

URBAN PLANNING AND SPRAWL CRISIS IN AFRICA: ECOLOGICAL SANITATION AS A VIABLE POLICY OPTION

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Abstract

Rapid urban growth is a common phenomenon the world over, particularly in the developing countries. Africa is no exception in this respect. Lack of affordable housing in African towns has pushed most people into the peri-urban areas. These new settlement areas, often hitherto agricultural lands, are normally unplanned. "Development", therefore, seems to progress ahead of planners instead of the other way round. By implication, therefore, these peri-urban areas often lack vital services necessary for human settlement such as proper sanitation, particularly human excreta disposal. In these areas the most affordable and therefore most common method of human excreta disposal is the use of pit latrines. In few homes, however, isolated cases of use of cesspits and septic tanks can be found. In comparison with conventional methods of human excreta disposal, ecological sanitation (eco-san) is a viable and feasible alternative in these peri-urban areas since it has a lot of advantages, viz.: recovery and re-use of nutrients for urban agriculture; minimal risk from spread of diseases; cost-effectiveness; minimal/no use of water and no contamination of ground water. As such adoption of eco-san is the likely way forward for planning for sanitation services in Africa's peri-urban areas.

Introduction

Urbanization and urban growth are evident phenomena in the whole world. The continued expansion of urban areas boils down to one thing: it is a great challenge to urban planning and urban governing authorities to both provide services required by urban residents while at the same time preventing environmental degradation. Keeping such a balance is not an easy task. Promoting urban sustainable development is a desirable goal but one that can turn out to be elusive unless much care is taken. In the process of urban expansion, many people have moved far from the city centre to the peri-urban areas where housing is cheap in terms of rent and construction. The disadvantage of settling here, however, is inadequacy or sheer lack of services vital for human settlement, such as proper sanitation. Consequently, residents resort to cheap methods of providing sanitation services the best way they know how. For instance, they use pit latrines and open defecation as a method of disposing excreta.

Such disposal of human excreta is not the best - from an environmental as well as health point of view. These peri-urban residents can adopt alternative, more hygienic human excreta disposal in a cost-effective way by adopting ecological sanitation, (eco-san). Adoption of eco-san not only by peri-urban dwellers but also by residents of other parts of an urban area can have far reaching positive implications, among them the cutting costs of running municipal sanitation services. This can in fact lead to a significant reduction in the existing disparity in the provision of urban sanitation services whereby municipal authorities tend to neglect peri-urban and slums/squatter areas.

Urban Growth and Urbanization

Since the dawn of industrialization, urban growth and expansion have accelerated. For example, the average population of the world's 100 largest cities was over 5 million inhabitants by 1990 relative to a mere 2.1 million in 1950 and less than 200,000 in 1800 (UNCHS 1996:12). By implication, with time, there is likely to be more urban dwellers directly linked to the perceived role of cities in social transformation as well as economic development of a country or region. This explains why, for instance, most of the world's largest cities are found in the world's largest

economies. A case in point is the counties in the South that have urbanized most rapidly in the recent past and these are also generally those located in regions that are experiencing rapid economic growth (UNCHS 1996: 25). This reinforces the strong linkage between economic wealth and cities. No wonder the terms city and civilization have the same root. Urbanization is seen to be inevitable, irreversible and all the while an essential ingredient for human development. Thus Gross National Product and per capita numbers are said to be much higher in countries with more of their people in cities (UNCHS 1994:32).

Urban Planning and Management in Africa

As already noted above, since the benefits of urbanization are more than the problems generated thereby, the solution, therefore, lies in formulation of better and more effective urban management systems, than attempting to stop it (UNCHS 1994:32). Past policies of attempting to stop urbanization by restricting rural-urban migration have failed miserably in some countries. A case in point is the path taken by socialist and communist countries, notably Tanzania and the Peoples Republic of China. Kenya, though adopting neither a communist nor a socialist ideological stance, tried its infamous “*turudi mashambani*” (return to the countryside) policy involving forceful repatriation of migrants. This was also met with similar failure.

There are inevitable disparities brought about by urbanization, both between and within countries. Africa has not been spared from this problem of glaring social and economic disparities. Since urbanization is inevitable, the solution (to these disparities) lies in adopting urban planning and management approaches that efficiently utilize resources to provide satisfactory living and working conditions to facilitate economic production in urban areas (UNCHS 1994:32), such as:

- Formulating appropriate objectives, goals, policies and strategies;
- Mobilization and efficient use of resources for developing, maintaining and providing essential urban infrastructure and services;
- Strengthening urban informal sector roles; and
- Strengthening urban institutional capacities.

