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Addressing rural sanitation in Botswana

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The Government of Botswana is implementing the first phase of a national rural sanitation programme, following from the success of a pilot project. The programme's objective is to contribute to the control of water and excreta-related diseases through improvements in sanitation infrastructure and personal hygiene at the household level. For many years, an impressive water supply programme has provided clean water to over 80 % of gazetted rural villages. By contrast less than 30 % of this population has access to formal sanitation. This programme aims to redress this lag.

SANITATION INFRASTRUCTURE

Latrine Design

The programme promotes the use of ventilated improved pit (VIP) latrines through a policy of subsidised self-help construction. The principles of the Blair VIP latrine have been used and modified to accomodate local physical and socio-cultural conditions.

Pits are rectangular with a 2.7 cu meter capacity. They are constructed with ring beams in stable soils or lined with hollow cement blocks in unstable soils. In sandy areas, a circular pit lined with trapezoidal blocks is used. Three reinforced concrete slabs complete the substructure.

Ventpipes are 3 meters long with a 100mm interior diameter. A pitch-fibre pipe is currently used replacing the earlier hessian and PVC pipes. Stainless steel wire mesh flyscreens are fitted. A glass-fibre or polyurethene seat liner with tapered chute is fitted.

Most superstructures are built using cement blocks. The walls are usually plastered and painted and often a privacy wall is attached. Doors are generally fitted. Corrugated iron sheeting provides roofing.

Implementation

The programme is implemented by District Councils with support from the Ministry of Local Government & Lands. Within each district, villages are selected based on a range of planning criteria. At the village level, participation in the project is voluntary. Mobilisation relies on the health education and promotion activities described below.

Latrine construction is a shared responsibility between householder and government. First, the householder registers and pays a Pula 30.00 fee (1 Pula = 0.52 $US, Dec 1988). Then s/he must excavate the pit to specified dimensions. Where unpickable soil is encountered, the council assists with a jackhammer.

Second, the council constructs the sub-structure. Until now, council has directly employed its own builders. Now in selected areas, council will contract this work to small citizen builders in an effort to reduce council overheads and achieve higher productivity.

Third, the householder constructs the superstructure. Household or hired labour can be employed while traditional or modern materials can be used. In some cases, the council offers a free door as an incentive for rapid completion. Finally, the council installs the seat liner, the ventpipe and flyscreen.

The total construction cost varies between P491 and P558, depending on design details. The household contributes 42% of the cost. The subisidy is therefore in the order of 58%. Of this amount, two-thirds represents capital costs borne by central government while one third represents recurrent costs borne by the council (ref 1).

SOCIAL MOBILISATION AND HEALTH EDUCATION

These activities have been central to the programme in Botswana, as it is recognised that infrastructure provision in the absence of health education will not necessarily improve a community's health status. The aim is to create awareness about community health problems and to demonstrate how the proper use of latrines can assist in addressing such problems. A demand for latrines must first be created so that people are willing to contribute to construction costs, and thereafter ensure that latrines are used and maintained properly. Of equal importance is to link the project to other primary health care practices which affect community health, such as proper storage of water and handwashing.

These activities are implemented by a range of individuals and institutions. Initial promotion is undertaken by project staff based in council public health departments. They target their promotion on community leaders who in turn address the community at large. Key opinion leaders and facilitators include the tribal authority, members of the village development committee, NGO and government extension workers. It is usual for meetings to be held at the tribal assembly and then for workshops to be organised to discuss the project in greater detail.

Once the project has taken off, seminars and workshops focussing on health education are organised. In these instances, the existing primary health care delivery system is used in order to integrate this particular project into wider PHC activities. Workshops therefore tend to be multidisciplinary, rather than focussing exclusively on sanitation issues.

BACKGROUND TO THE NATIONAL RURAL SANITATION PROGRAMME

Government support for on-site sanitation provision started with an urban low-cost sanitation research project, funded by IDRC in 1976. It developed a double vault VIP latrine, to operate on the alternating pit principle. This latrine has been used as the basis for sanitation provision in urban non-sewered site and service areas. Plots are serviced with a latrine substructure, provided by the council. With the support of a building material loan, plot holders construct the superstructure, a pre-condition for receiving a certificate of rights. Service levies are charged in part to recover the cost of the substructure.

