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Review and Recommendations

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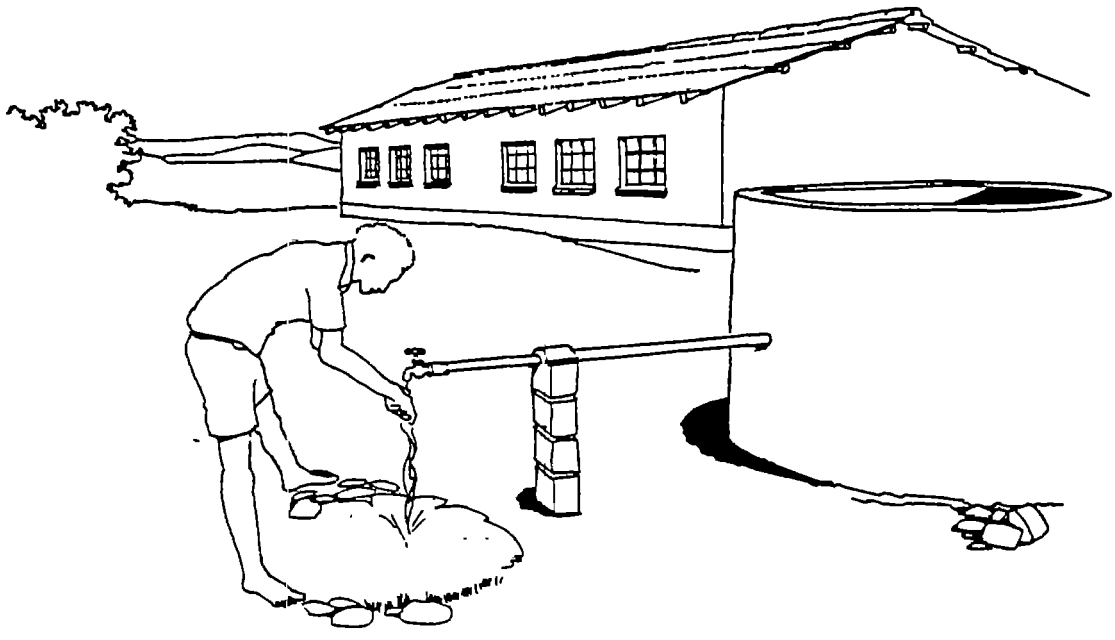
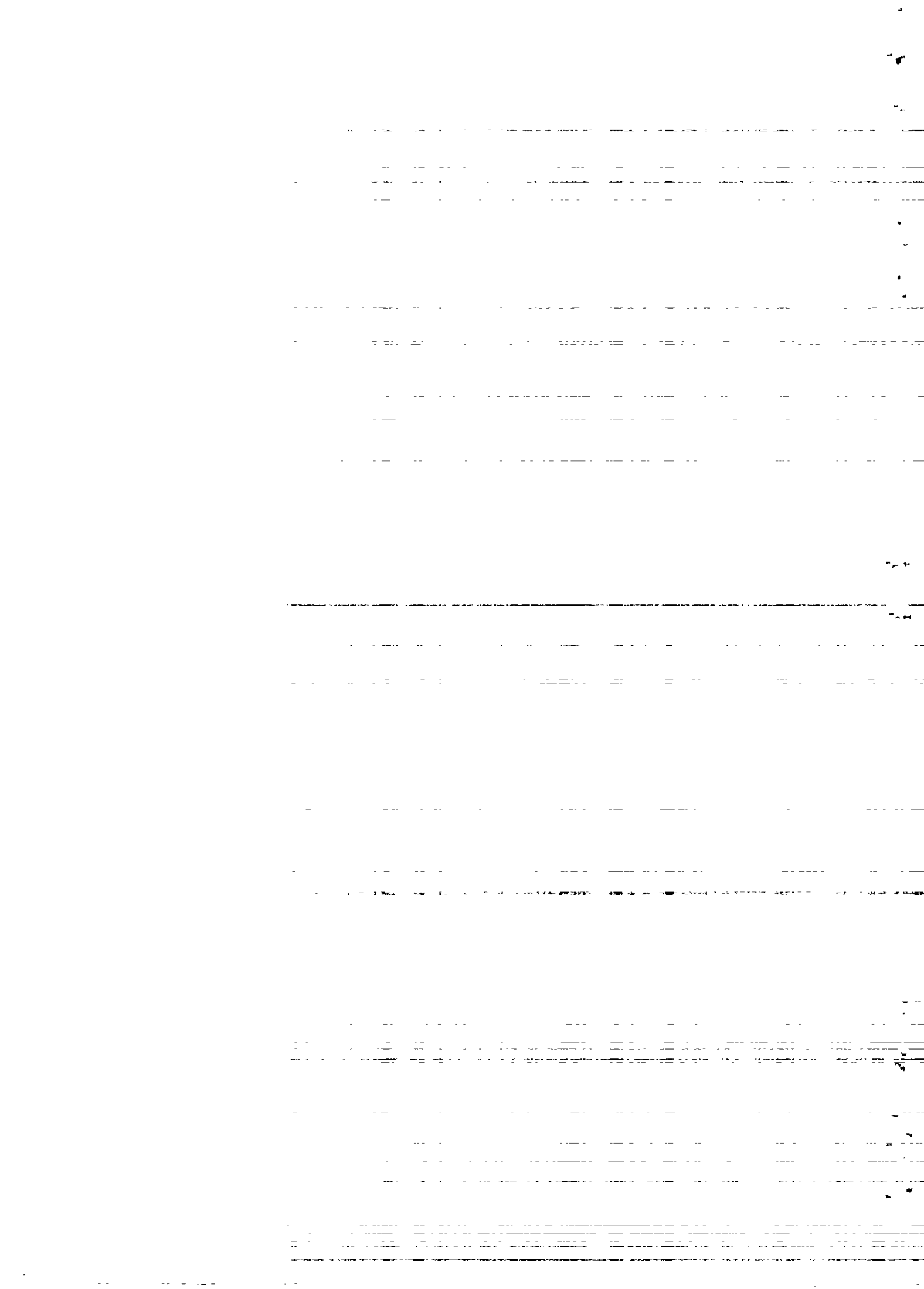


February 1990



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0. SUMMARY

SIDA is in the process of reviewing its strategy in the field of environmental hygiene and has requested us, Erik Nordberg and Uno Winblad, to contribute by studying a few selected SIDA-supported projects, by reviewing the most relevant literature and by reporting our conclusions to SIDA. From past and present SIDA-supported water supply and environmental health programmes in developing countries and from published literature in this field we draw the following conclusions.

A large proportion of morbidity and mortality in poor countries is caused, directly or indirectly, by unsatisfactory water supplies and inadequate basic sanitation. Data quality varies widely, however, and chains of causation are in many cases poorly documented. There is increasing evidence that improved water supply (larger quantities available per household member and less contamination) and improved sanitation, when combined, are associated with considerably reduced burden of illness; this association is particularly strong among poor households and particularly obvious in methodologically superior studies.

Current development programmes tend to neglect the poorest half of the population. Technologies affordable to these groups have not been systematically developed and tested, and insufficient attention has been paid to socio-cultural factors influencing adoption of new practices and new facilities. One particular technology (Ventilated Improved Pit Latrine) has been advocated too widely and too uncritically. Problems of high costs are solved by SIDA-funded subsidies to private households. Problems of non-availability of transport and materials are solved by SIDA-funded import of vehicles, fuel, reinforcement and flyscreens. The programmes are therefore not sustainable by local resources. Nor do they (except in Zimbabwe) operate at a sufficiently large scale to make a real impact on health. Far too much reliance on imported insecticides has distorted vector control programmes, and a new start, emphasizing locally affordable environmental methods, is necessary.

We recommend that:

- environmental hygiene be given a more prominent role and a larger share of the resources within water and health development support programmes;

- much more emphasis be given to sustainable, affordable improvements in the poorest households within the area of any given project;

- new projects be based on survey and analysis of local environmental hygiene conditions, prevailing disease patterns and relevant socio-economic and cultural factors;

- project documents be made more specific as regards what is to be done, how and by whom;

- local communities be systematically involved in project formulation and implementation; strategies depend upon the presence of local institutions and other circumstances;

- the needs of women, particularly in poor, woman-headed households, be given more attention when projects are formulated and that local women with different socio-economic characteristics are invited to influence project design;

- monitoring and evaluation make use of more standardized methods and that people representing the beneficiaries be more actively involved in the evaluation process;

- that aid projects be implemented within the framework of existing administrative infrastructures rather than by autononous or semi-autonomous project implementation units.

1. INTRODUCTION

Rural sanitation was added to donor-funded water supply programmes and given increased emphasis in health programmes some six to eight years ago following the adoption in Alma Ata in 1978 of WHO's and UNICEF's primary health care strategy, WHO's global programme Health for All by the Year 2000, and the launching two years later of the International Drinking Water Supply and Sanitation Decade. The inclusion of sanitation coincided with attempts to reorient rural water supply programmes towards small-scale schemes, appropriate technology, intersectoral coordination, community participation and integration of water supply improvement with sanitation and health education. SIDA's new strategy for water supply improvement in rural areas was drafted in 1979 and after some revisions published in 1984 (see chapter 4). Other donor agencies have adopted similar strategies. Still, almost two thousand million people lack basic sanitary facilities and more than one thousand million lack safe water supply (figures exclude China); 80% of them live in rural areas but urban slums with very poor sanitary conditions are growing rapidly. An unhealthy environment, poverty and low educational levels are the main obstacles to health improvement.

Improved health in low-income rural households is the single most important objective of SIDA's assistance in the health and water sectors. Sanitation as well as health education are parts of this assistance, together with improved water supplies, as stated in SIDA's health and water strategies. While water source improvements are prominent in most programmes with environmental health components there has been a relative neglect of sanitation and health education. The result is poorly balanced intervention programmes with modest health benefits, at least in the short term, and with very limited demonstration value.

The main accomplishment of the first eight years of the Decade is that increased attention has been focused on a previously neglected field: environmental hygiene in rural areas. Although progress has been made, SIDA as well as other donors have experienced a high rate of failure, particularly with its sanitation programmes. SIDA has therefore decided to prepare improved guidelines for SIDA-funded programmes in the field of domestic water supply, environmental hygiene and health education. As a base for future discussions about the new guidelines two consultants, Erik Nordberg and Uno Winblad, have been asked to compile and analyse SIDA's experiences of environmental hygiene, particularly in Ethiopia,

Kenya, Tanzania, and Zimbabwe. For Terms of Reference, see Appendix I.

This report is based on field work in Tanzania and Kenya carried out specifically for the assignment but also on observations made during other consultancies in Africa and Asia over the past ten years. The field work has been supplemented by studies of relevant documents from SIDA's archives.

The field work in Tanzania was carried out during ten days in May 1988. We visited the SIDA-funded HESAWA programme in the Lake Regions, the UNICEF-funded Wanging'ombe project in Iringa Region and met government officials and donor agency representatives in Dar es Salaam. The corresponding work in Kenya was carried out during ten days in November/December 1988. We visited the SIDA-funded projects in the districts of Kwale, Machakos and Kitui and met government, donor agency and NGO representatives in Nairobi.

The terminology in this field is not all that clear and definitions vary. We are using "environmental hygiene" to mean water source protection, drinking water supply management, waste water drainage, safe diposal of human excreta and household refuse, disease vector control, and health-related education applicable to those activities. "Sanitation" is used as a more narrow concept including disposal of human excreta and different forms of domestic refuse.

