

GHANA'S EXPERIENCE WITH KUMASI VENTILATED IMPROVED PIT (KVIP) LATRINE

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ABSTRACT

Since the International Water Supply and Sanitation Decade (1981-1990), many developing countries including Ghana have given attention to domestic water supply and sanitation in urban planning and developing. However, the majority of the population who live in the rural areas still lack water and satisfactory sanitation, especially excreta disposal outlets.

This paper documents the experience of the Bureau of Integrated Rural Development (BIRD) in the promotion of KVIP latrine and examines some of the technical and sociological problems associated with the technology in Ghana.

INTRODUCTION

Since the International Water Supply and Sanitation Decade (1981-1990) and given the spatial convergence of populations upon urban centres, many developing countries have focused attention on domestic water supply and sanitation in rural/urban planning and development. This, notwithstanding, majority of the population, especially those in the rural areas, lack potable water and satisfactory sanitation such as human excreta disposal outlets.

Against the background of increasing faecal related diseases prevalent in many communities which lack sanitation facilities, the development and promotion of low cost, affordable and viable technologies which incorporate traditional systems in design and are therefore compatible with developing country conditions have engaged the attention of sanitation engineers and development planners.

The search for a new technology and an effective approach to environmental sanitation, especially the hygienic disposal of excreta has led to the introduction and promotion of the Kumasi Ventilated Improved Pit (KVIP) latrine. The development of the KVIP latrine technology in Ghana forms part of a strategy aimed at improving the living conditions of rural people by means of a systematic programme embodying the provision of basic services and infrastructure such as education, communication, health and sanitation.

Active in this development and technology promotion drive are the environmental health engineers, health inspectors and rural development experts who collabo-

rate in their efforts towards developing effective technologies for excreta disposal in a safe and clean environment.

Recently, government efforts have been directed towards Economic Recovery and its accompanying Plan of Action to Mitigate the Social Cost of Adjustment (PAMSCAD) programmes. The Economic Recovery Programme (ERP) which was introduced in April 1983 under the World Bank and International Monetary Fund (IMF) conditionality aimed among other things: to provide water and sanitary facilities which have tended to reduce the incidence of faecal and urine related diseases arising from substandard disposal systems, defecation in the bush and open places. However, more remains to be done in terms of research to discover ways and means of eliminating or reducing to the barest minimum the incidence of faecal related diseases and thereby raise health standards in the rural and urban areas.

The adverse consequences of improper waste disposal systems, especially faecal matter in the rural areas, has necessitated the promotion of the KVIP latrine technology by the Bureau of Integrated Rural Development (BIRD) as part of its rural development objective. So far, both rural and urban communities have benefitted from consultancy services provided by BIRD in the provision of sanitation and other infrastructural facilities such as schools, community clinics etc, under the European Union (EU) Government of Ghana (GOG) Microprojects Programme.

In the implementation of these projects, particularly the KVIP technology, a number of technical, economic and sociological problems have been identified. Among these problems are economic and budgetary constraints, the inability of communities and District Assemblies with responsibilities of providing and maintaining public places of convenience and managing domestic waste disposal facilities to meet set objectives and targets.

Moreover, in areas where public KVIP latrines have been provided, they have often failed to function properly due to abuse by users. In the promotion and diffusion of the KVIP latrine technology some other notable problems which have been encountered include cultural practices which always act as barriers to KVIP latrine technology adoption. This needs to be removed through education in order to make the KVIP technology acceptable.

Given the limitations of the traditional pit latrine viewed along hygienic and technical lines and that of the open



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latrine not forgetting the indiscriminate defaecation and the nuisance it creates, the KVIP latrine technology provides a more hygienic option for excreta disposal in the rural and urban areas in Ghana.

The Role of the Bureau of Integrated Rural Development (BIRD) in Rural Sanitation.

Ghana's sanitation problems are not confined to the urban centres. Rapidly increasing rural population has created a growing need for efficient human excreta and domestic waste disposal systems in the countryside. Realising the importance of sanitary facilities in rural development and in order to overcome the health problems related to poor sanitation infrastructure (e.g. gastroenteric and respiratory diseases), development experts have looked for alternative approaches to excreta disposal which would be acceptable to both rural and urban dwellers.

After years of research, design, testing and construction, the Kumasi Ventilated Improved Pit (KVIP) latrine is increasingly becoming accepted as the best available alternative to the traditional pit latrine. In 1987, the Kumasi Ventilated Improved Pit (KVIP) latrine was developed by the Civil Engineering Department of the School of Engineering in the University of Science and Technology in Kumasi. Since then, the Bureau of Integrated Rural Development (BIRD), has collaborated with the Civil Engineering Department and has successfully transferred the technology to the rural areas.

