

15. Governmental and Regulatory Aspects of Irrigated Urban Vegetable Farming in Ghana and Options for its Institutionalization

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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 directly or indirectly linked to urban vegetable farming and urban wastewater management. The chapter also looks at relevant bylaws, strategies and policies that have implications for the recognition of informal irrigation and/or the adoption of safety measures for risk reduction in irrigated vegetable farming. It also suggests options to facilitate the institutionalization of irrigated urban agriculture.

15.1 Informality of Irrigated Urban Farming

Cornish et al. (1999) define *formal* irrigation as being reliant on some type of fixed irrigation infrastructure that was designed and may be operated by a public entity or private sector and which is used by more than one farm household; while *informal* irrigation 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 more water-scarce countries. In 2007, the Ghana Irrigation Development Authority (GIDA) under the Ministry of Food and Agriculture (MoFA) reported 22 irrigation schemes under its jurisdiction with a potential area of about 14,700 hectares (ha) of which about 60% are developed for irrigated farming (JICA-MoFA 2007). The actual land area that is cropped has been changing over the years and seasons and varies among reports from 5,000 to 7,000 ha. Most of the nonfunctioning or underperforming schemes are pump-based (GIDA-JICA 2004). Similar to the definition of Cornish et al. (1999), Namara et al. (2010) classified irrigation systems in Ghana into two broader groups based on their current level of formalization. These are (1) the *conventional* systems, which are mainly initiated and developed by the Government of Ghana or various NGOs; and (2) *emerging* systems initiated and developed by private entrepreneurs and farmers, either autonomously or with little support from the government and/or NGOs. Besides a few – mostly export-oriented – commercial schemes (Agodzo and Blay 2002; Gyamfi 2002), irrigated vegetable farming in urban and peri-urban Ghana clearly falls under the ‘informal’ or ‘emerging’ smallholder category. In the 40

kilometer (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 about twice the area cropped 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 (Namara et al. 2010).

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 GIDA, which is the government agency officially responsible for developing irrigation in Ghana focused since its inauguration solely on conventional or formal irrigation schemes, until in 2010 the new National Irrigation Policy, Strategies and Regulatory Measures extended GIDA's mandate. Still, it takes time till official training programs for extension staff and farmers consider the needs of informal irrigators.

15.2 Agencies Relevant to Irrigated Urban Farming

At least seven ministries¹ are responsible for the formulation of policies affecting the nexus of irrigated agriculture, food safety and food quality. These are the

- Ministry of Food and Agriculture;
- Ministry of Trade and Industries;
- Ministry of Health;
- Ministry of Local Government and Rural Development;
- Ministry of Environment, Science, Technology and Innovation;
- Ministry of Tourism, Culture and Creative Arts;
- Ministry of Water Resources, Works and Housing.

Due to decentralization, many responsibilities, especially of the Ministry of Food and Agriculture and Ministry of Health have shifted from ministerial departments to district departments and units, which remain linked to the original ministries but report to the local **assemblies**, like the Accra or Kumasi Metropolitan Assemblies (AMA and KMA).

The Ministry of Food and Agriculture (MoFA)

The MoFA is charged with the development and growth of agriculture in the country. The departments and agencies under the MoFA undertake, for example, the setting of standards

¹ Names of ministries differ slightly over the years, also as certain purviews might be moved from one to another ministry. For the current status please see www.ghana.gov.gh.

for Integrated Crop Management (ICM), Integrated Pest Management (IPM) or irrigation water management, to name just a few activities. They are also responsible for providing extension services and specific components of inspection and registration in collaboration with the Ghana Standards Board.

In accordance with government policy of decentralization, the MoFA's current structure comprises a National Secretariat made up of four line directorates, technical directorates, regional and district directorates, and subvented organizations.

Selected subvented organizations and directorates are, for example, the

- Ghana Irrigation Development Authority (GIDA);
- Agricultural Extension Services Directorate;
- Women in Food and Agricultural Development Directorate.

In 2005, the Ministry at the national level officially acknowledged urban and peri-urban agriculture and its water challenge in a vision statement (see chapter 10). Implementing this, the MoFA-AMA **director**ate started working on zoning of lands for farming and tried to assist farmers in accessing safer irrigation water. MoFA-AMA works closely at the implementation level with the **Metropolitan Sub-Committee on Agriculture**, which mainly plans and evaluates agricultural policies, marketing options and so forth. The directorate also works with the **metro-health directorates** to enforce bylaws related to health aspects of urban agriculture (food quality, market cleanliness etc). The national MoFA Extension Services Directorate supports the district directorates, and in 2005 started exploring groundwater availability for urban vegetable farmers in Accra. The **Irrigation Development Authority** is a semi-autonomous subvented government agency under the responsibility of the MoFA. With the recent approval of Ghana's first national irrigation policy, GIDA will support formal, informal and commercial irrigation in the country, including irrigated urban and peri-urban agriculture.

The Ministry of Trade and Industry (MoTI)

The MoTI has overall responsibility for the formulation, implementation and monitoring of Ghana's internal and external trade. Bodies under the MoTI set standards for local and imported fresh and processed foods and drugs. They also ensure chemical safety by monitoring quality and usage. These bodies, in addition, undertake training of staff as well as inspection of products and premises.

The statutory and regulatory agency under the MoTI concerned with the safety of food is the **Ghana Standards Authority** (see below).

