Chapter 13
Urban Agroforestry Products in Kisumu, Kenya: A Rapid Market Assessment

Sammy Carsan, Dennis Osino, Paul Opanga, and Anthony J. Simons

Introduction

As researchers from the World Agroforestry Centre (ICRAF) and the National Museums of Kenya, we undertook the work described here as a contribution to Kenya's national development agenda, articulated in policies such as the Poverty Reduction Strategy Paper (PRSP) and Economic Recovery Strategy for Wealth and Employment Creation in Kenya after the change of government in December 2002. Those policies' priorities of ensuring food security and livelihood support systems require the identification of activities that can provide a basis for localized action. Urban hunger and poverty are major issues, and urban agriculture (UA) is one such activity that can play an important role in reducing poverty and enhancing opportunities for wealth creation. In a region experiencing declines in agricultural productivity and competitiveness resulting in national-level food insecurity (Cunningham et al. 2008), producing food and non-food agroforestry products nevertheless provides many with a meaningful sense of food and income security.

Agriculture in the larger Kisumu district is carried out at a subsistence level – maize, beans and sorghum commonly being grown for household consumption. However, vegetables such as kale, tomatoes and local vegetables are increasingly being cultivated for the urban market although the district remains a net food importer (UN-Habitat 2006) with food supplies coming mainly from neighbouring districts. Urban agriculture, including livestock keeping, though widely practiced, is restricted and penalized through repressive implementation of outdated urban bylaws, being seen as a nuisance and a threat to public health (Ishani et al. 2002). Still, a recent livelihood survey of Kisumu showed that 60 percent of households living on the peri-urban fringes of Kisumu were involved in some form of urban agriculture and livestock keeping, with a total of 737 households found to be holding an average of KShs 150 000 (US$2150) worth of livestock per household (Onim 2002). However, urban crops often fail due to poor farming practices, unreliable

S. Carsan (✉)
World Agroforestry Center (ICRAF), Nairobi, Kenya; University of the Free State, Bloemfontein, South Africa
e-mail: s.carsan@cgiar.org

G. Prain et al. (eds.), *African Urban Harvest*, DOI 10.1007/978-1-4419-6250-8_13,

rains, drought and frequent floods in low-lying areas, posing a direct challenge to poverty-reduction opportunities for the city.

UA, as defined in previous chapters, includes integrated agriculture and forestry systems. Growing trees can be combined with food crops or mixed cultivation and animal husbandry, which together diversify income and produce. The potential of urban and peri-urban agriculture to alleviate food poverty in Kisumu is recognized in the City Development Strategy 2004−2009 (UN-Habitat 2003). In fact, the city has a strong agricultural tradition and intensification of UA and livestock keeping is taking place. As well as being a place of production, a city like Kisumu acts as a trading hub for produce from surrounding areas and there is considerable variety in agroforestry food and non-food products traded there, with great potential to benefit many low-income urban dwellers, either from production or marketing or both. However, systematic studies to understand the value chain for key agroforestry products have been lacking, hindering the development of better marketing strategies. There is a lack of even a basic understanding of where things are coming from and going to, despite it being established that such key products as fruit, timber, medicinal plants and local vegetables have potential to contribute significantly to farmers' and small urban traders' income and food objectives. An enhanced role for these products is depressed by lack of data on local markets, whose size or even availability is unknown.

It is against this backdrop, and based on the need to better inform national policies on food security and other livelihood support systems, that we carried out a rapid market assessment on agroforestry food and non-food products in urban and peri-urban Kisumu. The study aimed to situate urban agroforestry within the wider system of production of agroforestry products by identifying local demand and supply patterns for existing products and their embedded value chain characteristics. Key food and non-food products surveyed were fruit, local vegetables, medicinal plants, tree nurseries and timber.

This chapter specifically discusses marketing prospects for key identified agroforestry products, whether from urban, peri-urban or rural production, as well as current challenges and opportunities to enhance their enterprise value. This is intended to be of benefit to urban food security and livelihoods through production and marketing and to be of assistance to Kisumu City, which faces the task of integrating urban agriculture and livestock keeping into its broad urban development plans, albeit within a carefully regulated framework to minimize conflicts and health problems such as addressed elsewhere in this book.

The Study Area

Situated on Lake Victoria, Kisumu City is Kenya's third largest urban area and headquarters for both Kisumu District and Nyanza Province. Founded as a railway terminus and internal port in 1901, it later became the leading commercial, trading, industrial, communication and administrative centre in the Lake Victoria basin (UN-Habitat 2003). It covers an area of approximately 417 km^2 and had an estimated population of 345 312, growing at a rate of 2.8 percent per annum,

according to the 1999 Kenya Government census. At 1100 m above sea level, the city has a humid climate with bimodal rainfall averaging 1245 mm per annum.

