

Emerging Issues in Urban Agricultural Development in West Africa¹

Olufunke Cofie

International Water Management Institute Africa Regional Office, Accra, Ghana
International network of Resource Centres on Urban Agriculture and Food Security
PMB CT 112 Cantonments, Accra, Ghana; Tel/Fax: +233-(0) 21-784753/
E-mail: o.cofie@cgiar.org; www.ruaf.org; www.iwmi.cgiar.org

Urban Agriculture (UA) is an old practice which has grown to a phenomenon of significance in the last decades as a result of rapid rate of urbanization and its attendant increase in urban food demand. Urban agriculture in West Africa contributes to city food supply, employment creation, livelihood support and poverty alleviation. Although these benefits are known, the knowledge has not been fully translated to the recognition of UA as an important component of urban development and land use system. This is mainly because of high demand for land by more valued land use sectors and the fact that farming within the city is often associated with health risks by municipal authorities. An examination of the development of UA in West Africa reveals a number of issues that need to be addressed by the policy makers to maximize the benefits and ensure its sustainability. Most important is the need to institutionalize UA by giving it due recognition and integrating it into overall urban development plan in the cities. Achieving this will involve the formulation of appropriate policy and development of strategic action plans with the full involvement of all relevant stakeholders.

1. Introduction

In West Africa, there is increasing demand for food in the cities as urban population is growing. While in the 30's, 40 million people lived in West Africa with about 4% in cities, in the 90's there were about 190 million and 40% in cities; and by 2020, it is estimated that 63% of the estimated population of 430 million will be found in urban centers (Figure 1). This trend is alarming in a region with limited resources for providing the necessary urban services. Ensuring food security and appropriate nutrition of the urban population and in particular of the poorest households is a challenge particularly where rural food production is limited and where poor road infrastructure and storage facilities constrain rural-urban food flows. Yet, for a healthy city, urban households must have access to and be able to afford adequate food and nutrition. Maxwell (1999) noted that the nature of urban food insecurity has changed from the problem of just "feeding the cities" (or maintaining aggregate supply), to that of access at household and individual level. The increasing rate of rural-urban migration implies that the poor are found more and more in the cities; hence poverty is becoming urbanized without any substantial increase in newly created jobs to absorb the unemployed. Livelihood support becomes a problem for up to half of city dwellers. Poor urban consumers can spend from 60% to 80% of their limited income on food while their rural counterparts spend less. In addition to this, there are environmental concerns with increasing city population. This is because more wastes are generated while sanitation facilities are inadequate and various coping strategies are being employed to meet these challenges.

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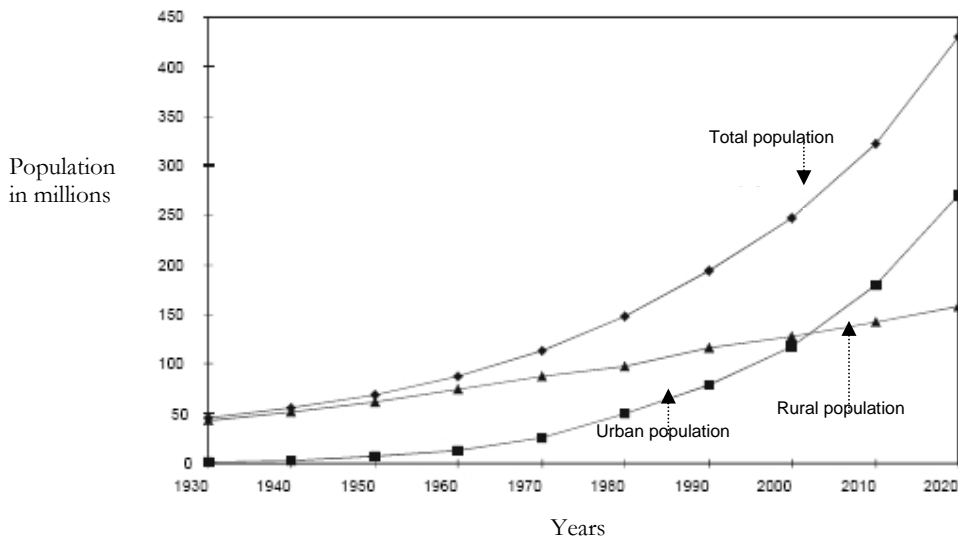


Fig. 1 Long-Term Population Trends in West Africa

As a response to inadequate and costly food supply, both crops and livestock production in urban backyards have become a common feature. Increase in urban food demand has also opened door for other farming systems in open spaces within the cities with the production of perishable products, which is taking advantage of market proximity and inadequate food storage and processing facilities. These and other factors such as instability of the local economy, market fluctuations, civil unrest and wars have led to the development of Urban Agriculture (UA)¹. As used here, UA refers to the growing of plants and rearing of animals for food and other uses in urban and peri-urban areas, as well as related activities like the production and delivery of inputs and the processing and marketing of products (Mougeot 2000; Danso 2004). It is a dynamic phenomenon that comprises a large variety of farming systems, a high degree of flexibility, and serves various functions including local economic development and urban environment management.

2. History of UA in West Africa

Urban agriculture has a long history though it is a recent phenomenon that has attracted a lot of attention by multilateral donors and local governments. In the past UA has quite often been seen as a rural phenomenon but there are cases e.g. in Accra (box 1) where city gardening has been carried out for decades (La Anyane, 1963). Early in the 1980s, only about 10-25 % of the urban population in Africa was engaged in UA while in the 1990s, the proportion has increased to about 70% (Rogerson, 1997). The United Nations Development Program (UNDP) estimated in 1996 that 800 million subsistence people are engaged in urban agriculture worldwide. Of these, 200 million are considered to be market producers employing 150 million people on full-time basis. Urban agriculture contributed 15% of world food production in 1993 and this is expected to grow to 30% by 2005 (Smit et al., 1996)

¹ Often UA and UPA are used interchangeably in this paper.

