

Sociopolitical Crisis and the Reconstruction of Sustainable Periurban Agriculture in Abidjan, Côte d'Ivoire

Alfred Babo

Abstract: This article examines the effects of the post-2002 sociopolitical crisis in Abidjan, Côte d'Ivoire, on urban and peri-urban agriculture. Based on the case study of Abidjan, it argues for a conceptualization of sustainability that includes social as well as environmental dimensions and focuses on coping strategies of producers and merchants. In Abidjan, these strategies included internal migration within the city and its periphery, the use of organic fertilizers, and changes in market structure. The study illustrates how such strategies allowed producers to continue to supply produce to the market, despite the difficulties of war.

Résumé: Cet article examine les effets de la crise sociopolitique post 2002 à Abidjan, en Côte d'Ivoire, autour de l'agriculture urbaine et périurbaine. En nous basant sur l'étude de cas d'Abidjan, nous avançons une conceptualisation du développement durable qui contient des dimensions sociales aussi bien qu'environnementales, et se concentre sur des stratégies de survie pour les producteurs et les commerçants. À Abidjan, ces stratégies comprenaient la prise en compte d'une migration interne dans la ville et sa périphérie, l'utilisation d'engrais organiques, et les variations du fonctionnement du marché. L'étude démontre comment de telles stratégies ont permis aux producteurs d'approvisionner le marché en vivres en dépit des difficultés de la guerre.

The sociopolitical crisis in Abidjan, Côte d'Ivoire, changed the way fresh produce was grown and marketed, and resulted in the emergence of sustainable periurban agriculture.¹ This article critically examines the concept

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Alfred Babo is an assistant professor (maitre-assistant) in the Department of Anthropology and Sociology at the University of Bouaké, Côte d'Ivoire. His research interests include agriculture, rural development, socioeconomic policy, and sociopolitical crisis in Côte d'Ivoire. He is currently working on a study of the role of youth in the peace-building process. E-mail: babo_alfred@yahoo.fr

of sustainability itself, which often focuses on environmental issues without taking into account the social dimensions of sustainability (Bell 2004), including a society's ability to adjust in the face of exogenous shocks (Wa Githinji & Perrings, 1993).

Before the year 2000, fresh produce production in the city's periphery was low and consisted mainly of food produced for home consumption, rather than market sales. Starting in 2000, and particularly after the beginning of the sociopolitical crisis in 2002, many additional cultivation sites emerged on the periphery of Abidjan.

The purpose of this analysis is to trace this process of adaptation and change in periurban agriculture. It is based on data from qualitative interviews with individual vegetable merchants and focus-group interviews with producers. The study sites were delimited by ANADER (the National Agency for Rural Equipment and Development Support), which subdivided the perimeter of the city of Abidjan into five major sectors of vegetable production: Port-Bouet and Marcory (both in the south of the city), Bingerville (18 km outside of Abidjan), Songon (32 km away), and Anyama (22 km away) (see map). The last three sectors are on the periphery of the city in the east, north, and west, respectively. The main sectors that supply produce to Abidjan are Port-Bouet and Marcory (Affou 1998). Port-Bouet consists of three sites located near the international airport, the 43rd BIMA (Bataillon d'Infanterie de Marine) military camp (both in existence since 1985), and a more recent (2001) site called "Sans fils." The main site—referred to as "Airport" because of its location near the Felix Houphouet Boigny International airport of Abidjan—has about eight hundred producers on more than seventy hectares. Marcory includes one site called ATCI—because of its location on land owned by ATCI, the Ivoirian telecommunication agency—that has been occupied by immigrant workers since 1977 and currently has more than five hundred producers on sixty hectares.

The study is based on data from the largest sites of the "airport" from the Port-Bouet sector, the site of ATCI for Marcory, the smaller one of Gbagba-Marchou (with 30 producers on 42 ha) for Bingerville, GDS in Anyama, and Songon-Kassamble (with 15 producers in the cooperative on 2 ha) in the sector of Songon. The production from these sites supplies the main vegetable markets of the capital, Abidjan, including the neighborhoods of Plateau, Cocody, and Adjame in the center of the city. I interviewed thirty merchants and thirty-five producers from August to October 2005. Since the interviews were conducted during the conflict, I faced both resistance and hostility from immigrant producers, who repeatedly refused to be interviewed. After several visits with producers, and in conversation with their delegates, I decided to use focus groups of about seven to ten people. In contrast, I met merchants easily at the sites while they supplied buyers, and also in the markets. As a complement to the field data, I collected data in public offices such as ANADER, OCPV (L'Office d'Aide à la Commercialisation des Produits Vivriers—the foods trade and prices office), and



Sites of vegetables production inside and on the periphery of Abidjan

BNEDT (Le Bureau National d'Etudes Techniques et de Développement—the national office for technical development studies).