In rural Botswana, latrines have existed for a considerable time. However, few householders possessed such facilities and many of these were poorly built and insanitary. Increasing concern for the protection of the environment - in particular scarce water resources - and the increased incidence of excreta-related diseases, prompted government to consider ways in which rural communities could improve their sanitation.

In 1980, the first government supported rural sanitation project was established: The Environmental Sanitation Protection Project (ESPP). Project design was influenced both by developments in urban low-cost sanitation in Botswana, and by wider international support to the UN International Drinking Water Supply and Sanitation Decade. Research from Zimbabwe's Blair Institute was particularly influential.

As a pilot project, ESPP sought to develop an effective health education programme, an appropriate sanitation technology for rural conditions, and a replicable and sustainable technology delivery system. The project was implemented between 1981-82 in 2 districts. Although the project only succeeded in fully achieving the second objective, it was deemed a success and experience gained and lessons learned were documented in two technical manuals. In 1982, the district councils expressed their desire for the project to be extended, and with the assistance of MLGL, set about developing a second phase.

SELF-HELP ENVIRONMENTAL SANITATION PROJECT (SHESP)

The project began in 1984 when a plan of operations was signed between the Government of Botswana and UNICEF. With the aim of encouraging latrine construction and improved community hygiene, SHESP continued where ESPP had left off in trying to develop sustainable and replicable delivery systems. It represented the second phase of the pilot project. It was implemented in 4 districts - the initial ESPP districts, Southern and Kgatleng, and 2 additional districts, Kweneng and Central. When it was recognised that this phase of the project could not possibly be completed within two years, it was extended, coming to a close in 1988.

An end of project evaluation conducted in August 1988, concluded that although the achievement of project objectives had progressed unevenly, substantial overall progress had been made in the development of a sustainable, replicable and effective rural sanitation programme, sufficent to warrant the establishment of a national programme (ref 2).

Boosted by these achievements, and with over 3500 project latrines now in use, efforts are underway to extend the project to all of Botswana's districts. At the time of writing eight out of Botswana's nine district councils are included, reaching over 60 rural communities.

SUSTAINABILITY AND REPLICABILITY OF THE PROGRAMME

In moving from a pilot project to a national programme, solutions to questions relating to the sustainability and replicability of the project need to be considered to ensure long term viability. Below, some of these issues are raised, which are considered relevant not only to the programme in Botswana, but also to similar projects in Africa.

Latrine Technology - Technical and Socio-cultural Suitability

The Blair VIP latrine concept has been adapted to create a design appropriate to Botswana's physical and socio-economic conditions.

The Substructure is the most important part of the latrine and is the part provided by the government. The design is based on the following criteria:

* sound cover slabs to support the superstructure, and to be cleanable

Three segment pre-cast reinforced concrete slabs are used. Inserts are made for the drop-hole and ventpipe while the upper surface is smooth to facilitate cleaning. One slab is exposed and is removable to permit pit emptying. Quality control is essential to ensure concrete is properly mixed, reinforcement is correctly placed and curing is completed.

* appropriate pit lining to prevent collapse of superstructure and pit, avoid groundwater contamination, and permit re-use after emptying

Four design options are available to suit different soil conditions. Botswana tends to have unstable sandy soils where a full lining is required, or stable granitic formations where excavation is difficult and pits must be raised. Here, only a ring-beam is required. If a risk of groundwater contamination exists, the pit is sealed, and preferably raised. The responsibility falls on the project coordinators to assess which design to use. Further training is required to improve their ability to make correct judgements.

* pit with sufficient capacity to last at least 10 years for an average family of 6 persons

Ideally, a pit should be as deep as possible to increase the life span of the latrine. In practice, this is not possible. The cost of lining a deep pit in unstable soils, or of excavating in hard unpickable soils is prohibitive. Moreover, the protection of groundwater sources is a major concern where almost all potable water in rural communities is obtained from such sources. For these reasons, a relatively shallow pit is prescribed giving a useful life of about 10 years.

Superstructure design reflects household's preference although demonstration units have been built to display different designs. Both ESPP and SHESP promoted the use of traditional as well as modern materials. The former have proven unpopular.

