TEMPLATE FOR COMPLETION WHERE PhD/MSc PROJECTS CONTRIBUTE TO SWITCH DELIVERABLES

Name of SWITCH theme:

Theme: Urban Water Environments and Planning
Subtheme: Resource Recovery and Re use Urban Agriculture

Work package title and number: WP 5.2 Use of Urban Water for Urban Agriculture

Identification of Deliverable (name and number):
5.2.4 Ab2
Accra PhD research

Details of contributing PhD/MSc theses (including title, date, author, abstract, details of where thesis can be accessed):

PhD: **Ernest Mensah Abraham**
Title: **Improving Urban Water Quality for Livelihoods Enhancement in the Odaw-Korle River Catchment of Accra, Ghana**
Date finalised: expected *July 1 2011*
Financed completely by SWITCH (IWMI/GUEL-NRI)

Availability
When finished: www.

Abstract:

In Ghana, regular dumping of domestic waste into drains and streams is a major problem, which leads to the extreme pollution of especially urban and peri-urban water bodies. An important case is the Korle Lagoon and the Odaw River complex in Accra. The situation constrains the use of urban water bodies and surrounding areas for livelihood activities as well as urban biodiversity.

The objectives of the research is to understand the contribution water makes to livelihoods of urban and peri urban households, including issues of access and use and their effects on income and wellbeing; to investigate the perceptions, attitudes, and behaviour in relation to surface water and the environment, and to investigate how organizations can promote community participation in water and environmental management. This understanding will contribute to influencing urban water planning approaches to become more integrative in support of both urban water based livelihoods and improved water quality.

Ten communities in Accra were selected for detailed study, representing the peri-urban situation, and different levels of access to infrastructure. Focus group discussions and a household survey were conducted in each community. Surface water samples from selected locations in the Odaw-River catchment were analyzed to compare with communities' perception of water quality. Interviews were held with key persons in selected water related organizations.

There is high demand for water in both the peri-urban and urban communities with the rising population within the city. However, connectivity to tap water pipelines is

limited in the peri-urban areas and in communities which have medium to low access to infrastructure provision. There are irregularities in water supply in the city, because water is rationed with no published list of ration schedules. Households without a connection fetch water from a variety of sources, such as neighbours and small-scale water vendors at a cost of up to ten times the official Public Utilities Regulatory Commission (PURC) approved rates. Tap water contamination from drains and leakages is also a concern. Contributions to household income from water dependent occupations were up to 100% in some households. Existing social processes influence occupational choices, including water dependent occupations as a main or second occupation. The strategy of many households is to get out of poverty by expanding their asset base.

In relation to surface water, individuals perceive water quality differently depending on their location along the river course and their specific experiences with the environment. These perceptions influence attitudes and specific behaviour towards the river. Though certain attitudes and behaviour lead to pollution, lack of infrastructure (such as toilet, solid waste collection bins) also compels people to consider other alternatives, which include the environment and the river. A high level of agreement with an *attitude* statement may not necessary correspond to the associated *behaviour.* Inefficiencies in solid waste collection and disposal and pressures of urbanization are also driving forward water and environmental pollution.

Efforts are needed to improve connectivity and access to water in the communities with limited connectivity; to address illegal activities and leakages on pipelines and to discourage wastage from tap water connections. There is also a need for innovation in the way solid waste is managed in the city and for enforcement of the laws on sanitation and environmental pollution control. Community members have a positive desire to see the resolution of these challenges, but are constrained by a lack of appropriate leadership. Steps to synergize community and organizational efforts hold prospects for responding to the current challenges in order to ensure a clean, healthy and safe city for all.

Contribution to Deliverable:

The PhD research contributes to overall theme of 5.2, *Use of water for urban agriculture and other livelihood opportunities*.

Work package 5.2 aims to contribute to a paradigm shift in wastewater management and sanitation towards a recycling-oriented closed loop approach. Water, sanitation and food problems affect people directly, and call for sustainable management of urban resources. The aim of the work package is to effect significant improvements in agricultural production, processing and marketing, and other livelihood activities, using freshwater, storm and waste-water. Changes sought include positive actions (e.g. integrated planning) and mitigating actions necessary to reduce risks to the environment and health of producers and consumers. The work-package involves working in Accra, Beijing and Lima and (to a lesser extent in Hamburg) to start up multi-stakeholder processes for action research on productive use of water and wastewater.

In Accra research focused on the availability of water, and the (productive) use of waste-water by urban farmers. In addition to the demonstration in Dzorwulu area in Accra, research has been undertaken by two PhDs, and several MSc students who have contributed to demonstration in Dzorwulu area and its watershed in Accra.

One PhD (van Rooijen: product 5.2.4 Ai) focused on integrated urban water management, or more specifically at the impact that urban development in general and investment in water and sanitation infrastructure at city level and facilities at the household level have on the city scale water flows.

This PhD student, Ernest Abraham, has been jointly coordinated by GUEL-NRI and IWMI. He worked on urban water quality characteristics related to livelihoods (food and income) and use of waste-water for productive activities in the Odaw-Korle catchment. The study investigates the actual situation of dwellers in different areas of Accra, with respect to water access, use and the environment. It has increased understanding on the range of productive uses of water and their contribution to incomes and livelihoods. It has examined the complex area of human attitudes and behaviour in relation to water and the environment and evaluated this in the light of current approaches and strategies to urban water management. It is developing useful recommendations to inform strategies for improving water access and for public involvement in water and environmental management. This resulting knowledge will contribute to influencing urban water planning approaches to become more integrative in support of both, urban water based livelihoods and improved water quality. It will add to the other research and feed information to the LA and support the further implementation of the new policy on urban sanitation in Accra.

