

Urban Farming and Ecosanitation: Nigerian Experience

Prof. M. K. C. Sridhar

Division of Environmental Health, College of Medicine,
University of Ibadan, Ibadan, Nigeria

Introduction

In a developing country like Nigeria, urban low-income communities resort to alternate income generation activities to alleviate their economic hardships. Urban farming is convenient and viable for those who live in high density areas closer to water sources. The same water source is used for domestic and drinking needs, waste disposal, and for the farming activities. This practice is more pronounced in major cities such as Lagos, Ibadan, Kano, Kaduna, and Port Harcourt to name a few among more than 100 designated urban centres in the country. The driving forces for urban farming are the availability of water, plant nutrients and land. The advantages of urban farming are low investment, ease of cultivation usually by the immediate family, and readily available market for the produce. The polluted waters commonly used for irrigation also provide sufficient nutrient inputs for the crops to flourish. Health and hygiene are not considered as vital factors as long as the income is assured.

Data has been collected over a period of time from various urban centres from the States Akwa Ibom, Delta, Kaduna, Kogi, Lagos, Ogun, Ondo, Osun., Oyo, and Rivers. The information gathered include the nature and magnitude of urban farming, the factors that attract the urban dwellers for farming, the quality of the waters used in urban farming, the inputs on the farms, the quality and hygienic conditions of farm produce, and the communities' attitudes to urban farming. The information was collected through structured questionnaire administered to the farmers seen on the farms, opinion leaders among the communities, and chemical and microbiological analysis of samples of water sources used for farming purposes and representative samples of crops marketed.

Materials and Methods

Samples of various waters were collected from drains, streams, municipal solid waste waste leachates and shallow ponds in clean bottles and brought to the laboratory immediately for analysis. Where microbiological analysis was carried out, sterile bottles were used. The samples were analyzed for physicochemical characteristics, viz. pH value, Total Dissolved solids, Electrical conductivity, Dissolved oxygen, Biochemical Oxygen Demand, Total alkalinity, Total Hardness, Total Phosphorus, Nitrate nitrogen, Sodium, Potassium, Calcium, Magnesium, Chloride, and Total coliforms. Standard methods (APHA, 1998) were followed in the analyses. The data were analyzed using the hand calculator and presented as means and standard deviation.

Results and Discussion

Quality of waters

The results brought out a wealth of information. The waters used for urban farming are: (a) rivers or streams flowing near the communities, usually polluted from domestic wastes, human and animal excreta, municipal solid wastes, storm drainage and untreated industrial effluents; (b) open drains carrying household sullage or gray water, mixed with human excreta and solid wastes; (c) leachates from illegal refuse dumps from the communities admixed with complex biomedical and other hazardous wastes; (d) effluents from soakaway pits connected to aqua-privy or septic tank systems of excreta disposal, and some times from (e) shallow dug wells or wash bores in the vicinity of drains or polluted streams. The waters are usually turbid, dark and viscous in appearance with high levels of suspended matter (often more than 140 mg/l), total dissolved solids (230 to 1300 mg/l), Biochemical Oxygen Demand (<5 to 50 mg/l), ammonia and nitrate (<1.0 to 43.0 mg/l), phosphorus (0.07 to 1.17 mg/l), certain heavy metals (lead, cadmium, chromium, zinc, nickel, and iron) above the WHO limits, oils and grease (0 to > 10 mg/l) and faecal coliforms (10 to > 2400 / 100 ml). Some of the streambeds and drainage sediments also contained helminthic ova and larvae. In Kano, Kaduna, Lagos, Ibadan and Port Harcourt, at least one river in each location is sacrificed for industrial waste discharges. Wastes from tanneries, textile mills, pharmaceuticals, metal industries, fertilizer and other process industries contribute to various pollutants. The presence of plant nutrients such as nitrogen, phosphorus, potassium and other trace elements in these waters outweigh the other toxic elements or infectious agents. The cost of provision of irrigation water and the associated carriage system is also eliminated. In Ibadan and Lagos, raw faeces from an improvised toilet (a toilet seat with a long drain pipe) is led into a water course and the resultant nutrient rich water is used for irrigation and also for fish farming.