The Ministry of Health (MoH)

As a critical sector of the economy, the MoH seeks to improve the health status of all people living in Ghana. The statutory and regulatory agency under the MoH tasked with issues related to food quality and safety is the **Food and Drugs Authority** (see below). Another important body is the decentralized **Ghana Health Service (GHS)** established under Act 525 of 1996 as required by the 1992 constitution. It is an autonomous Executive Agency responsible for implementation of national policies under the control of the Minister of Health. The GHS has eight directorates and under the **Public Health** office there are several units, which all could be linked to health risks from irrigation, like Disease Control, Family Health and Nutrition.

There are regional and district **Directorates of Health**, District Health Management Teams and District Health Committees. Though they work with the assemblies, they report to both the Assembly and the Ministry. According to the Local Government Act of 1993 (Act 462) Section 14, the directorates are the implementing agencies responsible for health and sanitation issues within cities. There are some overlapping functions with the Environmental Health Departments of the local assemblies which, however, address sanitation to prevent unhealthy situations while the MoH outlets work more on the curative part of health care. The health directorates also work closely with the **Metro Subcommittee on Environmental (Health) Management** which is responsible for making policies in areas of health, sanitation, waste management, pollution control and prevention, management of waterbodies and resources among others.

The Ministry of Local Government and Rural Development (MLGRD)

The Ministry is the supervisory body of the District Assemblies. Its task is to promote the establishment and development of a vibrant and well-resourced decentralized system of local government. Tasks include among others facilitating the promotion of a clean and healthy environment and of horticultural development. The Ministry developed the National Sanitation Policy (NSP) which was approved by the Cabinet in 2010. In 2008, the **Environmental Health and Sanitation Directorate (EHSD)** was established under the MLGRD which addresses, among others, wastewater treatment and is the single most decentralized institution with presence at national, regional and district levels. The Directorate is supporting Regional Environmental Health and Sanitation Units in support of District Environmental Health (and Sanitation) Departments to provide input on possible health impacts linked to environmental sanitation in district-planning processes. The departments have to prevent communicable diseases, promote health and educate the public on basic

personal hygiene and the rudiments of environmental health through Environmental Health Officers (**EHOs**). The enforcement of the laws regulating food treatment and handling in general and street-food vending in particular is also the task of these departments. They work closely with the respective **Metro Environment Management Sub-Committee** and **Waste Management Departments** where available.

The Ministry also operates the **Department for Parks and Gardens** which takes care of some sites occupied by urban farmers.

The Ministry of Environment, Science, Technology and Innovation (MEST)

The overall objective of the MEST is to ensure accelerated socioeconomic development of the nation through the formulation of sound policies and a regulatory framework to promote the use of appropriate environmentally friendly, scientific and technological practices and techniques. This includes the intensification of the application of safe and sound environmental practices. Under the Ministry, the **Department for Town and Country Planning** has an advisory role to the assemblies in planning and zoning for different land uses. Activities related to food quality and food safety relate to the planning, set up and maintenance of market infrastructure and inspection/licensing of food vendors and caterers which is done in cooperation with the Food and Drugs Board (FDB).

The Ministry is also supervising the **Environmental Protection Agency (EPA)**. The EPA was created in 1994 as a regulatory body for environmental affairs. Included in its mandate is the control and prevention of discharge of waste into the environment, and the protection and improvement of the quality of the environment in addition to ensuring compliance with any laid down environmental impact assessment procedures in the planning and execution of development projects. The EPA is also charged with setting standards (environmental management, chemical management), pesticide regulation and registration of chemicals as well as advice and inspection tasks.

The Ministry is also operating through the **Council for Scientific and Industrial Research (CSIR)** which provides an umbrella for Ghana's research institutions such as the Water Research Institute (WRI).

Ministry of Tourism

The **Ghana Tourism Authority (GTA)** was established by the Tourism Act, 2011 (Act 817) as the main implementing body of the Ministry of Tourism. It replaced the **Ghana Tourist Board** which was established in 1973, and has among others, the mandate to register, supervise and regulate practices and standards of accommodation and catering enterprises,

including restaurants, ‘chop bars’ and fast food establishments, and thus is an important partner for any efforts to improve food safety in this sector (see below).

The Ministry of Water Resources, Works and Housing (MWRWH)

The Ministry is supervising the Ghana Water Company Limited (GWCL), Community Water and Sanitation Agency (CWSA), **Water Resources Commission** (WRC) and the Water Directorate of the Ministry.

While GWCL embarks on water supply development activities in urban areas, the CWSA is responsible for facilitating the provision of potable water and sanitation to rural areas and small towns under the auspices of the District Assemblies. The guiding program is the National Community Water and Sanitation Programme (NCWSP). Sanitation in urban centers falls under the responsibility of the respective assemblies.

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 coordinate policies relating to them. The WRC coordinated the process of developing Ghana’s National Water Policy and initiated the National Water Quality Monitoring Programme. As a first step, a Raw Water Quality Monitoring Guideline for the Coastal and Western river systems in the country has been developed. Consultations are ongoing between the WRC and the EPA for preparing a memorandum of understanding on wastewater discharges and pollution of waterbodies and the respective roles to be played by each institution. The WRC also facilitated the establishment of a uniform riparian buffer zone policy for riverbanks, reservoirs, lakes, etc. This policy targets 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.

Selected National Statutory Bodies:

With regard to food quality and safety, the following statutory and regulatory bodies play a significant role in Ghana, the Ghana Standards Authority (GSA), the Food and Drugs Authority (FDA) and the Ghana Tourism Authority (GTA).