We greatly appreciate the valuable assistance given to our mission by government officials and project staff in Kenya and Tanzania. Generous support was offered in spite of the fact that our mission offered little if any immediate benefits to ongoing projects but rather must be seen as an effort to improve SIDA's future development assistance in the field of environmental hygiene. Valuable comments on a draft of this report have been gratefully received from a number of experienced individuals including Sandy Cairncross, Joshua Kingori, Gunnar Schultzberg and Eva Tobisson.

The views expressed and the recommendations made are our own; they may - or may not - be shared by the officials of SIDA.

2. DISEASE PATTERNS AND ENVIRONMENTAL HYGIENE

The average health situation in poor countries has improved during the last two-three decades. But the total illness burden is heavy and the disease pat-

tern is still dominated by communicable diseases such as respiratory infections, intestinal parasites, diarrhoeas, malaria, and other conditions related to poor hygiene and undernutrition. Also in East Africa average health indicators have improved, as illustrated by vital statistics from Kenya, showing declining early childhood mortality (age 0-2 years) from 184 in 1948 to 125 in 1979, infant mortality (0-1 year) falling from 119 in 1969 to 87 in 1979 and to 74 in 1987, and crude death rate declining from 25 in 1948 to 14 in 1979.

The relative importance of improved education, better nutrition, increased average household income, improved sanitary conditions and more accessible medical care is difficult to assess. These improvements are unevenly distributed, however, and the given averages obscure large inequities between geographical areas and between socio-economic groups. Patterns of ill-health in low-income countries are dominated by conditions caused by poor environmental hygiene and inadequate protection against various environmental hazards. This is particularly the case in low-income households. Parasitic diseases including malaria are responsible for a large proportion of overall morbidity and of deaths. Diarrhoeas, together with intestinal worms, cause some 10-20 per cent of total morbidity and large numbers of childhood deaths (Tables 1, 2). Skin and eye infections are related to the level of personal hygiene, which again is associated with awareness and access to sufficient amounts of water.

Unfortunately, routine statistics does not show differences in infection intensity, illness severity, and need for intervention. Most people have low parasite loads of little health importance while a few are heavily infected and badly in need of treatment even though recurrence is certain in the absence of preventive measures. A large proportion of the intestinal worms and the diarrhoeas are related to human excreta and its disposal while malaria and skin infections are associated with water. The importance and the role of excreta in the chains of transmission vary with the specific causative organism involved, and an overview is shown in Table 3.

Diarrhoea, a symptom closely related to environmental hygiene practices may be caused by many different microorganisms such as viruses (measles, rotavirus), bacteria (cholera; dysentery; salmonella), and parasites (amoeba; giardia). Diarrhoea is reported to be the third most common cause of death in Kenya and the third most common outpatient diagnosis. Only a very small percentage seek care at clinics. Household surveys indicate an average of some

Table 1. Outpatient cases in district hospitals, health centres, and dispensaries in Kenya, 1978

Disease type	Number of cases	Per cent of total cases
Acute respiratory infections	5,881,000	31.2
Malaria	4,417,000	23.4
Skin diseases	3,263,000	17.3
Diarrhoea	1,664,000	8.8
Intestinal worms	1,126,000	6.0
Accidents	1,120,000	5.9
Gonorrhoea	507,000	2.7
Measles	292,000	1.5
Pneumonia	288,000	1.5
Other	350,000	1.7

Source: Kenya: Ministry of Health. Health Information Bulletin, vol 3, 1979.

Table 2. Reported outpatient morbidity. Ethiopia 1983

Serial no.	New diagnosis	Patients % of total no.
1.	Dysentries & gastroenteritis	8.9
2.	Helminthiasis	7.8
3.	Eye diseases including trachoma	5.3
4.	Infections of skin and subcutaneous tissue	4.5
5.	Acute upper respiratory infect.	4.3
6.	Gastritis and duodenitis	3.9
7.	Pneumonia, all types	3.6
8.	Arthritis and rheumatism, excluding rheumatic fever	3.5
9.	Venereal diseases	3.4
10.	Malaria, all forms	3.4
	Others	48.6
		100%

Source: Ministry of Health, Addis Ababa.

Table 3 Environmental classification of excreta-related infections*

Category	Features†	Infections	Dominant transmission foci	Major control strategies
I	Non-latent, low infectious dose (<100 organisms)	Enterobiasis Enteric virus infections Hymenolepiasis Amoebiasis Giardiasis Balantidiasis	Personal contamination Domestic contamination	Domestic water supply Sanitary education Improved housing *Provision of toilets*
II	Non-latent, medium or high infectious dose (>10 000 organisms), moderately persistent and able to multiply	Typhoid Salmonellosis Shigellosis Cholera Path. *E. coli* enteritis Yersiniosis *Campylobacter* enteritis	Personal contamination Domestic contamination Water contamination Crop contamination	Domestic water supply Sanitary education Improved housing *Provision of toilets* Treatment prior to discharge or reuse
III	Latent and persistent with no intermediate host; unable to multiply	Ascariasis Trichuriasis Hookworm infection Strongyloidiasis	Yard contamination Field contamination Crop contamination	*Provision of toilets* Treatment prior to land application
IV	Latent and persistent with cow or pig intermediate host; unable to multiply	Taeniasis	Yard contamination Field contamination Fodder contamination	*Provision of toilets* Treatment prior to land application Cooking of meat Meat inspection
V	Latent and persistent with aquatic intermediate host(s); able to multiply (except *Diphyllobothrium*)	Clonorchiasis Diphyllobothriasis Fascioliasis Fasciolopsiasis Gastrodiscoidiasis Heterophyiasis Metagonimiasis Paragoniniasis Schistosomiasis	Water contamination	*Provision of toilets* Treatment prior to discharge Control of animal reservoirs Control of intermediate hosts Cooking of fish and aquatic vegetables
VI	Excreta-related insect vectors	Bancroftian filariasis (transmitted by *Culex pipiens)*, and all the infections listed in Categories I–III which may be transmitted by flies and cockroaches	Insects breed in various faecally contaminated sites	Identification and elimination of suitable breeding sites

*Source: Feachem *et al.* 1980 J Trop Med Hyg 83:230.

†Latency: a latent organism requires some time in the extra intestinal environment before it becomes infective to man. Persistency refers to the ability of an organism to survive in the extra-intestinal environment.

500 episodes per 1000 people per year in Eastern Africa. The incidence is much higher among children under the age of five, often 3-5 diarrhoea episodes per child per year. Although most childhood episodes are mild, having 20-30 diarrhoea days per year has a weakening effect, often becoming part of a dangerous vicious circle of malnutrition, diarrhoea and other infections. Some diarrhoeas - one in five or ten - are severe, associated with major loss of body fluids. This may cause death, which is particularly common in malnourished children. In a recent review of alternative anti-diarrhoea interventions Feachem (1986) mentioned improved water supply and sanitation facilities and promotion of personal and domestic hygiene as showing strong evidence for high effectiveness and feasibility. Taking all evidence together, it is possible that well-designed projects combining water supply, excreta disposal and hygiene education may achieve diarrhoea morbidity rate reductions of 35-50%. He considered chemoprophylaxis and fly control to be ineffective and improved food hygiene to be of uncertain effectiveness.

Malaria is common, particularly during childhood before a protective degree of immunity is established. We can assume, on the basis of population-based surveys, that the average adult person in East Africa's high-transmission areas (including large parts of western Kenya and the coastal area), has 2-3 malaria attacks and the average child under five 3-5 attacks per year. This would correspond to about 3000-4000 attacks and a considerable number of deaths per 1000 people per year in high-transmission areas. Each attack is associated with a period of disability usually lasting five days or more, or 10-25 days per adult per year. This is causing household expenditure, great disruption of family life and farming, and loss of income as attacks tend to occur during peak farming seasons. Malaria is a big and complex health problem requiring coordinated control programmes involving several sectors, mainly health, and education but also water and agriculture.

Bilharzia is present in large parts of East Africa with particularly high prevalence rates along the coast and around Lake Victoria. Most episodes are mild but late complications may be serious. The transmission route is not well understood by the general population, and symptoms are often misinterpreted by patients and by health workers. Control can be achieved through a combination of environmental measures and chemotherapy but requires large-scale community participation and sustained efforts over many years.

Hookworm and ascaris are common in rural East Africa, contributing to anaemia and general malaise particularly in women and children. Ascaris (roundworm) is not only widespread in rural areas with unsatisfactory excreta disposal practices but also wellknown by household members and relatively easy to identify by laymen. The intensity of infection varies greatly between individuals.

Sanitary conditions and requirements are influenced by a number of factors including poverty, education, population density, subsoil conditions, type of water supply, and local disease pattern. Sanitary solutions must be tailored to local conditions and flexibility is necessary. Health benefits of latrines are likely to be small in sparsely populated arid and semi-arid areas while they are much greater in densely populated areas. The presence of large numbers of livestock, sometimes carrying salmonella and other harmful microbes, requires certin precautions regarding animal excreta and slaughter.

The conclusions are (1) that a large proportion not only of the total disease burden but also of the severe disease episodes is associated with poor environmental health conditions such as unsatisfactory water supplies, poor excreta disposal facilities, and low level of awareness of environmental health risks, (2) that improved environmental hygiene, given sufficient time, could substantially reduce the total burden of illness at modest cost.

3. WHY ENVIRONMENTAL HYGIENE AND HOW? A LITERATURE REVIEW

The published literature in the field of environmental hygiene has increased in recent years. Useful overview
s include "Low-lost Technology Options for Sanitation" by Rybczynski, Polprasert and McGarry (1978), and "Sanitation and Disease. Health Aspects of Excreta and Wastewater Management" by Feachem, Bradley, Garelick and Mara (1983). Useful contributions on more specific subjects are listed under Chapter 12, REFERENCES.

A critical review of the literature on methods available to study the impact of both water supply and sanitation improvement on diarrhoea/disease was published by Blum and Feachem (1983). They review over 40 studies, mainly from developing countries, focusing on the methods applied and make a few recommendations to improve the usefulness of future studies. They suggest that evaluations be conducted by interdisciplinary teams, that natural, "opportunistic" experimental situations be ex-

ploited, that more attention be paid to confounding factors and that behavioural processes be the primary focus of project evaluations. A review, specifically of the literature on impact of excreta disposal facilities on health has been published by Esrey, Feachem and Hughes (1985). A recent review, including the technical and institutional development and issues recommended for further study, has been presented by Cairncross (1989).

When reviewing combined water supply/excreta disposal improvements a median reduction in diarrhoea morbidity rates of 27 per cent (range 0-68%) was found in studies of satisfactory design, and the median reduction in mortality was 30 per cent (range 8-64%). Morbidity reduction in relation to specific types of intervention are shown in Table 4. It is concluded that improvements in water availability or excreta disposal have a larger impact than improved water quality but that combined improvement in water quality and water availability (quantity) has a larger impact than any single improvement.