Kisumu has suffered from neglect under successive political regimes in the country, lacking both national policy support and investment. Remarkably, despite its great natural resource potential, it has one of the highest food poverty levels in Kenya. Fifty-three percent of its population lived below the food poverty line in the early 2000s compared to 8 percent in Nairobi, 39 percent in Mombasa and 30 percent in Nakuru (CBS & MPND 2003). Its status as an opposition stronghold during national economic decline in the 1980s and 1990s eroded the city's economic potential, resulting in high rates of poverty. About 60 percent of Kisumu's population lives in un-serviced settlements and over 15 percent has HIV/AIDS (UN-Habitat 2006). Over half the city's population is engaged in the informal sector, with increasing street trading in the Kisumu Central Business District accompanied by an insurgence of street children. Along with rapid urbanization this means many low-income households have extremely insecure livelihoods (Guendel & Richards 2003). Further, residents suffer from lack of decent and affordable housing and the city's transport and communication potential is unexploited. There are great disparities in the distribution of urban infrastructure and basic services between slums and higher income areas. The road network is deficient, excluding many slums from easy access to the city centre and other strategic areas. The poor are forced to rely on the informal sector for survival.

Methods

Several survey techniques were combined to carry out the assessment. Lacking any secondary data on traded agroforestry products to inform the study design, we made a cross-section of urban and peri-urban Kisumu using area maps, key individual interviews and chain referrals, to discover what products exist and their market activities. Most such products were found in the urban informal settlements where they are commonly traded in open-air markets. Using a sketch map of Kisumu, a total of sixteen such urban and peri-urban markets were identified for assessment. These markets were classified as urban or peri-urban based on their distance from the central business district and the observable trade volume. The following four markets were classified as urban: Jubilee, Kibuye, Kondele and Mamboleo, while nine markets, namely Kiboswa, Otonglo, Kibos, Nyamasaria, Kisian, Obambo, Ojola, Chiga and Rabour, were classified as peri-urban. Figure 13.1 shows the four urban and the innermost of the peri-urban markets visited. Three World Bank-funded open-air markets in the informal settlements of Migosi, Manyatta and Nyalenda were found to be not in use, reportedly due to their being poorly sited in terms of strategic attraction of good trade volumes and lacking proper road links to facilitate transactions. Permission was sought from the relevant local authorities for the market visits and interviews, and in the case of urban markets the visits were also carried out with the agreement of the market superintendents.

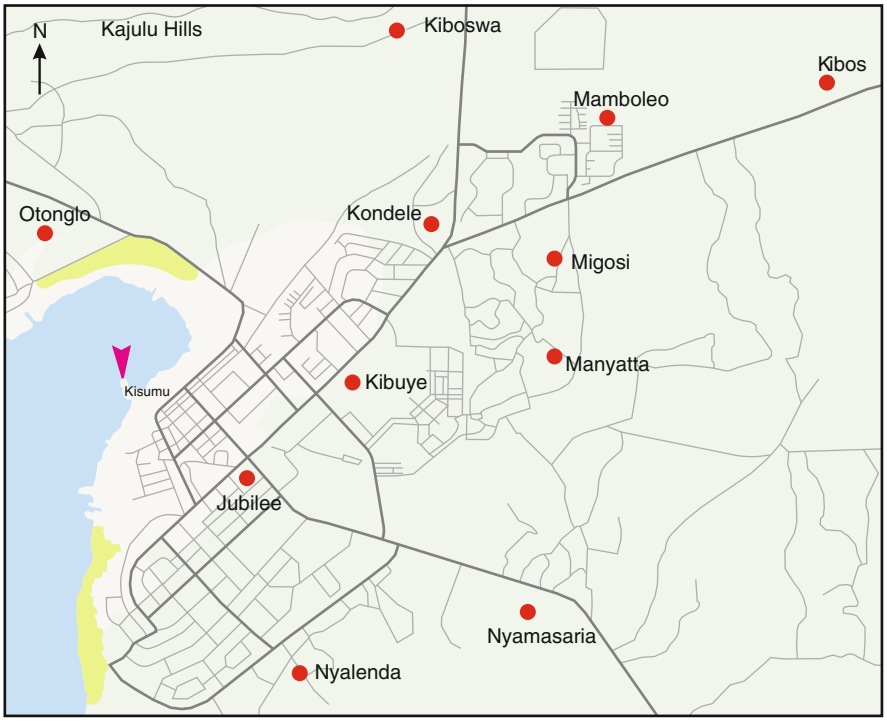

Fig. 13.1 Map of Kisumu city showing key open air markets

Two or three individuals found selling the products being investigated were interviewed in each open-air market. A total of 25 respondents were interviewed, either from the open-air markets or at these individuals' workshops or timber yards. Four focus group discussions (FGDs) were carried out, two in urban markets (Kibuye and Kondele) and two in peri-urban markets (Kiboswa and Kibos) using the same interview questionnaire tool, with open-ended questions leading to discussion. FGD's were easy to set up as the traders for each product were found stationed together at the market place. Finally, five nursery operators and three timber yard operators were also interviewed to complete the product survey. Although minimal, the numbers were keyed in and analyzed using Microsoft Excel for simple descriptive statistics. Simple value chain assessment was performed for each product market (Thompson et al. 2005).