The Ghana Standards Authority (GSA) formerly the Ghana Standards Board (GSB): As an authority under the MoTI, the GSA is tasked with setting standards, including those on food quality in line with relevant international standards, like the FAO-WHO supported ‘Codex Alimentarius’. The application of food standards in products and processes is governed by national standards. The GSA has established over 300 standards on food products that offer

protection, reliability and choice while ensuring safety and quality. Sections of the standards on food safety touch on hygiene, microbiological, packaging and labeling requirements.

An example of such standards is the GS ISO 22000:2005, which specifies requirements for an enterprise in the food supply chain, to plan, implement, operate, maintain and update a Food Safety Management (FSM) system. The FSM combines the Hazard Analysis and Critical Control Points (HACCP) plan (Box 15.1) with basic conditions and activities necessary to maintain hygienic environments suitable for the production, handling and provision of safe end products via *good practices* (cf. Conclusions). The standards require that all hazards expected to occur in the food chain, including those associated with the type of process and facilities used, are identified, assessed and controlled or eliminated, to ensure food safety.

BOX 15.1. Hazard Analysis Critical Control Point (HACCP)

The **HACCP** is a systematic **preventative** approach to food safety and quality assurance of food products based on a system of identification, evaluation and control of hazards. It addresses physical, chemical and biological hazards as a means of preventing threats rather than inspection of finished products. The HACCP is recognized by FAO and WHO as a Quality Assurance System that contributes to enhancing food safety and preventing the outbreak of food-borne diseases. Legislators in an increasing number of countries stipulate legal requirements regarding hygiene in the food industry based on the HACCP principles as laid down in the Codex Alimentarius *Code of Practice – General Principles of Food Hygiene*.

Another key operational area of the GSA is quality control and testing: chemical and microbiological analysis of food and drinks and agricultural products for quality evaluation and certification purposes, pesticide residues in food products, product-testing and certification to ensure conformity with specific (export) target markets. However, as the GSA is addressing many sections of life, it is less equipped in terms of staff and resources in individual areas like food quality; here the FDA (see below) is in a better position. On the other hand, the GSA is probably better positioned to steer a policy process to institutionalize the new WHO guidelines in the country through the Codex Alimentarius.

The **Food and Drugs Authority (FDA)** evolved in 2012 from the Food and Drugs Board (FDB) which was established in August 1997. It is the National Regulatory Authority mandated by the public Health Act, 2012 (Act 851) to regulate among others food, drugs and food supplements. The FDA operates under the MoH and is charged to regulate the

manufacture, importation, exportation, distribution, use and advertisement of food, drugs, cosmetics, household chemical substances and medical devices. With special reference to food quality and safety, the FDA is responsible for:

- The registration of food, human and animal drugs, herbal medicines, homeopathic drugs, cosmetics, medical devices and household chemical substances;
- The publication of codes of practice in connection with matters provided for under the food and drugs law for the purpose of giving guidance (such as guidelines for the export of palm oil).

The FDA's activities in the field of food hygiene and food safety are based on the Food and Drugs Law, 1992, PNDCL-305B; and Food and Drugs (Amendment) Act, 1996, Act 523. The FDA's **Food Safety Division** contributes to the attainment of the functions of the authority for safeguarding public health and safety by ensuring that all food products meet the appropriate standards of safety and quality. This is achieved through inspection, analysis as well as ensuring that labeling requirements are met. The division also monitors catering facilities by collaborating with EHOs of district assemblies who carry out inspections and enforce basic rules related to food hygiene on site.

The Ghana Tourism Authority (GTA), formerly the Ghana Tourist Board (GTB), was established by the Tourism Act, 2011 (Act 817) under the Ministry of Tourism. The GTA has the powers to register, supervise and regulate the practices and standards of accommodation and catering enterprises in Ghana. The GTA is also empowered to close until further notice the premises of an enterprise and fine/imprison an owner, where the standards do not meet the minimal criteria, declared in LI 1205. In this context, LI 1205 specifies:

- That all catering enterprises need to be registered and licensed (license renewed each consecutive year) by the GTA, or otherwise to be considered illegal and liable for prosecution;
- The minimum requirements for the staff members of an enterprise and standards of the facilities needed to prepare, serve and store the food, including kitchen and dining area facilities; facilities for customers and staff; garbage disposal; water supply; staff medical examination (every half a year and photocopies submitted to the GTA); staff uniforms and so forth. Street food vendors have to register with the municipal assembly;
- Some of the food hygiene aspects that must be observed by the catering enterprises: clean and tidy premises; "no food exposed to the risk of contamination"; appropriate hand washing facilities for staff and customers with "soap, nail-brushes and clean towels".

In order to avoid overlapping responsibilities, the FDA and GTA agreed some years ago that the FDA (FDB) should carry out inspections in hotels and restaurants and award hygiene permits on behalf of the GTA (GTB).

Other Institutions

Besides various urban farmer associations (see chapter 11) or Ghana's Traditional Caterers' Association, the *Nestlé* supported Maggie Fast Food Association of Ghana (MAFFAG) is very prominent within the fast food sector and has significant outreach. The MAFFAG also engages in capacity-building activities with a significant interest in food safety. Other stakeholders are for examples GIDA's irrigation training center, MoFA's training schools for extension officers and the various schools providing training in food catering, food safety and hygiene as well as the Ghana Social Marketing Foundation (GSMF) which could be an important partner for facilitating behavior change towards 'good practices'.