In a review of the evidence for health benefits attributable to improved water supply and sanitation, Esrey and Habicht (1986) identified 26 studies examining the health impact of sanitation, 20 of which

Table 4 Percentage reductions in diarrhoeal morbidity rates attributed to water supply or excreta disposal improvements

Type of intervention	Number of results[a]	Percentage reduction	
		Median	Range
All interventions	53	22	0-100
Improvements in water quality	9	16	0-90
Improvements in water availability	17	25	0-100
Improvements in water quality and availability	8	37	0-82
Improvements in excreta disposal	10	22	0-48

[a] There are 53 results in total but only 44 attributed to specific interventions. The remaining 9 results are for other interventions or combinations of interventions having less than 3 results, and include interventions in fly control and health education together with water supply or excreta disposal.

reported a possitive impact. Most of the studies comparing the relative importance of water and sanitation found that sanitation was more important than water. The impact was greater in very poor households and in children of illiterate mothers. Since hand-washing and other forms of hygiene behaviour are increasing the effect of improved sanitation it is worth noting the conclusion on water quatities consumed:

> "The amount of daily water per person necessary for improved domestic hygiene is not known. Some of the studies suggest that when water use is low, small increases result in health benefits, but the health benefits resulting from an increase in the amount of water used above 20 liters per capita per day are not known. Estimates on the amount of water to be provided daily per person have varied from a low of 15 liters per capita per day in refugee camps ... to a high of about 50 liters per capita per day ... A target range of 20-40 liters per capita per day has been advocated by the United States Agency for International Development ... Achieving such high estimates may not be necessary and may be costly. Nevertheless, targeting areas where water use is low should be considered with simultaneous encouragement of hygienic use of the extra water."

A "threshold-saturation theory", implying that there is a certain low level of investment in water supply and/or sanitation below which very little detectable health improvement will follow, was proposed in 1981 (Shuval, Tilden, Perry, Trosse 1981). The proposal also suggested that there is a similar high level above which additional investments have no measurable effects on health (Fig. 1).

The authors found evidence from different countries (Lesotho; Bangladesh) to support this hypothesis and felt that minor improvement, for instance in drinking water quality, would not under certain severe resource constraints be sufficient to generate significant improvement in health status even though such improvement is desirable as one element of a lasting change. If validated by further research, this hypothesis would help explain some inconclusive or conflicting findings from different studies. It does not imply, however, that small investments in water supplies and sanitation are meaningless but rather that additional improvements will be required before measurable health improvement occurs.

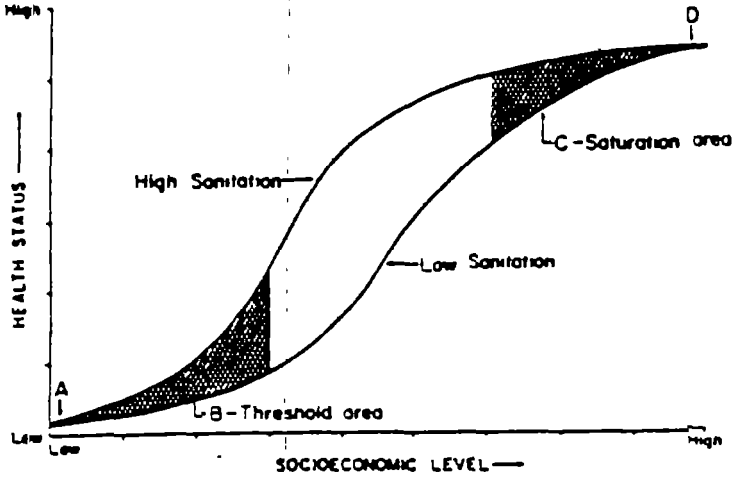


Fig. 1. Schematic presentation of the 'threshold-saturation' theory.

In a study of infant mortality determinants among around 2500 infants in Bangladesh Rahman et al (1985) found a postneonatal mortality 3.12 times higher in households not using latrines than in those using them and 1.5 times higher in larger than in smaller households. Neonatal mortality (up to four weeks of age) was not related to environmental factors studied. The authors conclude:

> "To reduce infant mortality substantially in developing countries measures such as improvement in literacy rate and socioeconomic conditions must be attended to. However, it may take a long time to bring about these changes. For immediate health benefit, efforts should be directed towards improving household cleanliness through the use of low-cost latrines and tube-well water, with community health education being applied to motivate people to use these technologies."

The inappropriateness of assessing only one transmission route when several are simultaneously at play has been demonstrated by Briscoe (1984), who studied cholera transmission in Bangladesh and found evidence that drinking water was the main route but that others (food; person-to-person contact; ingestion during bathing) are sufficiently important to maintain a fairly high level of transmission even if safe drinking water is supplied. The implication is that multiple interventions have a much larger chance to succeed.

Interesting methodological improvements are under way in the area of assessing health impact of alternative interventions. Briscoe, Feachem and Rahaman (1985) concluded that prospective cohort studies would require large population samples to detect significant changes in outcome variables, and that, therefore, such studies would be expensive. Alternatively, they proposed a relatively inexpensive case-control approach comparing groups with and without diarrhoea as regards their environmental health situation and trying to identify factors likely to explain the difference. They point out as advantages that smaller sample sizes are sufficient and that the sensitivity and specificity of the disease measure are much higher. They consider the main problems with the method to be bias either due to measurement error in the sense that subjects are misclassified with respect to disease and exposure status or due to inappropriate selection of subjects for the study. Confounding confusion of the study factor such as water quality with effects of extraneous variables such as socio-economic status is another potential problem. This method has been tested in ongoing projects in different countries and results are beginning to appear in various publications. A case-control study of childhood diarrhoea in eastern Malawi, showing a 20 per cent diarrhoea reduction in families with good quality water and latrines, has been reported by Young and Briscoe (1987). A recent contribution has been made by Briscoe, Baltazar and Young (1988) who in reviewing the case-control study in Malawi and one in the Philippines conclude that effect estimates "appear to be valid and sufficiently precise" but that sample sizes (281 and 390 cases and 384 and 440 controls, respectively) need to be substantially increased if interaction between variables are to be studied. They feel that more field studies need to be conducted to test a simple, rapid and inexpensive approach.

The Public Health Sevices of the US Government published in 1933 a state-of-the art review called "The Sanitary Privy", offering sound advice on pit latrine construction including ventpipe design: "The receptacle shall be ventilated from the user to a point outside the building by a flue or ventpipe having a cross-sectional area of not less than 7 square inches. The joints shall be tight and the opening screened with a 16-mesh copper screen wire." The publication also describes the double-vault compost latrine.

The same subjects as in "The Sanitary Privy" are covered in Wagner and Lanoix' WHO classic of 1958,

"Excreta Disposal for Rural Areas and Small Communities". This is the first publication to deal comprehensively with sanitation in developing countries. (At the time when it was compiled Wagner and Lanoix were apparently not aware of the benefits of a ventpipe: "In tropical areas, howver, evidence seems to indicate that venting serves no useful purposes.") The next state-of-the-art review was published twenty years later (Rybczynski et al 1982). The review states that "there is no doubt that the pit latrine remains one of the few technologies affordable by the rural population". A more detailed account of various pit latrine and compost latrine systems is given in Winblad and Kilama (1978). This handbook states that "There is no "best" solution for all situations all over the world. Technical solutions must be adapted to the local environment, the financial resources, the skills and the traditional "latrine behaviour" of the user."

Considering the magnitude of the problems of sanitary disposal of human excreta, very little research and development on the technology of low-cost sanitation has ever been carried out. Most efforts have been piecemeal and of too short duration. An exception is the work in India during the 50s and 60s (India, CPHERI 1964). Another exception is the work carried out by Peter Morgan and Ephraim Chimbwunde at the Blair Research Laboratory (MoH) in Zimbabwe, resulting amongst other things in the VIP latrine. The results have been publihsed periodically in the mimeographed "Blair Research Bulletin" and in a number of very detailed and exceptionally well illustrated manuals. A brief account of the VIP latrine is given in chapter 6 of this report.

One more research and development project is worth mentioning in this context: "The Latrine Project" at the National Institute for Physical Planning in Mozambique, coordinated by Björn Brandberg. The project resulted in a latrine very different from the VIP latrine:

> "The VIP latrine design needs a dark 'house' and a screened ventpipe to control the flies (and the smell inside the house) while we had enormous difficulties simply to find building materials for houses for people to live in, let alone to build superstructures for their latrines. ... it was the lack of building material that forced us to give up the idea of a roofed superstructure and a ventpipe. The smell problem was solved by using a tight-fitting lid. There were also doubts about the lifetime of the mesh which should top the ventpipe. If the mesh was broken it could

> provide easy access for flies, rather than reducing their numbers."
>
> "To control the flies we had introduced a light tight-fitting lid of high quality concrete, cast in the very hole of the slab where it was to fit. We found that this did not only stop the flies but also the smell, as long as it was properly fitted in the hole. And if it was not, the smell was a good reminder to do so. ... we suspect there are many places where VIPs are only affordable if subsidized. Although governments may be prepared to offer subsidies in the context of aid-assisted projects in particular areas, most could never afford to offer them to their entire urban population. *Our* latrines are affordable and are even a source of income for the members of the cooperatives who make the slabs." (Brandberg 1985).

(Observations by Peter Morgan and Uno Winblad in Mozambique do not support Brandberg's claim that a tight-fitting lid stops flies and odours.)

The World Bank Research in Water Supply and Sanitation carried out during the preparatory phase of the Decade has resulted in a large number of publications (World Bank 1980). It would be reasonable to expect such a massive, well-funded research programme to reshape available knowledge in the field of sanitation for the rural and peri-urban poor. This, unfortunately, has not happened.

Socio-economic and cultural factors influencing environmental hygiene practices have so far not been systematically studied. Examples are the need for privacy, the reluctance for men and women in many areas to share latrines, the importance of social prestige in constructing latrines, the perception of children's excreta as harmless and the apparent differences between Asia and Africa regarding the willingness to use digested human excreta as manure. A number of case examples from Latin America were presented by Elmendorf and Buckles (1980), and health education efforts in Africa were summarized at a Botswana workshop on "Sanitation in developing countries" (1981).

Advice on methods applicable to socio-cultural studies in this field was provided in a UNDP/World Bank publication related to the Decade (Simpson-Hébert 1983); observer participation, key-informant interviewing, user interviewing and surveys are covered.

The evidence regarding the effects of personal and domestic hygiene education on diarrhoea has been reviwed by Feachem (1984) who focused particularly on studies from Bangladesh and Guatemala. He concluded that diarrhoea could be reduced by up to 35% through health education, which in these cases was restricted to hand-washing. He pointed out the absence of data on costs of education programmes.

The Guatemala study, to which Faechem referred, has been presented by Tonón (1982). 600 families in two villages were followed by observational visits three times per year during four years and the community health education impact on seven sanitation indicators were measured in relation to findings during a "behavioural diagnosis" made early in the project. The selected indicators are shown in Table 5 below.