Results

PRELIMINARY RESULTS AND CONTRIBUTIONS TO THE SWITCH OBJECTIVES

The results of the research indicated a high demand for water in both the peri-urban and urban communities which is increasing as the city's population rises. However, connectivity to tap water pipelines is limited in the peri-urban areas and in communities which are classified by the Accra Metropolitan Authority as having medium to low infrastructure provision. The water challenges are further worsened by the irregularities in the supply of water in the city, because water is rationed with no published list of ration schedules. Occupants of dwelling units without a connection, fetch water from a variety of sources, with neighbours and small-scale water vendors being important. This has created the conditions for private water vendors to exploit the situation. Other challenges are illegal activities on pipelines, such as illegal connections to water mains and tapping of customers' pipelines which deny customers water, and the high cost of water for those not connected who purchase water at a cost of up to ten times the official Public Utilities Regulatory Commission (PURC) approved rates.

Households spend between 1-10 % of their monthly income on domestic water, with more than half (58.82%) of respondents spending from 5 % and above of their net monthly income on domestic water. Mean per capita per day water consumption ranged from 64-203 litres for households obtaining water at PURC rate and 26-40 litres for households obtaining water at private rates in the city. Potable water quality is also a concern because of the disorganized nature of pipelines running through drains, and leakages which lead to tap water contamination.

Surface water augments domestic water in the peri-urban communities, especially where the quality of the water is considered safe for specific uses. In some sections of the city, it is used for urban agriculture. Contributions to household income from water dependent occupations were up to 100% in some households. Existing social processes influence occupational choices, including water dependent occupations as a main or second occupation. The strategy of many households is to get out of

poverty by expanding their asset base. The results showed the importance of water use for productive livelihood activities in the city and therefore the importance of incorporating this dimension in the development of interventions in the urban water management agenda. This is line with the overall objectives and expectation of the SWITCH project in the city.

In relation to surface water, individuals perceive water quality differently, depending on their location along the river course and their specific experiences with the environment. People's perceptions about the river influence attitudes and specific behaviour towards the river; that is to either pollute, protect, or remain passive. Though certain attitudes and behaviour lead to pollution, lack of infrastructure (such as toilets, solid waste collection bins) also compels people to consider other alternatives which include the environment and the river. Expressed *attitudes* may not necessarily correspond to the associated behaviour because of two other important factors; the extent to which individuals can control their behaviour [behavioural control] and the pressure from the society in relation to the behaviour [subjective norm]. Inefficiencies in solid waste collection and disposal, lack of adequate sanitation and pressures of urbanization are driving water and environmental pollution. This research has deepened the understanding of the factors influencing the management of urban surface water and what aspects to consider in making water safe for use for agriculture and other livelihood activities within the city. It calls for the integration of both the general and specific issues in the initiation of policies on improving urban water management at the catchment level. It can help policy makers to appreciate the fact that if sound environmental management reduces influx of pollutants into the surface water, farmers and others can access water of appreciable quality for productive activities in the city. This is in line with the SWITCH objective of identifying and integrating acceptable and appropriate urban water management approaches and strategies into policy, legislative and regulatory, urban planning and decision making frameworks for the city.

The results also identified that key organisations in urban water and environmental management have defined objectives that are aimed at improving the water and the environment. However, the gap in the operations of these organisations in terms of involving the respective communities in the city has contributed to some of the current problems in the water and the environmental management sector. Thus community cooperation is important. The results showed a desire on the part of community members to be involved in decision making and interventions relating to water and environmental management. In some communities, there are informal associations that are already participating in environmental management and therefore have contributed to abating pollution of surface water resources. The findings on the prospects of integrating community concerns and efforts into the urban water management and use offer opportunities for expanding the multi-stakeholder approaches by involving and developing local skills and initiatives.

The above three key results provide the Accra Learning Alliance, knowledge and relevant information and perspectives on urban water management and use for integration into proposed amendments in policies and decision making plans within the city. The overall goal is to access water that is safe for productive activities and other livelihoods.

Specific results will be included after finalisation of the PhD report.

Related products
(and deliverable number)

5.2.1 Ab **Planning urban water-dependent livelihood opportunities for the poor in Accra, Ghana.** Abraham, Ernest Mensah, Daan van Rooijen, Olufunke Cofie, Liqa Raschid-Sally. 2007. Paper for SWITCH Scientific Meeting, 9-10 Jan 2007. Birmingham. UK. SWITCH
5.2.4 Ab1 **PhD Proposal Ernest Abraham (IWMI, GUEL)**
Improving Urban Water Quality based on a Stakeholder Orientated Integrated Planning Approach in Accra's Odaw-Korle Catchment, Ghana.
5.2.4 Ac **The Challenge of urban flood control: The case of Accra's Korle Lagoon** E.M. Abraham, P. Drechsel and O. Cofie. 2009.
5.2.4 Ag **Water-dependent livelihoods in selected communities: Analysis of practices and perception of water quality in Accra**
Ernest Mensah Abraham, Olufunke Cofie, Liqa Raschid-Sally,Adrienne Martin, IWMI, GUEL. 2009. Presented at the SWITCH SC meeting, Delft.