To develop good practices for enhanced food safety, several national research organizations and universities had related projects in the past, such as the CSIR and the Noguchi Memorial Institute at Legon concerning (street) food safety, and the Kwame Nkrumah University of Science and Technology (KNUST) and University of Development Studies (UDS) regarding safer irrigation practices, both in close collaboration with IWMI, Accra. Particular research interest and support for urban agriculture has also been provided over the last years for example by FAO (www.fao.org/fcit), the RUAF Foundation c/o IWMI-Accra, the College of Agriculture and Consumer Sciences (CACS) of the University of Ghana, the Development Planning Unit at the University College London (UCL) and the African-German partnership under UrbanFoodPlus – GlobE (www.urbanfoodplus.org).

15.3 A Review of Regulatory Bylaws, Policies and Development Plans

Of over 90 bylaws, policies, regulations and strategies reviewed in 2007 and periodically later, several addressed unsafe water for agricultural production and/or street food safety. There are three legislative documents which directly mention and/or address 'wastewater' irrigation. These are at the district level Accra's bylaws and at the national level the 2010 Medium Term Agriculture Sector Investment Plan and the National Irrigation Policy of 2011. Most others legislations address issues related to food handling and safety (see also Fenteng 2000; Laryea 2002). The most important documents and statements of relevance for irrigated urban vegetable farming and the implementation of the WHO (2006) guidelines and their institutionalization are summarized below.

Bylaws

The most comprehensive bylaw compilation is available for Accra. In the 1970s, most municipal bylaws referring to urban food production and sale were put in place, however, not to increase food production but to maintain sanitary standards (Obusu-Mensah 1999).

Many bylaws which date back to 1972 were updated in 1976, 1977, 1993 and 1995 (Obosu-Mensah 1999). They support back yard gardening but demand the registration of open-space farmers. Three sections of these bylaws show that the Accra Metropolitan Assembly (AMA) has a clear direction for urban agriculture and food safety. Among these are (i) control of swine, cattle, goats and sheep; (ii) control of poultry in dwelling houses; and (iii) growing and sale of crops (AMA 1995, pp. 171-202). The third states that no person shall grow crops anywhere other than on land within his/her premises unless he/she has registered with the medical officer of health furnishing his/her name and address and the description of the site where the crop is to be grown. It continues strictly that:

“No crop shall be watered or irrigated by the effluence from a drain from any premises or any surface water from a drain, which is fed by water from a street drainage. Also no crops shall be sold, offered or displayed for sale at any other place than in a market, stall, store, or kiosk. The medical officer of health may where he considers necessary in the interest of public health, declare any crops unfit for human consumption. No crop declared unfit for human consumption shall be sold, offered or displayed for sale as human food. A person who contravenes this bye-law commit an offence and is liable on summarily conviction to a fine not exceeding hundred thousand cedis² or in default of the payment of the fine, to a term of imprisonment not exceeding three months or to both” (AMA, 1995).

In short, the AMA bylaws follow categorically a water standard-based approach, which does not foresee alternative measures to protect public health. These bylaws are however barely enforced and currently under review for possible revision. There are no specific bylaws regulating urban agriculture in other cities, like Kumasi or Tamale.

With increasing attention to farming in the city and knowledge about options for health risk reduction, the MoFA proposed a revision of the AMA bylaws. This process is still ongoing, and was facilitated in the past by IWMI’s Resource Centres on Urban Agriculture and Food Security (RUAF) project resulting in the following proposition for a wastewater irrigation bylaw (Box 15.2).

² 100,000 (old Ghana) cedis were about USD100 in 1995; USD11 in 2006 and approximately USD2.7 in August 2014.

BOX 15.2. Proposed Changes in Accra Bylaws on Wastewater Irrigation

Current AMA Bylaw

“No crop shall be watered or irrigated by the effluence from a drain from any premises or any surface water from a drain, which is fed by water from a street drainage” (AMA, 1995).

Proposed AMA Bylaw

“No parts of the crops consumed in the fresh or raw state shall be watered or irrigated directly by the effluent from a drain from any premises or any surface water from a drain which is fed from any water from a street drainage, unless appropriate risk reduction measures such as drip irrigation, furrow irrigation and cessation of irrigation prior to harvesting as outlined in the WHO/FAO guidelines (wastewater reuse) of 2006, or simple water treatment options are put in place”.

National strategies and policies

At the national level, especially those policies of younger origin appear progressive and supportive of the WHO (2006) guidelines.

The **Food and Agriculture Sector Development Policy (FASDEP) I and II** (September 2002, August 2007): The first FASDEP edition highlighted that MoFA considers food quality as part of food security and that “the quality of food is determined by the methods of production, harvesting, haulage, processing, storage, packaging and marketing”. The second FASDEP edition (2011-2015) acknowledges in addition that “practitioners of **urban agriculture**, a source of livelihood for migrants in major cities, are confronted with problems of access to land and irrigation water, and access to extension services, particularly on the safe use of agrochemicals. Since the commodities are mainly vegetables that are in most cases consumed fresh, the lack of access to quality extension also has food safety implications for consumers.” The policy also says that “Formal irrigation development has been very much supply-driven. The informal sector on the other hand is not serviced sufficiently to realize its potential. Irrigation support services especially for the private sector have been inadequate due to unclear institutional mandates.” In this sense, FASDEP I supported micro- and small-scale irrigation with the provision of boreholes and dugouts.