Agroforestry Food Products

Fruit

The fruits most traded in Kisumu at the time of survey included tamarind (*Tamarindus indica*), guava (*Psidium guajava*) and mango (*Mangifera indica*). Fruit

such as pawpaw (*Carica papaya*) are important, although these were not surveyed as they were not in season. A more extensive study would be needed to get a comprehensive picture, although the three types of fruit found are indicative of market conditions (Thompson et al. 2005).

Tamarind is a common fruit in many urban and peri-urban market outlets in Kisumu. Two cultivars, readily identified by their taste and size, are traded locally. Fruit pods come from the neighbouring regions of Alego, Gem, Ugenya and Asembo, where the wholesale traders gather them from homesteads in 50 and 100 kg size sacks. Traders have to meet the costs of collection (plucking and packing) and transport to urban wholesale markets like Kibuye. Here, bulk loads of tamarind pods are broken down and traded in smaller units called *gorogoro* or tin-load – a standard local measuring unit. It was estimated that about two to three 100 kg size sack loads are sold per week per trader in the urban market outlets such as Kibuye. Table 13.1 details the levels of transaction.

Retail traders, mainly women coming from the peri-urban markets around Kisumu, such as Kondele, Nyamasaria, Kibos, Jubilee and Otonglo, source their tamarind supplies from the urban markets. At these peri-urban outlet markets, which are mainly in the informal settlements, the pods are sold in small bundles or by the single pod. The retail volume per trader at the small peri-urban outlets like Kibos and Nyamasaria is normally about one to two tin-loads per week. There is no processing or special packaging being used, and the consumers of tamarind are mainly urban dwellers. Interestingly, the tamarind chain was found not to extend beyond Kisumu, with nothing being transported to Nairobi or other cities, although the

Table 13.1 key fruit type transactions in urban and peri-urban Kisumu

Produce	Produce source	Collection cost/unit (in US$)	Farmer SP/ unit (in US$)	Trader SP (US$)/ unit (urban outlet)	Selling price/unit (peri-urban outlet)
Tamarind	Alego, Gem, Ugenya Asembo	0.5 – 0.8 per 50 – 100 kg size sack	2 – 2.6 for 50 kg sack 5 – 7 for 100 kg sack	0.3 – 0.4 per 2 kg tin-load	KSh 5 – 10 Bundle Or KSh 1 per piece
Mango	Nyahera, Kiboswa Imports from Nairobi	Farmers collect	0.25 – 0.40 per basket	6.6 per 100 kg size sack	KSh 2 – 5 per piece
Guava	Widely available in peri urban Kisumu	Farmer/trader collection	5 – 6 per basket	6 – 7 per basket load	KSh 1 per piece
Local vegetables	Kisumu–Kakamega route, Kiboswa, Gambogi, Serem, Sui & parts of Nandi Escarpment	Farmer/ trader	2.6 – 4 for 100 kg size sack	n/e	High trader mobility between markets can make up to US$13 per day

Key: n/e: not established; SP: selling price; Exchange rate US$1 equivalent to KSh.75

survey could not conclusively identify all possible buyers at the farm level. The interviewed buyers did not indicate that there was any form of competition for farm produce. Table 13.1 provides a summary of key costs in the tamarind trade.

A particular local variety of mango is sourced from peri-urban Nyahera and Kiboswa along the Kisumu–Kakamega road and is marketed in small basket-loads during the hot season. Farmers seem more engaged in the mango value chain than the tamarind one, either by selling their produce at strategic points along the busy Kisumu–Kakamega route or by trading it at peri-urban outlets such as Kibos and Kondele. Table 13.1 summarizes mango transactions in Kisumu. During the hot season (January to February), mangoes of different varieties are imported from outside Kisumu and often traded in sacks at Kibuye urban market, interestingly at a lower bulk price of KShs 500 ($6.6) for a 100 kg sack.

Guavas are not widely traded, even though they grow abundantly, especially in peri-urban Kisumu. The depressed market demand is indicative of a widely available product. However, traders in certain peri-urban places like Kiboswa take advantage of their proximity to the main road to sell to travellers.

Local Vegetables

Women dominate all levels of the vegetable supply chain. Peri-urban traders often source vegetables from their own home gardens situated in close proximity to the market outlet whereas the more urban traders, particularly those in Kibuye, may not necessarily be farmers. However, the majority of the women traders hail from Kakamega District, and at the retail outlets they operate in groups of five to ten. The main source of the vegetable is the Kisumu–Kakamega peri-urban route, from farms scattered in Kiboswa, Gambogi, Serem, Sui and parts of Nandi Escarpment.

Numerous species of vegetables were found to be traded in Kisumu, many of them local, traditional foods. The most common were wild spider flower, creeping foxglove, cowpeas, mustard collard and black nightshade, but there were many others. Table 13.2 provides a list of some of the vegetable species found in the city.