The solution therefore is not to run away from urbanization but rather to accommodate it. In doing so, there is need to devise urban planning and management strategies that will promote benefits of urban growth to both urban dwellers as well as the entire regional economy.

Urban Sprawl Crisis in Africa

Despite the economic boom in some nations that have experienced urban expansion, the picture is a little different in Africa. This is a good example of disparities in economic benefits accruing from urbanization as a process. The 1980s and 1990s have been described as a period of “urban crisis” in Africa due to the evident general stagnation and, in some cases, decline in economies in the face of continuous rural-urban migration. This is evidenced by declining formal employment levels, deteriorating basic service delivery, proliferation of the informal sector, and environmental deterioration (UNCHS 1996:89). The urban poor have felt the greatest blunt of this scenario.

One common characteristic of urbanization in Africa is urban sprawl, a phenomenon true of other developing countries. Urban sprawl has continued despite technological achievements that enable people to live and work in high-rise buildings (Tolba 1992:188). Actually, laws have been enacted that enable one to own a flat in a high-rise block, either for residential or office/work purposes. Thus one does not have to move far into a peri-urban area in search for property. A case in point is Kenya’s Sectional Properties Act of 1987 which to date has not been put into good use by property owners. Instead, more and more people are continuing to move further from the Central Business District in search for property, particularly for residential purposes, yet there exists legislation that enables them to own a residential flat right in the city.

Urban sprawl chews up land, in some cases valuable agricultural land. This leads to shortage of food supply for urban residents who normally depend on agricultural produce from farms in the peri-urban areas (Tolba: 1992:188-189). Lack of affordable housing and the desire to own and live in one's own house is one pertinent reason that propels urban sprawl. Unfortunately these peri-urban areas where urbanites choose to settle are also places beyond the reach of urban municipal services. These services are either inadequate or are altogether lacking. A notable example of services that are wanting in these areas is water and sanitation. There is lack of safe and sufficient water supplies, besides other sanitation-related services, including drainage, garbage removal, health care and disposal of human excreta. This is part of what UNCHS (1996:114) calls "housing poverty" - emphasizing lack of adequate basic infrastructure and services essential for human health - a condition affecting at least 600 million urban dwellers in Africa, Asia and Latin America. Lack of financial resources on the part of urban municipal authorities leaves peri-urban dwellers to provide these services themselves the best way they know how. This often worsens the environmental and health conditions of these areas. Urban sprawl is, therefore, an urban planning as well as a health crisis. Developers move ahead of development (and planning), thus worsening the crisis situation.

Water and Sanitation Situation

Globally about 3 billion people lack basic sanitation, a situation that explains why every year 1.5 billion people are infested with intestinal worms while more than 3 million people die of diarrhea (WHO 1996). UNCHS (1996:268) indicates that in 1990 nearly three fifths of the population in low-income countries and a third of those in middle-income countries lacked access to sanitation. Additionally, UNCHS (1996) emphasized that in 1991 at least one third of the South's urban population had no hygienic means of excreta disposal. Most of these sanitation problems were (and still are) more apparent in urban areas where size and density of settlements make defaecation in the open difficult or impossible or, for women, dangerous.

Most of these peri-urban settlements are far from sewer lines, hence connection to sewers is not even an option for consideration. Municipal authorities normally provide sewer services to the richer residential and commercial areas (UNCHS 1996:269). This is the reality of urban sanitation services and this contributes to the widening of the already existing disparity between the "haves" and "have-nots". In addition, constructing septic tanks is unaffordable to majority of the residents in those areas. The only option left to these people is the use of pit latrines, open defecation and emptying of untreated raw sewage in rivers, streams, canals and gullies. No wonder morbidity and mortality levels in these areas would not be expected to be low given the ripe environment for the proliferation of water-borne diseases. For instance, in 1978, infant and children mortality rate was 112 per 1000 in Abidjan compared to 197 in the rural areas. The situation in urban Abidjan deteriorated ten years later, in 1988, to 120 per 1000 against 191 in rural areas (UNCHS 1996:92). This is an example of what is happening in other urban areas in Africa, particularly in those peri-urban areas where more and more people are forced by social and economic circumstances to live in unserviced settlements.

The pathetic situation of sanitation conditions in urban areas calls for urgent action to seek ways and means of effective sanitation, particularly disposal of human excreta. Towards this effort an alternative cost-effective alternative would be eco-san.

Eco-san as a Viable Policy Option

The conventional sanitation systems have for a long time been advocated for as effective methods of human (and household) waste disposal. However, these methods are now found wanting in a number of respects. Their shortcomings are even more pronounced in the peri-urban areas experiencing urban sprawl. These sanitation systems are mainly of three categories: open defaecation, pit latrines, and water borne flush-and-discharge systems.