The **Medium Term Agriculture Sector Investment Plan** (METASIP) was developed to implement FASDEP II from 2011 to 2015. The plan refers, under component 2.6, explicitly to the support of urban and peri-urban agriculture and mentions the common use of wastewater. It outlines related benefits and potential risks and refers in this context to Section 51, subsection 3 of the **Local Government Act** 462 (1993) which generally allows urban farming activities without prior permission from the District/Metropolitan Planning Authority.

However, METASIP also mentions the AMA bylaws (see above) demanding mandatory registration with the metropolitan officer of health. METASIP mentions that urban farmers face constraints of access to land and quality water for irrigation. Under 2.6.1, METASIP is setting a target of a 20% production increase from peri-urban agriculture and earmarks – among others – the following to increase output generation from urban and peri-urban agriculture:

- Liaise with metropolitan, municipal and district authorities to zone areas within urban and peri-urban areas for agricultural activities;
- Identify owners and potential users of such lands for agricultural purposes and discuss and agree on conditions of use;
- Monitor and enforce the use of the lands according to agreements;
- Train peri-urban producers in good agricultural practices (GAPs).

The **National Water Policy** (2007) and **National Environmental Sanitation Policy** (1999, revised 2010): Both policies list as one of their main principles the quality of water resources, the prevention of pollution and the fundamental right of all people to safe and adequate water. A key objective concerning water for food security in the designated water policy is to ensure availability of water in sufficient quantity and quality for cultivation of crops. This policy gives irrigating farmers a strong position and makes clear that it is the duty of the government to prevent pollution and provide safe water.

National Irrigation Policy, Strategies and Regulatory Measures (2010):³ Ghana's *national irrigation policy* which was approved by cabinet in 2010 acknowledges the importance of the informal irrigation sector, including irrigated urban and peri-urban agriculture. The policy complements the National Water Policy by accepting the reality of polluted waterbodies and corresponding recommendations directly supporting the WHO guidelines. The policy emphasizes the need to:

³ <http://mofa.gov.gh/site/wp-content/uploads/2011/07/GHANA-IRRIGATION-DEVELOPMENT-POLICY1.pdf> (accessed 18 April 2014).

- Support best practices for the safe use of marginal quality water in accordance with the WHO *Guidelines for the Safe Use of Wastewater, Excreta and Greywater in Agriculture* (section 5.1.1);
- Promote access to safer groundwater or safer irrigation practices where only marginal-quality water is available (section 5.3.1);
- Encourage research on safe irrigation practices for irrigated urban and peri-urban agriculture and disseminate these in collaboration with other institutions (Section 5.3.1).

The need for a functional link between research, extension and farmers is also stressed in the **Agricultural Extension Policy** (June, 2003; October 2003 abridged version).

National Land Policy (June 1999): The National Land Policy encourages the use of wetlands for farming provided that this supports the sustainable productivity of wetlands, but declares a minimum of 100 meters (m) off the high water mark (of a waterbody) as protected area. This prohibition is targeting on the one hand flood control, i.e. the sealing of natural drainage areas through constructions, and on the other hand aims at the protection of the waterbodies from pollution. Protected land is defined in the National Land Policy as “any land area established by the appropriate bye-law of which social and/or economic activities are permitted only in accordance with the bye-law and under supervision”. This formulation does not categorically exclude farming from protected areas.

Riparian Buffer Zone Policy

The WRC started in 2004 to develop a Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana as a harmonized document of all the dormant and fragmented regulations in the country concerning buffers bordering waterbodies or river systems. The November 2011 edition of this policy published by the Ministry of Water Resources, Works and Housing states – among others – that the following practices and activities shall be restricted within the buffer zone, except with the prior approval of the appropriate authorizing agency:

- a. Clearing or grubbing of existing vegetation;
- b. Clear cutting of vegetation or trees;
- c. Soil disturbance by practices such as grading and stripping;
- d. Filling or dumping of waste;
- e. Use, storage, or the application of pesticides, herbicides and fertilizers; and
- f. Conversion of existing vegetation from majority native to majority exotic species.

These restrictions would not permit farming, especially of exotic vegetables, within the buffer zones. However, growing crops further away from the waterbody would be a hardship given the increased transport distance for water. These arguments were shared with the WRC. It was also pointed out that in urban areas farming along streams has a more positive function than any likely alternative, like squatting and illegal waste dumping, and that farm soils have a high water retention capacity in the case of flooding.

However, the policy argues in section 7 (Riparian Buffer Zones in Urban and Peri-Urban Areas) that farming is an ecologically unfriendly activity. The policy refers to harmful contaminants such as pesticides and fertilizer from agricultural farms which can degrade drinking water quality and threaten public health. The policy does not say that this contribution might be negligible compared with the volumes of waste and wastewater which transform urban streams and rivers across the country into unusable waterbodies. The policy encourages, however, *approved edge gardening and flood recession farming for purposes of mitigating erosion and water pollution and for sustenance of livelihoods*.

The recommended buffer widths are for 10-60 m for major perennial rivers/streams; 10-20 m for minor perennial streams; and 10-15 m for important seasonal streams. If the land use involves, for example, intensive chemical-based farming, the buffer zone width shall be adjusted to include an additional 20 m. On the other hand, if the land use involves flood recession farming, a variation to the buffer zone width can be possible. In addition, under 9.3.7 (Legislative Initiatives), the policy acknowledges that controlled farming can provide better waterbody protection in urban areas where natural vegetation no longer provides sufficient protection from indiscriminate waste dumping or vehicle washing.