Table 5 Behavioral Change Indicators and Checklist Items

Behavior Desired	*Indicators*	*Typical Checklist Item*
Removes and/or cleans fecal matter from the home.	Presence/absence of feces on the floor or counters.	Is any fecal matter of any type present? Yes = 1 No = 0
Appropriate food storage.	Protection of cooked foodstuffs.	Is all cooked leftover food stored in a covered container? Yes = 1 No = 0
Appropriate water storage.	Protection of water stored in the home.	Are water vessels covered? All = 2 Some = 1 None = 0
Removes and/or cleans garbage from the home.	Presence of garbage on interior floors.	Is there garbage on the floor? Yes = 1 No = 0
Removes and/or cleans garbage from the patio.	Patio has been recently swept/raked.	Has the patio been swept or raked recently? Yes = 1 No = 0
Builds and uses a latrine.	Purchase of a latrine; installation of a latrine; continued use of a latrine.	Does inspection of the latrine show sign of continued use? Yes = 1 No = 0
Builds and uses a domestic animal barrier.	Presence of a barrier across the threshold.	Is the barrier maintained in position? Yes = 1 No = 0

36.2% adopted latrines (79 new latrines, all being used while no new latrines in control village), 48.1% swept yards, 55.9% covered cooked food, 58.3% covered all water storage vessels, 67.8% kept floors free from faeces, and 14.4% barred domestic animals from entering the house. No significant change occurred regarding garbage disposal. Additional analysis showed that neither wealth nor education was related to the type or number of innovations adopted.

A socio-cultural survey of beliefs, attitudes and practices related to excreta disposal and water use was conducted by Omambia (1984) in Magombe sub-location, Busia District, Kenya. He studied a 10% sample, 90 households, through a combination of open-ended interviews, key-informant interviewing, and participant observation. Most of the 89% of households with a latrine had constructed it in connection with cholera outbreaks and essentially to prevent prosecution. Collapsing pits and ants destroying superstructures were reported as serious problems, and latrines were perceived as important (1) to prevent cholera, (2) to be convenient for visitors; and (3) to provide privacy during defecation. Of 71 households with latrines 46 did not allow all members to use the same latrine; a father does not share the latrine with his married sons and father-in-law does not share with daughter-in-law. 26 households had constructed separate latrines for those who could not share. Children's excreta are considered harmless and may therefore be handled, i.e., removed and buried. Children are reluctant to use the latrines due to the large squatting hole, due to darkness inside (fear of snakes), and due to unsatisfactory cleanliness.

A similar study was conducted in 1983 in Kibwezi Division, Machakos District by Oendo (1983), who found that almost everybody built latrines for health and prestige, and not to comply with legal requirements. They were mostly built to be used. Those built as status symbols were not regularly used. The number of latrines increased considerably following a Community Health Worker training programme. Sharing latrines with in-laws was not a problem. Children were reported to start using latrines at the age of three. Small children's excreta are scooped and thrown into the latrine. High cost of latrine construction was an important obstacle, particularly when homesteads are temporary and in low-income households. Most latrines appear to be built of local material with squatting slabs of poles and mud. Ashes are spread on the floor and in the pit to expel flies and reduce odour, and latrines tend to be located on the leeward side of houses. The study in-

cludes a number of household case studies - including a few not having latrines; most people agreed that latrines are desirable but that costs are high. Flies and odours were not mentioned as problems. Oendo emphasizes the importance of taking into account household cash income and the priorities for improvement in each household and notes the local availability of resources (e.g. hard wood and bricks) and skills to reduce costs of constructing high-quality latrines.

A case-control study of water-sanitation practices in 1350 households with high and low childhood diarrhoea rates and of effects of educational interventions has been conducted in Bangladesh by Clemens and Stanton (1987). High-diarrhoea families were characterized by high rates of open defecation in the family compound, by low rates of handwashing before meals and by inattention to proper garbage and excreta disposal. Educational intervention attempting to alter hygiene behaviour was evaluated over a six-month period following the intervention and showed reduced rate of diarrhoea and improved handwashing practices in educated families while no improvement was observed for excreta disposal and refuse disposal practices.

Control of disease-transmitting vectors remains an essential component of environmental hygiene. A brief review of fly and mosquito breeding in sanitary installations has been published by Curtis (1984) who mentioned breeding of filaria-transmitting Culex mosquitoes in wet latrines as an unresolved problem in need of further study. He also noted the growing problem of increasingly expensive chemicals with declining effect against vectors. Vector behaviour in relation to human dwellings was discussed in detail by Schofield and White (1984) who discuss siting and design of rural housing and new problems associated with rapidly expanding low cost houses in urban areas. Environmental intervention against vectors is reviewed in various WHO reports such as "Manual on environmental management for mostuito control" (1982) and "Integrated Vector Control" (1983) which is an expert committee report in WHO's Technical Report Series. "Engineering against Schistosomiasis/Bilharcia" by EG Pike (1987) is a detailed manual on the control of bilharcia. Useful contributions to the knowledge in the field of environmental hygiene are often made in formally unpublished reports. These are not widely known and often difficult to get hold of.

4. SIDA HEALTH AND WATER SECTOR POLICIES

SIDA defined its health sector assistance policy in 1982 and formulated a water strategy in 1984, both documents incorporating sections on environmental hygiene.

"SIDA's Health Sector Policy" is underlining, as a major general goal for Swedish development assistance, "to raise the standard of living for the poorest people, especially those living in rural areas". The policy is based on the WHO/UNICEF Primary Health Care strategy which, for instance, implies health-related cooperation across sector boundaries, emphasis on prevention, costs at affordable levels "and based primarily on the resources available at the community level".

On water and hygiene the policy document points out that for health to improve it is not sufficient to provide water but that safe disposal of human excreta and other household refuse with local community participation are also necessary. The document does not recommend any particular strategies or techniques as regards sanitation or environmental hygiene and does not indicate what sort of balance should be established between sanitation and other components within the area of environmental health or between environmental health and other PHC elements.

The document *"Water strategy. Water Supply Programmes for Rural Areas"* is stating as programme target groups poorer groups in rural populations, particularly in less developed areas, and goes on to define these groups as the 40% of the rural population with the lowest incomes. The main goals of the assistance to the water sector is improving the health of the people and creating better prospects for social development and economic growth. Operative goals include improved health by increasing popular participation, especially the participation of women and health and hygiene education directed towards the target group and to combat water-related and hygiene-related diseases. The operative goals also include improved hygiene by latrines which are more sanitary, socially, and culturally acceptable, by drainage, by waste disposal, and by vector control.

In relation to water supplies a few hygiene activities are mentioned, namely the construction of separate washing places, construction of socially accepted and functional latrines, improved waste disposal, good drainage at the standpipe and for waste

water in the home, water hygiene compaigns, and vector control. Cross-sector co-operation and local co-ordination of activities by NGOs, women's groups, village societies, etc are emphasized.

On the links between water and health it is stated that domestic water programmes should suitably incorporate:

- sanitation programmes, initially at schools and institutions, which include water supply as well as the construction of latrines and the installation of hand basins and the planning of sanitary systems. Here the intention is to show the advantages of latrines and to protect ground water;

- environmental hygiene which includes (1) waste disposal, (2) drainage of waste water, (3) drainage at standpipes and wells, (4) vector control, (5) protection of ground water, (6) measures aimed at preserving the environment;

- the combating of water-related diseases by means of information to consumers and assistance to health and hygiene education in the areas of the installations. New or re-equipped installations shall be designed in such a way that the spread of water-related and hygiene-related diseases is minimised;

- information about personal hygiene related to water use.

On the question of programme organisation and coordination the document indicates the roles of concerned ministry infrastructures and draws the following conclusion (p. 14):

> "The country's water authority is normally responsible for the technical and administrative aspects of water production. The sanitary aspects can be the responsibility of different ministries depending on the organisation and structure of the country. Health education is the responsibility of the ministries of health and education. Irrigation and water for cattle are usually the responsibility of the ministry of agriculture. Small scale water supply projects can be implemented by different central authorities, by non-governmental organisations and by local groups. Coordination of projects shall be promoted between the authorities concerned. Preferably the projects should be integrated at both the donor and recipient levels.

However, since this would require a far too fundamental reorganisation, a coordinated cross-sector effort should be made instead. It may therefore be necessary to divide the components of the water programme between more than one ministry and to have the components coordinated by steering committees and representatives of the various authorities. What is the most important in this respect is to strive towards the goal that the various benefits are received at the same time by the consumers of an installation. One precondition is the active participation of the recipient authority."

Women and children are mentioned as the most important target groups while at the same time particularly difficult to reach. Special efforts are recommended for reaching the poorest women with health education and hygiene information.

5. COUNTRY-SPECIFIC EXPERIENCES

5.1 Ethiopia

General

Ethiopia has a relatively weak PHC infrastructure which has undergone considerable physical expansion during the last 10-12 years. However, it has insufficiently trained manpower and inadequate recurrent resources for effective service provision. Each of the 14 regions has one or two regional sanitarians and each Health Centre is supposed to have at least one sanitarian on its staff, many of these positions are vacant. The output of sanitarians from Gondar has been low and irregular and their practical field training has been poor.

The 1985 Primary Health Care Review, conducted by the Ethiopian Ministry of Health with support from WHO, UNICEF and SIDA, noted that regional targets had not been stated in the plan and that implementation was hampered by a number of problems such as financial constraints, lack of vehicles, limited community participation, and lack of construction material. The review team recommended that MOH Hqs staff offer stronger support to regions, that Health Centre sanitarians give priority to environmental health activities, that locally appropriate technology be applied, that budgetary allocations to water development and sanitation be increased, that Regional Health Department supervision of Health Centre sanitarians be intensified as well as HC supervision of Health Stations, and Health Stations work more closely with Community Health Workers and the mass organisations.

The Ten-Year Perspective Plan for health sector development 1985-1994 is stating extremely ambitious targets with little if any resources contributed from outside the local communities. It is for instance assumed that household coverage of sanitary facilities will reach 80% in 1994, which means the construction of six million latrines, although household resources are almost certainly inadequate for this as well as for other tasks stated in the plan document. This is one of several unrealistic assumptions made in the plan; protection of 30,000 springs and hand-dug wells during the plan period is another one.

The Hararghe Rural Water Supply Programme

SIDA has supported water supply development in Hararghe since 1976, by assisting the National Water Resources Commission in its efforts to develop new water sources, upgrade old ones and maintain existing supply schemes. SIDA is contributing around SEK 12 million per year and the Ethiopian government between SEK 3 and 4 million. The programme is estimated to have improved water supplies for 800,000-900,000 people out of the 4.2 million population in the region. The programme includes deep well drilling, shallow-well development, many with handpumps, water distribution schemes and rehabilitation of non-functional wells. Except waste water drainage around wells environmental sanitation is not part of the programme.

Environmental health component of health sector assistance

During 1988, a SIDA-supported health sector programme in environmental health, including excreta disposal improvement, has been formulated for Hararghe, Wollega, and Bale regions. It is essentially strengthening the existing infrastructure in the form of refresher training, transport and building materials and is also providing the Ministry's Environmental Health Division with supplementary resources. Coordination of the two SIDA-supported programmes in Hararghe Region is underway. FINNIDA has agreed to support an integrated water supply, sanitation and health education programme in North-Western Ethiopia, and Canadian CIDA is funding a demonstration project in the South.

Key observations

Simultaneous and balanced provision of education, sanitation, and water supply improvement has so far not been achieved, and little cross-sector cooperation takes place. Modest low-cost improvements of traditional latrines need to be tested and promoted in project areas. Retraining of existing sanitarians is important. Recurrent resources for environmental health field work need to be increased at Regional Health Departments and Health Centres and the National Water Resource Commission infrastructure at regional level needs to be expanded if rural water supply development is supposed to be one of their main future responsibilities. Selection, basic training, and supervision of Community Health Agents need to be more properly conducted according to plans. Local community support is currently weak.

