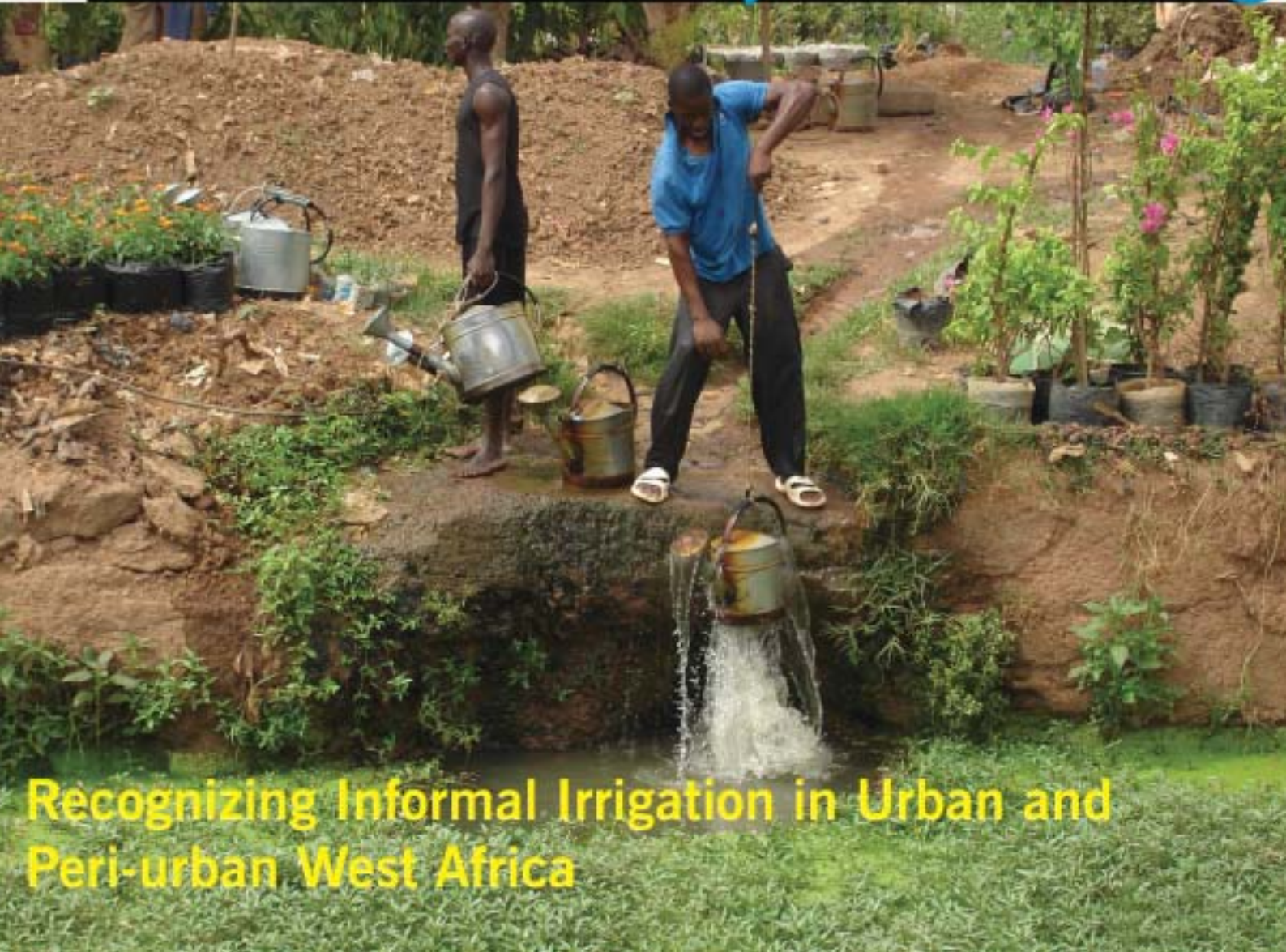


Water Policy Briefing

Issue 26

Putting research knowledge into action



Recognizing Informal Irrigation in Urban and Peri-urban West Africa

Farmers engaged in horticulture in Ouagadougou, Burkina Faso

Photo credit: IWMI Ghana

In many parts of West Africa, informally irrigated urban and peri-urban agriculture supports fast growing cities. With rapid urbanization that is occurring in the region, urban and peri-urban agriculture is thriving with significant benefits for farmers and the urban populations but is little recognized and often handicapped by water pollution. Supporting this sector requires that governments change attitudes to acknowledge the value of informal irrigation and urban agriculture, identify options for health risk reduction and bring together disparate institutions to integrate this development into urban planning.