In the same line of (urban farming supportive) argumentation, the Ghana National Urban Policy Action Plan, published in 2012 by the Ministry of Local Government and Rural Development, recommends under Action Area 4 (Environmental Quality) to “develop and use open spaces, green belts and other ecologically sensitive areas (i) for appropriate recreation and urban farming; (ii) to enhance visual amenity; and (iii) to promote microclimate control as appropriate” in order to support the policy goal “Protect open spaces, green belts, forest reserves, water bodies, wetlands, water catchment areas and other ecologically sensitive areas from physical development and urban encroachment”. The main responsibility for this is with the metropolitan, municipal and district assemblies.

15.4 Institutionalizing Safe Vegetable Farming

As the policy review shows, several policies and development plans recognize irrigated urban farming which is crucial for its institutionalization and the development of support programs and mechanism for urban farmers. However, the trajectory from policy to practice takes time, and the integration of urban farming into particular institutional structures, plans and strategies remains a significant challenge (see chapter 14). To support the institutionalization of urban farming multi-stakeholder approaches have been tried with noteworthy success (Amerasinghe et al. 2013). However, several of the initiated processes, like the revision of Accra's bylaws, lost their momentum once the external project came to an end.

Forkuor et al. (2011) suggested the use of GIS for integrating urban and peri-urban agriculture (UPA) into urban and peri-urban planning (Figure 15.1). The authors determined the suitability of areas for irrigated vegetable farming in five districts of southern Ghana based on soil type, access to transportation, market access, available water resources, slope, and tenure security. Results indicate that, out of the five districts, Tema has the highest percentage (44%) of highly suitable lands for market oriented vegetable production followed by AMA (13%), Ga Est (12%), Ga West (7%) and Akuapim South (4%). This type of analysis could allow policy makers and planners to study different scenarios with different criteria and weights in a participatory manner before decisions for example on zoning are made.

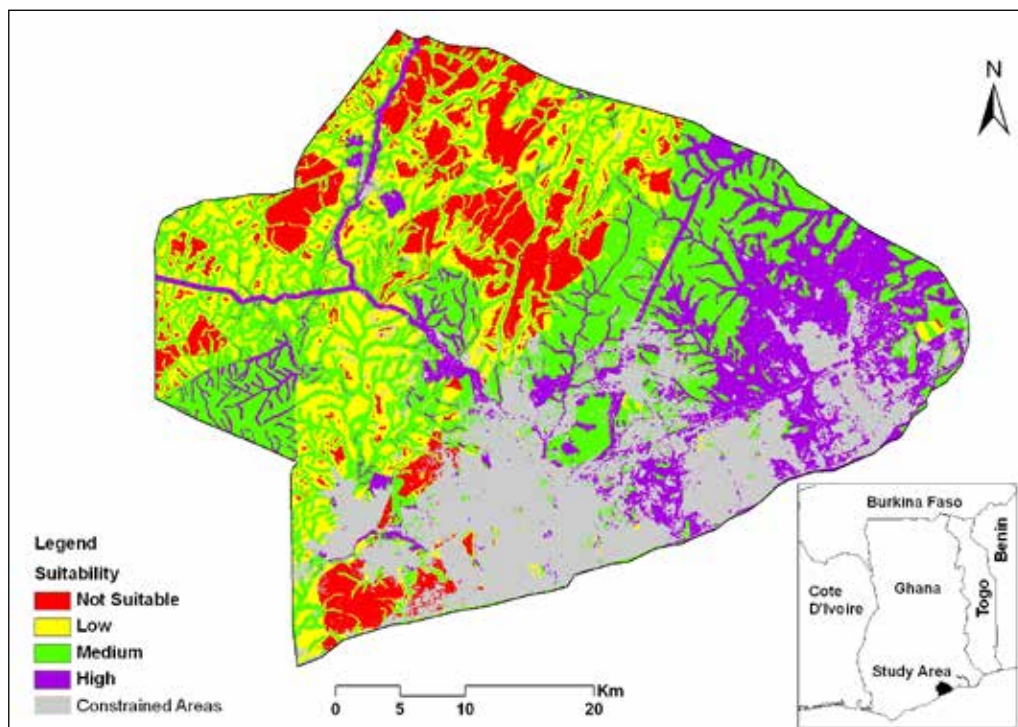


Figure 15.1. Suitability map for urban and peri-urban irrigated vegetable production in the Greater Accra Area. (Source: Modified from Forkuor et al. 2011).

For a successful institutionalization, it might be appropriate to promote urban farming less for its own sake and benefits but as a means to support the existing development agendas of cities and institutions, instead of flagging its ‘classical’ contributions to urban greening, livelihoods and food supply. In other words, to attract sustainable institutional support it will be crucial to analyze and show how urban farming serves the actual challenges of the targeted authorities or institutions, instead of promoting something which is seen as an independent or additional issue not linked to institutional priorities and work plans. An innovative approach would be to show, for example, the actual and possible (cost-saving) contributions of irrigated urban farming to climate change adaptation for instance via urban flood control (Annorbah-Sarpei 1998). Table 15.1 highlights possible contributions of open-space farming to different (urban) development goals.

In order to analyze the impacts of **climate change (CC) adaptation and mitigation** through urban and peri-urban agriculture and forestry (UPAF), an analytical framework was presented by the RUA Foundation (2014). The framework (Table 15.2 shows a small section) can serve as a basis for analyzing potential impact categories for different farming and forestry interventions in the urban context.

