

11. Institutional aspects of urban vegetable farming and “wastewater irrigation”

This chapter examines key institutional issues that are important to the recognition and sustainability of irrigated vegetable farming in Ghanaian cities. It assesses the informal nature of the business and examines current roles being played by relevant agencies in urban vegetable farming and urban wastewater management under consideration of bylaws and new policy developments that have implications for the recognition of informal irrigation and/or the use of polluted water in irrigated vegetable farming. It also suggests an innovative way to facilitate the institutionalisation of urban agriculture.

11.1 Informality of irrigated urban farming

Cornish et al. (1999) define *formal* irrigation as one that is reliant on some form of fixed irrigation infrastructure that was designed and may be operated by the government or a donor agency and which is used by more than one farm household while *informal* irrigation is one that is practiced by individuals or groups of farmers without reliance on irrigation infrastructure that is planned, constructed or operated through the intervention of a government or donor agency. The development of formal irrigation schemes in Ghana is recent compared to other countries. The first of such schemes was initiated in 1960. The Ghana Irrigation Development Authority (GIDA) has 22 irrigation schemes under its jurisdiction covering about 14,700 ha of which 60% are developed and about 5478 ha actually put under irrigation (status of June 2003). All together farmers on these schemes number about 10850 (GIDA-JICA, 2004).

There is little data on formal irrigation schemes set up and managed by the private sector (e.g. Agodzo and Blay, 2002; Gyamfi, 2002). Besides a few – mostly export oriented – commercial schemes near Accra, irrigated vegetable farming in urban and peri-urban Ghana clearly falls under the “informal” smallholder category since it does not involve using fixed irrigation infrastructure, and governmental support is minimal. In the 40 km radius around Kumasi alone, there are estimated to be 12,700 households irrigating at least 11,900 ha in the dry season, which is more than twice the area functioning under formal irrigation in the whole of Ghana (Cornish and Lawrence, 2001). However, informal irrigation goes beyond urban and peri-urban vegetable production and includes, for example, shallow groundwater use, as in the Upper East and Keta area, irrigation around small reservoirs and along the Volta river.

In spite of its size and importance, these forms of irrigated vegetable farming do not yet receive the support they need from policy makers and irrigation institutions. For instance, the

Ghana Irrigation Development Authority (GIDA), which is the government agency officially responsible for developing irrigation in Ghana had always focused solely on public or formal irrigation schemes and had until recently, considered informal irrigation as outside its jurisdiction. Policy or training programs organised to educate farmers on irrigation related issues do not consider the needs of informal irrigators. For this and other reasons, informal irrigators, more often than not, lack the requisite skills and know-how relating to the non-traditional (exotic) vegetables they grow and safe irrigation practices.

11.2 Agencies relevant to irrigated urban farming

Improving urban vegetable farming requires dealing with complex issues pertaining to food production, income generation, health, sanitation and environment. A single agency or institution may not be able to adequately and appropriately handle all the complexities involved, suggesting a multi-agency approach. A number of agencies and institutions have specific or general roles regarding urban vegetable farming in Ghana. The number of agencies, and the degree to which each is involved differs among the three major cities of Ghana. Accra displays the highest complexity while the much smaller Tamale displays the least.

The institutional analysis focussed on the policy environment of urban agriculture and classified the concerned institutions under two categories, i.e. those who have direct involvement with urban agriculture on land and water use, food safety; urban planning; and those who indirectly influence the practice, for example from the perspective of sanitation and the environment.

The most prominent institutions that would require to be involved in decisions pertaining to urban vegetable farming are the Metropolitan, Municipal or District Assemblies which are responsible for all activities at the Metropolitan, Municipal or district levels. The other key agencies of direct relevance are:

- The Ministry of Food and Agriculture (MoFA), which operates through the Directorate of Food and Agriculture, which is decentralised down to the district level.
- The Directorate of Health, which is also decentralised is not an agency of the Ministry of Health but stays loosely linked to it. These directorates are closely linked and report directly to the Assembly at a given administrative level.
- The Department of Town and Country Planning and the Department of Parks and Gardens, are departments within the regional administration, which have now been decentralised to the local authority (metropolitan, municipal or district) levels.