Reliable statistics on urban agriculture are difficult to obtain, even from official sources. Not only are production and marketing processes informal and undocumented, but growers often use unsecured land owned by private firms, or public spaces, and so are sometimes displaced from one production site to another. In addition, because growers are often both merchants and direct consumers of their produce, it is difficult to determine the relative shares of production for the market versus home consumption. For all these reasons, it is difficult to estimate total production.

The traditional, more limited view of sustainability often does not recognize that governments in less developed countries face multiple challenges in addition to ensuring that agricultural production is environmentally sustainable. These include poverty, food security, access to clean water and sanitation, and infrastructure in transport, health, and education. Environmental protection is often not their main priority, especially in a context of war such as in Sudan, Chad, and Côte d'Ivoire, when govern-

ments have military priorities. Meanwhile, while transformation of the relations between a city and its agricultural hinterlands can be induced by environmental changes, transformation can also be the result of sociopolitical upheavals such as war (see Doucoure & Fleury 2004). In this article the question of *social* sustainability is addressed by exploring how small producers and merchants in Abidjan, in circumstances of war, reorganized the production and the marketing of fresh produce in order to preserve their livelihoods and continue to supply urban consumers. The analysis shows that in addition to the environmental sustainability of agriculture, which is shaped by factors like water supply and land quality, sustainability in a less developed country such as Côte d'Ivoire also depends on social adaptation on the part of vulnerable food-producing populations, especially in the periurban areas.

Background

Urban agriculture (UA) has been defined in various ways over time and across organizations, institutions, and disciplines (see Smith et al. 2004). This article, using a definition proposed by Mougeot (2000:10), considers UA as

an industry located within (intra-urban) or on the fringe (periurban) of a town, a city or a metropolis, which grows and raises, processes and distributes a diversity of food and non food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that area.

The present study also takes into account the economic and social definition of CAST (Council for Agricultural Science and Technology), which defines urban agriculture as a complex system encompassing a spectrum of interests, from a traditional core of activities associated with production, processing, marketing, distribution, and consumption, to a multiplicity of other benefits and services. These include recreation and leisure; economic vitality and business entrepreneurship; individual health and well-being; community health and well-being; landscape beautification; and environmental restoration and remediation. UA provides jobs and food within and around cities in developed countries as well as poor countries in Africa (Guyer 1987; Smit et al. 1996; Friedberg 2001).

The production of fresh vegetables in cities was introduced during the colonial period in Côte d'Ivoire, which served as an important administrative and commercial center in the West African subregion (Bonnecase 2001). Initially, produce was developed by immigrants and consumed by Europeans living in cities like Abidjan, Bouake, and Daloa. The administration created and maintained an open immigration policy before the 1930s,

largely to increase the supply of low-skilled labor from the subregion. To facilitate the inflow of migrant labor to fuel the development of plantations and economic infrastructure, Haute-Volta (now Burkina Faso) was integrated into the colony of Côte d'Ivoire in September 1932 (see Kouassi 2001; Cordell & Gregory 1982).

Immigrants became involved in multiple sectors of the Ivoirian economy, including urban agriculture, especially the cultivation of fresh produce. In the beginning, it was a small and precarious activity practiced by immigrant workers in swamps and on the borders of the rivers in Marcory and Port-Bouet. However, as time went by, the sector grew in importance due to the growth of the urban population and accelerating demand. As a result, the government of Côte d'Ivoire created several agencies to give institutional support, including the Society for Development of Fruits and Legumes (Societe de Developpement des Fruits et Legumes/SODEFEL), the Ivoirian Company for Development of Food Crops (Compagnie Ivoirienne de Developpement du Vivrier/CIDV), and most recently, ANADER. The role of these agencies has been to provide technical support and training in order to improve the production and supply to large urban markets. Before the conflict, markets in Abidjan, for instance, were supplied by a combination of imported vegetables (e.g., 40,000 tons of onion in 1987 [FAO, 1997]), but also by production in the farming sites of Marcory and Port-Bouet.

In 1969 urban agriculture, in particular the production of vegetable crops, supplied 66 percent of the national demand for food and production and was valued at about FCFA 1.4 billion (roughly US\$2.8 million) (Chateau 1969). Thirty years later this value was estimated at FCFA 7 billion (roughly US\$14 million) (Ministry of Agriculture 1998). In Abidjan vegetable consumption has grown steadily from 10,500 tons in 1970, to 18,000 tons in 1979.