In outlets such as Kondele, Kibos and Jubilee, vegetables are sold in bundles, often by the producers themselves, the size of bundle varying with outlets and consumers, while at the retail level the different traditional vegetable species are sold by the traders. This wide distribution responds to consumers' needs to prepare the variety of local dishes that are largely accompanied by these vegetables. The vegetable trade seems to offer more returns to traders than fruit and medicinal plants. Traders rotating among the different open-air markets can make an average of $13 per day. A sack-load of leafy vegetables costs $2.6–4.0 at the point of origin; transport for a 100 kg size sack to the urban market outlets costs $1.3–2.6 (Table 13.1). Traders source the vegetables from their own and from neighbours' farms.

In addition, a complementary vegetable-seed trade has emerged as a result of the booming vegetable trade, suggesting that urban and peri-urban production may be expanding through home gardens. Kiboswa market is now one of the largest points for local vegetable seeds. Seeds for most vegetable species were found to

Table 13.2 Local vegetable species traded in Kisumu markets

Common name	Botanical name	Seed trade?
Akeyo/dek/chisaga (wild spider flower)	*Cleome gynandra*	Yes
Apoth/murenda(e) (Nalta jute)	*Corchorus olitorius/trilocularis*	Yes
Atipa (creeping foxglove)	*Asystasia gangetica*	Yes
[a]Awayo	*Oxygonum sinuatum*	n/f
Cowpea	*Vigna unguiculata*	Yes
Dodo/chiboga/muchicha	*Amaranthus* sp.	Yes
Kanthira (mustard collard)	*Brassica carinata*	Yes
Managuu, Osuga (black nightshade)	*Solanum nigrum*	Yes
Mitoo (sunhemp)	*Crotolaria brevidens*	Yes
[a]Moringa, ben tree	*Moringa oleifera*	n/f
[a]Rosemary	*Rosemarinus officinalis*	n/f

[a]n/f- not found: trade in seed for this vegetable species not found

be traded except for *Oxygonum sinuatum, Moringa oleifera* and *Rosemarinus officinalis* (Table 13.2). Seeds are sold in cups (200 ml size), with prices varying by the species. A cupful of *Crotolaria brevidens* and *Cleome gynandra* were the most costly seed traded at $2 and $1.5, respectively (Table 13.3).

Table 13.3 Key plant species used as remedies for different health problems

Local name	Botanical	Main and/or combination uses
Ajua	*Ceasalpinia volkensii*	Malaria
Aloe	*Aloe* spp.	Ulcers, arthritis, as a laxative, wounds, rashes, burns
Arupiny	*Commiphora africana*	Typhoid fever, stomach problems, malaria
Murembe/Orembe	*Erythrina. abyssinica*	Gynaecological conditions, diarrhoea, malaria
Mbao/Ndege	*Eucalyptus* sp.	Headaches resulting from cold
Manyasi	*Cotula anthemoids*	Cold, colic, rheumatism
Mukombero	*Mondia whytei*	Aphrodisiac, appetizer
Mwarubaini	*Azandiracta indica*	Malaria
Nyaluetkwach	*Toddalia asiatica*	Gastrointestinal, fever, malaria, cholera, rheumatism, lung diseases
Nyatigotigo	*Chenopodium opulifolium*	Leaves (cooked as spinach) are used as a nutritional supplement – no medicinal value reported
Obolo	*Annona senegalensis*	Respiratory infections, de-worming, toothaches, snake bites, cuts, wounds,
Ochol	*Euclea divinorum/ racemosa*	Purgative
Odolo	*Chrysanthelium americanum*	Urinary tract infections
Ombasa	*Tylosema fassoglense*	Gastrointestinal, anaemia, healing uterus after birth
Ombulu	*Abrus precatorius*	Respiratory problems
Mswaki	*Salvadora persica*	Toothbrush
Onera	*Terminalia brownii*	Yellow fever in children
Tido	*Ekebergia capensis*	Emetic, dysentery, headaches, chronic coughs
Yago	*Kigelia africana*	Respiratory and gynaecological conditions, malaria, ulcers, sores, syphilis

Moringa pods were found only in Jubilee market, where demand – mostly from the Asian urban community – was reported to be dwindling. The pods, mostly harvested in August and September, are sourced from Kajulu Division and sections of Kano plains or from small-scale individual farmers in Kisumu town. One trader sourced them from his own farm in Kano plains while others were reported to be supplied from Nairobi.

Medicinal Plants

The World Health Organization (WHO) estimates up to 80 percent of the world's population, mainly in poor countries, rely on traditional healthcare, and recent studies have aimed at documenting and promoting better incorporation of ethnomedicine in Kenya and Uganda into government regulation (Aduma 1999; GAN 1999). An estimated 2500 species of medicinal and aromatic plants are traded worldwide. Most of these medicinal plants are still collected from wild sources (Cunningham et al. 2008). During this survey over 20 plant species were recorded as useful for treatment of different ailments (Table 13.3), either singly or in combination therapies.