Recognizing informal irrigation in West Africa

Informal irrigation, irrigation that is practiced by farmers without the reliance on planned, constructed irrigation infrastructure, is fairly widespread, not only in urban and peri-urban areas, but throughout Africa. Table 1 gives an overview about common systems in the West African subregion.

The informal practice has largely arisen due to the freedom of individuals or groups to react to market demand or their own needs, and their ability to maintain their own systems, while the planning and operation of 'formal' irrigation infrastructure is hampered by a large variety of constraints.

Table 1. Major types of informal irrigation in West Africa

System	Water source	Production	Main objective
Open-space urban and peri-urban agriculture	Streams passing cities, groundwater and wastewater	Vegetables, paddy	Income generation
Irrigation at the border of formal irrigation schemes	Return flow, unused water, illegal connections	Cereals, vegetables	Subsistence; income generation
Groundwater use	Shallow and deeper groundwater; use, often via treadle or motor pump	Vegetables, spices	Income generation
Surface water use	Pumping from streams and rivers in rural areas	Paddy, vegetables, fruits	Income generation
Inland valleys, floodplains	Run-off water; flood recession, stream water deviation	Paddy, vegetables	Subsistence; income generation
Multi-purpose reservoirs	Small reservoirs with dam	Paddy, vegetables	Subsistence; income generation

Source: (Payen and Gilet, 2007, modified)

These constraints vary from country to country and usually include one or more of the following reasons: i) the lack of a coherent irrigation development policy and strategy for the subsector; ii) insufficient attention to management systems; iii) inadequate funding (including poor cost recovery); iv) high capital

and operating costs; v) inadequate farm support services; vi) poor operation, repair and maintenance; vii) a low level of project ownership acceptance by the direct beneficiaries; and viii) uncertain financial and economic viability, and ix) dependency on subsidies e.g. to provide market access.

This Water Policy Briefing is based on:

Informal Irrigation in Urban West Africa: An Overview by P. Drechsel, S. Graefe, M. Sonou and O. O. Cofie (IWMI Research Report 102), www.iwmi.cgiar.org/pubs/pub102/RR102.pdf

Informal irrigation in peri-urban areas: A summary of findings and recommendations by G.A. Cornish and P. Lawrence, P.; 2001. DFID's Water KAR Project R7132. Report OD 144. Wallingford, UK: HR Wallingford. pp. 54, .

Irrigation in Africa in figures. Aquastat Survey 2005. FAO Water Reports 29: FAO, 2005. Rome

Irrigated urban vegetable production in Ghana: Characteristics, benefits and risks by E. Obuobie, E.; H. Keraita, G. Danso, P. Amoah, O.O Cofie, L. Raschid-Sally and P. Drechsel, IWMI-RUAF-CPWF, Accra, Ghana: International Water Management Institute. pp. 150. 2006m <http://www.cityfarmer.org/GhanaIrrigateVegis.html>

L'Irrigation informelle en Afrique de l'Ouest. Une solution ou un problème? Payen, J. and V. Gillet. 2007. IPTRID Issue Paper 6; FAO, Rome *Urban Agriculture: Food, Jobs and Sustainable Cities*. United Nations Development Program, Publication Series for Habitat II, Volume One. UNDP, New York, USA, 1996.

Guidelines for the safe use of wastewater, excreta and grey water: Wastewater use in agriculture (Volume 2). WHO: Geneva, 219 pp, WHO, 2006.

In the shade of the struggle of the formal irrigation sector, informal irrigation gained in significance, especially where water is accessible without major infrastructure investments. The FAO estimates that in the Sudano-Sahelian zone of West Africa 89% of all irrigation takes place in equipped schemes, but this is only the case in 39% in its Guinea zone. West African countries with more informal than formal irrigation are for example Nigeria, Ghana, Sierra Leone and Liberia. In most African countries, however, comprehensive assessments of the informal sector are still missing.