- Ghana Irrigation Development Authority, which is a semi-autonomous body under the Ministry of Food and Agriculture.
- Water Resources Commission (WRC) under the Water Directorate of the Ministry of Water Resources, Works and Housing.

More indirectly involved are:

- Waste Management Departments (WMD) of the metropolitan, municipal and district assemblies, and
- Ghana’s Environmental Protection Agency (EPA).

There are many other important stakeholders, such as the national research institutions, universities, NGOs, farmers associations, traders associations, consumers associations, the media, etc. which were recently analysed by RUAF for Accra, but not part of this analysis.

11.2.1 Food and Agriculture Directorates of MoFA – Extension service

The decentralization of the Ministry of Food and Agriculture (MoFA) resulted in district level directorates also in, for example, Accra, Kumasi and Tamale districts. The purpose of the decentralization policy, among others, was to facilitate grassroot participation in decision-making and implementation of agricultural policies and programs. The directorates were set up to deal with all issues relating to urban and peri-urban food and agriculture within the various districts. Though the directorate represents the MoFA at the different levels, it is more affiliated to the assemblies. Its responsibilities include:

- § Monitoring the performance of all agricultural developments in the metropolis and their impact on food production.
- § Managing and co-ordinating day-to-day activities of the metropolitan agricultural development unit (comprising veterinary services, crops, extension, fisheries, policy planning monitoring and evaluation) and also analyzing participation and adoption of appropriate technologies by farmers and fishermen.
- § Liaising with all partners (e.g. farmers, fishermen, researchers, subject matter specialists, NGOs, educational institutions, and the public on programs related to the development of agriculture in the metropolis, municipality, and district.
- § Organizing and participating in all meetings, workshops, etc. related to agriculture with the view to clarify MoFA to all concerned.

The directorate receives financial support from the parent ministry as well as the metropolitan assemblies.

In all cities, the directorate offers extension services to urban open-space farmers, and is thus actively involved in organizing and educating farmers on improved farming practices such as nursery management, IPM and safe use of organic manure. It also educates farmers on the existing AMA bylaws that regulate urban agriculture (see section 11.3). MoFA-AMA was pro-active with regard to lands for urban agriculture and is trying to pass a bylaw to reserve certain areas in and around Accra as green belt or green zone areas. These areas will be used explicitly for farming until such time as the government requires them for other purposes (some of these areas are currently being used by farmers). The directorate is trying to ensure that these lands are reserved for farmers. The directorate has also assisted many urban farmers to get access to pipe borne water in order to help farmers avoid the use of polluted surface water and untreated wastewater in agriculture. The use of potable water for farming in Accra is currently being questioned due to new commercial tariffs and because potable water is scarce.

MoFA-AMA works closely at the implementation level with the metropolitan sub-committee on agriculture, which mainly plans and evaluates agricultural policies, marketing options etc. The directorate also works with the metro-health directorate to enforce bylaws related to health aspects of urban agriculture (food quality, market cleanliness etc), and is a partner in Accra’s RUAF team. The directorate intends to encourage farmers to cultivate high value crops and export crops such as mushrooms and flowers, contribute to the urban economy. It also intends to give farmers land security. However, MoFA-AMA faces some constraints such as inadequate budget allocation, manpower capacity to disseminate policies, logistics to support policies, limited voice to interfere in land tenure issues, etc. While this description reflects largely how the authorities view themselves, Box 11.1 lists what urban vegetable farmers are deprived of at MoFA-AMA.

The national MoFA Extension Directorate supports the district directorates, and started in 2005 exploring groundwater availability for urban vegetable farmers in Accra.

The MoFA directorates in Kumasi and Tamale have the same tasks as in Accra, like organizing training for farmers in areas such as the use of agro-chemicals. MoFA-KMA also assisted farmers securing good quality irrigation water by constructing shallow wells on a cost-sharing basis (KMA 90%, farmer 10%). KMA will pre-fund the whole project while farmers pay their share over a period of time. On land acquisition and use of land in urban

areas for vegetable farming, the directorates in Kumasi and Tamale have so far realized little, but try to get urban agriculture recognized in city planning. Since majority of lands in and around Kumasi belong to traditional rulers and individuals there is, however, little it can do to assist farmers in gaining access to such lands. The situation is different where other authorities, like the local university, own the land.