Open defecation

This primitive method of human excreta disposal is still practiced in urban areas. The case of "flying toilets" in urban slum and peri-urban areas is an added dimension of this method. It is needless to emphasize the health hazards

associated with this method of excreta disposal, with the heavy contamination of pathogens being a source of diseases affecting human life.

Pit Latrines

This method is also referred to as drop-and-store. Here the human excreta may be safely kept out of reach of human beings, and hence chances of spread of diseases arising from direct faecal contamination are relatively slim. This is particularly so when latrines are the VIP (Ventilated Improved Pit) type. The method however, has its shortcomings. It requires a property owner to have a lot of space for digging pits once one pit is full. This is impractical where there is crowding, where property sizes are extremely small and in places where soils are difficult - either too rock (impenetrable ground) or too soft (pits susceptible to collapsing). Besides, such pits may be a source of destabilization of foundations of nearby houses. In places where the water table is high and/or are areas prone to flooding, pit latrines cannot be very useful. Pit latrines can be a source of nuisance arising from odours, more so when the pit is almost getting filled or when ventilation is poor.

Pit latrines provide ideal grounds for disease vectors due to the humid conditions in the pits. Finally, a pit latrine can be a source of contamination of water, both the ground waters (e.g. by increasing nitrate levels) as well as surface water, particularly through pathogenic contamination.

Waterborne Sanitation Systems

This system is also referred to as flush-and-discharge. It is based on the wrong premise that human excreta are a waste suitable only for disposal and that the natural environment is capable of assimilating this waste (SIDA 2000: 10). Whereas this method is considered as very safe and very effective in human excreta disposal it has its own shortcomings:

- It tends to waste a lot of precious water, often-treated water ready for consumption. It is estimated that an adult human being on average produces about 50 kilogrammes (or litres) of faeces per year. This is the potentially harmful part of human excreta. Further, on average, an adult human being produces about 500 kilogrammes (or litres) of urine per year. Urine is relatively sterile while faeces are potentially harmful to the environment and human health. The tragedy of flush-and-discharge method lies in its failure of source-separation of urine and faeces. The two components are mixed rendering the entire 550 kilogrammes (or litres) potentially harmful to the environment and human health. To make the matters worse, these 550 litres are flushed away using a minimum of 15 000 litres of clean and treated water. In the final analysis, over 15 500 litres per person per year are contaminated by a mere 50 litres of faeces instead of being put to other better uses. This is wastage and misuse of water as a resource.
- Sewers are normally prone to leakage, thus adding to the possibility of contaminating groundwater or, nearby water bodies or even adjacent pure and treated piped water. Besides, it is a known fact that over 90% of the sewage in developing countries is discharged untreated into surface waters (SIDA 2000: 10);
- It is a very expensive method of sanitation in terms of construction, water mis(use), institutional capacity and general operation and maintenance/management. For instance, according to SIDA (2000: 10), annual investments for so-called modern water and sewer systems for developing countries have been estimated to be \$ 30 billion, and by 2025 this cost may rise to \$75 billion. These estimates exclude the cost of maintenance. This is unaffordable for poor countries in the developing world.

All in all, the disadvantages of conventional methods of human excreta disposal are immense. Uganda Government summarizes the shortcomings of these conventional methods as follows:

- Most of them contaminate water sources;
- are a high risk of disease spread and contamination;
- use a lot of water and hence reduction in quantity for other uses;

- maximize potentially dangerous material;
- offer opportunity for vectors to breed;
- prompt an “I don’t care attitude”, whereby nobody cares what happens to the excreta once it is released from the body;
- have high effect of mismanagement, e.g. more people in a larger area may be affected when, for instance, sewer lines are not functional, or leaking or when faeces are exposed; and
- offer more opportunity for accidents, especially in pit latrines (Republic of Uganda 2003:2)

Eco-san as an alternative comes in handy since it not only overcomes the shortcomings of the conventional methods but it also has a lot of benefits to the natural environment. Eco-san seeks to address problems associated with the conventional human excreta disposal methods. This is done through advocacy of the fundamental ecological principles of zero pollution, water conservation and recycling. Hence, eco-san has also been rightly referred to as sanitize-and-reuse system (Winbald 1997) whose objectives, as outlined by (Republic of Uganda 2003:2) are:

- Disease prevention by sanitizing human faeces (zero infectious);
- Reduced water use, thus prevention of pollution;
- Recovery of plant nutrients by recycling human faeces (zero waste).