5.2 Kenya

General

Kenya's Health Development Plan 1984-88 has a chapter "Environmental Health" (p 38-39) stating vaguely that "activities in environmental health will be directed towards improving small-scale water supply, water quality control, refuse and sewage disposal...". There will be construction of demonstration pit latrines at strategic places (schools etc) at affordable costs to teach and encourage communities to construct and use latrines and construction of demonstration incinerators and compost pits for solid waste diposal in market centres, health centres and schools. No recommendations are made regarding technologies or coordination of inputs, selection of institutions for demonstration, cost sharing, etc. It is unlikely that the 1989-94 five-year plan will be more specific.

Kwale District Community Water Supply and Sanitation Project

This project was initiated in 1985 to become part of the Kenya-Sweden Rural Water Supply Programme. It is an extension of the South Coast Handpump Testing Project which was implemented by Ministry of Water Development with supervision from the World Bank, and the extended new project implies a variety of water supply and sanitation improvements and health education in addition to drilled and hand-dug wells with handpump.

Objectives included "... to establish a programme comprising integrated, well-coordinated water supply, sanitation, community liaison, health education and training activities". In the field of sanitation it was specifically stated that 130 demonstration latrines (later increased to 200) should be constructed, and that the project should promote "further construction of latrines by interested institutions and families, through health education, provision of squatting plates and possibly ventpipes with fly traps at cost and, as appropriate, either provision of technical assistance on request and/or sponsorship of training of Public Health Technicians, Community Development Assistants and local artisans in construction techniques and directly related activities".

A 1988 mid-term evaluation report states, as a positive feature, that VIP latrines suitable for rural institutions have been built in health centres, schools, mosques and churches, that intersectoral cooperation has taken place, that staff have been trained and that efforts have been made to involve rural women in solving water problems. It is noted that the external support has been crucial while at the same time negative for the sustainability of the programme and for sentiments among government staff outside the project.

The project has not yet properly addressed the question of improved latrines affordable in poor households, and 200 project-generated latrines is obviously an extremely modest target in a district where some 10,000 unimproved latrines already exist. This may be due to inaccurate assumptions regarding the number of latrines in current use. While Omambia et al (1985; page 70) estimated that less than 25% of homesteads had usable latrines, the project, which is subsidizing no more than 100 latrines per year (KWSP Progress Report July 1987 - March 1988, page 21) expects to accomplish 75% pit latrine coverage by the end of the project implementation period (idem p 19).

VIP latrines have been the project's standard technology and, according to our observations in the field, the workmanship is poor, fly screens are usually not functioning, cracks and unsuitable doors often reduce or eliminate the fly control effect of screened ventpipes. Still, fly breeding did not seem to be much of a problem in the substandard VIP latrines, at least at the time of our visit (November).

Demand for household latrines is low, and the project has not so far been able to significantly increase it. VIP latrines are likely to be too expensive and possibly unnecessary in the eyes of household heads, it is probably necessary to educate and motivate households at different socio-economic levels using, to begin with, findings from the 1985 socio-cultural survey (Omambia et al 1985) and existing data on household resources also in low-income groups. This is a major educational task to be jointly taken on by staff in the project itself as well as personnel in health, water, education and social services sectors, preferably with the District Health Education Officer as the coordinator. Village chairmen, self-help group leaders, Traditional Birth Attendants and Community Health Workers are potentially important and sanitation-related. Additional studies on specific sanitation-related practices and attitudes in selected population groups would be helpful in formulating a continuing and systematic health education effort.

Establishing a rather independent project management unit may cut some red tape and speed up early implementation but will also complicate subsequent integration of the project into existing administrative infrastructures and possibly generate hostility and resistance in surrounding institutions. There is some evidence of all of this in Kwale; we feel that projects of this kind would benefit in the long run by being integrated from the beginning into one existing government structure.

The Environmental Health Programme in Eastern and Rift Valley Provinces is implemented by Division of Environmental Health, MOH, and its provincial and district infrastructures in all six districts of Eastern Province and in the six southern districts of Rift Valley Province. It is part of SIDA's health sector assistance to Kenya and the SIDA contribution is around SEK 350,000 per district per year. The initial three-year phase of the project ends at mid-90.

The project has provided demonstration VIP latrines to institutions and upgraded traditional household latrines but appears to have reached relatively few poor households so far. Replication of promoted technologies without project subsidy is so far negligible. The project represents an additional managerial responsibility for District Public Health Officers which some of them are inadequately trained for.

The role of women groups in Eastern Province is described by Kingori et al (1988), who see these groups as a convenient entry point to communities, particularly in Machakos and Kitui districts where these groups are particularly strong; it is reported that in parts of Kitui district half of the men are not residing in the area but work in towns like Nairobi, Mombasa and Kitui. While this migration may be an appropriate solution to male underemployment in rural areas and low household income it does increase the vulnerability, especially of households headed by poorly educated women with small children. These women, who are high priority targets for SIDA assistance, are the least likely members of existing women's groups. Programmes geared towards such groups may, therefore, never reach the most needy people in the project area.

Kenya-Finland PHC Progamme in Western Kenya. The stated objective of this project, which started in 1984, is improved health in Western Province. Environmental health and sanitation is one of its three components, geared to improved latrine coverage, water supply improvements, vector control and occupational health. Finnida contributes 90% of project costs (FIM 75 million). It works very closely with Kenya-Finland Western Water Supply Programme which has largely similar objectives. VIP latrine construction for demonstration purposes and for individual households is an important element of the project as well as training of local artisans in the communities. It appears that VIP latrines are heavily subsidized by the project.

Key observations

Sanitation tends to remain a low-level activity in rural health programmes and even more so in water sector programmes. Tangible outcomes consist almost exclusively of subsidized institutional latrines and a modest number of household VIP latrines. Little or nothing is done for very poor households where VIP latrines are unaffordable. Design and workmanship of demonstration latrines are satisfactory in Eastern Province but relatively poor in Kwale. Project management is well integrated into existing infrastrucutures in Eastern Province but not in Kwale.

5.3 Tanzania

General

Comprehensive rural water supply and sanitation programmes are under implementation in several regions but there is no national policy on rural sanitation except a government decree from 1974, sometimes supported by District Council by-laws, that every household must have a latrine. Foreign donors play a significant role in the planning and implementation of the water supply and sanitation programmes. In this chapter we shall deal with the SIDA-funded HESAWA programme in the Lake Regions.

The Hesawa Programme

The HESAWA programme started in 1985 in three pilot areas covering 32 villages (out of a total of over 1500 villages in the Lake Regions). The activities have since expanded and now cover 95 villages in six districts. The programme is implemented by several ministries with the Prime Minister's Office as the main coordinating agency with HIFAB (a Swedish consulting company) as the agent for SIDA. An adviser on health and sanitation from AMREF is attached to the programme. Promotion work at village level is carried out by HESAWA District Promotion Officers assisted by Village Health Workers trained under the HESAWA programme.

When the programme began about half of the rural households already had a simple pit latrine.

In a consultancy report to HESAWA Therkildsen (1984) is discussing excreta disposal practices in the Lake Regions. Latrine coverage is reported to be high, 85% in Kagera and Mwanza and 75% in Mara Region. The quality of inspected latrines varied but was described as "fairly low" (shallow pits; rudimentary walls; frequently no roof and door) and the lifetime of the latrines was stated to be no more than ½-3 years. Cholera epidemics tend to stimulate construction but "the lasting effect is doubtful. A core of non-owners remain". Non-owners are reported to be most common among households headed by old people or females; physical inability to dig the pit, poverty and poor acceptability of latrines generally are mentioned as obstacles. The author concluds that "... prevailing economic conditions restrict the possibilities for promotion of latrine types that require cash input unless significant subsidies are provided", and suggested a sequence of

improvements: (1) full latrine coverage through intensive promotion among non-owners, (2) upgrading of existing latrines using locally available material; (3) introduction of VIP-type latrines using local materials, (4) use of cement to prolong latrine lifetime, and (5) introduction of permanent (compost type) latrines. Lack of cement and the grave economic situation in Tanzania was expected to delay (4) and (5).

Sanitation has been given a low priority within HESAWA during the early years of the programme. The initial approach was to build demonstration latrines of VIP type at 30 institutions and public places at unit costs ranging from TAS 2000 to 15,000. The new sanitation strategy became operative in 1988/1989 with a pilot village in each district. It is "... essentially an enabling strategy ... The cost of a household latrine is borne by the owner and the cost of latrins in village institutions and public places are shared between the programme and the community... The chief implementors are Village Health Workers and village fundis (craftsmen)."

Efforts are now being made to involve the local communities in planning as well as implementation of the HESAWA programme: "During the promotion phase meetings are held with villagers ... and villagers choose ... a VHW ... a Village Health Committee is formed. After the VHWs' training the village is solely respnsible their renumeration and control ... the village decides whether they want to embark on a latrinization programme at all and also on what type of latrine they want ... a revolving fund /for sanitation/ has been set up ... latrine component supplies sufficient for 25 latrines per village are supplied ... The proceeds from the sale of the materials shall be used to purchase more latrine components."

The SIDa-funded HESAWA programme provides one staff car per district, one motorcycle per Rural Health Centre, and one bicycle per Dispensary. The programme also provides one toolbox per district, one set of construction tools per village, and one Cinvaram /a block-making machine/ per ward.

The total number of household latrines built under the HESAWA programme is 522 (Report from Joint Review, October 1988, chapter V). There is no subsidy of household latrines.

Key Observations

During its first four years the HESAWA programme had no staff member with up-to-date knowledge of rural sanitation and experience of large-scale sanitation programmes. As a result the demontration latrines were wrongly designed and often poorly constructed. They were also much too expensive for the majority of rural households and built with materials (cement, reinforcement, flyscreens) not readily available in the Lake Regions. Although the situation has improved, there is still a lack of knowledge of latrine technology suitable for the specific conditions in the Lake Regions. The high latrine coverage figures reported by Therkildsen are surprising to other observers; coverages probably vary widely between areas, and also very poor latrines have probably been included.

HESAWA did during its first four years never address itself to the real magnitude of the problem: how to establish a local, sustainable capacity for improving sanitation for all in a situation characterized by rapid population growth (550,000 households in 1985 to 1,200,000 in 2010), a stagnant economy and a non-functioning commodity market. The new strategy does take these factors into account but the results are yet to be seen.

Action research aimed at developing no-cost or low-cost excreta disposal systems for households is urgently required. Local communities should be encouraged to participate in the research and development, possibly through the system of study groups already functioning within HESAWA. All those involved in HESAWA's sanitation programme as trainees, instructors and promotion agents must receive a thorough education and training in the theory and practice of rural sanitation.

For sanitation at schools and other institutions the technology of multi-compartment latrines developed in Zimbabwe should be adopted in the Lake Regions.

5.4 Zimbabwe

General

Zimbabwe has a National Master Plan for Rural Water Supply and Sanitation covering the twenty-year period 1985-2005. Although not yet formaly approved it acts as a guide for regional/local short and medium term action plans.

The goal of the Master Plan in the field of sanitation is to provide the entire communal and resettlement area population (5.7 million in 1989) with access to safe and adequate facilities by the year 2005. In terms of rural sanitation "safe and adequate" according to national policy means a Blair latrine (a ventilated, improved pit latrine) for every household. Only latrines with a ventilated, lined pit, a squatting slab of reinforced concrete and a superstructure of permanent building materials are considered "safe and adequate".