Box 11.1: Farmers’ 2005 top complaints from six major urban vegetable sites in Accra, on the performance of the MoFA extension service (IWMI, unpublished):

- Slow response to pest problems
- No monitoring of seed quality
- No assistance with marketing
- Too little assistance to reduce post-harvest losses
- Lack of farmers’ participation in MoFA program development (too top-down).
- No demonstration farms on, for example, IPM
- No Field Schools for farmers for the past 4 years
- No effective Monitoring & Evaluation of the Extension Services (uncompleted programs, low staff motivation, limited accountability, too long “no see”)
- MoFA in general focuses too much on traditional crops, which takes most resources
- No facilitation to get access to loan and credit e.g. from poverty reduction programs etc.
- Poor access to land and water, no assistance to get land use rights
- No linkages with research to improve soil fertility management and yield increase

11.2.2 Health Directorates

The health directorates are implementing agencies responsible for health and sanitation issues within the cities. They are responsible for enforcing bylaws, which also touches areas of urban agriculture and wastewater irrigation. The Local Government Act of 1993 (Act 462) Section 14 mandates them to enforce all bylaws relating to metropolitan public health. In Accra, the health directorate represents the environmental management sub-committee of the metropolis which is responsible for making policies in areas of health, sanitation, waste management, pollution control and prevention, management of water bodies and resources among others. In Kumasi and Accra, the health directorates now have a more positive attitude towards irrigated open-space urban agriculture where they were earlier bent on prosecuting farmers. Now they educate farmers and take legal action only when it is really necessary.

Currently, the health directorate is working with MoFA-AMA to educate farmers on the health and environmental implications of their activities. The situation is not different in Kumasi where the directorate works closely with agricultural extension agents of MoFA-KMA. The Kumasi directorate organizes forums for farmers on human health and environmental impact of their farming activities. Like in Accra, they educate the farmers who break their bylaws before taking any legal action.

11.2.3 Department of Town and Country Planning

The town and country planning department, a department within the regional administration, which has now been decentralised, has an advisory role to play for the assembly and is responsible for planning various land uses in the whole country. However, it is the local authority (assembly in this case) that makes the decisions pertaining to governmental land use. In Accra, the department assists MoFA-AMA to identify all government lands within the metropolis that could be used for farming while awaiting government decision on what those lands should be used for. Some areas in and around Accra, Kumasi and Tamale have been zoned and declared as open-spaces by the department to be used for landscaping and as recreational centers. Once zoned for this purpose they come under the purview of the Department of Parks and Gardens. Since some of the open-spaces have not yet been developed, this department (Parks and Gardens) has allowed urban farmers to use them in the meantime. In Kumasi for instance, farmers have been allowed to farm in marshy areas and along riverbanks.

11.2.4 Department of Parks and Gardens

Like the previous department, this one was also housed within the regional administration and is decentralised to the local authority level. The department is responsible for developing open spaces into recreational grounds and gardens, including grassing. For lack of funds and other reasons, the department has not been able to develop some of these areas. Since these cannot be properly maintained because of the cost involved, they have released part of them to urban farmers, particularly those in Accra, to cultivate. The department sees this as a strategy to avoid encroachment on these lands and to keep them in order. In fact, due to the high beds common for vegetable farming, these sites appear very neat and well integrated, like the site called Marine Drive beside the Independence Square.