Even with this growth, food crops have not been a priority of the government, which has focused on the main export crops of coffee and cocoa. But even without support from the state, in Abidjan, as in many West African cities, urban agriculture generates jobs for urban dwellers, especially for men as producers and women as traders.² The average annual rate of population growth in African cities is approximately 7 percent. This phenomenon is especially pronounced in West Africa, where the share of urban dwellers in the total population increased from 4 percent in 1930 to 40 percent in 1990. In 1991 produce consumption was estimated at 810,000 tons (Ministry of Agriculture 1998). According to Akindes (1991), growth in consumption of meals prepared outside the home in Abidjan and Bouake—especially consumption in an Ivoirian type of popular restaurant called a *maquis*—increased the consumption of produce such as tomatoes, onions, lettuce, and carrots. The result was the development of new sites of vegetable production, especially on the periphery of the city, including Bingerville, Akouedo, and M'Pouto. Some of Abidjan's markets were supplied by other cities like Bouake, Yamous-

soukro, and Daloa. Meanwhile, with the support of ANADER, producers tried to create cooperatives in order to improve land tenure security, access modern supermarkets, and develop and promote relationships with other partners to obtain chemical fertilizers and improved seed varieties. At the national level, immigrants were a majority (57%) of all producers of these crops (Akindes 1991). This share was even larger in Abidjan, where immigrants were estimated to constitute 80 percent of all periurban vegetable producers at the end of the 1990s (Ministry of Agriculture 1998; Affou 1998). The civil war that started in September 2002 first affected vegetable producers, and then production itself.

Since the mid-1990s, policies associated with the ethnonationalist concept of *Ivoirité* have led to several coup attempts in Côte d'Ivoire.³ The invention of "Ivoirité" by President Bedié in 1994 aimed both to give power to his Akan ethnic group and to create conditions that would keep him in power. These coup attempts, and later the rebellion in 2002, were carried out by military groups that claimed allegiance to the north and called for the end of ethnic discrimination and violence. This ideology was imposed through harassment, humiliation, and violence against West African immigrants and Ivoirians from the northern region.

The precarious security and living conditions of those targeted by these policies, particularly after September 2002, greatly affected urban agriculture. Because of the razing of their homes and the destruction of their goods, many immigrants, including vegetable producers, returned to their homelands. Six months after the beginning of the civil war, 158,114 Burkinabe had gone home (see Banégas & Otayek 2003; Zongo 2003).⁴ The exodus of the main group of vegetable producers led to a new dynamic on the periphery of Abidjan.

Theoretical Issues in Sustainable Agriculture

My focus here is on sustainable agriculture and its links with conceptualizations of sustainable development. In less developed countries—in particular during a long social-political and military crisis such as that experienced in Côte d'Ivoire—sustainability of agriculture should be linked with the ability of the main actors (farmers and merchants) to adapt over a long period of time to the changing social conditions in which they produce vegetables. In fact, the social sustainability of the system will affect both its economic sustainability and its ecological sustainability. In this article, social sustainability of vegetable production must be understood as the adaptability of small-scale producers and their ability to find new ways of production and new linkages with markets. It has three main dimensions: (1) the reshaping of families through migration; (2) the improvement of land tenure in agricultural production through the organization of producers and institutional support; and (3) the making of new markets through the modernization of partnerships.

Bell (2004) examines factors surrounding agricultural production and relates these to the discussion of social sustainability. For him, social sustainability involves farmers' ability to engage in the construction and development of knowledge about agriculture. James (1996) and McCorkle (1996) argue that sustainable agriculture in Africa is also based on the sustainability of natural systems. These points of view move the understanding of sustainable practice from an exclusive focus on relationships between nature and society to include greater awareness of relevant societal relations as well. Mwangi and Perrings (1993) define social sustainability as the ability of human social institutions to continue functioning in the face of stress and shocks. In the case of Abidjan, this directs attention to the ability of producers and merchants, in the face of war, to maintain sustainability through their own resources (see Conway & Barbier 1990). Even the ecological approach to sustainability, especially the analysis of how people cope with increasingly difficult material conditions in Africa's periurban areas, must consider the local social institutions that have been shaped by long histories of close urban contact (Friedberg 2001).

The rethinking of economic development led to the development of the concept of sustainable development (SD). The 1960s and the 1970s were marked by an intensification of concern about pollution, and the term was used to convey the conviction that environmental protection and continuing economic growth could be seen as mutually compatible (Turner 1988). For the WCED (1987), SD was "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Such a definition certainly contributed to the popularity of the concept of SD. For most scholars, institutions, and organizations, SD was the ideal response to the inadequate patterns of economic development centered on industrialization. In the era of globalization, the idea of SD—especially its local dimensions—was presented as the new panacea for economic development in Third World countries (Da Silva 2002; World Bank 2001; IICA 2000). This optimistic position defined sustainability in agriculture as the product of a certain path to the modernization of agriculture. It meant the use of new technologies and techniques to increase agricultural production in order to improve producers' social and economic circumstances and standards of living.