A prerequisite for the success of this ambitious programme is that government provides - free of charge - locally unobtainable items like cement, reinforcement and flyscreen. Future replacement of latrines is supposed to take place through unsubsidized self-help. The expected life-time of a standard, household-size Blair latrine is approximately 15 years.

The Manicaland Programme

SIDA has since 1985 been funding a health, water and sanitation programme in Manicaland Province. It is an integrated programme including staff training, shallow well construction, spring protection, latrine construction, flyscreen production, health education and development of educational materials. Over the past three years the programme has assisted local communities in constructing 16,000 household latrines and 100 multi-compartment school latrines. The physical targets for the current third phase of the programme (July 1988 - June 1990) are: 600 wells or springs, 20,000 household Blair latrines, 300 multi-compartment school latrines, and 400 school washing tanks. (The total number of households on communal lands in Manicaland was in 1987 128,000).

In Manicaland the average cost of the subsidy is ZD 90 (SEK 325) per latrine. (In the rest of the country the subsidy is usually 2D50.) The household itself provides labour, bricks and other building materials and often hires a builder to construct the unit.

The programme is implemented through the Provincial Medical Directorate by the beneficiaries themselves on the basis of community self-help. Local communities are mobilized by Health Assistants and Community Development Workers. The Health Assistants provide technical assistance and train some community members (including women) as builders and supervise construction activities. Tool sets are provided on loan to the builders. The Health Assistants are equipped with motorcycles.

Key Observations

The achievements of Zimbabwe in the field of rural sanitation are quite remarkable. No other country in Africa has achieved comparable results. The main factors contributing to this success are:

- an excellent latrine design based on years of research, development and field testing in Zimbabwe;
- a firm government policy (high-quality Blair latrines for every household);
- a substantial materials subsidy to all rural households;
- a good national economy and a functioning market/transport system;
- foreign aid covering a major part of subsidy and transport costs;
- standardized instructions for project workers in the form of a high quality, field-tested and evaluated Builder's Instructional Manual.

The major weakness of Zimbabwe's rural sanitation programme is its heavy reliance on foreign aid and on non-local materials. A nation-wide shortage of cement is currently hampering the progress of the Manicaland programme.

6. SANITATION TECHNOLOGY

Since the beginning of the Decade the VIP latrine has been the technology of choice for almost all donor-funded rural sanitation programmes outside South East Asia. This is understandable since a correctly designed, well built and properly maintained VIP latrine fulfils all essential health and hygiene criteria. There are basically two problems with the VIP approach to rural sanitation: high cost and dependence on non-local items. In the Kwale project (Kenya) the cost of a VIP demonstration latrine is KSH 13,000 and in the HESAWA programme (Tanzania) around TSH 15,000. The non-local building materials required for a single compartment VIP latrine (assuming that 1200 bricks are available locally) is cement (300 kg), reinforcing wire (25 m x 3 mm), chicken wire mesh (3.6 sq m) and stainless steel (aluminum, copper) flyscreen gauze (0.07 sq m).

The majority of rural households cannot afford a properly built VIP latrine, developing country governments cannot afford to subsidize construction on a large scale and essential items like cement, reinforcement and flyscreens must be purchased from abroad. Sanitation programmmes based on VIP technology are neither replicable on a large scale nor sus-

tainable by local resources. These problems are covered up by heavy donor-funded subsidies and special import of essential items like flyscreens.

What is a VIP latrine? The VIP (also called Blair latrine) was developed in the 1970s by Peter Morgan and Ephraim Chimbwunde at the Blair Research Laboratory (Ministry of Health) in Zimbabwe. The VIP/Blair latrine is based on a clever and simple idea: A ventpipe draws odours from the latrine vault; the latrine compartment is dark because it is built in a spiral shape and fitted with a roof; flies in the pit are attracted to the light at the top of the pipe where they are trapped by a screen; the screen also prevents flies from outside from entering the pit through the pipe. Other improvements are a brick-lined pit and a squatting slab of reinforced concrete, see Fig. 2.

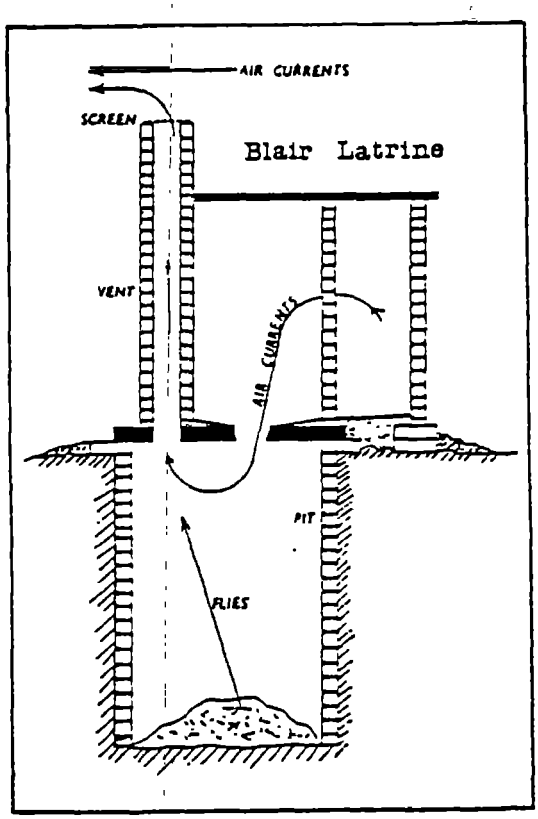


Fig. 2. Section through a VIP/Blair latrine showing air flow and movement of flies.

Most donor-funded VIP/Blair latrines we have come across over the past few years on various health, water supply and sanitation assignments in Kenya, Tanzania and Zimbabwe have no functioning flyscreen. The stainless steel (aluminum, copper) screen recommended by the Blair Research Laboratory is not available inany of the countries, not even in Zimbabwe where, for instance, the SIDA-funded Manicaland programme reports that "a backlog of over 10,000 Blair latrines constructed during the last phase of the programme are still without flyscreen gauze" (MoH 1988). Screens of other materials quickly corrode or turn brittle and break from being exposed to sunlight.

The raison d'être for the VIP/Blair latrine is its ability to prevent the flies breeding in the pit from escaping from the latrine. If there is no flyscreen, or if there are cracks in the structure allowing flies to escape, there is no justification for the ventpipe and the heavy, spiral-shaped, dark, and roofed superstructure. (A ventpipe without flyscreen will still remove odours though.)

In Kenya and Tanzania most VIP latrines are built with a rectangular superstructure fitted with a door. The door is sometimes missing, often broken, and mostly found ajar. With full daylight in the latrine the Blair system does not work as intended even if the ventpipe is fitted with a proper flyscreen.

Where the VIP/Blair latrine is unaffordable or otherwise unfeasible, which are the alternatives? Atempts have been made to cut costs by substituting mud, timber and coconut fibre for cement, reinforcement and stainless steel screen (Winblad, Kilama 1985, pp 104-107) but such constructions have not proved feasible under field conditions due to rapid deterioration and lack of maintenance and cannot be recommended.

From a health/hygiene point of view the purpose of a latrine is to break the cycle of infection or infestation. This does not necessarily require a conventional latrine, nor is the use of latrines a sufficient condition for breaking most cycles. There is in fact no simple or stable relation between latrines and health. What matters most is not the latrine itself but the degree of faecal pollution of the ground and the level of personal hygiene. Human excreta must be disposed of in such a way that there is no handling of fresh excreta and no contamination of topsoil or surface water. The excreta must be de-

posited and stored out of reach of humans and animals and in such a way that it does not promote the breeding of insect vectors. This in combination with handwashing after defecation will break many potential cycles of infection and infestation.

Human faeces can be deposed of in several ways at different levels of safety convenience and cost. Hygienic disposal can, for instance, be accomplished without conventional latrines. The method has been practiced since time immemorial, is actually prescribed in the Bible (Pentateuch 23: 12,13) and is still in use (Winblad 1987, p 9; Omambia et al 1985, p 46). The faeces are buried in a shallow hole (10-20 cm deep) and covered with tightly packed soil immediately after defecation. Due to the intense biological activity in the top layer of the soil the faeces rapidly decompose. This so called "cat method" is particularly appropriate when people are far away from home, e.g. working in the *shamba*, or looking after cattle.

A variation of this theme is the covered "one-day latrine" (Fig. 3). It consists of a hole in the ground, about 20 cm wide and 20-30 cm deep. Every user must cover his/her faeces with a layer of soil and preferably some ashes. A new hole is dug every day. The "one-day latrine" should only be used together with a lid made of a piece of sheet metal. When the sun is shining on the lid the temperature inside the hole may in hot dry climates rise above 45°C thus killing Ascaris eggs as well as eggs and larvae of hookworm and filth flies.

A similar device, known in French-speaking countries as "feuillées" is described in Wagner and Lanoix (1958, pp 111-114), see Fig. 4. Small children may be more willing to use these shallow latrines than a conventional latrine. They can also be used as a complement to the regular latrine in households observing taboos about mixing parent-child and/or male-female faeces.Neither the "one-day latrine" nor the "feuillée" is, however, a satisfactory solution for permanent settlements and should as soon as possible be replaced by latrines offering better protection against flybreeding and infestation by hookworm and other geohelminths.

The next rung on the latrine technology ladder is represented by the traditional pit latrine, which in many cases is a good solution. The main technical problems, provided it is possible to dig a deep pit, are how to avoid pit collapse and where to find termite-resistant timber for the squatting slab. Other problems are odour and fly breeding.

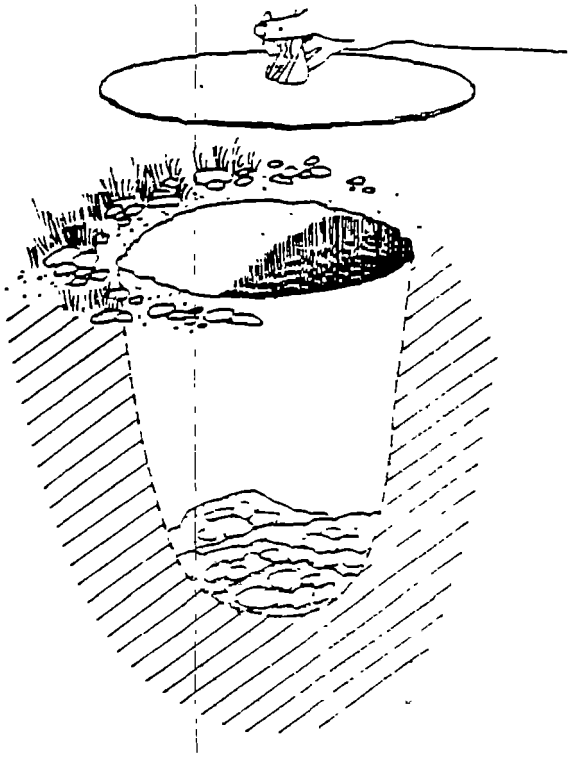


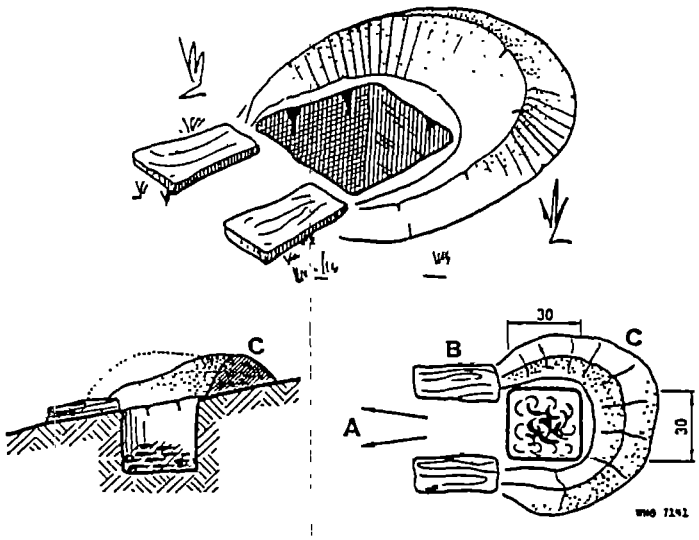
Fig. 3. A 'one-day latrine' covered with a sheet metal lid.