In Ghana, IWMI estimated that about 100,000 farm households are engaged in the informal irrigation sector, which is ten times the number found in Ghana's 22 public irrigation schemes. Around the city of Kumasi alone, an area of about 11,900 ha is under dry season vegetable production. Already this is more than twice the area that is actually put under formal irrigation in the whole of the country. In Nigeria, to give an extreme example, several hundred thousand hectares of the fadama inland valleys are under informal irrigation. Traditionally many farm families in Nigeria had cultivated small areas in fadamas during the dry season, while other relied on flood recession cropping.

Meeting the demands of urban West Africa

In West Africa, the urban population is growing rapidly and as in other parts of the world, the urban lifestyle is changing local diets. To respond to this development, and the problems caused by scarce or stretched resources, the urban agricultural sector has started to expand and is increasingly being seen

as a fast, profitable and tangible way to complement the overwhelming demands of city dwellers. There are different types of urban farming (Table 2) and we focus here primarily on market gardening on unused land, often along streams and drains where informal irrigation takes place. Most of these farmers grow perishable vegetables, most of them being important cash crops. In Accra, which has a population of 1.6 million, more than 280,000 urban dwellers eat every day fast food complemented by lettuce, cabbage or spring onions that are grown by informal irrigation in the city or its outskirts.

There are many advantages to supporting the urban agriculture sector. In addition to providing food and employment, year-round farming allows a continuous soil cover against erosion, contributes to urban biodiversity and greening, reduces encroachment of unused plots, protects urban water bodies against waste dumping, recycles used water and organic waste, and helps to diversify the livelihoods and diets of poor urban and peri-urban dwellers. The food that is grown in backyards also contributes to individual household's food supply, and can save on cash that would otherwise be used to purchase food. As marketing of vegetables is in most West African countries the domain of women, irrigated urban farming has also a strong gender component.

Despite the positive contributions of this sector, there is a large gap in quantitative data available on the individuals and communities whose livelihoods depend on this informal irrigation and the aggregate value of urban farming for the society. The data available show, however, that urban agriculture provides a significant commodity-specific share in urban food supply and supports food security in times of economic crisis. An IWMI

Table 2. The three major categories of urban and peri-urban agriculture in West Africa

Farming systems	Urban areas	Peri-urban areas
Market gardening	Irrigated vegetables (year round or seasonal), flowers or ornamentals, rain-fed cereals on undeveloped open spaces	Fruits, dry season irrigated vegetables alternating with rain-fed cereals; rice
Subsistence production	Backyard or front yard farming	Home gardens; farming around homestead
Livestock husbandry and aquaculture	Predominantly poultry, small and large ruminants, equines	All kinds of poultry and livestock, increasingly aquaculture

Source: RR 102, Informal Irrigation in Urban West Africa

survey in 18 West African cities showed in addition that irrigated open-space vegetable production provides in nearly all cases a higher income than the gross national income, and allows farmers who irrigate year-round to pass the poverty line.

The prominence of informal irrigation provides a unique opportunity to acknowledge the capability of urban areas to cope with poor rural linkages and lack of refrigerated transport and storage. By supporting urban agriculture, governments would signal a new vision of the urban landscape which includes acknowledging the agricultural potential of cities, something common in Asia and South America.

Coordination of urban planning is the key to supporting and regulating urban agriculture in general and irrigated urban agriculture in particular. This however, is a big challenge due to the fact that responsibilities for city development are distributed between many different departments and institutions, which seldom come together, not to speak about the rural-urban divide. Planning to improve and invest in informal irrigation for urban farmers requires bringing different stakeholders to the table to problem-solve together.

Urban and Peri-urban agriculture and irrigation techniques

About 20 million urban dwellers in West Africa practice 'backyard gardening' for subsistence making it one of the most popular farming systems in the sub-region. In Accra alone, there are about 80,000 small backyards with at least a few crops or some poultry.



Vegetable farmer lifting water from a well stabilized with car tyres

Photo credit: IWMI Ghana

While some backyards are irrigated with wastewater from kitchens, intensive irrigation takes place on open urban spaces used for market gardening. Water lifting relies on treadle pumps, small motor pumps and manual water fetching with buckets and watering cans. The latter is the most common method of urban irrigation. Although this is an extremely labor intensive method of irrigation, it has many advantages, the most important being the combination of low investment costs and precise water application. Farmers try to keep infrastructure investments low as in most cases they are only tolerated on the land they occupy. Where land is not in short supply, farmers often hire seasonal wage-workers to cope with the labour intensive irrigation.