By the late 1980s and early 1990s, the concept of sustainable development had been subjected to severe criticism (see, e.g., Adams 1995; Redclift 1997). Baker et al. (1997) argue that SD must be understood as a construct that, in addition to traditional developmental objectives, also takes into account the social and political dimensions of societal change. Becker and Jahn (1999:4) argue that the main interest of social scientists in sustainability is not the conservation of nature, but rather "the viability of socially-shaped relationships between society and nature over long periods of time." They are tapping into a particularly telling critique of the concept of sustainable development, which is that it does not account sufficiently

for the various aspects of sustainability ranging from the ecological, to the economic, to the social relations associated with the use of a resource. The city of Bobo-Dioulasso (Burkina-Faso) provides a counterfactual example that helps to underscore the point. In this city, economic austerity and natural resource deterioration have transformed the meanings and practices of daily work, undermining once useful relations of collaboration and trust. As these relationships have eroded, so has the sustainability of urban agriculture (see also Friedberg 2001).

This article highlights how farmers in periurban Côte d'Ivoire were able to make a living by using their capacities and assets in ways that met essential needs and resisted shocks and stress over time. Abidjan's vegetable producers have used many different coping strategies to resist the shocks of the sociopolitical crisis. By tracing these processes, the analysis generates insights into the dynamics of social sustainability in urban and periurban agriculture that are relevant to many African countries.

Coping Strategies in Abidjan during the Crisis

Even in the face of war and expropriation, produce growers and merchants mobilized their social networks to sustain production and distribution. As in countries participating in the World Bank's Structural Adjustment Programs, growers and merchants invested in the maintenance of their families as the base of the production unit. In response to the crisis in Abidjan, producers adopted a twofold strategy aimed to protect their families and preserve their economic activities, which relied on both internal and external migration.

The standard economic view of migration (e.g., Prothero & Chapman 1985) focuses exclusively on the economic determinants: individuals migrate in order to improve their material conditions. However, migration can also be viewed as a survival strategy (see, e.g., Parnwell 1993; Droz & Sottas 1997), especially in the context of war. During the crisis in Côte d'Ivoire, people moved to find better conditions to continue their economic activities and also to survive. As stated by Grimard (2000), civil war, more than labor demand or rainfall, impelled people to divide the household into two main subunits (residence and production) in the city of Abidjan. Some producers adopted the survival strategy of sending away their wives and children while remaining in Abidjan themselves. Other producers and their family members returned to their homelands in Burkina-Faso or Mali. The population of Abidjan decreased about 24 percent in 2002 (Roubaud 2003). On the site of Marcory-ATCI, for example, about one-fifth of all producers (out of a total of roughly 500) had left Abidjan for Bobo-Dioulasso or Ouagadougou in Burkina-Faso. At Airport Port-Bouet, about 10 percent of the producers had returned to Burkina Faso.

Using a classic strategy adopted by Kikuyu people in Kenya (Droz & Sottas 1997) and the Baule in Côte d'Ivoire (Babo & Droz 2006), immigrants

do not “put all of their eggs in one basket.” The context of war points out that the (re)composition of a household is made under the influence of social and political factors. It is often the household heads who stay behind in order to tend to the farm and protect other property. In this way, they are able to transfer their knowledge and land to their children or brothers. Thus, some immigrants adopted an attitude designed to resist the shocks of a long-standing crisis. As in Mozambique (Grünwald 2005), immigrant families in Côte d'Ivoire chose to split their members in order to maintain a minimum standard of living. In many cases, the wife (or wives) moved to other parts of Abidjan and sold different crops called *logodogou* in order to make money (see Babo 1997; Chaléard 1996). They were able to remain in Abidjan by moving within the city, leaving for example, Marcory “Sans fils” to go to Port-Bouet and/or M’Pouto. Many of those who left the country had no strong ties to their homelands (Zongo 2003), and many (e.g., more than 336,000 Burkinabe) returned to Côte d'Ivoire after the signing of a cease-fire on July 4, 2004 (IRIN 2004). On the site of Marcory-ATCI, seventy out of one hundred producers who had left the country came back. Similarly, on the site of Port-Bouet, about fifty producers out of eighty returned.

