

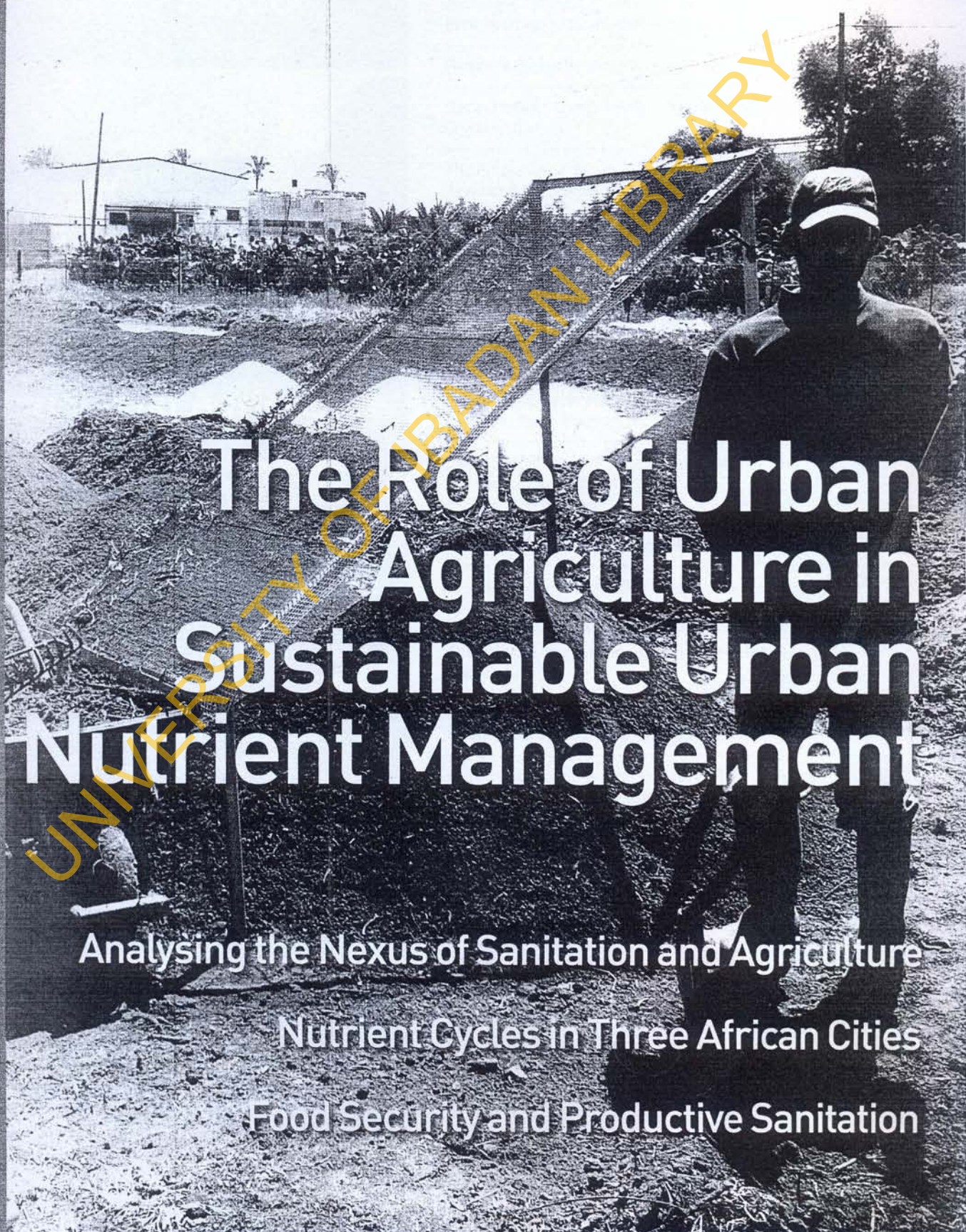
BOLANLE WAHAB

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# URBAN AGRICULTURE MAGAZINE

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23



## The Role of Urban Agriculture in Sustainable Urban Nutrient Management

Analysing the Nexus of Sanitation and Agriculture

Nutrient Cycles in Three African Cities

Food Security and Productive Sanitation

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## Cover

This issue will look at options for closing the loop through safe recycling of urban wastes, and argues that urban agriculture can play an important role in creating sustainable urban nutrient management. It is produced in collaboration with WASTE. This issue of the UA Magazine is partly made possible by subsidy from the EU.

photo: Waste Recycling in Gaza, Palestine.  
by: A. Adam-Bradford

# Improving Food Security through Environmental Management in Ibadan: The case of the Ayeye community

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Bolanle Wahab,  
M. K. C. Sridhar and A. A. Ayorinde

Solid waste disposal is a nagging problem faced by various communities in Ibadan in southwest Nigeria and other state capitals. Ibadan, the capital of Oyo State, is the most densely populated city in the state with over three million inhabitants. It is said that in Ibadan every street is a market. Many backyards are used for growing local vegetables and medicinal herbs.

The Sustainable Ibadan Project (SIP) was established in 1994 (together with 11 similar projects across the world) by UNCHS (HABITAT) as part of the Sustainable Cities Programme. Participants at a City Consultative Forum in 1995 concluded that waste management and conversion to organic fertiliser were top priorities for Ibadan and jointly identified aerobic composting technology using windrows as a viable method to collect and recycle waste, generate income, and use compost for urban agriculture.

One of the pioneer community-based projects is the "Ayeye Waste Sorting Centre". In collaboration with Urban Basic Services (sponsored by UNICEF), the authors trained community members in waste assessment and source separation of biodegradable and non-biodegradable wastes. The project has been able to generate economic returns and employment for the local community (Sridhar and Adeoye, 2003).