The survey confirmed the existence of an important medicinal plants trade in Kisumu, enhanced by a strong cultural attachment as well as belief in their efficacy. Kibuye and Kondele urban markets are major outlets for medicinal plant products in the city. Much of the trade takes place in stalls, especially in Kondele. The products are sold either as raw extracts (roots, leaves, bark) or in powdered form. A significant number of consumers were said to prefer raw extracts, as they are sure of the ingredients rather than powdered formulations where it is difficult to distinguish the active ingredients included. The prices for products are flexible and often based on negotiations with customers. However, customer bargaining for lower prices was reported to increase when it comes to locally sourced and well-known species. Products are prepared at home as an accompaniment to meals for many home-based therapies, including malaria and HIV/AIDS management. Many herbal medicine hawkers made claims for the efficacy of their formulations to cure HIV/AIDS. We made the assumption that the many ailments treated were actually opportunistic diseases from HIV. Most plant species are harvested from the surrounding peri-urban hilltops of Kajulu. However, plant material for product formulations may also be sourced from diverse regions, including neighbouring districts.

Interestingly, we found that cultivation of medicinal plants on farms was rare and impeded by certain cultural and traditional religious beliefs. Many believe these plants can only be obtained from common property such as the surrounding community hills. Both men and women, old and young, are engaged in the trade in medicinal plant products, but it is limited to particular family circles due to traditional beliefs. To overcome some of the challenges in traditional medicine practice, training of ethno-healers on record keeping and plant analysis, and promotion of cultivation of medicinal plants by both women and men, are among measures being

proposed for a Regional Center for Medicinal Plants and Biodiversity Research, with an emphasis on the Lake Victoria Basin in which Kisumu lies (Aduma 1999).

Products Transport

Transportation for agroforestry products to key urban and peri-urban markets was identified as a major factor determining volumes of trade and even the nature of trade. Strategically located open-air markets like Kibuye and Kondele receive higher volumes as they are easily accessible by main paved road from different parts of the city and are also linked to the high-potential areas of Kakamega District. Road transport by public means (taxi) or hired truck is a common form of transport for the more bulky products. Charges are per distance covered and determined on negotiation. Table 13.4 indicates transport costs for key agroforestry products traded in Kisumu.

Table 13.4 Transport cost for various products around urban and peri-urban Kisumu

Product	Quantity	Locations	Distance (km)	Maximum cost (KSh)
Avocado	100 kg sack	Kiboswa-Kibuye	7	50 ($0.70)
Mango	100 kg sack	Kibuye-Kondele	2	50 ($0.70)
	100 kg sack	Kiboswa-Kibuye	7	50 ($0.70)
Tamarind	50 kg sack	Kibuye-Kondele	2	20 ($0.3)
	100 kg sack	Alego-Kibuye	50	2450 ($35)
Local vegetables	100 kg sack	Kiboswa-Kibuye	7	200 ($2.7)
		Serem-Kibuye	15	100 ($1.4)
	100 kg sack	around Kiboswa Gambogi-Kondele	10	50 ($0.70)
Poles	7 tonne lorry	Gambogi-Kibuye	12	3500 ($50)
		Hamisi-Kibuye	30	4500 ($64)

Non-food Agroforestry Products

Increased agroforestry programs could provide fuelwood, building poles, and timber for the Lake Victoria region (Kairu 2001). There are many open spaces in the urban and peri-urban areas of Kisumu, indicating the potential to produce many tree-based products, even though much of this land appears to be privately owned. This survey assessed the marketing activities for eucalyptus poles, timber, firewood and tree nurseries.

Kibuye and Kondele urban markets were found to be the main outlets for wood products such as poles and timber. Commonly traded timber species in Kisumu include cypress (*Cupressus lusitanica*), pine (*Pinus patula*), eucalyptus (*Eucalyptus saligna*) and podo (*Podocarpus* sp.). A respondent in Kondele revealed that cypress,

pine, eucalyptus and podo are commonly sourced from the distant North Rift areas of Nandi, Kapsabet, Marakwet and Nakuru, including Molo and Elburgon. The respondent sources 8000 feet of various sizes of cypress that is supplied by seven-tonne lorries. The gate price of the wood (inclusive of transport) is about KShs 130 000 ($1800). On average, he places orders for timber every 3–4 weeks, depending on demand. The common sizes of timber sold include 6 × 2, 8 × 1, 4 × 2, 3 × 2, 2 × 2 and 6 × 1. The premises are rented at a fee of KShs 5000 ($70) per month, while municipal licensing fees are paid annually and range between KShs 6000 and 8000 ($83–111). Currently, cypress is the most popular timber in the city.

The large timber traders in Kisumu also serve neighbouring districts. However, there is shortage of wood supply owing to a logging ban on gazetted forests. Environmental degradation due to destruction of forests is widespread in Kenya while erosion due to deforestation is affecting Lake Victoria in particular. Thus the persistent timber shortage is feared to worsen in the near future, while agroforestry and reforestation initiatives have not been intensified.