Upon their return, they began to produce vegetables again, either on their former production sites or on new sites. Some increased the number of plots or farms cultivated in different sites around Abidjan. Thus some producers from the site of 43rd BIMA military camp created new plots at M’Pouto and Gonzagville (a suburb of Port-Bouet in the south of Abidjan), and some of them established new sites in Bingerville. Early in 2005 about fifty producers from Marcory-ATCI moved to the new “Sans fils” location in Port-Bouet, in part to escape harassment from the military, but also to maximize the chances of securing land for cultivation. It was very difficult for producers to gain access to the Airport site because it was occupied by soldiers from 10:00 a.m. to 3:00 p.m. Yet even those producers continued to work there from 6:00 a.m. to 9:00 a.m. and after 4:00 p.m. in order to mark the land as “in use” and also to maintain relationships with customers who knew only that site. Many also worked plots elsewhere. In the end, some of them possessed two or three farms and shuttled between these different sites. According to farmers from two sites within Abidjan, “We do not earn a lot of money, but we can feed our family, we can afford non-food purchases like children’s education, our health, and we can continue to send money to our family members in Burkina-Faso, so we cannot abandon vegetable agriculture” (interview, September 2005, Airport-Abidjan).

The Movement toward the Periphery

Undoubtedly the sociopolitical and military crisis led to a decrease in the number of traditional produce growers within Abidjan. Yet even before the war, new sites were being created on the periphery of the city. As is the case

Evolution of the number of producers in Abidjan per produce

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2004 |
|------------------|------|------|------|------|------|------|
| Tomatoes | | 342 | 185 | 120 | 165 | 12 |
| Eggplants | 896 | 438 | 199 | 321 | 348 | 120 |
| Cabbage | | 253 | | | | 220 |
| Cucumber | | | 239 | 83 | 34 | |

Source: Annual Reports (2002–2004) ANADER-Abidja

in most countries of sub-Saharan Africa, property rights in land are a major issue for vegetable growers. Generally, they occupy public spaces, such as Airport, Koumassi-remblais, Marcory-remblais, and Baie de Cocody, or private properties such as those at Marcory-ATCI. In this situation, the main issue in urban agriculture is not the unavailability of land, but rather the security of the activity and the precariousness of access, especially given the pace of urban growth. As Lebeau (1979:89) argues more generally, “the tremendous pace of expansion of large [African] cities nibbles away at periurban space. Thus, every year, part of this space is given up for the buildings, highways, airports, industrial area, and entertainment area. In Abidjan, insecure access to land . . . led to the displacement of producers to the periphery.” This brought growers especially to Songon and Bingerville (Affou 1998), where they have established land tenure contracts with rural landowners. For many of them, “a quiet location in the rural site is better than precarious gratuity in the urban areas” (interview, Sept. 2005, Bingerville).

In this context, the war can be considered mostly as an accelerator of the displacement toward the periphery. The crisis further threatened secure access to farmland that was already in use, and producers also experienced harassment. In Port-Bouët they were driven away in order to secure the French 43rd military, and as a result there was a 37 percent reduction in the number of producers, from eight hundred (precrisis) to five hundred. The Marcory-ATCI site had about five hundred producers before September 2002 but fewer than two hundred producers in 2005. This reduction in the number of growers can also be seen in the number of producers growing specific crops (see table above). In Abidjan, vegetable producers reduced total land cultivated by half. From 2000 to 2001 the total acreage of tomatoes decreased by forty-nine hectares out of a total of sixty hectares and the decrease continued by another 21 percent in 2002. For cabbage acreage dropped from 52.66 ha in 2000 to 13.5 in 2002. Eggplants lost 79.58 ha in 2001, and 1.65 ha in 2002 (ANADER 2003).

The situation within the city of Abidjan caused the displacement of producers to Bingerville on the eastern periphery, where the number of vegetable producers on the site of Gbagba-Marchou increased by about 13 percent (ANADER 2000) and new sites also emerged such as Anna I,

Sebia-Yaokro, Achokoi, Akakro, Scierie (or Anna II), and Carrière (ANADER 2004). Songon in the west saw the development of new sites such as Songon-Kassemblé (where the total acreage of land cultivated increased from 0.5 hectares in 2002 to 1.5 hectares in 2003), Songon-té, and Songon-Agban. In Bingerville, most plots were provided by the municipality in order to create sustainable vegetable production and to provide employment for young people. On the sites of Anyama, Songon, and also Bingerville, plots are owned by natives of the region, who have rights to land but producers working on these sites have the ability to bequest access to the next generation. In order to support this growth, ANADER also introduced new crop varieties—such as *petomèch*, *tropicana*, and *mongal*—that were easier to grow and maintain.