Another, frequently discussed contribution of irrigated urban agriculture is its **ability to treat wastewater** (land application, land treatment, soil filtration). This possible benefit applies in particular to the production of fodder crops, biofuel or fuelwood, but can also apply for example to rice systems as long as the water does not contain chemical contaminants, like heavy metals which could accumulate in the food. Given the significant degree of water pollution in the cities, urban farms can only absorb and filter a certain amount of the generated urban wastewater, thus the bulk of all wastewater still pollutes the environment and requires other means of treatment. To assess the magnitude of this contribution Lydecker and Drechsel (2010) estimated that vegetable farmers in Accra use maximal 11,250 m³ of irrigation water per day; most of this water is urban gray water, raw or mixed with stream or river water, which is often diverted into shallow standing-water dugouts to allow easy storage and fetching, but also allows for pollutants and pathogens to settle out of the water. With an average per capita production of wastewater of approximately 50 l day⁻¹, the flow of water from residents to urban vegetable plots informally contributes to the wastewater treatment of 225,000 residents (Figure 15.2). In theory, these 225,000 residents – some 14% of the population – currently have a functioning (‘natural’) wastewater treatment system that is not disposal-oriented, but turns wastewater into an asset. This number is probably larger than the one served through sewerage and existing treatment plants in the city.

TABLE 15.1. Possible replicable benefits of urban open-space vegetable production.

Condition/threat	Innovation/benefit from open-space farming	Transferable aspects to achieve urban development goals
Climate change and flooding	Buffer zones for improved infiltration; slope stabilization and prevention of soil sealing	Climate change adaptation; flood control
Marginalized wasteland along watercourses	Transformation of marginal lands into productive use for general benefit, scenic value and health risk control	Land reclamation; urban greening, urban biodiversity
Storm and wastewater channels entering streams	Wastewater purification through land application, filtration and constructed wetlands	Wastewater filtration, pollution control, reduced treatment costs
Urban demand for fresh produce	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 (reduced urban footprint)	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 Associations for protecting farmers' interests.	Strengthening vulnerable minorities
Flooding	Slope upgrading/stabilization, improved infiltration and human-induced fencing; minimized waste dumping into streams	Flood control; improved drainage
Solid waste accumulation in cities	Need for organic inputs; use of organic waste products; minimized waste dumping into streams	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) Enacting 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).

Table 15.2. Section of the Framework for Monitoring the Impacts of UPAF on Climate Change (Source: RUAF Foundation 2014).

City zone	UPA type or measure	Impacts of climate change (CC)		Development benefits	Variables that determine the extent to which such impacts on CC can be achieved.		
		Mitigation benefits	Adaptation benefits				
Inner city	Promotion of back yard and community gardening	+ + + + +	Less energy use and GHG emission due to reduce food miles Reduction of waste volumes due to on-the-spot composting/reuse Minor carbon storage and sequestration.	+ + + + + + +	Less vulnerability to an increase in food prices and disturbances in food imports to city due to enhanced local production and diversification of food (and income) sources Positive effects on urban biodiversity (especially niche species).	Enhanced food security and nutrition (for the urban poor and women) due to improved access to nutritious food close to consumer Positive effect on urban biodiversity and live-ability Educational and recreational opportunities.	Food import and consumer transport distances for buying food Degree of external inputs and materials used in UPA and related energy costs/ GHG emissions (ecological vs. conventional production; degree of waste recycling, use of rainwater harvesting and water saving production techniques, crop choice: use of drought-resistant species).

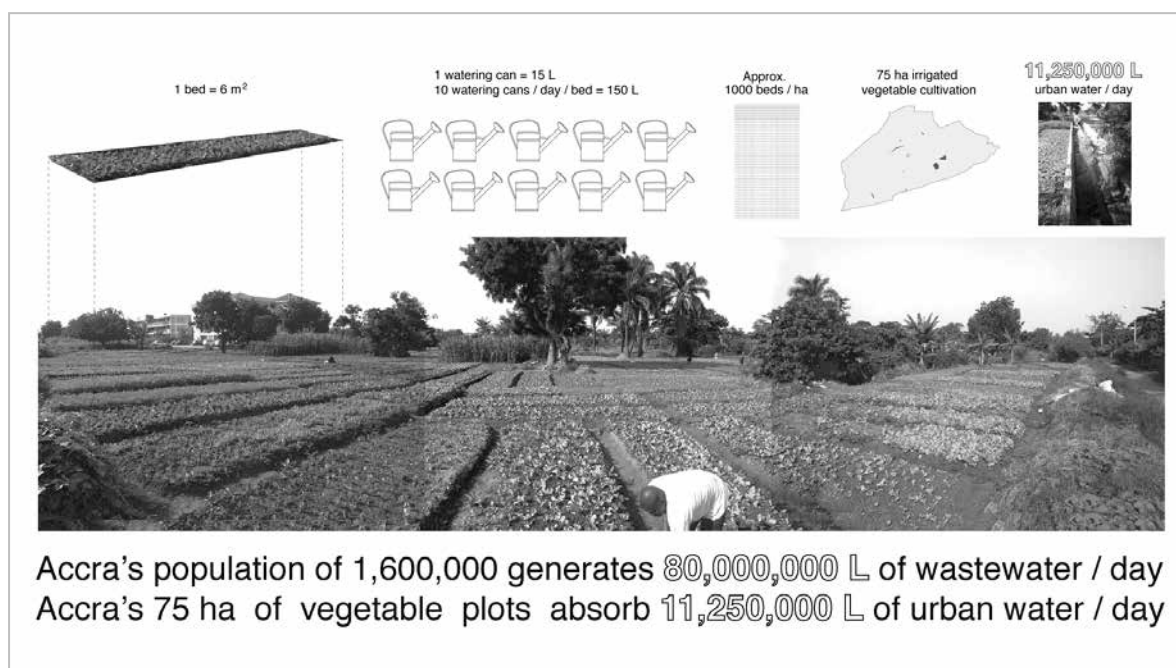


FIGURE 15.2. Contribution of urban agriculture to wastewater re-use in Accra (Lydecker and Drechsel 2010).