The rural sanitation challenge has been a major concern for BIRD whose primary objective is to assist rural people to improve upon their living conditions through research, education and training. As a research institute which focuses on rural development, BIRD fulfills three roles in rural sanitation: the creation of awareness and dissemination of research information, the development of skilled manpower at the local level to maintain KVIP latrines and implementation of transfer of research information on the technology to rural people. By transferring technology to solve the real life issues of rural dwellers, BIRD has provided the opportunity for multi-disciplinary collaboration between the Civil Engineering Department and BIRD. The overall goal of the Bureau in promoting the KVIP latrine technology is to minimise faecal-related diseases and improve upon the health standards of rural people.

BIRD has been responsible for providing technical advice on the KVIP latrine technology which is being implemented, both as community initiatives project (CIP) and as part of the Ghana Government European Union (EU) Microproject Programme. The financing of KVIP latrine construction is done by the direct users who pay for the full cost of the project. However, in some poor communities, the EC, donor agencies and Non-government organizations (NGOs) such as the World Vision International (WVI) provide assistance to communities which are able to mobilise resources and show a commitment towards self-help.

The Bureau has been directly involved in research programmes that are part of rural development and has assisted rural communities to implement KVIP latrines in many communities in Ghana. It has been involved in

the management of KVIP latrine projects in Ashanti, Brong Ahafo, Volta and Western Regions. The Bureau recognises the fact that if the implementation of sanitation projects is to be successful, it is important to involve the community. The Bureau therefore organises seminars and workshops which bring together rural development experts, technical staff and local project managers to discuss problems in rural sanitation, project planning, implementation, monitoring and evaluation.

In addition, BIRD trains local artisans on the job to erect KVIP latrines and through that improves the skills of local artisans while providing them the opportunity to earn income through KVIP latrine construction.

The Kumasi Ventilated Improved Pit (KVIP) Latrine

The KVIP latrine was conceived for the purpose of providing a more permanent pit latrine that can be emptied and the contents used as a soil conditioner. Well constructed and maintained KVIP latrines have the advantage of overcoming the nuisances such as smell and flies which are commonly associated with the traditional dry pit latrines.

The KVIP latrine which is an improvement on the traditional dry pit latrine consists of a substructure which is the pit and a superstructure or the cubicle. The KVIP latrine is roofed with corrugated iron sheets and is designed in such a way that it provides double pit holes in each cubicle that can be used alternatively. A squatting plate constructed essentially with concrete is provided on one side of the floor in the cubicle.

A vent pipe is provided to carry foul air resulting from the decomposing excreta in the pit out of the pit and away from the superstructure into the atmosphere. The vent pipe which is located in the slab on the pit and the fly screen made from mosquito netting (metallic or plastic) which is placed at the top of the vent pipe prevent the entry or exit of flies into or out of the pit respectively. The faeces are retained within the sealed compartment until the pathogens die so that when the contents are removed they are inoffensive and harmless.

A properly built KVIP should meet certain design and engineering standards especially in areas where the physical conditions are not suitable. It is not possible to illustrate all the possible KVIP latrine design options available to rural people, however, Figures 1-4 illustrate one of the design options which has been implemented by the Bureau of Integrated Rural Development (BIRD) under the European Union (EU), Ghana Government Microproject Programme.

The main variations in design options depend on the holding capacity or the number of seaters provided.

Advantages of the KVIP Toilet

The KVIP latrine has many advantages over the traditional pit latrine. In areas where soils are declining in fertility and local people traditionally use night soil as a fertilizer, the KVIP toilets serve as an ideal source of manure.

The KVIP latrine technology gives privacy to the users especially women who feel a greater need for privacy than men.

It is also easy to use and is odourless because the foul gases which are produced in the process of decomposition are vented away through an external ventilation pipe. It is therefore odour free if properly maintained and free from flies with the aid of the flyscreen which stops unwelcome visitors (flies) from dropping in. For these reasons, they can be constructed close to dwellings and within townships. This reduces the distances that one has to walk to reach the facility.

In a recent survey of 60 households around refuse dumps and previously open defecation points at Nkoranza, the responding households reported that with the introduction of the KVIP latrine, the environmental conditions of the town has improved and the number of diseases reported at Nkoranzaman hospital by the reporting households have reduced remarkably. Reported cases of diarrhoea and dysentery among children were reported to have reduced by 50 per cent in the households compared to the period when there were no KVIP latrines. When the users of KVIP latrine were interviewed in three project areas in the Brong Ahafo Region, the overall impression of local acceptability and the success of the KVIP latrine technology was established. Local respondents unanimously agreed that toilets that can be emptied are necessary for settlements with large populations and where availability of space for excreta disposal poses a problem.