Around Cotonou and Lomé where tenure arrangements are more secure, water is piped from wells using a small motor or treadle pump and conveyed to a series of reservoirs, from where the water is manually carried to plots using watering cans. Along streams, spray pumps, an intermediate technology between manual systems and more sophisticated sprinkler or drip systems, are increasingly being used. This method is also relatively cost efficient and saves labor.

Areas for policy development

In Africa, policies acknowledging urban agriculture are rare. There are a few examples where a municipal policy is devoted to urban farming (like in Cape Town) while there are more examples at the level of bye-laws and regulations addressing e.g. livestock keeping in cities. Due to its nature, urban farming is exposed to conditions unknown in traditional farming, like the threat deriving from soil and water contamination, the often illegal occupation of Governmental land and the related tenure insecurity. This makes urban farming a sensitive issue and related recognition, support and policy development an uneasy task.

Informal irrigation and Water Quality

One of the features of informal irrigation that is a major concern and driver of policy discussions is the issue of water quality. Since most surface waters in urban areas are highly polluted, and urban agriculture largely makes use of these water sources, the question of water quality and potential health risks is an important area of study. The degree of pollution can vary depending on the type of water source used for irrigation, the season, distance from

the source, dilution, or time of day. Due to poor sanitation, many studies have confirmed a high degree of bacteriological contamination of urban water throughout West Africa. The most common source of pollution comes from urban household wastewater, which contains pathogens but also nutrients. The dilution of the water determines both health risks and fertilizer value. The nutrient load can be minor in comparison to what is gained from applying raw wastewater or manure when the wastewater is diluted by runoff from streams and storm water. IWMI's surveys in the region have shown that even in the humid parts of West Africa, the main motivation for using wastewater or polluted stream water for irrigation comes from its reliability and/or lack of alternative (safer) water sources. The nutrient value is not the primary incentive for its use, although in cases such as around Tamale in Ghana, faecal sludge is as a fertilizer substitute. Pollution of water sources from industrial effluent is not as common, as most heavy industries are located along coast. However this has shown to vary in places such as Kano or Ouagadougou, which are known for their tanneries. Here, urban streams can have undesirable heavy metal concentrations.

Health Risks

Health concerns of wastewater use in agriculture is a large area of research in itself (see Water Policy Briefs 9 and 17). A significant amount of policy formulation has focused on regulation to address the health impacts of wastewater use in farming, especially where irrigated crops are eaten raw. The main challenge is to maintain the benefits of wastewater irrigation while minimizing the real risks to farmers and consumers, especially where wastewater treatment is too expensive.

Research initiatives to address these issues, for example under the CGIAR Challenge Program for Water and Food (CPWF), are closely linked to the efforts of WHO and FAO to develop state-of-the-art guidelines on wastewater use in agriculture. The latest guidelines adopted by WHO, FAO and UNEP see the treatment of wastewater as a part of an integrated risk management strategy. The guidelines have undergone a number of changes over the years, acknowledging in low-income countries increasingly non-treatment options for health risk reduction (such as safer irrigation practices and post-harvest decontamination) and the role of irrigation in livelihoods. The Stockholm

Framework, one of the main set of principles upon which these new guidelines have been created, refers strongly to more comprehensive risk assessments reflecting an integrated approach which goes beyond a narrow focus only on the health risk from wastewater irrigated food.

The recognition of irrigated urban farming requires the institutionalization of risk reducing interventions. This has to consider the risk perceptions of all the actors along the contamination pathway from the farmers, to the traders and consumers. Irrigation practices that reduce exposure to polluted water and effective vegetable washing before consumption are some of the ways in which health risks can be mitigated. Ongoing studies by the CPWF on this problem focus on arriving at a shared understanding of the level of awareness and perceptions on water pollution, vegetable contamination and options to safeguard health.