11.2.5 Ghana Irrigation Development Authority (GIDA)

GIDA is a semi-autonomous government agency also under the responsibility of the Ministry of Food and Agriculture. It is officially responsible for the development of irrigation in Ghana, which was until recently understood as “governmental irrigation schemes”. Seasonal or year-round irrigation in urban and peri-urban areas with watering cans was not considered as part of the jurisdiction of GIDA. For this reason GIDA has no regulatory and implementation role in irrigated crop farming in the metropolitan areas of Ghanaian cities. However, GIDA noticed the potential and the need for an informal irrigation sector and initiated together with IWMI the development of a broader national irrigation policy, which should also cover the informal irrigation sector. The policy development was funded in 2005 by FAO and was carried out in a participatory process with full involvement of stakeholders. The current draft will be submitted to Cabinet in 2006. If it remains as the final draft (May 2006) showed, then this will become the first national policy in Africa recognizing the informal irrigation sector including irrigated urban and peri-urban agriculture.

11.2.6 Water Resources Commission

Ghana’s Water Resources Commission (WRC) was established by an Act of Parliament (ACT 522 of 1996) with the mandate to regulate and manage the country’s water resources and to co-ordinate government policies in relation to them as well as the activities of the institutions, which already deal with the resource. The Water Resources Commission is made up of technical representatives of the main stakeholders involved in development and use of water resources. WRC coordinated the recent process of developing Ghana’s National Water Policy. Also a National Water Quality Monitoring Programme has been developed and will be implemented from 2004 to 2008. As a first step towards preparation of the program, a Raw Water Quality Monitoring Guideline for the Coastal and Western river systems in the country has been developed. Consultations are going on between the Water Resources Commission and the Environmental Protection Agency aimed at preparing a Memorandum of Understanding on wastewater discharges and pollution of water bodies and the respective roles to be played by each institution. The Water Resources Commission is also initiating studies under the Water Supply and Sanitation Programme (WSSP-II, 2004 – 2008), to develop and establish a uniform buffer policy for riverbanks, reservoirs, lakes, etc., to address the current varying buffer zone demarcation statutes for the protection of water resources. So far, the WRC has completed the compilation of information on various buffer zone demarcation policies and regulations. This policy will target agricultural encroachments and

therefore small-scale farmers along the major rivers but also along streams in urban and peri-urban areas using stream water for irrigation. However, since human activities are not expected to be excluded from all buffer areas, the WRC was asked for provisions to accommodate such farmers, especially where impact on water resources can be minimised.

11.2.7 Waste Management Department/Environmental Health Department

With the inception of the local government administration, the Metropolitan, Municipal and District Assemblies are today responsible for managing solid and liquid wastes generated within their boundaries. Prior to this, the sewage division of the Ghana Water Company Limited (GWCL)¹, then Ghana Water and Sewerage Corporation (GWSC) was responsible for managing sewerage systems in Ghana. Assemblies have created waste management departments (WMD) and/or Environmental Health Departments to take up the corresponding responsibility. The Assemblies have also made bylaws to give legal backing to the functions of the WMDs. Parts of the solid and liquid waste collection have been subcontracted to the private sector. The transfer of responsibility of managing urban wastewater from GWCL to the Metropolitan and District Assemblies and then to the private sector has not been very smooth.

The WMD also interacts with urban and peri-urban farmers where solid waste and/or excreta are used as composted or raw input, like in Kumasi and Tamale (see Chapter 8.5)

11.2.8 Ghana Environmental Protection Agency

One of the statutory functions of the Environmental Protection Agency (EPA) is to coordinate activities of such bodies, as it considers appropriate for the purposes of control, treatment, storage, transportation and disposal of waste. Its general objectives include:

- providing technical assistance for the Metropolitan, Municipal and District Assemblies to enable them meet their responsibilities for managing the environment;
- ensuring that the implementation of environmental policy and planning is integrated and consistent with the country’s desire for effective long-term maintenance of environmental quality; and
- ensuring environmentally sound use of both renewable resources in the process of national development.

¹ GWCL is currently reformed towards Private Sector Participation. The sewage division was considered as a costly obstacle to the privatisation and was consequently detached (Ridder, 2002).

The EPA provides guidelines for developments that affect the environment and sets standards for emissions and discharges into the environment. EPA’s role in the management of domestic wastewater in Ghanaian cities is more of an advisory one. However, it has a monitoring and prosecution mandate as well. Due to limited resources, EPA has not been able to properly monitor the management of domestic wastewater in most Ghanaian cities, hence lacking the basis for any legal suit. Further, government institutions like hospitals, learning institutions etc contribute a lot to water pollution, making the prosecution of individuals or private establishments a farce.