Many factors have made UA to be in the limelight in recent times: 1) the increase in urban food demand and changes in diets from the traditional staple high energy intake to more diversified food crops including vegetables etc.; 2) increasing volume of food waste which are potentially recyclable for use in crop production; 3) food related health problems due to inadequate or unbalance diet causing malnutrition; 4) the dependence of low income earners on emergency sources of food; civil unrest and wars; market opportunities; water availability; 5) the growing food establishments such as restaurants, hotels, fast food places, supermarkets etc.

Box 1. Case Study: The development of vegetable gardening in Accra

Development Period	Description
From 16 th century	Exotic Vegetables grown in the gardens around castles and forts by Europeans and local merchants
1890s	Aburi botanical station near Accra became an important vegetable growing centre with a by-weekly supply into Accra on Mondays and Fridays
1 st – 2 nd world war (1914-1945)	More extensive and outstanding vegetable production to meet the demand of American and British forces during the war
After the war till 1950	Reduction in production due to withdrawal in war demand
1950 to present	A gradual increase in production of exotic vegetables with 160 ha in Accra and about 300 in Greater Accra incl. Tema

Features of vegetable gardening in 1950s and 45 years after

	1956*	2002 [#]
Actors:	Private growers (70 ²) and institutions (7) involved	1000 vegetable farmers
Crop type:	Lettuce, cauliflower, onion, spinach, cabbage, tomato, carrots, beans, turnips, cucumber, beetroot, radish and garden eggs	60% exotic (lettuce, cabbage, spring onions, cauliflower, green pepper); 40% indigenous vegetables (Ayoyo, Alefi, okro, tomatoes, garden eggs)
Plot size:	30-700(m ²) per farmer	100-200(m ²) per farmer
People involved:	Mostly people from Northern Ghana	Migrant from rural area, mostly the North
Land tenure:	Mainly from residence, idle lands and no rent is paid	Residence, institutions and idle lands no rent is paid
Gender:	All men, no female labor employed	Less than 10% women
Age of growers:	25-50 yrs	Mostly from 20 and above 40
Labor requirement:	Av. 25 man-hrs per week	Depending on the season, it is about 25man-hrs per week
Cultivation:	Use of hoes and cutlasses	Use of cutlass, hoe, picking fork, spraying machine, mattock
Irrigation:	Watering cans are used for irrigation from drains and hosepipes from pipe water	Watering cans, motor and treadle pumps are used for irrigation from drains
Pest management:	Use of gamalin, didimac against insect; use of perenox against fungus	Neem extract, kerate, Dithane
Cropping cycle/yr:	3 croppings	3-10 croppings
Income from veg/yr:	160 shillings (Max = 600s)	US\$40-50
Marketing:	Wholesaling to market women who buy entire beds and harvest themselves – 20 sellers at Makola; direct sales to supermarkets and to hotels	Several marketing channels. Notable ones are Agboboleshi market, Kaneshie markets, numerous retailers, supermarkets, restaurants, and hotels.
Association:	No farmers' association in existence	Existing farmers associations
Major problems:	Sanitation with respect to manuring and watering. Use of dirty drain water for washing vegetables	Marketing - vegetable market women/sellers control produce prices; high cost of inputs or inadequate amount (compost, poultry manure); pest and diseases threats, drudgery in irrigation, no access to credit.

²The table presents data on the private growers

3. Current features of UA

Currently, there are many dimensions of UA in West Africa including crop and livestock farming, inputs and services delivery, processing and marketing of UA produce, these are often related. The significance of all these components is the integration of marginal groups (mostly women) into the local economic development and urban environmental management.

3.1 Crop Production

Crop production takes place in open spaces within the city such as government lands, unbuilt sites, along drains, under pylons and in lowlands areas. It is a market oriented and often the main source of leafy vegetables to the cities. In cities along the coast such as, Accra, Lome, Banjul and Dakar (Table 1), farmers are producing fruits, vegetables and flowers for export to Europe

Table 1. Cultivated open spaces in selected cities in West Africa

	Population 2005 (Mio.)	Annual urban growth rate 1995-2005 (%)	Irrigated open spaces in the cities (ha)
Accra	2.4	4.6	162
Bamako	1.4	4.3	300
Banjul	0.05	4.3	45
Cotonou	1.1	4.6	36
Dakar	2.5	3.9	150
Freetown	1.1	5.7	45
Kumasi	1.0	3.6	41
Lagos	16.9	4.9	40-100
Lomé	0.9	4.8	60
Niamey	0.9	5.6	400
Nouakchott	0.7	8.6	90
Ouagadougou	1.5	6.1	25-43
Tamale	0.2	2.5	33
Yaoundé	1.8	4.6	> 20

Source: Drechsel et al., 2005

Farmers within urban open spaces usually site farm locations to available source of water. In Niamey urban farms are located near and along the river Niger, (Graefe, 2004) while in Lagos farming around the city relies solely on the wetland which offers opportunity for farmers to cultivate throughout the year using water from ponds, dug wells or wash bores. In many urban and peri-urban areas of Nigeria sources of water for urban agriculture include: rivers or streams which are usually polluted from domestic wastes, human and animal excreta, storm drainage and industrial effluents; open drains carrying household drainage or grey water, mixed with human excreta and solid wastes; leachates from illegal refuse dumps from the communities; effluents from soak away pits or sometimes bore holes or shallow bores near polluted water sources (Sridhar and Adeoye, 2000). A survey of irrigated crop production by IWMI (2002) showed that shallow hand dug wells are commonly used in Niamey, Lome, Dakar, Kumasi and Cotonou, deep wells in Bamako and drainage water or polluted streams in Accra. Moreover, some farmers in Ouagadougou, Tamale and Dakar use wastewater directly from city sewage for crop production. Treated pipe water is seldom used because of the cost. Although health risks are implied with the use of such polluted water, the combined factor of water availability and market opportunities,

which supports intensive year-round production could not deter the farmers from using polluted water sources.

