'somewhat' important to the direct subsistence of the household, many emphasized that this was highly seasonal. To overcome the issue of seasonality, households rely on indirect access to products through informal social networks of gift and exchange. A majority (71%) of households indicated that products from gardens were used for 'giving' away (*para dar*—to give). When asked to whom the gifts were made, the response was overwhelmingly to a network of family, neighbors and friends. This 'network' (*a rede*) refers to gift and barter exchanges between family, neighbors and friends. Such networks have been documented in the Peruvian Amazon as well (Lerch, 1999). Few urban households, only 9.5%, used products from their gardens to sell commercially.

Over half of households surveyed (57%) in the urban zone also used the 'network' to obtain non-garden products. Only 28% of households relied only on purchased items to supplement what could be produced in the garden or obtained through gift and exchange networks. Most notable was the finding that rural households directly subsidized urban households with products produced in the rural area (e.g., manioc, fish, corn for chickenfeed, beans) (Nugent, 1993; WinklerPrins, 1999). In return the rural household received goods only available in the city, certain fruits as well as services. The extent of this varied by household. For example, Dona Lina, in her weekly trips from the floodplain to the urban zone to check on her teenage children, always arrived with a bag of manioc, corn, or some fresh fish to feed the urban household.

The role of gardens in social networking is also well documented on Montserrat (Thomasson, 1994). There gift-giving and periodic exchanges are second only to subsistence

in terms of the importance of garden products, similar to my findings. Food exchanges are an “important link in the food distribution system, effectively increasing the range of the food resource base and thereby enhancing [] subsistence security” (Thomasson, 1994). Another important component that Thomasson notes is of gift-giving and exchanges as a means of ‘storing credit.’ In other words, when my avocados are ripe, I give you several bags of them; months later, when your pineapples are harvestable, you give me some.

Exchanges go beyond produce to encompass services as well. For example, the husband of one of the participants in the survey was a bricklayer. His services were frequently exchanged for food products from other households. Also, access to government and other bureaucratic services was facilitated through personal connections with a kin member who worked in the various bureaucracies. Given the long waits and stalemates possible at banks, social security and other offices, these connections genuinely improved the quality of life for locals and would be generously rewarded with a bag of whichever fruit was in season.

In the African context findings from Tanzania and Senegal substantiate the role of gardens as linking rural with urban. Howorth *et al.* (2001) documented this direct rural ‘subsidy’ between the rural parts of households or kin groups in Dar es Salaam. Urban households would be provisioned with rural products as needed, and as the season permitted. Linares (1996) documented extensive uses of barter and exchange networks between kin and non-kin, and between urban and rural hinterland regions in Senegal. She argues that these exchange networks, which are based on garden products, link rural and urban zones and add to both the social and biological value of the city, comprising social and biological ‘capital’ (Linares, 1996).

Movements of people

Lastly, the interlacing of spatially segregated parts of households is made possible through the movement of people. When asked about household composition during interviewing, numbers were difficult to determine because of the high degree of locational fluidity of individual people. This fluidity is a key feature of Nugent’s ‘*caboclo*-complex.’ For example, during any given week several school age children may be in the urban house to attend school. Their parents will be in the rural home. Three of the households interviewed consisted only of teenagers living in the city for educational purposes. One parent or a grandparent might be living with the young adults, alternatively one would visit frequently (once per week), or an urban-based relative would supervise the teenagers. These teens often returned to their floodplain home on the weekends, especially for soccer matches.

Conversely, older adults may be in the city only on weekends or only during certain times of the month to collect pensions or seek medical care. One kin group that was part of our survey has elderly parents now living permanently in the city for the mother’s medical reasons. The sons and daughters continue to maintain both parts of the rural-urban split, and make a great effort to keep their parents provisioned with favorites from the rural zone. The urban garden provides the parents with daily provisions as well as a work ‘space’ for the father. He is still quite well and misses his agricultural and fishing life of the rural-floodplain. During a conversation with him he insisted on demonstrating a small plot of corn tucked in a corner of his house-lot. Tending it as well as the fruit trees kept him busy during the days.