The supply of cypress and other wood types was, for instance, reported to have decreased in the last 5 years, while the consumer behaviour of the Luos – the majority of customers within and around the city – is resistant to other wood types. One trader cites the example of *Podocarpus*, which he believes is a superior wood, although locals still prefer cypress. The price of timber has been increasing tremendously, with a 100 percent price increment in the last 5 years, cypress selling at KShs 28 for 6 × 2 size, KShs 25 for 8 × 1 size, KShs 17 for 4 × 2 size, KShs 15 for 3 × 2 size, KShs 11 for 2 × 2 size and KShs 17 for 6 × 1 per foot.

It was reported to be difficult to operate in the timber value chain due to government regulations and huge transport costs. Transporters sometimes twin as suppliers of timber products, gaining competitive advantage by combining both functions. Timber enterprises involve huge financial investments. There was an indication that all timber traded from one neighbouring district was sourced from farms.

Most of the poles traded in Kisumu, unlike for sawn wood, come from farm plots. The poles are mainly harvested from *Eucalyptus* spp. whose coppicing ability provides poles on at least a yearly basis per stump. Preliminary investigations indicate that eucalyptus poles, used mainly in construction as scaffolding, are sourced around the border of Kisumu and Kakamega or in peri-urban locations such as Kiboswa. The normal practice is that a dealer based in an urban market (mainly Kondele), operates both as retailer and wholesaler, buying eucalyptus poles from farmers with woodlots on their farms. The price is based on negotiation of the value of standing trees in a farm woodlot. Roughly, it costs about KShs 15 000–18 000 ($208–250) to fill a seven-tonne truck with eucalyptus poles. The buyer pays for the cost of felling trees, with loading estimated at KShs 2250 ($31). Such a task requires about 15 workers, who are paid at a rate of KShs 150 ($2) per person per day for the work done. Transport costs KShs 3500–4500 ($50–64) from the peri-urban areas of Gambogi and Hamisi to Kibuye, respectively (Table 13.1). On average, the traders require three seven-tonne truckloads per month in the Kondele outlets surveyed.

In Kondele, the poles fetch a good price when they are green, but when dry they are sold cheaply for firewood. When still green, the poles are mainly used in construction work. Prices vary with diameter. The smallest size is sold at KShs 15 ($0.2), while the biggest is sold at KShs 60 ($0.8) per pole. Consumers and some retailers come all the way from Busia, Bondo and Siaya towns. Further, investigation indicates the dealer requires the area chief's permit to enable him to transport forest product (poles) from one district to another. Some of the dealers have more than one pole outlet.

Tree Nurseries

Tree nurseries were identified as an important emerging business in urban Kisumu. The local authorities also seem comfortable with it as it contributes to the city beautification and environmental programs. There are a number of nurseries scattered along the roads leading into and out of Kisumu city. Young men aged 25–40 run tree nursery businesses along the main access roads, selling tree seedlings to passers-by, who are residents of Kisumu and neighbouring districts. From the five nurseries surveyed, it was evident that fruit-tree seedlings form a prominent part of the whole nursery enterprise, the most common being mango (*Mangifera indica*), orange (*Citrus* spp.), pawpaw (*Carica papaya*), avocado (*Persea americana*), jackfruit (*Artocarpus heterophyllus*), Indian blackberry (*Syzingium cuminii*) and passion fruit (*Passiflora edulis*). Seeds for establishing tree nurseries are reportedly sourced from Nakuru region, especially for timber species such as *Grevillea robusta* and *Eucalyptus*.

Few indigenous species and quantities were found in the nurseries as compared to the exotics. Some of the indigenous species found included *Spathodea campanulata* and *Markhamia lutea* whereas common exotic species identified in the nurseries were *Dovyalis caffra*, *Eucalyptus* spp., *Casuarina equisetifolia*, *Cupressus lusitanca*, *Grevillea robusta* and *Cassia siamea*.

Another feature of urban tree nurseries in Kisumu is the production of species with ornamental value, as earlier studies have demonstrated. Some key ornamental species traded include *Dovyalis caffra, Ficus benjamina, Palm washingtonia*, *Spathodea campanulata, Callistemon citrinus, Hibicus* spp. and *Bougainvillea* spp. In the early nineties it was reported that the sale of seedlings is a common informal sector business with the majority of plants and seedlings on sale being trees and decorative shrubs (Smith 1998). More recently it has been shown that gross incomes for urban and peri-urban community nurseries are largely supported by the large-sized ornamental seedlings produced (Muriuki & Carsan 2004).

While there are huge price differences between seedling species, the prices do not differ much from one nursery to another. The ornamentals are usually sold to new homeowners and for landscaping functions. They fetch marginally higher prices compared to fruit trees or any other type of seedling. Surveyed tree nurseries can stock up to 20 000 seedlings per year, earning an income range of KShs 5000–10 000 ($69–140) per month.

Market Chain Analysis

In our study we found three types of market channel for agroforestry products in Kisumu (Fig. 13.2). In the first type, farm products are taken to urban wholesale outlets, mainly Kibuye and occasionally Kondele, and then further to retailing outlets in peri-urban market centres such as Kibos, Kiboswa, Nyamasaria and Otonglo. An example of this kind of arrangement is the tamarind chain. The second channel applies to peri-urban farm products taken directly to retailing outlets, mostly skipping the wholesaling step. Products supplied in this manner include local vegetables, medicinal plant products, construction poles and fruit selling at bus stops.