Impact on livelihoods – Economic impact of irrigated urban agriculture

Urban agriculture is an important source of income to the approximate 200 million people worldwide who are actively involved in market-oriented farming in their gardens or on undeveloped urban spaces (UNDP 1996). The specialization on high value crops has benefits for farmers and traders as it brings in a significant income, and the demand for produce from urban areas means that there is also income security. Urban agriculture has been found to be an especially lucrative source of income in the dry season when the supply of vegetables goes down and prices go up.

Studies show that the monthly net income on mixed vegetable production in open-space urban agriculture is between US \$10 and over US\$300 per farmer. These figures mostly depend on the size of the farms and type of crop. The main factor influencing the individual profit of farmers is the ability to produce at the right time crops that are high in demand and consistently sell them at a price above the average market value. Market proximity or the distance to market centers is another important cost factor which favours urban farming. Research by the International Institute of Tropical Agriculture has demonstrated that in the case where farms were approximately 100km from city markets, the transportation cost were equivalent to about 26% on the value of the vegetables, as opposed to 7% where farms were at a distance of



Photo credit: IWMI Ghana

Most vegetables come from informal irrigation

10km away. Other studies confirm high profits among traders specialized on urban produced vegetables. As in West Africa vegetable traders are usually women, they can earn more than their farming husbands.

An IWMI study that made an economic comparison of year-round irrigated urban agriculture with seasonal irrigation and rain-fed farming in rural areas confirmed that urban farmers on irrigated land earned about twice the income of their rural counterpart engaged in traditional rain-fed agriculture despite 10-20 times smaller farm sizes. The “informal” farmers had lower operational costs and higher returns on investment also compared to vegetables farmers in “formal” irrigation schemes, who had, however, higher net profits.

Surveys showed that urban vegetable farming is often a side occupation, but in many cases, especially for poor rural migrants with few other skills than farming and little capital for investment, it is their sole means to a livelihood. These groups of people find it advantageous to produce quick yielding vegetables such as lettuce, which is considered to be exotic or ‘European’ and brings in sound profits over a short period of about one month.

Urban agriculture has also been an important livelihood strategy that has helped maintain urban food supplies during political and economic crises. In Liberia, where years of conflict led to civil war between 1989 and 1997, the Liberian Ministry of Agriculture along with the FAO developed a plan to support backyard farming, livestock-raising and aquaculture that was being practiced in the suburbs of Monrovia. In other countries in Sub-Saharan Africa that experienced civil war, such as Sierra Leone, Ghana, Zambia and Congo, similar initiatives also helped urban dwellers to grow their own crops and vegetables.

Lessons from Ghana

Until now, the value of informal irrigation has been seriously under-estimated in Africa. The same applies to urban agriculture. However, Ghana’s new designated national irrigation policy recognizes the informal irrigation sector including irrigated urban and peri-urban agriculture and calls for a thoughtful management of the wastewater challenge. The irrigation policy also acknowledges that the informal sector has been neglected for a long time, despite the fact that it is larger than the public sector dependent formal irrigation.

In addition the policy has set out the institutional framework required to implement recommendations, including instituting clearer mandates on the various areas set out to be improved, and also for linkages to be established between institutions including the research sector. Key features of the reform address the improvement of capacity to deliver public services and restructuring along functional roles within the Ghana Irrigation Development Authority. The policy also highlights the role of the Ministry of Food and Agriculture (MoFA) to support the development of services that will help move the policy recommendations forward.

In a parallel development supported by the Resource Centers on Urban Agriculture and Food Security (RUAF), Ghana’s Ministry of Food and Agriculture pledged in 2005 its support for urban agriculture in Accra in a Vision Statement on urban farming and started on different sites in the city to explore the ground for safer irrigation water. In 2006, the Government of Ghana honored for the first time since the start of the Farmers Day celebrations 21 years ago the *Best National Urban and Peri-Urban Farmer*, based on the recognition of this sector as studied in detail by IWMI and partners over the last years.



Photo credit: IWMI Ghana

Urban irrigation can take place in every free spot

Increasing the recognition of urban agriculture

Africa's cities are facing many challenges related to their growth, such as waste management, and the provision of shelter, health services, drinking water and sanitation. These challenges are far more visible in the eyes of municipal planners and hence get the attention of policymakers more often than food supply and urban farming. Although the official reaction to urban agriculture and informal irrigation in West Africa has varied, governments have tended to be more conservative in their attitudes towards both phenomena. Part of the issue lies in the fact that recognition of urban agriculture in cities is an issue of planning, and often the reluctance to acknowledge the practice has come from attitudes that do not see open space farming as something that goes along with the image of a progressing modern city. Recognizing urban agriculture and making it a sustainable livelihood activity involves changing perceptions and attitudes towards the informal sector, especially for those who see farming as part of a 'traditional lifestyle'. It requires in addition realistic options to address possible trade offs of the practice, which concerns mostly the use of polluted irrigation water. Other risk factors, such as pesticide use, are of similar importance as in rural farming.

