Sanitation in Developing Countries

Archival Item

IDRC - 168e

Archives of a workshop on...
The International Development Research Centre is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of developing countries. The Centre's activity is concentrated in five sectors: agriculture, food and nutrition sciences; health sciences; information sciences; social sciences; and communications. IDRC is financed solely by the Parliament of Canada; its policies, however, are set by an international Board of Governors. The Centre's headquarters are in Ottawa, Canada. Regional offices are located in Africa, Asia, Latin America, and the Middle East.

©1981 International Development Research Centre
Postal Address: Box 8500, Ottawa, Canada K1G 3H9
Head Office: 60 Queen Street, Ottawa

IDRC, Ottawa CA


Microfiche edition available
Sanitation in Developing Countries

Proceedings of a workshop on training held in Lobatse, Botswana, 14–20 August 1980

Sponsored by:
Government of The Republic of Botswana
International Development Research Centre
Canadian International Development Agency
Contents

Foreword 6
Participants 7

Technology

Use of dry pit latrines in rural and urban Ethiopia
K. Kinde 9

Pit latrines in Botswana
J.G. Wilson 13

Pit latrines in Malawi
A.W.C. Munyimbili 16

Housing sanitation, Mozambique
B. Brandberg and M. Jeremias 21

The PIP and REC II latrines
J.G. Wilson 24

On-site excreta disposal technologies
E.K. Simbeye 27

Anaerobic digestion as a rural sanitation option
R. Carothers 34

Zambia’s experience with aqua privies
J. Kaoma 41

The Botswana aqua privy
J.G. Wilson 48

Septic tanks
Beyene Wolde-Gabriel 50

Sanitary situation in Addis Ababa
Aragaw Truneh 52

Sewerage and low-cost sanitation: a solution to sanitation problems in developing countries
Frederick Z. Njau 56

Sullage disposal in urban centres
Frederick Z. Njau 59

Technology: discussion 61
Software

Disease transmission
G.P. Malikebu 64

Sanitation and disease transmission
J.B. Sibiya 68

Water pollution and sanitation in Botswana
L.V. Brynolf 71

Primary school health education in Tanzania
I.A. Mnzava 75

Health education in primary schools in Malawi
I.K. Medi 79

Health education delivery system in environmental health programs in Malawi
Winson G. Bomba 81

Rural health services in Ethiopia
Araya Demissie 84

Health education, an essential component in the promotion of health, with emphasis on rural sanitation
Saidi H.D. Chizenga 88

Water supply and sanitation in Lesotho
M.E. Petlane 94

The role of health education in sanitation programs
Winson G. Bomba 101

Some sociological aspects of sanitation provision (with particular reference to Botswana)
Nomtuse Mbere 105

Problems of acceptability of low-cost sanitation programs
P.M. Matiting 111

Community/household participation
A.W.C. Munyimbili 113

Applied community participation in sanitation provision
Nomtuse Mbere 118

Financial aspects of sanitation
Dawit Getachew 123

Financing of low-cost sanitation schemes in the urban areas of Botswana
Brian Bellard 131

Training implications within the sanitation sector in Tanzania
H.W. Rutachunzibwa 135

Health manpower planning and training
P.A. Chindamba 139

Software: discussion 143
Training

Training of civil engineers in Kenya
J. Gecaga 148

Sanitary engineering education in the Faculty of Technology, Addis Ababa University
Alemayehu Tesferra 152

The training of health inspectors in Malawi
P.A. Chindamba 153

Training of health assistants in Malawi
G.P. Malikebu 155

Training of primary health care workers: a personal account
Fred K. Bangula 157

Brigades in Botswana 161

Botswana Polytechnic and its involvement in the teaching of sanitation
J.E. Attew 163

Ethiopian sanitation sector institutional responsibility
Beyene Wolde-Gabriel 165

Training: discussion 166

Workshop Conclusions 167
The PIP and REC II Latrines

J.G. Wilson¹

The rate of urbanization in Botswana is one of the highest in the world and is, at present, approximately 15% per annum. The government is actively engaged in a process of upgrading existing squatter settlements and undertaking site and service developments to the extent that this now constitutes approximately 70% of all housing production. Being acutely aware of the need for appropriate sanitation, the government, in conjunction with the Building Research Establishment, England, has developed a twin-pit ventilated improved pit (VIP) latrine that could be the most appropriate form of sanitation for use in upgraded and site and service areas.