3.2 Animal Production

UA is not just about crop production but also includes livestock, poultry, rabbits, pigs, and fishery productions, domesticated wild animals and other small animals such as snails. However, animal farming within the urban areas is not as common as crop production. As one moves away from high density areas towards the outskirts of the city animal farming becomes more prominent. Graefe (2004) reported that sheep was the most widespread animal species kept by urban and peri-urban livestock farmers representing about 64% of households involved in Niamey. Sheep and goats are particularly abundant in the town centre where space is limited and most keepers have between one and three animals. Cattle keepers consist mostly of the Fulani who are traditionally strongly involved in cattle husbandry. In Niamey, average number of cows owned at the household is one but this varies widely to the highest number of twelve per household. Chicken were held by only few households. In Dakar, urban livestock accounts for 3% of small ruminants, 1% of cattle and 30% of poultry production (Direl, 1998). Poultry is the most important activity involving some 70,000 entrepreneurs. Poultry and milk production in particular are favored for their marketing potential and contribution to income generation. The development of livestock production in and around cities has great influence on the supply of milk, meat and egg to the urban areas. These animal products are very important in the diet of women and children and at the same time contribute to the generation of income and employment. Fall et al., (2000) reported that for these reasons many Senegalese families keep some form of livestock particularly in the Niayes area.

A study conducted by Kumasi Natural Resources Project (KNRMP, 1999) also revealed up to 500 regular cattle owners in Kumasi metropolis and up to 2000 short-term cattle owners. Most of the livestock in Kumasi were kept for cash income and could be on supplementary or full time basis and provides meat for the numerous street restaurants numbering about 13,000 in the city (Drechsel *et al.*, 2000). Livestock keeping is therefore a source of livelihood for people including migrants from Northern Ghana into the city of Kumasi. However the most attractive and profitable livestock farming in and around the city of Kumasi was found to be poultry for meat and egg production and involved people from various social sectors. Drechsel et al (2000) reported that between 1986 and 1995 Ghana's poultry population doubled from 6.4 million to 13.1million. In addition, farmers in and around Kumasi benefit from the large amounts of poultry manure generated as this offers them access to cheap but high quality fertilizer services.

3.4 Inputs and Services in UA

Depending on the urban farming system the inputs used and kinds of service providers vary. Urban farmers in the region adopt different strategies to minimize inputs use and maximize output. Major inputs used include labor, land, water, equipments and simple farm tools, organic and inorganic fertilizer, pesticides, and seeds. In most cases, land and water are for free. Within the region, land in urban areas either belongs to government's institutions, individuals, families and traditional authorities or chiefs (Obuobie et al., 2003; Olofin and Tanko, 2003). In Bamako producers may have access to land through lease, renting and customary estates (Zalle et al. 2003). Open-space agriculture is practiced along streams, drains and rivers in many cities and farmers do not need to pay for the water. For soil improvement, most urban vegetable farmers use chicken or cattle manure or/and chemical fertilizers, which are sometimes subsidized as in Dakar. In few cities farmers applied already sorted municipal solid waste (as in Cotonou) or burnt waste (as in Kano). Few people are involved in providing inputs for the farmers. Quite often they depend on

old stock or the open market for input purchase. Many urban UA farmers in West Africa do not have access to formal credit systems. This is mainly due to the fact that farmers are not able to meet the collateral demands of financial institutions. As part of their strategic approaches some UA farmers have managed to have a win-win situation with the vegetable sellers in terms of access to informal credit systems. In this system sellers pre-finance farming activities by providing seeds, fertilizer, pesticides or cash to farmers for production. Sometimes sellers order the products before cultivation usually through verbal agreement based on trust and confidence. The final amount of money received may differ from the initial amount agreed on as demand and supply might have changed during the growing period. This situation has been observed in Lome, Togo and Cotonou, Benin (Danso and Drechsel, 2003).

3.5. Processing and Marketing

Scale of production and technology in UA is usually intensive on very small pieces of land primarily for self-consumption (backyard farming) and market-oriented (open spaces within and around the cities). Urban agriculture products (fresh vegetables, ornamental plants and small livestock) are sold at the farm gate, in local market, supermarkets or for export. In Ghanaian cities, marketing of UA produce is a means of sustenance for many women while in Togo, it is for income generation through export. Value addition through processing have been observed in few cities such as Banjul