Pit collapse is usually blamed on the soil but often it is the result of wrong location or poor design: the latrine is not adequately protected from rain and surface water. The latrine should be located so that it is not in a stream of surface water during a heavy rain. If there is no such place for the latrine the flow of surface water must be diverted around it. The squatting slab must be well above ground level and around it there should be a mound of rammed earth, see Fig. 5. Care must be taken so that rainwater from the roof does not erode the edge of the pit.

In unstable soil it is necessary to line the pit. In such cases the pit should be circular to save on lining material. Suitable materials are stones and termite resistant timber.

In termite-infested areas the squatting slab must be made of resistant timber. Where such timber is in short supply the projects should encourage planting of suitable species. A surface of rammed cowdung is said to prevent hookworm breeding on the slab.

The first improvement for a traditional latrine is to provide it with a squatting slab of concrete or ferrocement. The main obstacle here is usually not



Measurements shown are in centimetres.

A = Flow of urine over the ground or in a furrow
B = Flat stones forming foot-rests
C = Loose earth used for covering faeces

" The system includes

" (*a*) a pit 0.60 × 0.40 × 0.40 m (24 × 16 × 16 in.);

" (*b*) above the pit a Turkish-type squatting plate provided with two foot-rests, two handles, one hole, and one gutter to divert urine towards a small pit or a drain;

" (*c*) a rought superstructure;

" (*d*) an open box or pitcher full of loose earth.

" When the pit is full, it is covered with an iron sheet held in place with four stakes (against animals, rain run-off, and soil pollution with worm larvae); and the squatting plate and superstructure are moved over another hole. After six to eight weeks, the iron sheet may be removed, the faeces having been transformed into humus and pathogens having been destroyed. Squatting plates of this type may be built of wood, metal, or concrete. They could be mass-produced and given away to poor communities following proper health education of the people as to their use." [Trans.]

Fig. 4. A "feuillée". Figure and text from Wagner and Lanoix (1958).

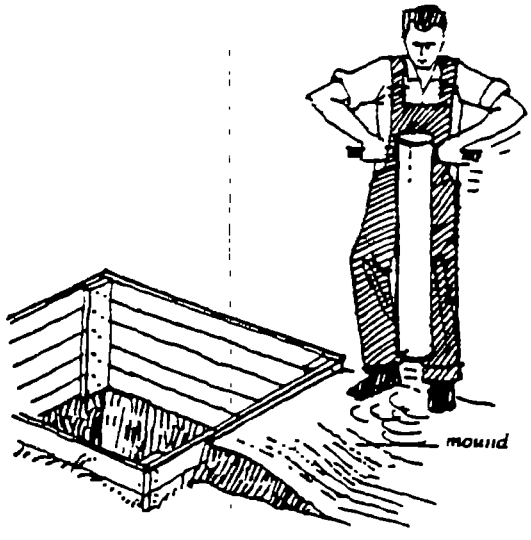


Fig. 5. Mound of rammed earth surrounding the pit.

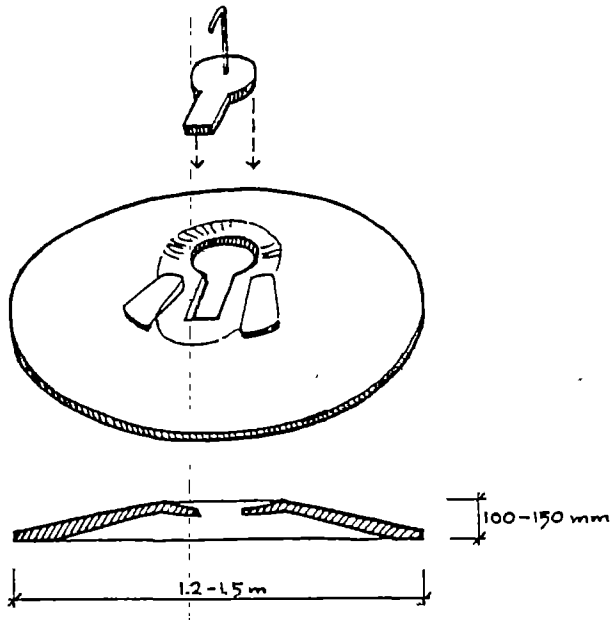


Fig. 6. Non-reinforced squatting slab with tight-fitting lid.

the cost but rather the poor availability, nationally and/or locally, of cement and reinforcement. A simple, low-cost latrine slab of nonreinforced concrete has been developed in Mozambique (Brandberg 1985, pp 24-26) (Fig. 6).

Other improvements made possible with purchased materials and components are: ventpipe, pit edge stabilization with a reinforced beam and pit lining with plaster, ferrocement or building blocks. With all these improvements plus a flyscreen and a well-built roofed superstructure (to keep the interior of the latrine dark) we end up with the VIP/Blair latrine or the ROEC latrine (for details, see Winblad, Kilama 1985, pp 108-111).

At about the same level of complexity and cost as the improved pit latrine is the double-vault compost latrine. Compost latrines are shallow. They do not require any pit and can, if necessary, be built entirely above ground (*ibid*).

Composting is a biological process in which various types of organisms under controlled conditions break down organic substances to make a humus (mature compost). The process can be used to turn human excreta into garden soil.

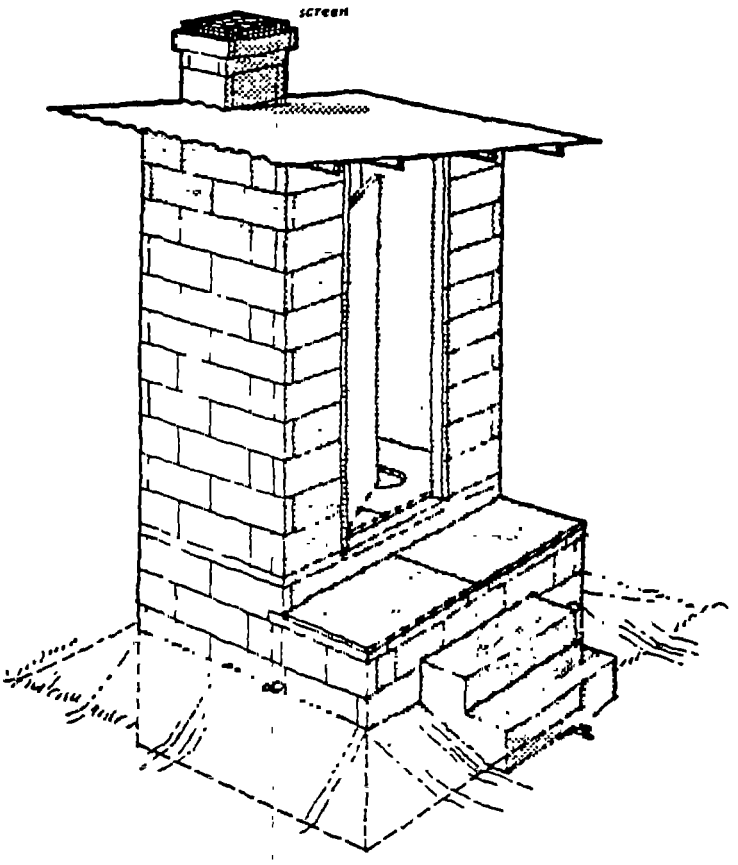


Fig. 7. Double-vault compost latrine.

In its simplest form a compost latrine consists of a vault divided into two compartments, a squatting slab with two holes, a shelter and a ventpipe, see Fig. 7.

Until recently this typ of latrine had never been tried on a large scale in Africa. A crucial question is therefore: Will the users accept to remove the compost? Recent experiences from the UNICEF-funded Wanging'ombe Project in Iringa Region, Tanzania, indicate that the answer is yes. The demand for fertilizer in Iringa Region is now so great that farmers have started digging up old pit latrines. The first Wanging'ombe latrines are beginning to fill up and according to the project staff there will be no problems in having them emptied (personal communication from Ian Blakely and Seth Kiffwe).

Composting belongs to the future. When the children being born today are adults, the world will have two or three times as many people as now. As there will not be more land we must make use of all resources. These include human excreta.

The range of available technical solutions at the high-cost end of the scale include the ROEC latrine, the solar-heated compost latrine (Winblad, Kilama 1985, pp 31-32), the pour-flush latrine (ibid pp 25-28), and latrine attached to biogas plant (Kristoferson, Bokalders 1987).

There is no single "best" method of human excreta disposal for households in rural Africa. The routine application of high standard/high cost VIP latrines in every SIDA-funded programme must give way to a rational choice based on local conditions with special consideration given to the resource constraints of the poorest half of the population and to post-project sustainability.

While households can manage very well with simple latrines, institutions like schools and health centres should have large capacity, non collapsible latrines of permanent building materials. They must be easy to keep clean. Intensive use tends to make a public latrine more malodorous than a household unit. Public latrines should therefore always be provided with a ventpipe, preferably screened for fly control. For institutions, particularly schools, in all SIDA-funded projects in Africa we recommend the Blair multi-unit latrine (Fig. 8) even if this means that SIDA has to subsidize a major part of the cost. We make this recommendation for three reasons:

- the school is a high-risk environment as regards infections;
- the daily use of well-functioning facilities is likely to reinforce the health education message of the curriculum;
- a lower technical standard than that offered by the Blair multi-unit latrine is unlikely to withstand the wear that school latrines are subjects to.

School latrines must be provided at a rate of one unit per 25 or 30 students and a minimum of one for boys and one for girls at each school is required. If only one demonstration unit is provided it is likely to malfunction from overuse.

Latrines at schools and health facilities should always be combined with handwashing facilities. Fig. 9 shows an arrangement used in the Manicaland Health, Water and Sanitation Programme (Zimbabwe).

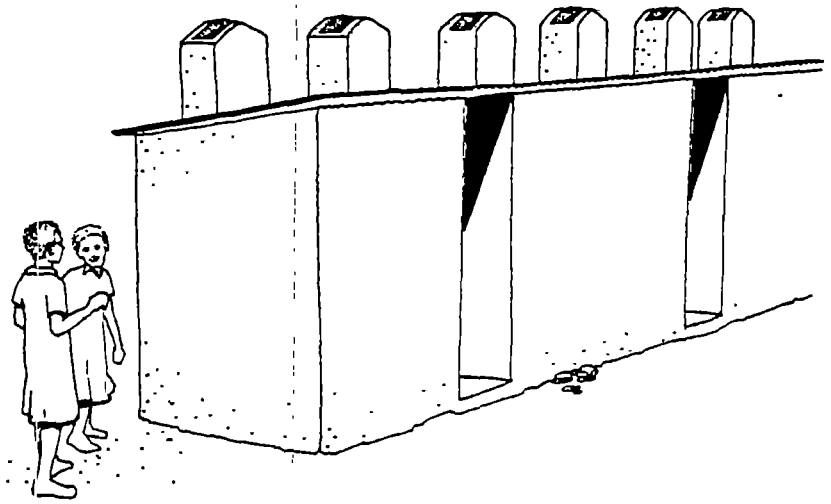


Fig. 8. Blair multi-unit latrine.