11.3 Regulatory bylaws

In the seventies, most municipal bylaws referring to urban food production were put in place, however, not to increase food production but to maintain sanitary standards (Obusu-Mensah 1999). There exist for example the AMA (growing and sale of crops) bylaws, which date as far back as 1972 and were updated in 1976, 1977, 1994 and 1995 (Obosu-Mensah, 1999). They support backyard gardening but demand that open-space farmers register:

‘No person shall grow crops at a place other than on land within his premises unless he has registered with the Medical Officer of Health furnishing his name and address and the description of the site where the crops are to be grown’

Official explanation indicates that this bylaw is meant to prevent indiscriminate cultivation of crops within the metropolis because of the perceived health and environmental implications of the input used by farmers. It permits inspection by the officials of the metro-health directorate of AMA to ensure that lands used for vegetable farming are not polluted as to cause contamination to crops. Another reason for this bylaw was to allow for inspection of irrigation water to be used by open-space farmers and to avoid the use of degraded/exposed lands and lands close to water bodies that might cause problems of erosion and pollution of water bodies. The bylaw is, however, not enforced, like most bylaws in the cities. The reasons are many and center mostly on the question of who to enforce them, who has the resources to do so, and where to start as nearly all municipal bylaws need a stronger enforcement.

Interactions with officials of the metro-health directorate indicate that the directorate has so far no record of the people cultivating in open-spaces within Accra. They also have no record

of places under cultivation. In fact, urban farmers do not register with any authority, including the Medical Officer of Health. Currently, MoFA-AMA is carrying out a project to document all the sites under cultivation and to assess the amount of vegetables produced on each site, both in the dry and rainy season. A GIS-based site assessment was also initiated under RUAF. Strict adherence to the bylaw would imply that most farmers would have to stop cultivating since they fall short of the intentions of the bylaw in one way or the other.

The second relevant bylaw refers specifically to irrigation water and puts a ban on certain sources of water currently being used by most open-space farmers in Accra. It states:

‘No crops shall be watered or irrigated by the effluent from a drain from any premises or any surface water from a drain which is fed by water from a street drain’

The official reason given for enacting the second bylaw is to protect the public against bacterial gastro-intestinal infection, which is contracted through consuming unwholesome food.

Vegetables grown with effluent from drains are at risk of contamination but studies have shown that effluents from drains is just one of the many possible sources of microbiological contamination of vegetables in the markets of Ghanaian cities. Other sources include manure and improper handling (see Chapter 9). Strict enforcement of this bylaw would imply that most urban farmers in Accra would be affected. However, like with the first bylaw, there is no enforcement due to financial and personnel constraints.

A closer look at the two bylaws reveals that they were not made to ban or promote urban agriculture per se but rather were made to maintain good sanitary conditions in the city. The other AMA (growing and sale of crops) bylaws are not discussed in this paper.

Contravening any of the crop related bylaws attracts a penalty in the form of cash fine, imprisonment or both.

‘A person who contravenes any of these byelaws commits an offence and is liable on summary conviction to a fine not exceeding 100,000.00 cedis or in default of the payment of the fine to a term of imprisonment not exceeding three months or to both’

[Eds: 100,000 cedis were about US\$ 100 in 1995; and are US\$ 11 in 2006]

There are no specific byelaws regulating urban agriculture in Kumasi and Tamale except the general National Land Policy, which prohibits any activity, including agriculture, within drainage reservations (area within 100 m away from water bodies). The penalty for offenders is a fine not exceeding 200,000 cedis and/or six years imprisonment (Keraita, 2002). Farmers in need of irrigation water do not comply with this policy and officials do not enforce it, in part as farming prevents other forms of encroachment or waste dumping.

A new initiative of Ghana’s WRC to reinforce a buffer zone policy aims at stricter rules (see above) which will hopefully consider the livelihoods and needs of small-scale irrigators.