4. **Significance of UA in West Africa**

4.1 For urban food supply and balanced nutrition

Urban agriculture compliments rural farming in the supply of fresh perishable farm produce to the city dwellers. Usually, the choice of crops grown in UA is dependent on the location, resources available, growth conditions as well as the market value. For instance in Lagos and Ibadan, many farmers cultivate lettuce, cabbage and carrots which have very high values because of the high demand by expatriates (Sridhar and Adeoye, 2000). Other wise, plantain, banana, okra, and garden eggs are grown for subsistence. In Lome, Schreurs and Van Reuler (2001), reported the main crops to be cabbage, lettuce, carrots, African spinach, and onions as well as spices and herbs, which are most important for export. Similarly about 60% of the vegetables consumed in Dakar are produced within or close to the city (Niang *et al.*, 2002). In Banjul, 80% of the leafy vegetables consumed are supplied from urban agriculture (Moustier, 2000). The specific contribution of urban agriculture to aggregate city supply and its complementarity to rural production have been quantified by IWMI in selected cities of Ghana and Burkina Faso (Figure 2). The analysis, which excludes backyard subsistence production, revealed that urban and peri-urban agriculture supplies vegetables to the cities' markets. Peri-urban production appears to be an important supplier of tomatoes and garden eggs, while urban agriculture supplies leafy vegetables such as spring onions, cabbage and lettuce. Majority of common staple crops such as cocoyam, cassava, plantain, maize and rice in the city markets derive from rural areas or import (Cofie et al 2001). More detailed studies in Kumasi showed that there are significant seasonal differences with higher urban and peri-urban shares in the bumper than in the lean season. During political and economic crises, urban agriculture is a popular survival strategy. War related shortage of food supplies often led to "Feed yourself" initiatives within and around cities in Sierra Leone and urban agriculture played significant role when the rural-urban road network was blocked (Dr. Saidu Kanu Njala University per communication). After several years of civil war lasting from 1989-1997 in Liberia, the country is still in transition from humanitarian assistance to development. Hence, the Ministry of Agriculture in conjunction with the FAO developed a plan of action for supporting emergency.

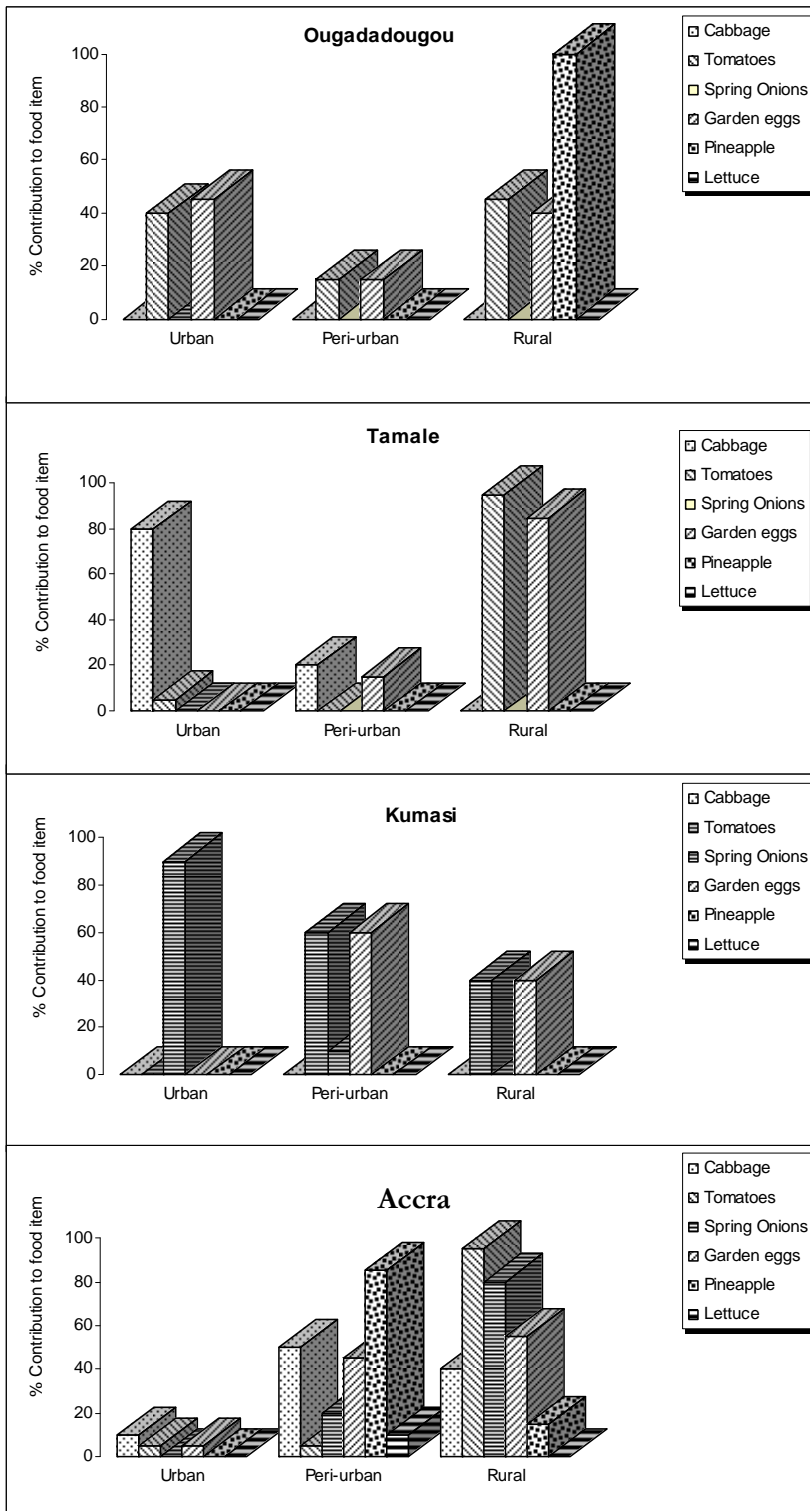


Fig 2: Contribution of urban, peri-urban and rural agriculture to urban vegetable supply in selected cities in West Africa.

agricultural activities. Part of it is the encouragement of urban agriculture around Monrovia, mainly through backyard farming, livestock raising and aquaculture (Jac Smit and Dagmar Kunze, personal communication).