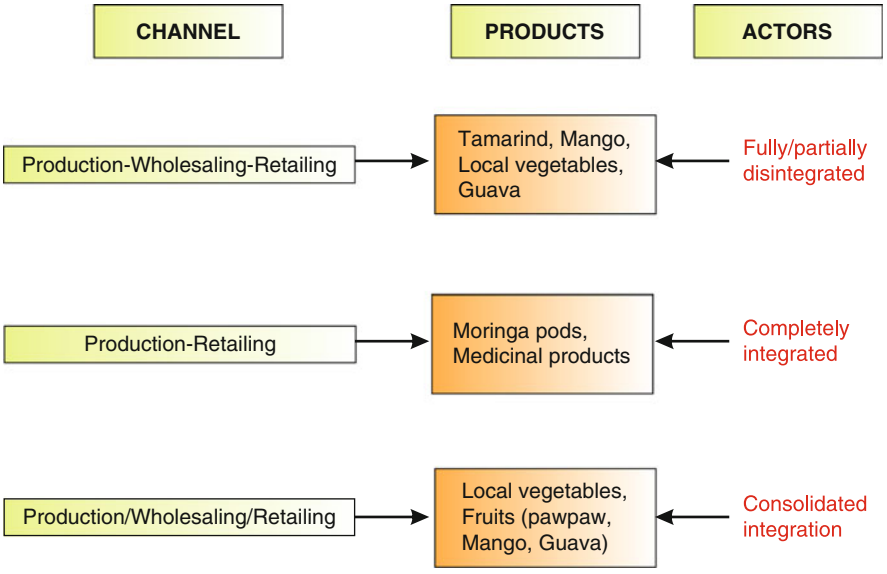

Fig. 13.2 Diagram of market chains for agroforestry products in Kisumu

In most instances, those dealing in products along the first channel are fully or partially disintegrated, which means that there are no direct connections or links between actors in the production and retail functions of the market chain. Transport providers or agents often facilitate these links. In case of the second channel, there is a possibility of integration among actors. This is illustrated when dealers make a personal effort to go to the source area and find the product, for example for the supply of local vegetables. The third channel represents consolidated integration, where the functions of production and retailing are consolidated, as in the case of peri-urban vegetable vendors. The most completely integrated case is that of the nursery enterprises, where production and retailing roles are performed by the same trader.

These preliminary findings indicate that fruit such as tamarind have a complete market chain involving wholesaling and retailing even though they are seasonal,

available only during the period August–October. Overall, our study shows that profit margins for agroforestry food products are generally low, although, with targeted improvements in the value chains of local vegetables and fruit varieties, there is potential for bigger margins.

These commercial agroforestry activities provide income and employment for numerous people, especially women and youth. Young men aged 20–35 were identified as key actors in the tree nursery enterprises, while the traditional vegetable supply chain is dominated by women, all the way from the farms to the Kisumu urban markets.

We identified the following marketing challenges during this assessment:

- *Product value chain* – there is an enormous disparity in incomes between actors in the value chain, with agents and "middlemen" who have better market networks reaping the most benefits. Small-scale producers often failed to achieve better market conditions and prices owing to their limited power;
- *Product differentiation* – farmers often failed to differentiate their products so as to attain a competitive edge and maximize income. They were unable to cushion themselves against frequent price fluctuations for certain products;
- *External factors* – there is a failure of policy and institutional support. Poor urban planning that doesn't incorporate urban agriculture and agroforestry as a means of livelihood constrains product development. In addition, sub-optimal infrastructure means there is an increased cost to trade. The inaccessible road networks compound high transport costs and limit trade volume.

Our study revealed that urban markets were more likely to source products from outside Kisumu while peri-urban market outlets were more likely to source some of their products from the surrounding farmlands. We found that Kibuye is an important centre for trade in agroforestry food and non-food products in Kisumu City and constitutes a major pathway for the wholesale and retail trade in food. Although there was this distinction between urban and peri-urban markets – with the latter sourcing products from peri-urban production – key urban markets such as Kibuye also sold products from outside Kisumu to the peri-urban markets.

The Kisumu–Kakamega route is a key link for the supply of agroforestry food products entering Kisumu City, including traditional vegetables, construction poles, and fruits such as mangoes, pawpaw and tamarind. At present, almost all the agroforestry food and non-food products used in Kisumu come from the bordering districts and very little from the urban area, even though there is potential for production of local vegetables, fruits, medicinal and timber trees in peri-urban or even urban sites. The community-owned hills within Kisumu that surround the city – places like Kajulu and Nyabondo – are an important source area for medicinal plants. However, this trade is taking its toll in the form of land degradation and even of species' survival. Thus an important opportunity is presented to rescue this area ecologically and for the benefit of the community through carefully managed agroforestry, in coordination with efforts to conserve indigenous knowledge and promote ethno-medicine (Aduma 1999).