Land holdings and farming practices

The land holding of the urban farmers ranged from 0.1 to 1 Hectare per family and the farms are located on the slopes of the water sources. Very rarely the land ownership exceeded 2 to 3 Ha. In Kogi State, a retired principal of a school started a large farm (up to 10 Ha) in the suburb of Lokoja town by making use of stream and drainage water supply available in the vicinity. However, such large holdings are rare. In urban farming activities, manual labour is engaged and the family members join in the efforts. Men are involved in hard labour such as digging and making heaps and women contribute to soft labour such as irrigating, weeding and harvesting. They irrigate the farm at least once every day in wet season (April to September) and both during morning and evening in dry season (October to March) with pots, shower cans or with a bowl or a bucket. Some farmers supplement the land with manure or fertilizer, though this practice is not common due to high cost and non-availability to small farmers. Waste dumpsite soil, animal dung, topsoil or mulch is commonly used as soil amendments. Pest control is through the use of indigenous or traditional methods, such as soap solution and kerosene.

Commonly grown crops

At least 19 varieties of crops were identified as popular in the urban farms. The type of crop depends on the location, need, growth conditions and the market value. In Lagos and Ibadan, many farmers resorted to lettuce, cabbage, and carrots, which yield higher income as they are

consumed more by the urban non-indigenes. Otherwise, plantain, banana, okra, hibiscus, maize, sorghum, cassava, sweet pepper, tomato and garden egg are grown. Sugarcane (for chewing only) is grown in swampy areas where the water table is high.

Women in urban farming

Some women groups, women cooperatives, and water and sanitation committees at community level in certain Local Governments developed backyard organized farming and they manage the entire set up. UNICEF has also encouraged such "Family Support Programme" initiatives in the willing target communities to use the spill over water from the boreholes to develop backyard farming (Enabor et al, 1998, Sridhar, 1995). This has become popular in some urban locations as it is a community based and community managed activity. In recent years, ornamental flower growers, mostly managed by middle aged men have increased in urban centres along the urban watercourses. They proliferated in Lagos, Ibadan, Abeokuta, Abuja and other State Capitals. They have ready market for special occasions and ceremonies.

Quality of farm produce

The quality of farm produce varied depending on the type of water used. Leafy vegetables such as lettuce, cabbage and cauliflower carry coliforms and helminthic eggs on their wrinkled surfaces, which is a health risk. These pathogens adhere firmly and washing 3 or 4 times with scanty water of doubtful quality available in the homes may not remove completely as evident from the laboratory tests. Even if washed 6 to 8 times did not completely eliminate these pathogen indicator organisms. A farmer who was using leachates from a landfill site complained of damage to his cassava tubers. They became soft on storage and the keeping quality has deteriorated (Sridhar, 1996). Another farmer in Asaba in eastern part has diverted alkaline textile mill effluent to his cassava farm and the yield and the quality were satisfactory. Leachate from a poultry waste on the backyard of a livestock farmer developed white patches on maize leaves, and red spots on spinach and immature citrus fruits dropped prematurely. These are indicative of nutrient imbalances for the crops. Depending on the crop, the levels of heavy metals varied and the lead levels are usually high on the vegetable washings. Lead is a serious problem in Nigerian urban centres, which gets into the environment through dust and exhausts from automobiles. There is a biological barrier between the root zone and the shoot and the grains for the heavy metals to pass through. Bioaccumulation of heavy metals in the farm produce is not a serious problem. Urban farmers, however, complained of more mosquito biting around the areas. Their children also suffer from schistosomiasis and worm infestations as they work on farms without any protective wear. However, the satisfaction is that once they get monetary returns, they can afford to buy drugs.

Conclusions

In conclusion, the scenario given above indicates that urban farming using any available water source is very popular in Nigerian cities and towns. Drainage waters and dump site leachates pose serious environmental and health hazards which is a curse. The farmers, however, derive economic benefit (in spite of health risks) and that is a boon. They believe that once money is available, they could improve health through medical care. From the scientific and public health point of view, there should be some check on the quality of waters being used for such farming activities. National and State environmental guidelines are ineffective when they come to implementation level. There is a need for effective urban planning coupled with environmental

and health education for the urban farmers on the hygienic way of treating such waters before using for economic gains.

References

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