Emerging Problems which Limit the Use of KVIP Latrine

Despite the advantages of the new technology, certain basic technical, social, administrative and economical factors limit the use of KVIP toilets in the rural areas. A survey of rural sanitation by the World Health Organisation (WHO) suggested that funding limitations are still the most serious constraint on achieving the goal of sanitation for all by 2000 (WHO, 1987).

In Ghana, like other African countries, the main problem as many rural people see it, with the KVIP latrine technology is that it is very expensive to construct compared to the traditional pit latrine because of the ventilation pipe, the pit lining and the superstructure which are required.

The cost of KVIP latrine is noted to be expensive to be afforded by small communities which need it. This has significantly impaired its widespread adoption, inspite of its proven advantage in overcoming the nuisances that discourage the use of traditional pit latrine. Hence, whilst there is an increasing demand for KVIP latrine, some effort must go into making it more affordable to low income households in the rural areas.

The cost of construction of the KVIP latrine is high because of high and increasing cost of building materials and labour. The lack of building material and labour are also factors which hinder adoption of the technology. Many rural communities in Ghana do not have the cash savings to build a KVIP toilet without external assistance. Although rural communities which benefit from EU/GOG microproject assistance do not pay the full cost of the KVIP latrine, the communities contribute a portion of the cost. In the current funding period, about 65% of the cost is paid from European Development Fund (EDF) funds, 15% from CPF, 10% from the District Assembly and the local people pay 10% in the form of labour. However, communities which have not been selected for assistance pay the full cost of the project.

According to recent estimates from BIRD, it costs a minimum of 4 million cedis to construct a 10 seater KVIP latrine. The total cost of 20-seater compartment KVIP latrine, including all materials, labour and transportation has been estimated to be in the order of 8 million cedis. The costs of BIRD's ongoing KVIP latrine projects financed under the microproject scheme in different locations in the Brong Ahafo region are shown in Table 1.

The differences observed in the construction cost of KVIP latrines in the different District Assembly areas are not due to different technical designs, but to site conditions and labour costs. Although the cost may be justified because the KVIP latrine is a more permanent structure, it is well above the ability of poor communities to pay. The problems caused by inadequate finance will undoubtedly continue to occur in many rural communities and therefore external assistance is necessary.

There are opportunities for cost reductions through the use of landcrete block instead of sandcrete block for construction.

TABLE 1: COST OF KVIP LATRINE CONSTRUCTION

District	Town	Project	EDF* (£)	CPF** (£)	District Adm. (£)	Community Contrib. (£)	Total Cost (£)
Kintampo	Kintampo	10 Seater	2,648,601	407,477	561,523	1,351,631	4,969,232
Atebubu	Atebubu	10 Seater	3,343,282	514,350	144,661	800,458	4,802,751
Sene	Kwame Danso	10 Seater	3,108,626	478,250	157,491	200,802	3,945,169
Berekum	Kato	10 Seater	2,556,213	393,263	199,928	385,021	3,534,425

* EDF European Development Fund

** CPF Counterpart Fund

Source: Microproject Report (1993)

With an average of 500 users for the 10 seater KVIP latrine, the first pit fills up after two year. However, it is often the case that where there are too many users of the facility, the pits fill up too quickly. Although the decomposed excreta may be harmless and may be used for land fertility restoration, emptying the pits can present problems.

It has become clear that in the urban areas where KVIP toilets have been provided, they have been poorly managed and maintained. In some places where the user population is very high, the pits have been filled too quickly to allow for full faecal decomposition.

Poorly designed, constructed and unmaintained KVIP latrines create a variety of problems which can cause them to fall into disuse. Poor slab work can constitute a danger to users, especially children.

From discussions held with community leaders and KVIP toilet attendants in six communities in the Brong Ahafo region, many villagers are unwilling to handle faecal matter because it is believed to be dirty and unhygienic. The re-use of decomposed excreta as fertilizer is encouraged but there have been no extensive education and advice on handling and application procedures. Rural people are therefore not encouraged to use decomposed excreta to replenish the soil. The lack of knowledge and information denies rural people from reaping the full benefits of the KVIP latrine technology.

Foul odours may be experienced in the superstructure where ventilation is poor. In addition to the foul odour, the problem of mosquitoes has not been eliminated. However, mosquito breeding can be avoided if dry pits are used. To have a dry pit, the bottom of the real pit should not be less than 0.5m above the highest water table level.