Most households build their latrines with modern materials; corrugated iron sheets and cement blocks, and install a door. The quality of workmanship is generally high, especially where local builders have been hired. This preference reflects wider trends in house building where the use of modern building materials is replacing traditional ones. Latrines are perceived as modern household accessories and are built accordingly. This in part reflects a status value but there are practical reasons too. During drought, roofing grass is scarce and expensive. Mud walls require regular maintenance. Increasingly, local artisans are losing traditional building skills. Where they exist, they are at a premium and are expensive. Modern structures by contrast can be built at a resonable price and are, moreover, durable, requiring less maintenance.

The permanency of the superstructure and high cost incurred creates a potential dilemma in the long term, since the structures are built on pits which will fill up. Several scenarios exist. A new latrine can be built using materials recovered from the first one. Alternatively, the pit can be emptied. This is not an obvious solution. First, manual emptying is culturally unacceptable and can be a health hazard where fresh material must be handled. Second, mechanical solutions for the removal of highly viscous sludge are sophisticated and expensive. While feasible in site and service areas where a phased empyting schedule can be implemented and where a proportion of costs can be recovered through service levies, this is not the case in most rural areas. A third option is to build double alternating pits to facilitate safe handling of inert sludges with simpler village-based technologies, if cultural resistance can be overcome. The government is currently investigating the possibility of developing cheaper, village operable and maintainable systems.

SUBSIDISATION AND COMMUNITY PARTICIPATION

Criteria used in determining levels of subsidisation and community participation in the programme must be examined in relation to wider rural sector policy for the provision of social infrastructure.

That policy currently prescribes a high level of subsidisation with minimal community participation in cost sharing, maintenance, or even planning and implementation. The government has provided a wide range of basic needs, such as water supplies, health facilities and primary schools, free of charge to most gazetted villages.

It has been difficult for the sanitation project to break away from this policy approach, although it has gone some way in increasing the level of community participation in most aspects of the project. The overriding concern of this, and indeed, of related basic needs projects is the effect of this policy on long term replicability and sustainability, and on operation and maintenance standards.

The case of sanitation should be compared to that of water supply. The financing, planning and implementation of rural water supplies is undertaken by central government with cooperation from donors. Community participation is limited to choosing sites for standpipes. With the exception of some larger towns, local authorities are responsible for the operation and maintenance of supplies. This includes repair work, the supply of fuel, and hiring of pump operators, stationed within the community. These activities are financed through the local authority recurrent budget. The community uses the water free of charge; fees and tariffs only being imposed on households with private connections. The limit of community involvement in the operation and maintenance of supplies is to assist in protecting standpipes by erecting fences and by participating in water hygiene campaigns.

In the sanitation programme, community participation is more substantial at all stages of the project cycle, while the level of financial contribution is also greater. As an on-site private facility, rather than a public one, the household decides whether or not to join the project and accepts to make the necessary financial and physical contributions. The network of village institutions and extension workers are also centrally involved in mobilisation campaigns as well as supporting the health education programme.

Responsibility for physical implementation is also shared - the household excavating the pit, providing the superstructure, and paying a registration fee. As noted, this amounts to 42% of construction costs. Efforts are being made to reduce the overall cost of the latrine structure. Currently, it is felt that the cost of the substructure, provided by government, cannot be reduced significantly without compromising safety standards. Some savings are being sought by contracting work to small citizen builders. It is hoped that a lower unit cost can be obtained as a result of higher productivity and a more cost effective use of transport. It is too early to say if such savings are being realised. The cost of superstructures can be reduced by supporting the production and use of cheaper materials such as soil cement blocks and by building a more compact structure. In the end, the choice rests with the consumer. However, so long as current levels of subsidy remain unchanged, any savings made in superstructure costs will serve to reduce the relative household contribution to the overall cost of the latrine. As yet, no plans exist to change the current level of subsidisation.

Responsibility for operation and maintenance rests with the household. Maintenance is minimal as the latrine is virtually maintenance free. It is restricted to proper use, encouraged through user education and periodic maintenance of the structure. Government responsibility should be restricted to inspection and health education and therefore costs should not be substantial.