Seasonal movement between rural and urban zones can accelerate or decelerate. During the flood season people move to the city, predominantly occupying their urban home. The higher the flood the more people come to the city as life becomes increasingly difficult on the floodplain. In his study of Santarém society, Nugent kept detailed records of the daily comings and goings within the neighborhood he lived in and documented the 'flood surge' of people (Nugent, 1993). During the dry season the rural dwelling dominates as subsistence activities are available on the floodplain.

The number of persons who 'usually' reside in the urban house-lot ranged from 2 to 17. The average was 5.38 person, which compares favorably with the 6 persons per house-lot the Municipality documented in its recent census (Prefeitura Municipal de Santarém, 2001). The majority of households surveyed (90%) claimed to continuously occupy the house-lot. This meant that a household member (but not always the same member) occupied the lot throughout the year, but individuals would be coming and going between house-sites in the urban and rural areas sometimes multiple times per week or month. Length of occupancy averaged 9 years, indicating that an urban 'toe-hold' is not a recent phenomenon. In other words, urbanization, or at least using an urban site in a range of residential locales that houses the 'split family,' is not a recent phenomenon (see also Madaleno, 2000). Interestingly the 9 year time-frame does coincide with the demise of the jute boom on the floodplain.

Conclusions and implications

"Urban and rural landscapes [] are not two places but one. They create[] each other, they transform[] each other's environments and economies, and [] depend on each other for [] survival. To see them separately is to misunderstand where they c[a]me from and where they might go in the future" (Cronon, 1991).

Although Cronon was writing about a very different place at a very different time, the point he is making about the interlacing of the urban and the rural is as valid for Santarém and other parts of the developing world in the early twenty-first century as it was for Chicago in the second half of the nineteenth century. Scientists have had a tendency to compartmentalize and thereby separate 'urban' from 'rural' when in reality there is a fluid continuum between them. This fluidity between urban and rural is clear when one considers exchanges of garden products and split households, such as those discussed in this paper.

There are four points I would like to reiterate. First, garden products link the rural and urban. Families are both urban and rural, occupying both simultaneously. Germplasm, manure, products, even chickens from both rural and urban gardens are used in gift and exchange networks that exist among kin and non-kin in those settings. These exchange networks yield different foods during different times of the year, as well as offering access to services rendered by people within the network. They are the mark of the urban-rural continuum as these networks maintain strong ties between the urban and the rural.

The second point is that gardens represent a source of food (especially fruit) for direct and indirect consumption, thereby offering food security. Urban gardening has often been considered a vestige of past rural habits, and as such officials have wanted to remove them from the urban landscape. Instead planners should take advantage of gardens and

urban agriculture in general in regions with rapid urbanization. Gardens enable people to continue having access to a food supply, and therefore offer a measure of food security. As Slinger found elsewhere in the Amazon, institutionalized gardening in the form of a planned agroforestry projects yield numerous benefits including surplus crop production that permits commercialization (Slinger, 2000). The trend of thinking about gardens as part of the urbanization process should continue and should also embrace the 'extended' definition of the household instead of the usual single-site households targeted for intervention by development agencies and governments (Ellis, 1998).

Third, gardens are important sites for agrobiodiversity. Further research on this dimension of gardens is warranted. In Senegal, Linares argues that the biological 'capital' that urban agriculture brings to cities is a point where the interests of the cash-poor migrant and the conservationist begins to converge (Linares, 1996). Zimmerer (1996) has urged the consideration of the importance of gardens as spaces of and for agrobiodiversity conservation. Gardeners experiment with different plants and varieties all the time, leading to the development of appropriate new varieties. Gardens may well have been important sites for the domestication of local fruit species (Clement, 2001), and today's gardeners may well be continuing these activities. Medicinal plants should also be a focus of research, not just for their agrobiodiversity, but also the associated ethnopharmacology.