To support the acceptance of irrigated vegetable farming, it is crucial to address related health risks. At the national level, informal irrigation practices like in urban and peri-urban areas receive increasing attention which is reflected in the mentioning of urban and peri-urban agriculture in FASDEP II and METASIP. Both documents also mention the challenge of urban and peri-urban farmers with poor irrigation water quality. FASDEP calls directly for the provision of safe irrigation water. The irrigation policy does not denounce the use of marginal quality water but calls for research on safer irrigation practices.

As discussed in previous chapters, the most promising options are a combination of conventional treatment and/or other risk mitigation measures as recommended by the WHO (2006) multi-barrier approach. The possible institutionalization of the WHO (2006) guidelines for safe wastewater irrigation is supported by the National Irrigation Policy, but its implementation at the district level will require support from a number of agencies and stakeholders.

The institutionalization of a multiple barrier approach as suggested in the revised WHO guidelines is in line with the HACCP approach and target of the Ghana Standard Authority to establish Food Safety Management (FSM) systems along the food chain based on Good Practices (Figure 15.3). For vegetables, the system should probably go beyond the current structure of Figure 15.3 by addressing options for risk reduction on farm and at the point of food preparation, for example in canteens or street food restaurants (Amoah et al. 2011).

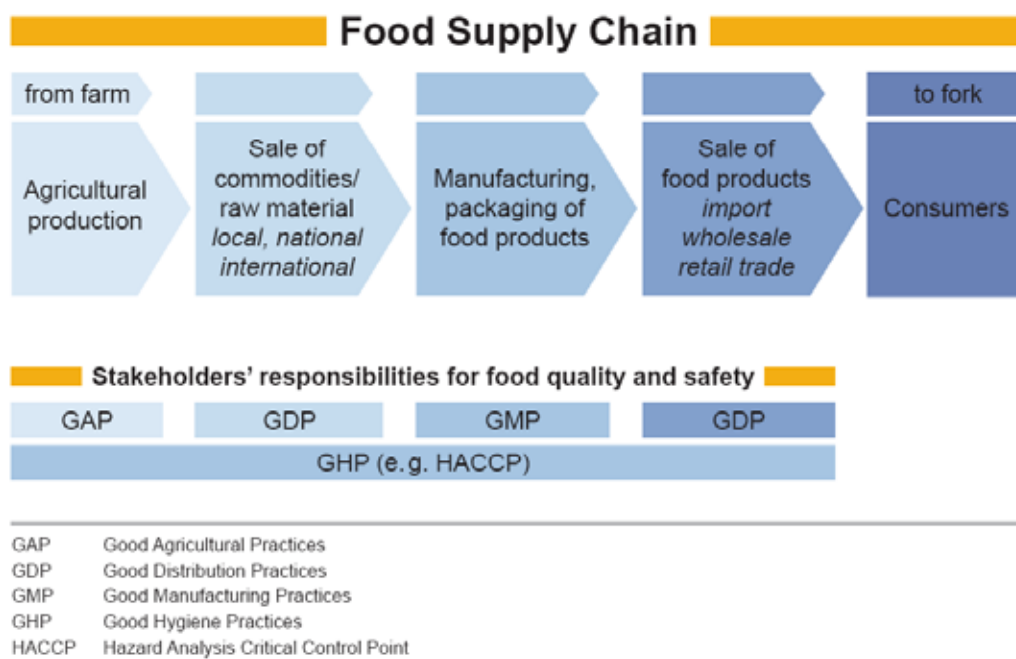


FIGURE 15.3. Ghana Standard Authority guidelines to establish FSM systems along the food chain (Source: Will and Guenther 2007).

However, there are also legislative documents which have reservations against farming close to waterbodies (Riparian Buffer Zone Policy) or prohibit the use of unsafe water (AMA bylaws). It is important to show that *good farming practices* can actually maintain land and water quality without affecting public health. The multiple dimensions of legislations and related institutional stakeholders clearly show that any progress towards the institutionalization of (especially irrigated) urban agriculture will require a multi-stakeholder dialogue with farmers and other actors along the food chain or from the health perspective along the contamination pathway.

WHO is currently working on an operational manual (Sanitation Safety Plan) for its 2006 guidelines on safe wastewater irrigation. Key institutions which should be targeted for the institutionalization of the multi-barrier approach at the national level are the extension service of the MoFA, Ghana Standards Authority, the Food and Drugs Authority and the private sector associations of farmers and restaurants selling raw salads (such as MAFFAG). Particular attention will be needed to understand that farmers and traders will require well-thought out incentives for a lasting behavior change, which requires an approach that goes beyond conventional ‘awareness creation’ and ‘education’ or threatening with fines or disciplinary measures (Drechsel and Karg 2013).