No decision has yet been taken on what should be done when the latrine pit becomes full. If a new latrine is to be built, who should shoulder the cost ? to what extent can materials be recovered and re-used ? should government again assist households to excavate in unpickable ground ?

The other option is to provide a pit emptying service so that the latrine can be re-used. The problem rests in identifying the best method for sludge removal and disposal and deciding who should pay ? In identifying appropriate solutions, attention must focus on capital and recurrent financial implications, institutional capacity and responsibility and public health standards.

The question of subsidisation levels and user tariffs is a broad one affecting rural development policy in general. Individual projects are influenced by wider sector strategies and can only go so far in setting their own guidelines. Policy towards sanitation provision must be considered in the context of rural water supply and primary health care delivery. At the same time, the programme must establish it's own clearly defined objectives, the most important of which is to decide whether the aim is to promote the utilisation of VIP latrines through demonstration effect, or whether the objective is to provide every rural household with a subsidised latrine. The second issue to resolve is what to do when the latrine is full ?

Consideration of the role of community participation must however not overlook the argument that it's purpose is not only to recover costs but to ensure the proper utilisation of facilities and to assist in achieving improved hygiene practices. This element, absent from the water supply programme is now recognised as a short-coming and is the reason why a water hygiene education programme has been established.

SANITATION WITHIN PRIMARY HEALTH CARE

The programme aims to help achieve better health in rural communities through the control of water and excreta-related diseases. Children under 5 are especially vulnerable to such diseases accounting for a high level of morbidity and mortality within this age group. In Botswana, diarrhoea is the most common cause of hospital admissions for under 5's and accounts for 20% of recorded deaths in the age category. It is the second most common diagnosed complaint at health facilities accounting for 11 % of adult cases and 18 % of under 5's (ref 3).

As such, the programme contributes to the preventive side in the control of diarrhoeal diseases. To date, significant progress has been made in the promotion of ORT and the alleviation of malnutrition. Greater efforts are however needed to strengthen water and sanitation hygiene education as preventive measures.

The programme concerns itself with more than infrastructure provision, representing a key input to primary health care. Health education is a central feature and to this end, the programme has sought to merge with the existing primary health care delivery apparatus. To this end, health workers responsible for health education are used in the programme. Family Welfare Educators assist project coordinators in promotional work. Workshops are organised to cover a range of related personal hygiene and public health issues and use community health nurses and district health education officers. Greater efforts are being made to better coordinate project activities with those of the successful water hygiene education programme, so that the theme of clean water and safe sanitation can be approached in unison. Already a number of integrated projects have begun which link together water supply provision, improved sanitation and health education.

The execution of these activities has not been without difficulty. In particular, the separation of responsibilities between various ministries, departments and authorities has made the task of coordination and cooperation difficult. Sanitation has typically, had to fight a hard battle to enjoy the recognition it deserves, so that committed assistance from other sectors can be obtained. The case for sanitation requires lobbying as much at ministerial level as at the community level. Effective cooperation can be achieved but the task of lobbying and training is far from complete.

At the household level, the health education programme has had mixed results. The project is popular and the latrine is increasingly perceived as a necessary part of the complete home. Similarly, piped water supplies are widely used and its availability appreciated. In both instances however the perceived benefit of these facilities is convenience and in the case of latrines, privacy. Health benefits are not so widely identified. This fact is reflected in relatively poor standards of hygiene in relation to the protection of water and maintenance of latrines. Evidence shows that clean water is contaminated between the standpipe and the point of consumption. Latrines are sometimes poorly maintained, handwashing remains the exception rather than the rule, and it is still common for young children not to use the latrine and for their faeces to be considered harmless.

The achievement of behavioural change is recognised to be a slow and painstaking process. A start has been made. Further success can be achieved through the improvement of techniques used for health education delivery. Greater community involvement in discussion, teaching and monitoring will certainly contribute to this, but this will necessitate changes in the way in which health education officers are trained and perceive their role in such activities.

CONCLUSION

The basis of a replicable and sustainable rural sanitation programme has been established. It has the committed support of the rural community and government. However, a formal sector strategy is still required to clarify several serious issues: what is the ultimate programme objective ? what level of subsidisation should be set ? how far can cost be reduced ? what should be done when latrines are full ? and how can the impact of health education be strengthened ?

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