4.2 For local economic development

UA has direct positive impact on farming households. Backyard farming supports main employment through income from sales of surpluses, savings on food expenditures, and exchange of agricultural products for other economic goods. Open-space production in most cases is a full-time job for many poor people. A review of profits from vegetable production in open-space urban agriculture showed that monthly income can go up to US\$ 330 especially if there is large area, extra labor and available water for irrigation (Table 2). Without access to water, production might be limited to few months and other income sources are required in the dry season. On the macro level, the contribution of urban agriculture to the Gross Domestic Product (GDP) may be small, but the importance for certain commodities, such as vegetables and poultry might be substantial as different reviews showed (Nugent, 2000; Cofie et al., 2001).

Apart from direct economic impact, there are also indirect social benefits that derived from the economic gains, such as the possibility to pay school fees, acquire more household and farm assets and pay for better health care and livelihoods support (Danso et al, 2002). Many women in Accra and Lome are gainfully occupied with the marketing and processing of UPA products, thereby changing their otherwise redundant status in some cases.

Table 2: Monthly net income from mixed vegetable farming in selected cities.

City	Typical net income in US\$/ month per farm (upper limit in brackets) ²	GNI* per capita (US\$/month)
Accra	40-50	27
Bamako	20- (200)	24
Bangui	320	22
Banjul	Ca. 30	26
Bissau	24	12
Brazzaville	80-130 (270)	53
Cotonou	50-70 (110)	36
Dakar	40- 66 (250)	46
Kumasi	35-85 (120-160)	27
Lagos	120	27
Lome	13-25 (270-330)	26
Nairobi	10-163 (279)	33
Niamey	40 (gross)	17
Ouagadougou	25-70 (100)	25
Dar Es Salaam	60	24
Yaounde	34-67	53

Source: Drechsel et al., 2005 ; * GNI = General Net Income

² Many reports lack information on the exact time period (number of harvests per season or year) and area (actual farm size or one hectare) the revenues are based on. Only cases with relatively reliable data are considered here.

4.3 Urban environmental management: The agriculture –sanitation nexus

Urban agriculture is important in environmental management. The link between UA and environmental sanitation is highly significant both for positive and negative reasons. On the positive side, in addition to supplementing rural agriculture in food supply, UA creates an avenue for recycling readily available urban organic wastes, thereby improving the productivity of farming systems as well as environmental health. UA facilitates the recycling of waste such as poultry manure, cow dung, market/household waste, human waste etc. In and around cities in West Africa, use of waste for agriculture is well established and has been practiced for example in Kano for centuries. Lewcock (1995) reported that in the 1960s 25% of fertilizer needs in the peri-urban environment of Kano were met by reuse of municipal waste. By the 1990s, the area in which waste was used had increased. Not all waste types are available at all times. Household wastes are usually generated in the largest proportion however, market waste are more readily accessible for composting and have very high organic content coupled with a low potential of metal contamination. Study carried out in Ghana showed that farmers are positive and interested in using compost to ameliorate the soil and as a source of plant nutrients provided it is of good quality and effective (Danso, et al., 2004). In Ibadan compost produced from market waste and cow manure is being used by farmers in both urban and rural areas but under subsidy by the government. In Kumasi, many farmers prefer to use poultry manure for crop production due to its high nutrient value (up to 2% N) and low price (only transport costs paid by farmers). In particular, there is high demand for municipal compost by estate developers and ornamental growers in Ghana. In the 1990s, it was reported that 90% of collected night soil in Tamale was used as fertilizer by farmers as an alternative to imported chemical fertilizer (Owusu-Bennoah and Visker, 1994). This situation has not changed much 10 years after. Some farmers in Tamale and Bolgatanga reported to have used human waste to cultivate cereals (their major staple) around the cities for up to 30 years. (Cofie et al., 2005). Usually, faecal sludge is applied by spreading it on the soil surface, or stored and dried in pits during the dry season and later incorporated into the soil at the onset of rainy season. The high temperatures of the savanna climate and long period of drying caused the sludge to be handled easily and to be relatively safe if properly handled. Through this practice, significant amounts of nitrogen (N), phosphorus (P) and potassium (K) are returned to the soil. In addition, the organic matter level of soil gradually increases.

4.4 Health Concerns

Urban Agriculture, especially irrigated vegetable production can give significant profits, and allow continuous cultivation for many years. Thus, it appears as one of the most productive and income generating farming systems in West Africa despite the use of marginal soils and the problem of insecure land tenure. The success, which is steered by large urban market and demand for high value crops, also require high inputs in form of water, nutrients and pesticides. While pesticide and fertilizer/manure can be bought, it is difficult to find sites with proper, reliable and cheap water access. In this situation, farmers often make use of typical urban 'resources' like water from streams or drains, exposing urban farming to urban pollution. Due to low industrialization, the contamination of irrigated water is seldom through heavy metals but rather through faecal matter. Studies from Nigeria, Ghana, Senegal and Burkina Faso confirmed that the bacteriological contamination of urban water sources generally exceeds irrigation standards of WHO and FAO, and can contribute significantly to crop contamination (Sridhar and Adeoye, 2000, Niang et al., 2002; Keraita and Drechsel, 2004; Faruqui *et al.*, 2004). Some of the problems in using human waste for agriculture in northern Ghana include itching and swollen feet (Cofie et al., 2005). Other problems can be soil and groundwater pollution or Salinization. Thus, while UA contributes to food supply, better nutrition, livelihood support, poverty alleviation as well as recycling of urban waste, urban greening and biodiversity, the use of polluted water, over application of manure and improper application of pesticides can affect the environment as well

as consumers' and farmers' health. Other impacts can be linked to the support of breeding sites for the malaria vector through irrigated farming (Afrane et al., 2002) or zoonoses through keeping animals under poor hygienic conditions close to humans (Mantovani, 2000).