The Sociopolitical Crisis and the Modification of Commerce

Merchants also created new economic strategies in order to cope with one feature of the crisis: the constant harassment on roads. A direct result of this harassment was an increase in supply costs by about 5000 FCFA to 10,000 FCFA, depending on the site.⁵ Though this may seem insignificant, the cost was incurred two or three times per week. Given the high poverty level of households in Côte d'Ivoire, which had already been worsened by the crisis, the rise in cost was substantial for the poorest operators in the vegetable sector. To make matters worse, these were unexpected costs that appeared quite suddenly.

It is often the case—certainly in Abidjan, as well as other African cities like Harare and Gaborone (see Gabel 2005; Hovorka 2005)—that if production is done by men, trade is the business of women. In some cases, as on the sites of Port-Bouet and Marcory, the wives and daughters of producers entered into the trade circuit as intermediaries between their husbands and the merchants and were largely responsible for supplying the markets. However, during the crisis many people in Côte d'Ivoire did not have the necessary documents, like immigrant ID cards, that would allow them to circulate without trouble in Abidjan. In addition, during the first three months of the crisis, producers could not go regularly to their farms. Part of the harvest was lost on the sites of Bingerville and Port-Bouet, and they could not grow many crops at a time, especially in Port-Bouet.

Faced with this situation, merchants doing business with producers on the periphery of Abidjan shifted away from dealing in perishable produce like lettuce and increasingly purchased produce such as cabbage, tomatoes, and spices, which would keep for four days or more, if needed. They also began to buy spices, tomatoes, cabbage, onions, mint, parsley, eggplants, and peppers in larger quantities (typically, from 500 kg to 800 kg, in contrast with the 20 kg to 90 kg they bought from sites within Abidjan).

One result was rising wholesale prices for these products and increased transportation costs from the farms to the market, which resulted in an

increase in retail prices. In December 2002, three months after the beginning of the war, the monthly inflation rate was 1.1 percent, partly due to increased prices of fresh vegetables (16.7%) and fruit (4.7%).⁶ In fact, because of crime and curfews, some merchants stopped selling altogether, briefly causing a shortage of vegetables (especially in the main markets of Plateau and Adjame), and the few merchants who defied these conditions acquired a monopoly and consequently charged higher prices.

The increase in the price of gas and the multiplication of checkpoints also contributed to the increase in supply costs. Nationally the price of petrol has increased steadily since 1992. The increase in the number of checkpoints also raised the total amount that merchants paid to the military, not because of the amount typically charged per checkpoint, but rather the large number.⁷ For instance, within Abidjan, from the site of Airport Port-Bouet to the markets of Plateau and Adjame downtown, there were four or five checkpoints. From the periphery, the number of checkpoints in Songon increased from two before the crisis to seven and eventually up to ten over a distance of thirty-two kilometers.

As these physical and financial hazards increased for producer and sellers, they mobilized a number of strategies to continue supplying their customers. In order to minimize the hazards and the costs of transportation, for example, individual merchants would organize themselves into groups and then hire larger suppliers to provide the transportation for all of them.⁸ During the shortage producers set aside part of their produce for their most important customers. Thus merchants who were part of these social and economic networks, mostly consisting of relationships based on friendship, trust, and loyalty generated by regular, repeated exchanges (see Melucci 1989; Tovey 2002; Rotberg 2001), did not suffer an interruption in their supply of produce. At the same time, new business networks emerged. A group of producers in the town of Cocody organized themselves into a group called Grain de Seneve of Anyama, for example, and established an agreement to sell most of their production to a select number of wholesalers. Similarly, the Frère de Bethlehem group of Songon-Kassamble established an agreement with Prosuma, one of the largest networks of supermarkets in Abidjan. These types of arrangements, encouraged by ANADER, are new for vegetable agriculture in Abidjan; they opened new professionalized opportunities for retail sales of vegetables in formal markets, and drew supermarkets into partnerships with producers.

Changes in Production Techniques and Sustainability

The producers on the periphery who established these direct relationships with businesses in Abidjan were also more likely to use organic techniques of production. This was due to several causes, including the quality of the soil at the new sites and its appropriateness for certain types of vegetable crops. Sites like Gbagba-marchou, created on the periphery of Bingerville,

are made up of high quality arable land with good drainage, and soil that is neither too acidic nor too salty, with the sodium chloride and sulfate composition within the range recommended by the U.N.'s Food and Agriculture Organization (FAO) for production in a swampy site (FAO 1988:61). For sites in this area, producers used largely organic inputs (basically manure). Especially around Bingerville there were large herds of livestock (about 60 cattle farms), and their waste also was cheaper than chemical fertilizer.⁹ In the case of the Songon producers who had partnered with PROSUMA, the use of organic fertilizer was one of the terms of their agreement with the supermarket. In Abidjan, the choice of manure represented an appropriate technology for processing organic waste and producing fertilizer in an urban agricultural system. A practice based on natural systems sustainability also improved the likelihood that future generations will have access to land on which they can continue to cultivate crops.¹⁰