Solid underground rock formations impede the construction of the pit and in areas where the table is high or rises during the rainy season, KVIP toilets cannot be successfully constructed. Ground water pollution which results from the KVIP latrine has not well been investigated but it is known that where KVIP toilets are constructed near sources of drinking water, they constitute an important health hazard for the community. Ground water pollution can occur where poor ground conditions exist. This problem can be overcome by "amounting" the latrine. Proper siting of the KVIP can prevent water pollution.

In areas where people have been defecating in the bush or at the seashore, KVIP latrine patronage is very poor especially where users are made to pay a user fee. A change from old habits usually has problems of acceptance but through education, people would learn to accept desirable changes.

Suggested Solutions to Emerging Issues

KVIP toilets have proved to have many advantages over the traditional dry pit latrine which is wasteful of land. The KVIP toilet is suitable to the urban areas

where land is generally scarce because it can be emptied and reused. There must be an increased commitment to providing KVIP toilets and other sanitary facilities for poor communities.

In the immediate future the economic situation for most rural communities in Ghana is bleak and the expense of maintaining and implementing KVIP toilets may prove very difficult. Donor agencies and decision makers must therefore make KVIP toilets more accessible to communities that need them and yet cannot afford for financial and technical reasons. The local planning agencies should assist communities to prepare layouts by integrating housing with public places of convenience in an efficient manner.

The problem with people not wanting to handle decomposed excreta can only be solved through education so that rural people will understand that it is harmless and the decomposed faeces has value as fertilizer. Education on the proper use and maintenance of KVIP toilet will minimise the problems encountered by communities who have provided with the facility and also convince communities of the potential benefits of the KVIP toilet.

Communities must be reminded to change pit at the right time especially where double pits have been provided. Demonstration which provide rural people with opportunities to see and handle the contents of a pit as it is emptied has an appeal to rural people and may serve as the strongest persuader for communities implementing KVIP latrines.

An appropriate excreta disposal project must be ecologically sound, that is, it must be hygienic and should avoid environmental damage. To prevent water pollution, KVIP toilets should be constructed away from drinking water source. This will reduce water pollution and the incidence of faecal related diseases which result from water pollution.

In view of the state of the KVIP latrine technology in rural sanitation as well as the potential of the KVIP toilet for helping to solve the excreta disposal problems in Ghana, BIRD must promote improved methods of construction of KVIP toilets. There are opportunities for reductions through the use of low-cost materials including the choice of pipes and sanitary fittings such as doors and locks. Re-designing the KVIP latrine or the use of available local building materials to reduce the cost without sacrificing its ability to make the environment safe and clean should be investigated further to enable its widespread use.

Limited instances exist in which local people are consulted on questions of design except in implementation. More often than not, the KVIP latrine has been designed without due accounts of traditional technological and aesthetic principles to which potential users are accustomed.

This has not been good enough because what has worked in one community may not be suitable for other communities.

To make excreta disposal technology acceptable to a community, it is essential to understand the background - the customs, traditions and religious taboos of the people. In some places a KVIP latrine may not be acceptable at the household level because the father and the mother will not defecate in the same place as the daughters and sons respectively.

The successful design and implementation of KVIP latrine technology should not assume these factors away or exclude local wisdom and values in the design and implementation of the KVIP toilet. Local norms, institutions, ethnic values and all related factors which are impacted by the KVIP technology are taken into account by BIRD in the design and construction of KVIP latrine.

Even though the construction of KVIP latrine is a technical activity, local artisans should be trained to acquire the engineering skills for construction. Seminars and workshops must bring together KVIP latrine technologists and local project managers to share ideas, experiences and a deeper understanding of the technology to solve the sanitation problems of rural and urban dwellers. Workshops can play an important part in improving the skills of local artisans so that the new technology can be sustainable. Community education and training should complement investment in KVIP latrine project implementation. Community Education in the use and maintenance of KVIP latrines must be organised by sanitation planners with support from donor agencies, District Assemblies and rural development agencies such as BIRD.

Rural sanitation and improvement should not be seen as a single project activity but as an integrated strategy. For the KVIP latrine to have its full impact on the environment, other complementary facilities such as health, rural water supply and street drains should be provided.

CONCLUDING REMARKS

I do not pretend that these comments have done more than outline some of the emerging difficulties encountered by poor rural communities implementing KVIP latrine technology. However, one thing I feel reasonably confident about is that both urban and rural people have accepted the technology because it is environmentally safe. Privacy, convenience, better health and a sense of prestige which the technology offers rural communities have made the KVIP latrine popular and acceptable.

Efforts should therefore be made to improve the technology by making it simple and affordable in order to ensure its widespread use in the rural areas.

Since much of the criticisms levelled against certain technologies which fail to make impact on rural people are blamed on inefficient education and motivation rather than technical failure, rural development efforts by BIRD should be strengthened and intensified especially in the area of community education and training.

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