4.5 Gender and Social Inclusion

Due to the cultural, economical and agro-ecological diversity within the West African sub-region there are few common patterns in urban farmer characteristics in several cities. Different categories of people are involved in various UA activities and for different reasons. While some people particularly from the poorer and middle classes choose UA as a strategy for livelihood support, some in the high class are interested in the cultivation of ornamental plants as a hobby.

In many cities, most open-space vegetable farmers are migrants or represent a minority group. In Lagos, 70% originated from the northern states of Nigeria (Ezedinma and Chukuezi, 1999); in Accra, most of the urban farmers are from northern Ghana; in Niamey farmers originated especially from Burkina Faso, and in Senegal from Guinea and Guinea-Bissau. However, this is not the trend for all aspects of urban agriculture especially not to backyard farming (Sanyal, 1985). Gender participation in urban vegetable production varies between countries and cities in West Africa (Figure 3). In Banjul, urban farming is done by community groups of women, while in Freetown vegetables are typical cash crops of individual women. Except for these and Conakry, where female farmers predominate, majority of urban farmers are male particularly in intensive farming where watering cans are used for irrigation. In Accra, equal number of men and women farmers can be found on sites with furrow or bucket irrigation is practised. In Yaounde, Gockowski et al. (2003) found that input and output intensive urban vegetable farming is the domain of men, while nearly only women are found in extensive vegetable production in peri-urban areas. Also in Lome, many women can be seen using water hose for irrigation. From Dakar to Abidjan, Accra and Yaounde, vegetable marketing is a traditional domain of women. This concerns especially retailers while shopkeepers can also be men (Mbaye and Moustier, 2000; Obuobie et al., 2004; Gockowski et al., 2003). These women, and not the farmers, also harvest leafy vegetables. They identify vegetable beds with best crops and offer a price per bed. Farmers complain that the women traders determine market prices, and that their limited knowledge of vegetable markets and marketing does not allow them to circumvent the traders. Equal access to information for reasons of gender equality would in this constellation disadvantage the women traders. These traders are often farmers' only source of credit (Danso and Drechsel, 2003)

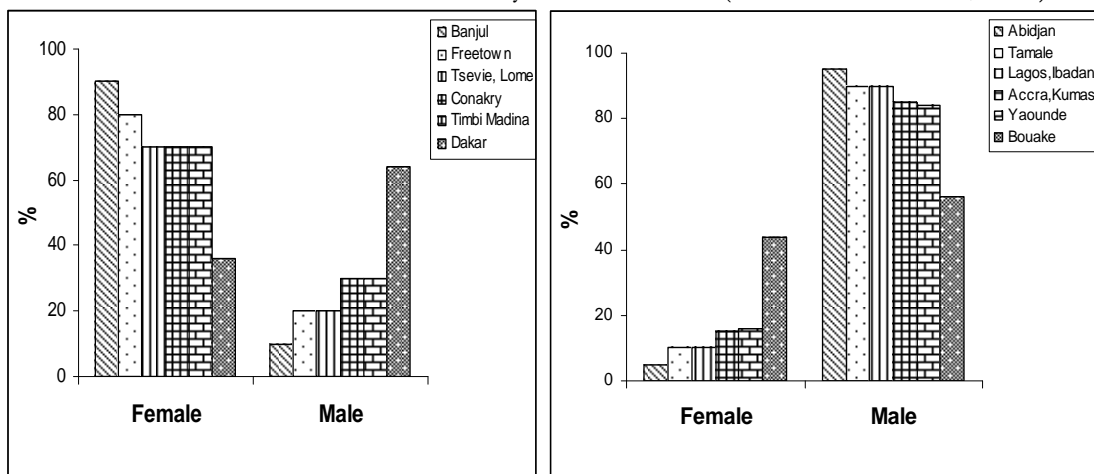


Fig. 3 Gender distribution in open-space urban farming in selected cities of West Africa (modified after Drechsel et al., 2005)