Producers on the periphery also modified their production to take into account the constraints experienced by producers within the city. Because of the presence of the soldiers on or near their farms, producers within Abidjan did not have sufficient time to adequately maintain their crops (i.e., watering, pesticide treatment, weeding). For example, the number of times young shoots of lettuce were watered decreased from four times to two times per day, slowing the normal growth of the plants. In order to cope, producers on the site at Airport Port-Bouet grew vegetables that needed less water and less labor such as okra, spices, and eggplant; and then parsley, mint, and okra at Marcory-ATCI. Consequently, inside Abidjan the production of lettuce, cabbage, and carrots decreased. In response to this situation, producers on the periphery tried to take advantage of the markets for products whose demand was steady in the urban areas but were no longer being supplied. On three such sites (Bingerville, Anyama, and Songon) producers responded to the market by producing increasing amounts of lettuce, carrots, peppers, green onions, cabbage, green beans, and cucumbers. Thus agricultural production in the periphery grew as the problems of intra-urban agriculture increased.¹¹

In order to support this new dynamic (and also in a context of labor shortage and weak support from the state), producers decided to work together in informal associations or cooperatives, particularly at the sites of Songon and Anyama. This system of mutual help was the periurban version of traditional rural production systems used throughout Côte d'Ivoire and Africa, and it enabled the continued production and supply of vegetables to urban markets in Abidjan. This was also a strategy that drew attention and financial aid from international organizations. For example, the creation of the NGO Frère de Bethlehem, with the financial support of UNDP (the United Nations Development Programme), on the site of Kassamble was the outcome of an initiative to build a strong group of producers in order to give value to agricultural work and provide employment opportunities to youth. These organizations of producers also attracted the interest of

municipalities. In order to encourage young people to go into agriculture, the municipality of Bingerville offered about 93 hectares for vegetable agriculture. The production of food crops provided jobs for youth, enhanced food security in Bingerville, and also beautified the city by creating farmland from bush. In this way, these urban food crops integrated municipal policies with urban land-management policies.¹²

In contrast, initiatives by producers on the sites of Airport and Marcory-ATCI failed regularly, mostly because of the precariousness of their sites. They were unable to initiate a sustainable project with a municipality, supermarkets, or other agencies on sites from which they could be driven away at any time. Compounding their problem was the fact that producers were not organized into groups, and were thus unable to obtain financial support from any international organization.

Final Considerations: How Has the Crisis Affected Sustainable Periurban Agriculture?

This study shows how vegetable producers maintained functioning families and continued production and trade by using their social and traditional knowledge and networks, and in some cases by developing new business arrangements. In this way, producers and merchants of vegetable crops reconstructed sustainable agriculture, mainly on the periphery of Abidjan. Before the crisis, vegetable producers and merchants had not been focused on issues of environmental sustainability. In the face of a long crisis, however, producers were displaced to and/or created new sites. In addition to reproducing traditional systems of production and commercialization, they realized that the sustainability of their activity depended on the modernization of trade networks as well. Thus they organized themselves into cooperatives and entered into agreements with supermarkets and wholesalers. Advantages included the reduction of the cost of inputs, and also quality improvements. The cultivation of secure plots that individuals or groups owned on the periphery of Abidjan guaranteed future transfers of land rights within families. And these forms of organization drew the attention, support, and financial assistance of municipalities and development agencies interested in sustainable urban agriculture, including the FAO and UNDP.¹³

Studies of the agricultural dimensions of sustainable development aim to account for the strategies developed over time by small farmers and sellers (see Henke & Zappacosta 1996; Barbier 1987). During a crisis, these strategies are guided and reinforced by economic logics that should be understood, at least in part, as survival strategies. These strategies do not necessarily maximize income, but rather improve the basic living conditions of the poorest households.

Despite the activities of organizations in Côte d'Ivoire such as ANADER and CNRA (the National Centre for Agronomic Research), food agricul-

ture, especially vegetable crops, has never been a priority of the government. For the most part, the government simply tolerated vegetable production in Abidjan, and the lack of a clear policy to regulate the practice of vegetable crops grown inside or on the fringe of cities encouraged the development of dispersed, small-scale initiatives. Despite the initiative shown by individual producers and cooperatives, this precariousness acts as a constraint on the development of periurban agriculture. If sustainable urban agriculture is to thrive, the government must supply clearer policy in the areas of land access, formalization of property rights, the efficient use of organic fertilizer, and the professionalization of a sector that offers employment to urban youth.