The recognition of urban and peri-urban agriculture is closely related to the rural-urban divide and the often disparate institutions and departments that are responsible for various aspects of city administration. This makes it difficult for planners to address informal irrigation. For instance, recognizing informal irrigation using polluted water in or downstream of a city would hypothetically involve authorities responsible for sanitation, irrigation, planning, agriculture and health from the city and its fringe. Coordination between these institutions is a difficult task, and most of these departments work in isolation from each other. There are, however initiatives that are working to link institutions together. RUAF, for example, operates a network that supports multi-stakeholder processes and action planning on various aspects of urban agriculture and is in operation in more than 20 cities around the globe (www.ruaf.org).

With respect to informal irrigation, an important objective is to advocate for tenure rights for poor urban farmers and access to credit that will improve their ability to invest in infrastructure such as pumps or wells, or even small-scale on-farm water treatment facilities to address the wastewater challenge.

Bright spots of recognition

In 2002, the Francophone Network on Urban Agriculture in West and Central Africa facilitated the Dakar Declaration on urban agriculture, signed by seven mayors and city councilors from West Africa in support of developing the urban agriculture sector and recognizing the potential problems of wastewater use. Taking the lead, the Mayor of Pikine in Dakar decided to support the farmers in his area and banned the removal of farmers from their lands. The 2003 Harare Declaration signed by five ministers of local government from East and Southern Africa was a RUAF supported milestone calling for the promotion of a shared vision of urban agriculture. Also at the sub-regional level of West Africa urban and peri-urban farming received increasing attention by the West and Central African Council for Agricultural Research and Development (CORAF) and the Economic Community of West African States (ECOWAS).

Following a multi-stakeholder process initiated by the Institut Africain de Gestion Urbaine (IAGU), the cities of Cotonou and Seme-Kpodji in Benin, supported by the Ministries of Agriculture, Interior, Finance, and the State Ministers Council, agreed to allocate about 400 ha of farmland with unpolluted water for the use of urban and peri-urban farmers. The site has shallow groundwater which can easily be lifted by treadle pump for all-season irrigation. About 1,000 farmers declared their interest to move to this site. The constraints are the required subsidies for setting up houses and infrastructure. This initiative addresses tenure insecurity and access to safe water 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 might try to maintain their valuable city plots one way or the other.

In Bamako, Mali, the Yiriwaton farmer cooperative has been effectively lobbying at the local government to gain access to public land in the peripheries of the city. Following a directive from the central government, the municipality started to explore the possibilities of leasing to farmers up to 600 ha near Bamako's international airport.

Source: IWMI RR 102



Vegetable farmers at the beach of Lome, Togo

Photo credit: IWMI Ghana

Water Policy Briefing Series

The **Water Policy Briefing** Series translates peer-reviewed research findings into useful information for policymakers and planners. It is published several times yearly, with the goal of bringing new and practical approaches to water management and planning into the policy recommendation process. The series is put out by the International Water Management Institute (IWMI) in collaboration with national and international research organizations. It is free of charge to development professionals.

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IWMI is a non-profit scientific organization funded by the Consultative Group on International Agricultural Research (CGIAR). IWMI's research agenda is organized around four priority themes covering key issues relating to land, water, livelihoods, health and environment:

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- Theme 2: Land, Water and Livelihoods: *improving livelihoods for the rural poor*
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The Institute concentrates on water and related land management challenges faced by poor rural communities in Africa and Asia. The challenges are those that affect their nutrition, income and health, as well as the integrity of environmental services on which food and livelihood security depends. IWMI works through collaborative research with partners in the North and South, to develop tools and practices to help developing countries eradicate poverty and better manage their water and land resources. The immediate target groups of IWMI's research include the scientific community, policy makers, project implementers and individual farmers.

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