4.6 Sustainability of UA

The future of UA depends on its sustainability which has been defined in many ways by different people emphasizing various values and priorities. A commonly used definition of sustainability is “development that improves the quality of human life while living within the carrying capacity of supporting ecosystems” (Munro and Holdgate, 1991). Dimensions of sustainability that are crucial to the sustenance of UA include economic, social, institutional and ecological aspects. The sustainability of UA will be assured by the extents to which UA can enhance productivity, reduce production risks, safeguard the environment, is economically viable and is socially acceptable. Of most importance to the farmer is perhaps the economic sustainability, which is the ability of the farmer to continue his farming business, the capacity of the farm to generate sufficient cash to meet its financial requirement within the current market value of produce and still leave significant profit for the farmer (Van Calker, 2005). Profitability is a common attribute of economic sustainability and this can be measured by using net farm income as indicator (Van Calker, 2005). Among the UA farming systems, irrigated vegetable farming in particular, can enable the farmer to pass the poverty line of US\$ 1 per day and per adult especially if other household members contribute their own income. As shown in Table 2, urban vegetable farmers in selected cities generate higher income than the per capital General Net Income (GNI) of respective countries. In the social context, while backyard crop farming is fairly well tolerated by the society, there are concerns about the impact of open space irrigated farming on the well being of people. This is a threat to the sustainability of UA systems except strategic interventions are initiated to mitigate the associated risks. In the past, the fear of negative health impacts has led to the imposition of generic and restrictive policies on urban agriculture but such policies have been ineffective for example in Ghana. Some municipal authorities (e.g. Cotonou, Pikine) are beginning to realize this ineffectiveness and are working with other stakeholders to manage risks through integrated package of measures that can ensure UA sustainability. The societal concern is closely related to internal social sustainability, which has to do with the working conditions for the farmer in UA. Main factor that may constrain the sustainability of UA is the unavailability or lack of access to land for farming. This leads to many other issues such as unwillingness to invest in farm land to enhance productivity, theft, etc. To ensure sustainability in this respect, planners need to accept urban farming as one of several livelihood strategies, realize the benefits and opportunities in the productive use of open spaces for farming and aim at efficient and sustainable use of urban land resources which is not necessarily the economic highest and best use (Janquinta and Drescher, 2002). In addition, micro technologies are available for landless people (Box 2) to engage in agriculture even though this will only contribute to household food security and may not be market-oriented.

Box 2. Examples of micro technologies for *landless* urban farmers

Hydroponics uses containers without soil, in some cases under direct irrigation with water enriched with nutritive solutions or with irrigation through substrata, which fixes roots and provides specific requirements for crops. Hydroponics can produce an average of 4.3 kg of over 15 species per square metre. Substratum hydroponics, zeoponics and organoponics have been adapted to UA. *Rooftop gardening* and high-density polythene bags, filled with soil can also be used in the cultivation of vegetables and cereals. Mushrooms can be cultivated as space confined agriculture indoors or outdoors in wetlands. Space-confined technologies such as *barrel gardening*, *tire gardening*, bottle gardening, PVC gardening, growing walls, window gardening, growing bench, permanent strip and mobile kitchens are in use in several places and could be introduced in the sub-region towards household food security.

Source: www.ruaf.org

Ecologically, there could be threats or benefits to the environment including plants/animal diversity, soil, water and the local climate. Many open areas unsuitable for housing or construction have been under more or less continuous cropping for 10-50 years. Interviews carried out by IWMI in Ghana showed that 80 % of all urban open space farmers (n = 100) use the same piece of land all year round and 70% had continuously cultivated their crops for more than 10 years. This is remarkable in the tropical context where urban soils are disturbed, sandy as along the coasts and generally low in organic matter content. The successful history of these systems over so many years on one hand is an indication of a sustainable production system. However, such intensive production without any significant fallow period has necessitated high external inputs to maintain the nutrient balance and productivity. In sandy urban soils such as found in Kumasi, high poultry manure application of about 20-100 t/ha has been reported. Continuous use of high (600-1200 kg/ha/yr) ammonium based fertilizer, coupled with frequent irrigation could lead to groundwater pollution, acidification and eutrophication.

5. Towards Strategic Development of UA in West Africa

In the light of the foregoing discussion, successful development of UA for the future should be based on the integration of a variety of strategies that combine social, economic and environmental concerns in the context of current institutional setting with the issues of food security and urban development. Hence there is need to formulate more diversified and regulatory policies that seek to actively manage UA risks through an integrated package of measures, involving all stakeholders in the analysis of problems and development of locally applicable interventions. With appropriate strategies in place, UA can expand as urban food demand increases. A possible approach is through learning alliances and participative multi stakeholder processes for action plan and policy formulation (MPAP). Development of institutional policy and framework that will enable municipal, national authorities and other stakeholder institutions work together to support and promote urban agriculture is an urgent need and crucial component of the development process. A possible MPAP³ framework for and link to policy change is illustrated in Figure 4. Such a process allows better representation of all relevant stakeholders and makes room for transparencies in decision-making process. If coupled with appropriate capacity building for UA stakeholders, such process could lead to:

- Better understanding and appreciation of UA potential and risks in specific city context
- Participatory development of appropriate UA strategy for the city
- Learning through monitoring and evaluation of experiences which allows sustainability of interventions and *facilitate exchange of experiences and spread of innovations*

In the application of MPAP in Accra, Freetown and Ibadan within the RUAF network, stakeholders have identified and prioritized issues for consideration in the development of UA in an organized manner. These are documented as City Strategic Agenda. Some of the recommendations for policy intervention are:

- Zone lands on the fringes of cities for urban and peri-urban agriculture and support these actions by legislation to protect it from encroachment and estate development.

³ The Cities Farming for the Future programme of RUAF used this approach in three pilot cities of W. Africa from which lessons learned and City Strategic Agenda on UA has been documented

- Formulate appropriate guidelines and tools for participatory and sustainable city planning that integrates UA.
- Promote UA as a business so that it can effectively contribute to income generation, achievement of sustainable livelihoods and poverty reduction. Promote value addition methods such as storage, processing, packaging and utilization.
- Introduce interventions such as safe irrigation techniques, on-farm wastewater treatment, improved shallow wells and boreholes that will minimize health risks in the use of marginal quality water.
- Effectively coordinate interventions in education and training in the safe use of pesticides especially for fresh vegetable production.
- Provide technical support and capacity strengthening in sustainable urban and peri-urban production to farmers through agricultural extension agents.
- Establish credit schemes for urban and peri-urban farmers.
- Recycle organic waste for UA and promote greening of the environment.
- Explore synergies between key stakeholders through appropriate information exchange and learning platforms
- Local and State governments and other stakeholders should make budgetary provision to institutionalize UA in the cities.