Urban agriculture in Abidjan is being progressively transformed into periurban agriculture, with new producers and sellers changing the process of production and commercialization. With the crisis in Côte d'Ivoire in the first decade of the century, and the troubles inside the city of Abidjan, the number of producers in the city decreased, along with the total area cultivated. But this process contributed to the newly developed vegetable agriculture on the periphery of the city. Faced with the constraints on the sites within Abidjan, agriculture on the periphery provided an alternative route to urban food production. This allowed for continued supply to the market, despite the shock of war. Yet vegetable producers still need additional assistance in the areas of technology, financing, infrastructure, and tenure security.

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Notes

1. By *produce* I mean lettuce, tomatoes, carrots, eggplant, cabbage, onion, parsley, green pepper, spices, beans, and okra.
2. For years UA and/or periurban agriculture, especially vegetable production, has played an important role in the food supply of large and rapidly growing African cities. See, e.g., Frayne (2005) for Windhoek; Chaléard (1999) for Bouake; Tallaki (2005) for Lome; Sonou (2001) for Accra; Moustier (1999) for Antananarivo; Mbiba (1995) for Harare; MBaye and Moustier (2000) for Dakar; and Affou (1998) for Abidjan.

Throughout West Africa, there is a tradition of women as traders in vegetables. For example, in Togo, according to Schulter (1991), women represent 92 percent of vegetable merchants. In Côte d'Ivoire, 96 percent of vegetable retailers were women in 1969 (Chateau 1969) and in 1998, 80 percent to 90 percent of those in this business were women (Minagra 1998).

3. Ivoirité was also intended to disqualify one of Bedié's main political opponents, Alassane Ouattara, by designating him as a foreigner.
4. The Burkinabe are citizens of Burkina-Faso or those whose families originate from one of the countries to the north of Côte d'Ivoire.
5. US \$1 equals about 450–500 FCFA
6. In fact, wholesale prices of produce on the farms doubled, and in some cases, even tripled. Thus the prices of tomatoes rose from 250 FCFA/kg or 300 FCFA/kg to 800 FCFA and up to 1000 FCFA/kg. The price of a basket of okra, which is about fifteen kg, increased from 2500 FCFA to 7000 FCFA; the price of spices varied from 5000 FCFA to 7000 FCFA. Obviously retail prices also increased dramatically. From September to December 2002 the price of tomatoes, for example, went from 300 FCFA/kg to 800 FCFA/kg; the price of lettuce from 50 FCFA to 150 FCFA for three stems.
7. Generally, in order to pass checkpoints quickly and save their merchandise, merchants had to pay about 1000–2000 FCFA inside the city and 2000–5000 FCFA on the periphery at each checkpoint. The price of gas went from 250 FCFA/liter to 375 FCFA/liter in 1996, and reached 410 FCFA in 2000. In 2005, when the government needed to support its military expenses, it took advantage of the worldwide increase in petrol prices to raise the price of the gas domestically to 535 FCFA. Thus, for example, the price for transportation of one basket of okra went from 200 FCFA to 250 FCFA—50 FCFA more from Bingerville to Abidjan. Similarly, the costs for the transportation of sixty baskets of okra from Songon to the markets of Abidjan rose from 15,000 FCFA to 18,000 FCFA and transport costs for sixty sacks of spice went from 24,000 FCFA to 30,000 FCFA. Within Abidjan, transport costs followed a similar pattern, increasing by 5000 FCFA for using a pick-up and 1000 FCFA for using city taxis.

8. For example, five merchants could pay about 15,000 FCFA–20,000 FCFA to transport 100 kilograms of produce from Port-Bouet to their marketplace in downtown, or about 3000 FCFA–4000 FCFA per merchant, less than what it cost each one to transport each individual share.
9. The price of manure was 200 FCFA/50kg (almost 4 FCAF/kg) in contrast with chemical fertilizer priced at 200 FCFA/kg.
10. For a comparable study of the city of Rosario Parks, Argentina, see Spiaggi (2005).
11. For example, the production of tomatoes and eggplants—the main products in demand—increased. The production of tomatos grew from 15.96 tons in 2001 to 43.24 tons in 2004; similarly, the production of eggplants went from 77.21 tons in 2001 to 756.4 tons in 2004.
12. For comparable examples of the municipalities of Rosario Parks in Argentina or other cities in Peru and Ecuador, see Dubbeling (2004) and Mougeot (2005).
13. For example, the HUP project on the site of Gbagba Marchou in Bingerville, based on the PPI (Integrated Protection Production) principle, started in 1999 with the support of FAO and aimed to maintain natural resources (water, land) and the quality of production.