Finally, given the context of urbanization and the conceptualization of gardens as zones of transition between urban and rural, their aesthetic and social value should not be underestimated. Gardens are an important place to 'be,' and a place to do 'work.' They offer occupational opportunities (gardening) and are a means of presentation of self in both rural and urban environments. New cities frequently have few public parks or other social spaces and gardens offer a respite from the realities of city life. For women in particular, gardens help maintain a sense of aesthetic pride, a social and emotional link, and a psychological buffer as households move between rural and urban settings.

Appendix

Locally identified plant species found in urban house-lot gardens in Santarém, Pará (total of 98 species; 12 with more than one variety). Plants with an asterisk* are also found in floodplain house-lot gardens. Source: fieldnotes (van den Berg, 1984; Cavalcante, 1991; Smith *et al.*, 1995; Smith, 1996, 1999; Lima and Saragoussi, 2000).

Local name (varieties in parentheses)	English name	Scientific name
Fruit		
Abacate (de kilo, comun, roxo)*	Avocado	<i>Persea americana</i>
Abacaxi/Ananas*	Pineapple	<i>Ananas cosmosus</i>
Abiu		<i>Pouteria caimito</i>
Açaí*		<i>Euterpe oleracea</i>

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Local name (varieties in parentheses)	English name	Scientific name
Acerola*	Barbados cherry	<i>Malpighia glabra</i>
Adão		?
Ata/Piña*	Sweetsop	<i>Annona squamosa</i>
Bacaba		<i>Oenocarpus distichus</i>
Banana (casca verde, grande, Casada, sapa, prata, roxa)*	Banana	<i>Musa spp.</i>
Buriti/Miriti*		<i>Mauritia flexuosa</i>
Caju (amarela, vermelha)*	Cashew	<i>Anacardium occidentale</i>
Carambola*	Star fruit	<i>Averrhoa carambola</i>
Côco*	Coconut	<i>Cocos nucifera</i>
Cupuaçu*		<i>Theobroma grandiflorum</i>
Fruta pão*	Breadfruit	<i>Artocarpus altilis</i>
Goiaba (branca, vermelha)*	Guava	<i>Psidium guajava</i>
Graviola*	Soursop	<i>Annona muricata</i>
Inajá		<i>Attalea manpa</i>
Ingá (cipo, comun, xixica)*		<i>Inga spp.</i>
Jaca (comun, da Bahia)	Jackfruit	<i>Artocarpus heterophyllus</i>
Jambu	Malay apple	<i>Eugenia malaccensis</i>
Jenipapo*	Genipap	<i>Genipa Americana</i>
Laranja (comun, da terra)*	Orange	<i>Citrus sinensis</i>
Limão*	Lime	<i>Citrus aurantifolia</i>
Limotanga	Lime/tangerine hybrid	<i>Citrus aurantifolia/reticulata</i>
Mamão*	Papaya	<i>Carica papaya</i>
Manga (rosa, periquito, maça, mulher)*	Mango	<i>Mangifera indica</i>
Mucujá		<i>Acrocomia sclerocarpa</i>
Muruci (grande, comun)*		<i>Byrsonima crassifolia</i>
Peroba/maracuja*	Passion fruit	<i>Passiflora edulis</i>
Pitomba		<i>Talisia esculenta</i>
Pupunha	Peach-palm	<i>Bactris gasipaes</i>
Tangerina	Tangerine	<i>Citrus reticulata</i>
Vegetables		
Cariru		?
Cebolinha	Green onion	<i>Allium cepo</i>
Couve (comun, manteiga)	Kale	<i>Brassica oleracea</i>
Cuentro	Cilantro	<i>Coriandrum sativum</i>
Espinafre	Spinach	<i>Spinacia oleracea</i>
Jerimum	Squash	<i>Cucubita spp.</i>