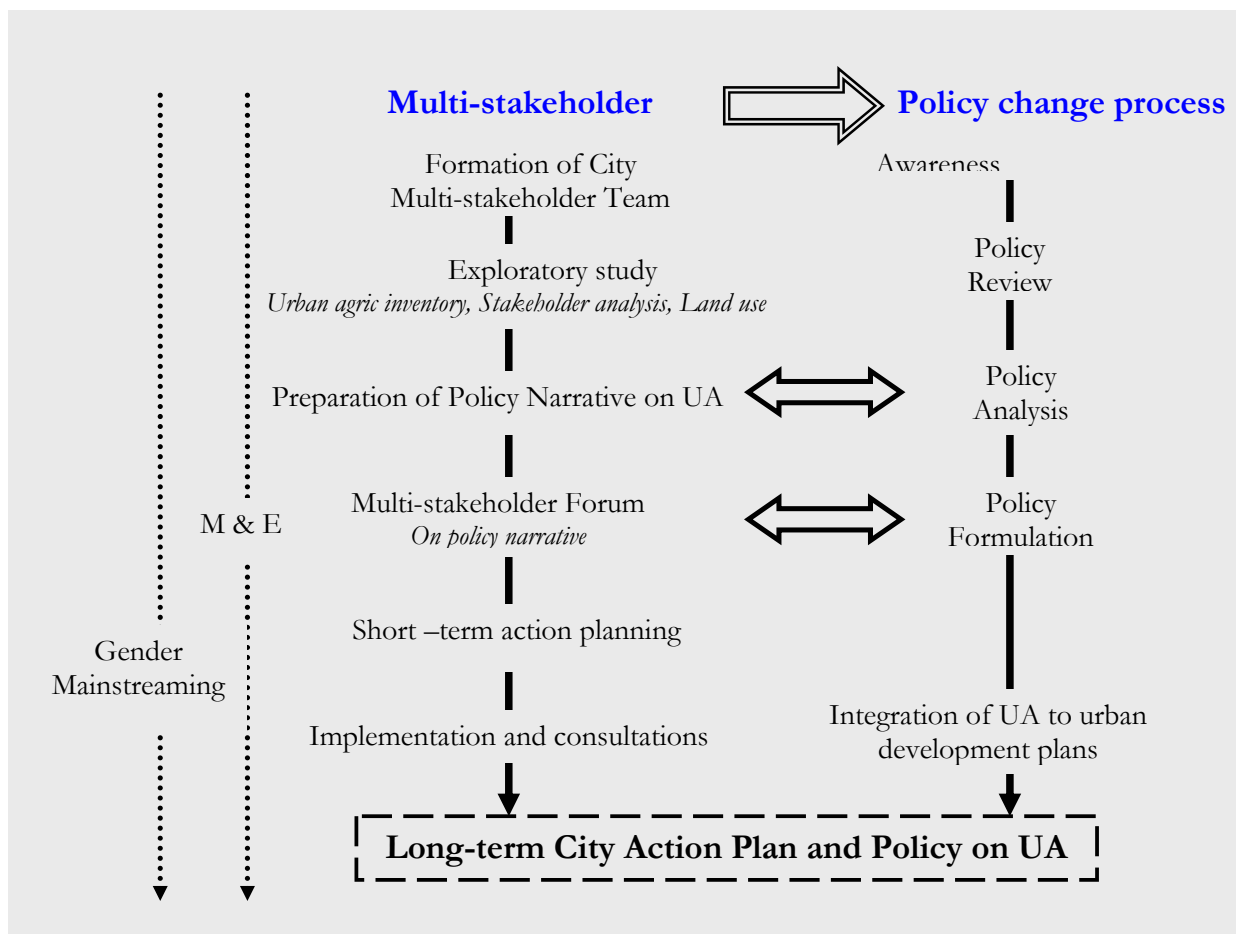


Fig 4. Process framework to facilitate UA development in W. Africa

For sustainable growth, UA must be seen as an integral part of urban and agricultural development and hence must grow along with related sectors such as public health, spatial planning, waste management and others, depending on the city context. In Accra for example, linkage with waste management and real estate development sectors with regards to recycling of urban waste is very paramount: Study by Drechsel et al (2005) shows that the overall cost of building and operating composting facilities for processing urban waste in Accra-Tema Metropolitan Area is much lower than the cost of land-filling or incineration of waste. Moreover, composting has the highest total economic benefits especially through labor-absorption, although the production cost is high and farmers can hardly afford to buy it without subsidy. Apart from the possible use of compost for urban food production, there is high compost demand from the real estate developers in Accra as it is required for lawns establishment of production of ornamental plants. Thus the real estate sector in this case could form private-public partnerships with the municipality in a **win-win** situation. The financial strength of the estate sector could in such arrangement subsidize the production of compost for agriculture.

By linking production, processing and marketing of urban produce, farmers can earn very high returns for their products and more people can be employed along the production chain. Micro-enterprise development in the area of marketing, processing and other forms of value addition is crucial for the future development of UA. However, this requires understanding of market opportunities and niches for UA.

Conclusion

In conclusion, Agriculture within and close to the cities could play a major role towards achieving the UN Millennium Development Goal—to reduce the number of people suffering from hunger by half between 1990 and 2015. In addition to supplementing rural agriculture in food supply, agriculture in urban and peri-urban areas creates an avenue for supporting the livelihood of urban poor and contributes to improved environmental health.

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