In urban areas, it is not always possible to abandon a full pit and dig a new one. The conventional single-pit latrine (modified or unmodified) can cause serious health hazards when being emptied. In order to overcome this, a new approach to pit latrine technology has been tried.

The permanent improved pit (PIP) latrine (Figs. 1, 2) and the revised earth closet II (REC II) (Fig. 3) have both been conceived for the purpose of providing a permanent unit that can be emptied as required. This can be achieved by providing double pits that are used alternately. The contents are retained within the sealed pit long enough for pathogens to die and when the contents are removed they are harmless and inoffensive.

Botswana, along with many other African countries, does not have a history of reusing excreta. Therefore, the resulting friable humus, though useful as a fertilizer, will initially be removed from the site by the council.

At present, the PIP latrine remains as a prototype at the Building Research Establishment to verify construction details and to investigate the effectiveness of alternative pit ventilation arrangements. The REC II, however, has already been constructed in quantity in Botswana. To date, approximately 2000 have been constructed by con-

Fig. 1. Permanent improved pit (PIP) latrine type A. (After R.F. Carroll, Building Research Establishment, England. Note: Pit top supported by cast in situ concrete liner 100 mm thick, forming two compartments, each having an effective volume of 1.5 m³.)

¹Senior Public Health Engineer, Ministry of Local Government and Lands, Gaborone, Botswana.
The main features of the PIP and REC II latrines (Carroll 1980) are: (1) small double pits, each with an effective volume of 1.5 m³; (2) supported pit tops and superstructure; (3) ventilated pits to reduce odour and attraction of insects; (4) mechanized or manual emptying; (5) 2 year retention period; (6) 3-4 year emptying cycle; and (7) pit contents once decomposed, harmless and inoffensive, to be used as fertilizer.

Because of the intensive housing construction program, the government has committed itself to invest heavily in this sanitation solution in urban areas. It is aware, however, that there are other important factors associated with the program that must be considered in order for it to succeed. The most important of these are affordability, emptying procedures, and health education.

The first of these is dealt with in greater detail in another paper (see Bellard). It can be said, however, that it is the government’s policy to provide a latrine substructure to each plot at a cost that can be afforded by each plotholder. It is the plotholder’s responsibility, however, to construct an approved superstructure and to purchase the locally made fiberglass seat unit.

Having introduced REC II latrines, the government now has 3 years (the time of the first emptying cycle) to complete its proposals with regard to emptying procedures. At present, it is proposed that emptying trials be conducted in conjunction with the Building Research Establishment using a machine that works on a high volume airflow principle and draws all types of material, ranging from light dry material to wet sludge, according to the groundwater conditions in the pit at the time of emptying.

At the same time, it is becoming very apparent that health education with regard to pit-latrine usage is of prime importance. For the REC II program to succeed and be acceptable to the plotholder, a health educa-
tion program must commence immediately. The following are examples of problems that are already occurring:

(1) Latrines are not being completed by the plotholders and, therefore, the government investment is not being utilized because the plotholders do not appreciate the advantages of having a latrine. As far as the plotholder is concerned, the bush is nearby and convenient and does not cost anything, whereas a superstructure does.

(2) Plotholders claim that the pits are too small and will fill too quickly. They do not fully understand the operating principles of the latrine.

(3) Some plotholders have removed the cap from the second pit so children may defecate into the second pit, thereby using two pits at the same time. The plotholder has also been known to use the latrine to wash in and then drain the water into the second pit, thereby flooding it.

Some of these problems will be overcome by slightly modifying the design of the substructure. Acceptance and correct usage and maintenance by the plotholder, however, are of prime importance if this sanitation program is to succeed. If it does not succeed, then apart from the loss of investment, it is the future health of the plotholders that is at stake and, therefore, emphasis must be placed upon increased health education, together with adequate manpower to supervise the implementation of the project.