Conclusions

It is evident that there is potential for market development for many agricultural and agroforestry products in Kisumu, provided there is more attention paid to the products' value chains, right from the producer level, to enhance their marketability. However, more research is required to identify opportunities and pathways through which smallholders could wield more power in market channels to boost their profits. An improvement in market outlets for tamarind and guava seems like a useful opportunity to boost the products' trade. Further agroforestry extension information is needed to help farmers increase and diversify their choices of tree species for trade products. However, both cultural and ecological issues need attention in designing these interventions.

There was very little value addition or processing in the product chains studied, the exception being some herbal products that were powdered and packaged in bottles. Fruit pods such as tamarind have complete wholesale and retail market structures even though they remain seasonal, available only during the August–October period. Subject to sustainability assessment, the trade in construction poles offers opportunities for income generation due to the high demand from building and construction work in Kisumu and the neighbouring districts of Nyando, Bondo and Siaya. There is need to scale up action research and foster policy dialogue on urban agroforestry products along the lines of the Kampala study of urban agriculture described in this volume (see Chapter 8 in particular), and to carry out a comprehensive market survey on products that would offer a competitive advantage to farmers and traders in urban and peri-urban Kisumu. Opportunities for value addition will need to be explored and intervention points identified to enhance production of agroforestry products that give sustainable incomes to urban and peri-urban residents. Such a study would include products such as firewood, baskets, charcoal, tool handles, woodcarvings and grass, that were not included here. All these products need to be assessed also in relation to sustainability and the requirements of the National Environmental Management Act (NEMA) and policies that aim to conserve Kenya's valuable biological diversity and forest cover. Urban agroforestry offers considerable opportunities for improving the environmental management and sustaining the biological diversity of a city like Kisumu, and of simultaneously improving the livelihoods of the urban poor. As a first step, efforts should be made to enhance awareness of the opportunities and then to linking research to the needs of farmers in urban and peri-urban Kisumu.

References

Aduma, PJ 1999, *Medicinal plants and biodiversity in the Luo and Suba communities of Lake Victoria*, Report of a Workshop at Maseno University College, Archived Project Report 633.88 (676.2) A3, IDRC, Ottawa.

CBS & MPND (Central Bureau of Statistics & Ministry of Planning and National Development) 2003, *Economic survey 2003–2007*, Government of Kenya, Nairobi.

Cunningham, AB, German, L, Paumgarten, F, Chikakula, M, Barr, C, Obidzinski, K, van Noordwijk, M, Koning, Rd, Purnomo, H, Yatich, T, Svensson, L, Gaafar, A & Puntodewo, A 2008. Sustainable trade and management of forest products and services in the COMESA region: an issue paper. Bogor, Indonesia. Centre for International Forestry Research (CIFOR).

GAN (Green Africa Network) 1999, *Ethnomedicine and medicinal plant conservation in Rachuonyo District*, Pilot Study Archived Project Report 633.88:615.89 (675.2) G7, IDRC, Ottawa.

Guendel, S & Richards, W 2003, 'Peri-urban and urban livestock keeping in East Africa — a coping strategy for the poor?', paper presented at *Deutscher Tropentag 2003*, Georg-August-University, Göttingen, 8–10 October 2003.

Ishani, Z, Gathuru, PK & Lamba, D 2002, *Scoping study of urban and peri-urban poor livestock keepers in Nairobi*, Mazingira Institute, Nairobi.

Kairu, JK 2001, 'Wetland use and impact on Lake Victoria, Kenya region', *Lakes & Reservoirs: Research & Management,* vol. 6, no. 2, pp. 117–125.

Muriuki, J & Carsan, S 2004, 'Assessing the merits of community level seedlings production and distribution', in Ngamau, D, Kanyi, B, Epila- Otara, J, Mwangingo, P & Wakhusama, S (eds) *Towards optimizing the benefits of clonal forestry to small scale farmers in East Africa, ISAAA Briefs No. 33*, ISAAA, Ithaca.

Onim, JF 2002, *Scoping study for urban and peri-urban livestock keepers in Kisumu City, Kenya*, Lowland Agricultural and Technical Services Limited (Lagrotech), Kisumu.

Puntodewo, A 2008, *Sustainable trade and management of forest products and services in the COMESA region: an issue paper*, Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Smith, DW 1998, 'Urban food systems and the poor in developing countries', *Transactions of the Institute of British Geographers, New Series*, vol. 23, no. 2, pp. 207–219.

Thompson, AA, Strickland, AJ & Gamble, JE 2005, *Crafting and executing strategy, the quest for competitive advantage: concepts and cases, 14th edition*, McGraw-Hill Companies, New York, NY.

UN-Habitat 2003, *Kisumu City development strategies*, http://hq.unhabitat.org/programmes/ump/kisumuCDS.asp [Accessed 29 February 2008].

UN-Habitat 2006, *Kisumu urban sector profile*, United Nations Human Settlements Programme.