Disease Prevention by Sanitizing Human Faeces (Zero Infectious)

Sanitizing human faeces can be either through dehydration or composting so as to render the faecal material harmless by destroying all the pathogens that are potentially harmful to human health. Eco-san as a sanitation policy option can help address urban management problems created by the crisis of, and in, urban planning and sprawl. As noted above, human faeces contain potentially harmful pathogens, which, if not handled carefully, can be a source of disease transmission. Already Africa and developing countries in general are facing problems of faecal contamination of drinking water since only a very small fraction of sewage is treated.

For instance, Rodgers (1995: 138 – 140) notes that about 50 % of greater Cairo’s sewage is dumped untreated into open drains which eventually empty into River Nile - the primary source of water for irrigation and domestic use. According to UNEP/UNICEF/WHO (2002:44 – 47), about 2.4 billion people worldwide do not have access to even a simple latrine. Hence, in Asia’s major rivers, faecal coliform count can be 50 times higher than the World health Organization’s set guidelines. Further, in Latin America, only about 14% of urban wastewater receive proper treatment before discharge. The situation in Africa could be even worse. In 1998, for instance, over 99% of the 2-million diarrhea diseases-related deaths of children occurred in developing countries.

Reduced Water Use - thus Preventing Pollution

Eco-san seeks to reduce water use and wastage. Freshwater is already a scarce resource with only 0.008% of the planet’s water being available for human consumption. This is unevenly distributed leaving about 70% of the world population without clean water (Rodgers 1995:139). Already this scarce resource is facing depletion and contamination - both the surface as well as the ground water. Adoption of eco-san can greatly contribute to solving the problem of faecal contamination of water resource.

Recovery of Plant Nutrients by Recycling Human Excreta (Zero Waste)

Human excreta contains valuable nutrients needed by crops, such as Nitrogen (N), Phosphorus (P) and Potassium (K). Urine, in particular, has up to 80% of the NPK fertilizer value (SIDA 2000: 11), and these nutrients are readily available for intake by plants (Vinneras 2002: 16). In addition to the above nutrients, sanitized faeces act as a soil conditioner, thus improving the soil’s capacity to hold water and consequently promoting agriculture and food production.

The benefits of eco-san over conventional methods of excret a disposal are immense. GTZ (2002:5) has summarized these benefits as follows:

- Promotes recycling (safe, hygienic recovery and use of nutrients, trace elements, water and energy);
- Conserves resources (lower water consumption, substitution of chemical fertilizers, minimal water pollution);
- Improves health by minimizing the introduction of pathogens from human excreta into the water cycle;
- Gives preference to modular, decentralized, partial-flow systems for more appropriate, cost-effective solutions;
- Helps preserve soil fertility;
- Improves agricultural productivity and, hence, contributes toward food security; and
- Promotes a holistic, interdisciplinary approach (water supply and sanitation management, conservation of resources, environmental protection, urban planning, agriculture, irrigation, food security, promotion of small business, health, household energy).

Way Forward

Ecological sanitation as a policy option cannot be ignored given the immensely many merits associated with it. Eco-san aims at promoting better and improved sanitary management of human excreta. If embraced in urban areas, eco-san, among other advantages, can be a panacea to the current problems of, and arising from, urban planning and sprawl crisis in Africa. More specifically, eco-san can help solve problems arising due to fast growth of cities into the peri-urban areas without accompanying provision of sanitation services in these areas. Adoption of this method in a city, particularly in peri-urban areas, can greatly help to:

- improve health conditions in slums and peri-urban areas;
- curb pollution of water – both ground and surface water;
- reduce water consumption, hence a big saving by municipal authorities and individual residents;
- promote urban agriculture and therefore urban food security through the use of nutrients (NPK) contained in the excreta;
- reduce reliance on, and the use of, chemical fertilizers in agricultural production;
- reduce problems arising from urban sprawl phenomenon.

Conclusion

Eco-san method of disposal (and utilization) of human excreta has an important role in future sanitary planning. However, despite all the benefits associated with eco-san in dealing with urban planning and sprawl crisis in Africa and the associated health problems, there is need to deal with misgivings that are likely to delay faster adoption of this method. The major problem is in the area of socio-cultural perceptions and attitudes toward the handling and management of human excreta. Cultural as well as religious reasons make most people in Africa to generally be faeco-phobic (fear of faeces and urine). The uphill task is to convince people that once human excreta is sanitized, then it is safe and can be handled without any fear of contamination.

Winning people's acceptance of human excreta as a valuable source of agricultural nutrients, not to mention other benefits associated with eco-san, can be a very slow process. Thus, for eco-san to be embraced and fully adopted, concerted effort by all stakeholders, including individuals, groups and organizations is required. In particular, relevant government departments and ministries, for example, health, water, urban planning among others, should be in the forefront to champion the cause of eco-san given its evident benefits to the nation.