11.4 Integration into city planning

In Ghana, a formal integration of urban agriculture into urban planning and city development does not yet exist. To integrate urban agriculture into urban planning, there is the need for improved perceptions and relationships between its different stakeholders. This is a major objective of the RUAF network in Ghana (www.ruaf.org). Key issues are the allocation of land and safe water.

Land and Water resources

In Accra, Kumasi and Tamale, the common and most challenging constraint to open space farmers is availability of land, access to it, and its usability for farming purposes. Anku et al. (1998) noted in their study on environmental assessment of urban agriculture in Accra that urban agriculture as a land use is missing in most planning layouts due to the fact that “real” agriculture was thought to take place in the rural setting only. Officials of the metropolitan and municipal departments of Town and Country Planning in the three cities confirmed what was found in most urban agriculture literature, that urban agriculture in general is not considered as one of the various land uses in Ghanaian cities. No immediate change is envisaged because very often, old master plans dating from colonial times are still being used,

which use does not make allowances for urban agriculture despite its even longer history (Obosu-Mensah, 1999).

As indicated earlier, most lands being cultivated in Accra are government lands, public open space property, or so far unused private lands (Obosu-Mensah, 1999). Due to the fact that these lands are not specifically zoned for agricultural purposes, individual or groups of farmers cultivate them through informal arrangements with local caretakers, security officers or representatives of the local government departments. These informal arrangements are temporary and farmers can be asked to quit the land any time, sometimes without notice. Informal land arrangements serve in part as strategies by which public institutions maintain undeveloped open spaces and avoid encroachment by private developers. Other farmers cultivate open spaces along the roadside, drains, under high-tension electrical transmission lines where any meaningful alternative development is not likely to take place.

Some farmers cultivating plots owned by private persons also have informal agreements with the landowners and they are allowed to cultivate as long as the owners have no immediate use for the land. Presently with increased property development, land area under cultivation in and around Accra is gradually reducing. Due to land insecurity, farmers are not willing to invest in farm infrastructure with medium or long-term returns.

Similar to the situation in Accra, most of the farmers in Kumasi cultivate public/ institutional lands (Keraita, 2002) while others hold leases to the lands they cultivate. Farmers with leased lands face increasing difficulty in renewing their agreements because landowners prefer selling or leasing their lands to private developers at much higher prices. When questioned about the possibility of reserving lands for urban agriculture, an official of the department of Town and Country Planning indicated that it would be extremely difficult for KMA to do this because of the shelter needs of the increasing urban population.

In spite of the mandate of MoFA-KMA it is unable to influence the situation because it has no control over land in the metropolis. As long as there is no provision for “open green spaces/urban farming” in the City’s master plan, it will remain difficult.

Compared to zoning in the city, it might be easier to allocate land at its fringe. In Cotonou, Benin, the authorities agreed to allocate about 400 ha of farmland for use by urban and peri-urban farmers outside the city. The site has safe groundwater, which can easily be lifted by treadle pump for all-season irrigation. This initiative addresses tenure insecurity and supports farmers and their food production for the cities. It also transfers farming out of the cities. How far the latter will occur remains open, as farmers will try to maintain their valuable city plots one way or the other (Drechsel et al., 2006a).

Until recently, there had not been any serious attempt in Ghana to either reduce water pollution or help urban vegetable farmers secure safe water for farming. The Accra Metropolitan Assembly (AMA) assisted on some locations farmers to get connected to piped water supply but this was not sustainable due to the common water shortage and efforts by the water suppliers to limit water use for domestic and industrial entities. In 2005, MoFA and Ghana’s Water Research Institute started (independently) to look for safer groundwater but with little success.

Integration and institutionalisation

Integrating urban agriculture in institutional structures, plans and policies is still a major challenge in Ghana. To achieve this it might be appropriate to highlight those elements of urban open-space farming which have the greatest potential for official recognition, on top of its “classical” contributions to urban greening, livelihoods and food supply. In other words, to attract sustainable support it will be crucial to analyse how urban farming serves the actual challenges of the authorities, instead of promoting its benefits outside their actual priorities and workplans. An innovative approach would be to show, for example, the actual and possible (cost-saving) contributions of irrigated urban farming to urban flood control and sanitation (Annorbah-Sarpei, 1998). Table 11.1 highlights possible contributions of open-space farming to different (urban) development goals.