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Local name (varieties in parentheses)	English name	Scientific name
Macaxeira	Sweet manioc	<i>Manihot esculenta</i>
Maxixe		<i>Cucumis anguria</i> L.
Milho	Corn	<i>Zea mays</i>
Pimenta (ovoda aruana, cheirosa, malaguenta)	Pepper	<i>Capsicum spp.</i>
Pimëntão	Green pepper	<i>Capsicum anuum</i>
Tomate	Tomato	<i>Lycopersicum esculentum</i>
Xicória		<i>Cichorium intybus</i>
Medicinal		
Algodão	Cotton	<i>Gossypium spp.</i>
Amor crescido		<i>Portulaca pilosa</i>
Arruda		<i>Ruta graveolens</i> L.
Baboze	Aloe	<i>Aloe</i>
Boldo (pequeno, grande)		?
Caímelitana		?
Cana-mansa	Sugar-cane?	<i>Gynierium sagittatum?</i>
Canela	Cinnamon	<i>Miconia spp.</i>
Capim santo	Lemongrass	<i>Cymbopogan spp.</i>
Cidreira		<i>Lantana canascens</i>
Comfre		?
Coramina		<i>Pedilanthus didhymaloides</i> Poid.
Crajiru		<i>Arrabidea chica</i>
Cumarú		<i>Coumarouna odorata</i>
Elixir paregórico		<i>Piper callosum</i>
Emenda-osso		?
Favaca grande		?
Folha grossa/malvarisco		?
Folha santa/pirarucu (folha amarela/diabrinho)		<i>Bryophyllum calycinum</i> Salisb.
Gengibre/mangarataia	Ginger	<i>Zingiber officinale</i>
Hortelã	Mint	<i>Menta linnaeus</i>
Jambú		<i>Spilanthes oleracea?</i>
Japana-branca		<i>Eupatorium spp.</i>
Japana-roxa		<i>Eupatorium spp.</i>
Manjericão		<i>Ocimum brasiliicum</i>
Marupazinho		<i>Eleutherine plicata</i>
Matruz		<i>Chenopodium ambrosioides</i>
Melhoral		?
Meracinha		?

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Local name (varieties in parentheses)	English name	Scientific name
Murtinha		?
Mutuguinha		?
Oriza		<i>Pogostemom heyneanus</i>
Pau d'angola		?
Piãõ branco		<i>Jatropha curcas</i> L.
Piãõ roxo		<i>Jatropha gossypifolia</i> L.
Quebra-pedra		<i>Phyllanthus lathyroides</i>
Romã		?
Sabugueiro		<i>Sambucus</i> spp.
Serra		?
Sucuúba		<i>Himatanthus sucuuba</i>
Trevo roxo		?
Vassourinha		<i>Scoparia dulcis</i>
Vik	Spearmint	<i>Mentha spicata</i> L.
Vindicá		<i>Alpina nutans</i> Rosi.
Other		
Apuí		<i>Clusia insignis</i>
Café	Coffee	<i>Coffea</i> spp.
Ipê		<i>Tabebuia</i> spp.
Itaubá		<i>Silvia itauba</i>
Mogno	Mahogany	<i>Swietenia macrophylla</i>
Pau brasil	Brazil wood	<i>Caesalpinia echinata</i> Lamarck
Seringa	Rubber	<i>Hevea brasiliensis</i>
Urucu	Annatto	<i>Bixa orellana</i>

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Notes

1. Over-urbanization refers to a situation wherein the urban area has more people in it than its infrastructure, including work opportunities, can support (*sensu* Browder and Godfrey, 1997).
2. I use IBGE's definition of urban for Brazil (IBGE, 2002).
3. The term *caboclo* refers to Amazonia's indigenous peasantry, people of mixed Amerindian, European and African descent.
4. Permission was asked of all participants following Michigan State University's UCRIHS (University Committee on Research Involving Human Subjects) guidelines.
5. Another level of agrodiversity is found as well with 12 of the 98 species having more than one variety.
6. Interestingly, Westmacott documents the 'swept yards' of the American south as possible cultural links to West Africa (Westmacott, 1992). The idea that 'swept yards' in the Amazon might also be cultural remnants from West African cultures is intriguing.

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