## Ayeye community

Ayeye is a densely populated, low-income community located in the core area of the city, with a population of 13,720 located in the core area of Ibadan city. It occupies an area of 14.13 ha, with 42 compounds and 460 houses (as observed in 2009). The population per housing unit is estimated to be about 30. Women and children regularly sell and load goods along roads in the area. The Ayeye community has very low access to sanitation and other basic services. The per capita generation rate of solid wastes is about 0.43 kg per day, 60 to 80 per cent of which is organic in nature.

The many open drains in the neighbourhood pollute the Gege stream. At the start of the project in 1994, there was no waste disposal facility and people littered everywhere, espe-



The community provides compost also to other local government areas.  
Photo: Photo: M. K. C. Sridhar

cially along the Gege stream. At that time, the community had only one toilet. In 2002, the Ayeye Community built two "Pay and Use" toilets, which initially were emptied into the nearby drains and then into the stream. In 2009 however, the Sustainable Ibadan Project established a system in which the pits are emptied by so-called "faecal waste contractors". The community charges five Naira (0.25 Euro cents) to each user of the toilet. This has improved the physical condition of the area.

## Concept and methodology

The initiative was set up to develop practicable solutions to the solid waste problems by converting wastes to fertiliser. By improving environmental health and employment and generating income as well as food security, it also aimed to benefit the community (particularly women and children, who are the most involved in waste collection and disposal and thus the most vulnerable to its hazards). Improving sanitation and training community members on food security, health care and waste management issues were also part of the project.

The community members collected solid wastes from their homes, and food waste from the Ayeye-Agbeni food market. Household wastes were sorted into major components (plastics, metal and glass) and then transferred to a sorting centre (where separate cubicles were provided for the segregated waste) at a location designated by the community.



Using compost on maize produced yields comparable to when fertilisers were used  
Photo: M. K. C. Sridhar

Biodegradable wastes were converted into organic fertiliser. UNDP and UNICEF provided major funding, while the Oyo State Government and other stakeholders (like university) provided other support through materials and human resources. A 5-t per day capacity plant was commissioned in November 2002. It was to produce 45-50 bags of 50 kg organic fertiliser per day to be sold to farmers within and outside the community.

The project was executed in three phases (in 2001-2002), a quick appraisal survey; construction, mobilisation and training; and community participation in the composting process, and field trials of compost utilisation on identified farms. At the end the project was handed over to the community.

### Results and lessons

Details of the waste generated in the community (in 2002) are given in table 1. The total compostable waste generated per capita / day was 0.16 kg. Other major components include plastics (high and low density film), metal, and ash arising from the cooking activities.

Table 1. Wastes generated in Ayeye community (kg) (Total population: 13,720, or 30 per housing unit).

	Per week per house	Per week in 460 houses	Per day in 460 houses	Per capita per day
Compostable waste	21.55	9913	1416.14	0.103
Animal waste	11.385	5237.1	784.16	0.057
Recyclables	15.15	6982.0	997.43	0.073
Total	48,085	22,132	3198	0.233

The project has been sustained since 2002. It is required that the waste collection is efficient, electricity supply is regular, production is steady, and buyers are readily available. In the project period, the supply of electricity to the composting plant was not regular, which affected production capacity. Other constraints identified were lack of land area for expansion, and lack of an organised marketing framework.

At least four people worked regularly at the sorting centre producing about 10 bags of fertiliser per week (each bag weighing 50 kg). In addition, they also produced Grade A compost by fortifying it with additional nitrogen (3.0 to 3.5 per cent) and phosphate (1.8 to 2.0 per cent), which was in greater demand by farmers who grew maize and other crops requiring high N.

Maize and other vegetable crops were also grown on demonstration plots. The finished compost and the compost amended with additional N and P produced yields comparable to when chemical fertilisers were used (see table 2). The farmers appreciated the benefits of organic fertiliser application, as they saw increased yields, a second crop with no additional inputs and its usefulness in controlling soil erosion and degradation (Adeoye *et al.* 2008). Farmers and horticulturists are eager to have the compost produced in larger quantities to satisfy their needs.

Table 2. Effect of organic fertiliser produced by Ayeye community on maize yield and comparison with the effect of chemical fertiliser

Fertiliser treatment	Plant height, cm	Grain yield, t/ha	Number of plants/ha
No fertiliser, n=12	177.97	2.02	197
NPK fertiliser (15:15:15); n=10	237.67	5.40	463
Organo-mineral fertiliser, 1.5 t/ha, n=14	212.5	6.06	435
Organo-mineral fertiliser, 3 t/ha, n=12	238.93	6.52	546

The community project provides compost to horticulturists and Oyo State Farmers Association, whose members are spread across 33 Local Government Areas (LGAs). But the members are continually looking for markets where they can sell their compost and their farm produce. The compost is also sold to other urban and periurban farmers: chairmen of the 11 LGAs in Ibadan buy and distribute the compost to their farmers. Ayeye represents one of the traditional core communities in Ibadan. The other 11 LGAs have expressed interest in replicating the project in their communities. This project also serves as a model in Nigeria and seven of these small to medium level composting plants have been established in different parts of the country.

Bolanle Wahab,

Department of Urban and Regional Planning,

M. K. C. Sridhar

Division of Environmental Health Sciences,

Faculty of Public Health, University of Ibadan, Ibadan

A. A. Ayorinde

Project Manager, Sustainable Ibadan Project, Oyo State Ministry of Environment and Water Resources, Ibadan, Nigeria

Corresponding Author: M. K. C. Sridhar:

Email: mkcsridhar@yahoo.com

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