11.5 Conclusions

Irrigated vegetable farming in urban Ghana falls under the informal category and government intervention is very minimal. For instance, the Ghana Irrigation Development Authority (GIDA), which is the government agency officially responsible for developing irrigation in Ghana has always focused solely on public formal irrigation schemes in rural areas and for many years considered irrigated vegetable farming in urban areas as outside its jurisdiction. Current efforts to develop a national irrigation policy which recognizes (peri)urban farming might change the situation.

However, a single policy or institution may not be able to adequately and appropriately handle the complexities involved in urban and peri-urban agriculture, suggesting a multi-agency approach. The most prominent institutions, which would require being involved in decisions pertaining to urban vegetable farming are the Metropolitan, Municipal or District Assemblies.

Table 11.1: Possible replicable benefits of urban open-space vegetable production

Condition/Threat	Innovation/Benefit from open-space farming	Transferable aspects to achieve urban development goals
Availability of urban marginal wasteland along watercourses.	Transformation of marginal lands into productive use for general benefit	Land reclamation; urban greening, urban biodiversity
Availability of wastewater and wastewater channels	Wastewater purification through land application and increased sedimentation (damming, dugouts), filtration gates...	Wastewater filtration, pollution control, reduced treatment costs
Ready market	Growing of high value crops for improved diets	Small scale private sector support
Lack of cold storage facilities in markets	Production of perishable goods in market proximity	Savings in power, transport and infrastructure investments
Squatters and waste dumping on unused land	Land under permanent agricultural use	Land protection, slum prevention, savings in waste collection
Land eviction (threat) or official support of farmers (opportunities)	Formation of Vegetable Growers Association for protecting farmers’ interests.	Strengthening vulnerable minorities
Flooding	Slope upgrading/stabilization, improved infiltration and man-made fencing; minimized waste dumping into streams	Flood control; improved drainage
Solid waste accumulation in cities	Need for organic inputs; use of organic waste products	Waste reduction through compost use; resource recovery
Competing claims for urban space by commercial and other conventional city land uses	(i) Incorporation of market gardening in land use of newly developing areas (ii) Enaction of municipal bylaws and legislation permitting market gardening	(i) Creating jobs for vulnerable groups (ii) Enacting proactive legislation
Economic crisis; civil war	Urban food supply independent of functional rural-urban linkages and external aid	Emergency food program

Source: Annorbah-Sarpei (1998, modified and extended)

Besides this, a number of other institutions are involved in agriculture within the (larger) urban areas of Ghana. One of these key institutions is the Metropolitan Food and Agriculture Directorate. The agency is employing various means to promote the practice and at the same time training and education of farmers to ensure human and environmental safety.

About decisions on land use and development of urban lands, which are currently used for agriculture, the Department of Town and Country Planning and the Department of Parks and Gardens are the two key institutions involved. Key agencies responsible for the management of urban wastewater are the Waste Management Departments of Metropolitan and Municipal Assemblies.

The study revealed that no formal consideration is given to possible agricultural use of wastewater in all the three cities. Most officials see only the possibility of health risks. This perception is a major obstacle to a more constructive integration of open-space farming. The authorities are in need of risk reduction strategies. Different national universities in collaboration with IWMI responded to this call and took up the task to explore safer irrigation and vegetable cleaning practices. The CGIAR Challenge Program for Water and Food funds these activities (2005-2007).

The low level of interactions within and between the key institutions related to urban vegetable farming and those in charge of waste or wastewater management (Vázquez et al., 2002) has been addressed by recent initiatives in Tamale (Amarchey, 2005) and Accra (e.g. via RUAF and FAO). A first major success was a joint declaration on urban agriculture in Accra (see Chapter 10.6). Pro-active land-use planning, which incorporates open-space farming into larger urban challenges, such as flood control, could be the next step. Such land use would have positive effects on the environment while reducing public spending for maintaining infrastructure. This could be a crucial step towards official recognition of urban open-space farming and its institutionalization.