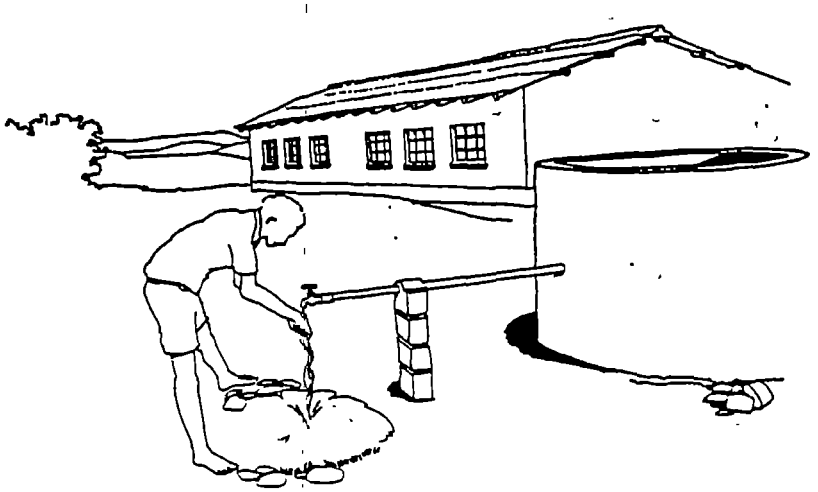


Fig. 9. School handwashing facility. An open tank with a tap is placed between the latrines and the classroom buildings. On Monday mornings every child brings about 5 litres of water and pours it into the tank. On Friday afternoons any water left in the tank is used to irrigate the school garden. Over the weekend the tank is dry. This simple routine prevents mosquito breeding.

7. ISSUES AND OBSERVATIONS

7.1 The balance between sanitation and other health-related interventions

The WHO primary health care strategy assumes community involvement in setting health care priorities. Still, suggesting how to combine different kinds of interventions and to balance the mix so as to achieve maximum health benefits is an important objective of rational planners. This is particularly crucial in poor countries where difficult choices have to be made. A relevant question is: what role is appropriate for sanitation within the PHC framework? Larger, smaller, different, or remaining as it is? And what is the view of the beneficiaries? Obviously, African health care systems are designed in ways that neglect the rural majority. They were shaped in a colonial situation to serve government officers, urban minorities and the ruling elite. This pattern remains but in the last two-three decades there have been steady efforts to increase basic health care coverage to a growing proportion of the rural people. This process has been slow and incomplete, partly because most of the scarce resources have been used to maintain and develop existing facilities in urban areas, such as hospitals, and partly because of general economic difficulties in poor countries. This is why safe and adequate water and basic sanitation are still unavailable to most rural dwellers in the least developed countries although there is mounting evidence regarding their health benefits. It is also important to remember that, while water supply improvement is often a community undertaking with fairly obvious benefits, excreta disposal is virtually always a task for the individual household and with health benefits that are slow and difficult to detect. A slow process of latrine adoption in poor rural households is, therefore, not all that surprising (Cairncross 1988).

One major obstacle facing interventions with multiple beneficial effects (e.g. education, water supply, sanitation, nutrition) is the fact that benefits tend to be narrowly analysed with regard to one benefit at a time, not taking into account a variety of other benefits achieved at no extra costs. Water supply and sanitation benefits are not restricted to human health but extend also for example to social conditions, livestock management and farming, but such effects are usually excluded from benefit/cost assessment. Another bias is the brief impact period after which interventions tend to be evaluated, which represents a bias in favour of measures with full effect immediately (drug use; immunization; surgery) while interventions increasing their impact

gradually and steadily over years may appear less impressive in the short term. A third obstacle is the 'incremental threshold' described in section 3 indicating how one intervention may be severely underrated in cases where its full effect is achieved only when combined with one or a few additional measures simultaneously.

Another observation is the fact that a large proportion of resources budgeted for rural disease prevention is regularly shifted during the financial year to solve various hospital problems including the supply of drugs. Sanitation programmes are constant losers in the competition for resources.

A general difficulty in studying programme-specific (or PHC element-specific) resource use is the awkward structure of most government budgets, which do not show expenditure by programme. A separate 'programme budget', in addition to the traditional one, would be helpful to ministry planners and also to donor agencies.

The relative importance of excreta disposal improvements and other environmental health measures has been assessed and conclusions are shown in Table 6. Disposal and treatment of excreta are considered the most important, followed by water availability and personal hygiene. This professional assessment must be matched with local community priorities wherever programmes are to be implemented, and in our experience community representatives tend to put water availability much higher on the list than excreta disposal and water quality.

We conclude that 'safe drinking water supply and basic sanitation' is a relatively neglected element of PHC and, also that excreta disposal improvement is not receiving the attention and the resources justified.

Table 6. Relative importance of alternative environmental health strategies

Intervention	Score
Water quality	14
Water availability	22
Excreta disposal	27
Excreta treatment	23
Personal and domestic cleanliness	22
Drainage and sullage disposal	6
Food hygiene	17

This situation would probably improve if resource distribution decisions are further delegeted to regions/districts, if community awareness is raised as regards causes of common illnesses, and if women's views are given more weight at all levels.

7.2 Service delivery systems: structures and resources

Several sectors provide services in support of environmental hygiene. The health sector employs staff trained to construct small-scale water supply and sanitation facilities and to provide health education and technical advice related to these. Its sanitarians (health inspectors; public health officers; public health technicians; sanitary overseers) work within the same institutions as doctors, nurses, medical assistants, etc, but tend to be left alone to struggle with the huge environmental health problems with access to only a tiny proportion of health sector resources. They have usually poor access to transport, severe shortages of field allowances, hardly any material for sanitary construction, and, partly as a consequence of all these constraints, tend to be absorbed into more resourceful programmes where they are able to make reasonably useful contributions. Sanitarians receive little or no post-basic training, and basic training of other cadres (doctors; nurses; clinical officers; health assistants) is weak in the field of environmental health.

Environmental hygiene is a responsibility also of other health sector cadres, particularly at subdistrict level and below, where nurses, health assistants and community health workers are the only medically trained individuals present. They are generally poorly trained in the field of environmental hygiene and usually fully occupied with patient care. They therefore tend to contribute little to environmental health improvement even though there are remarkable individual exceptions to this general rule.

The water development sectors are dominated by engineers and their infrastructure rarely reach effectively beyond the district level. They concentrate on large-scale urban water schemes and take on a limited amount of smaller-scale rural supplies but do little in the field of sanitation and drainage. Summary descriptions of the health and water infrastructures are presented in Table 7. The agricultural sector is relatively strong at district and subdistrict level and deals for instance with irrigation and with livestock management, both with im-

Table 7. Infrastructures for environmental hygiene at different levels

Level	Population covered	Health			Water sector		
		Institution	Staff	Activities	Institution	Staff	Activities
National	15-40 million	Ministry of Health Environmental Health Dept Health Education Dept	Several senior Health Inspectors (sanitarians; Public Health officers	Planning; supervision; training	Ministry of Water Development	Engineers	Planning; Supervision; Training
Reginal/ Provincial	2-4 million	Regional Health Dept Reg. Hospital	Reg. Med. Off. Reg. Health Insp. (sanitarian, etc)	Regional planning; Field supervision; training	Regional water Engineer's office/workshop	Reg. water Engineer support staff	Planning; Inventories Supervisional
District (Awraja)	500,000	District Med. Off's office Distr. Hosp.	Distr. Health Team incl. Distr. H. Insp. and Distr. Health Ed. officer	Planning, supervision proj. implementation	Distr. water Dev. Office	Distr. water Off. or Engineer + support staff	Proj. identification and implement; advice
Sub-district (Woreda)	50-100,000	Health Centre	Sanitarian or Publ. Health Officer	Planning with local leaders; proj. implement; supervision; training; health education			Project implementation; supervision; technical advice
Location	10-20,000	Dispensary Health Station	Public Health Technician; Nurses	Techn. acvice; proj. supervision health education			
Village	2000-4000	Health Post Village workshop	Local craftsmen; Community Health workers	Latrine construction; education			

plications for environmental hygiene and human health. Irrigation restricts amounts of water available for hygienic purposes and may increase vector breeding; domestic animals may transmit a number of diseases to humans, for instance through excreta (Schwabe 1984).

Educational contributions are possible through the school system and through adult education classes, which in many countries reach large numbers of poorly educated women. However, lack of good learning material is a serious constraint.

Social service sectors are potentially useful in educating and motivating individuals and groups and are probably underutilized in health development. They need to be much more aggressively involved by district health managers in primary health care planning.

7.3 Subsidy, replicability, and phase-out of donor support

The WHO/UNICEF Declaration of Alma Ata states *inter alia* that primary health care shall be based on "technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination".

The VIP technology advocated by the UNDP-World Bank Water and Sanitation Programme as well as by most bilateral donors does not fulfil this affordability criterion. The sanitation programmes we have seen are 'affordable' to the majority of rural households only when heavily subsidized. This means that a sanitation programme can continue only as long as foreign funds are available. Considering the economic prospects of most African countries it is unlikely that the recipient government will be able to continue subsidising household latrines over its regular budget when the foreign assistance dries up.

Can the problem be solved by an intensive donor-funded sanitation programme providing 100% coverage? No, this is not possible. Latrine construction does not end when every household has a latrine. The activity has to continue indefinitely due to rapid population growth, migration, and the need to replace latrines that fill up or collapse (Winblad, Kilama 1985, pp 10-11).

The main task of a donor-funded sanitation programme must be to assist the recipient country/community in starting an affordable and self-sustaining process of latrine construction, use, maintenance and upgrading. In order to be sustainable and replicable, sanitation schemes must be financed in full by the communities they serve, and all building materials and equipment required must be available locally. A programme relying on imported motor vehicles and fuel for the conveyance of people, equipment and materials is neither sustainable nor replicable.

7.4 Demonstration latrines

The purpose of demonstrating a new technology is to expose potential users to its benefit. The quality of the improved latrine must therefore be the best possible. This is of outmost importance during the users' first exposure to the new device. Once convinced that an improved latrine can provide benefits, the users will actively seek help in rectifying a poorly functioning latrine. However, if the first improved latrine they are exposed to does not work well they might refuse to give it another try. It is extremely difficult to overcome people's resistance to a new technology if their first exposure has been negative.

The demonstration latrine should also be replicable. Everything required to build it (materials, tools, skills) must be available locally at a cost affordable to the intended beneficiaries.

Many of the demonstration latrines we have seen on our tours in Africa have fallen short of these requirements. All have been much too expensive for the target households, many have design faults, some are poorly constructed and in public places often neglected and filthy. We have come across hardly any example of demonstration latrines being copied by households and institutions.

The whole concept of demonstration latrines should be reconsidered. If the main purpose is to show how a latrine of a particular type is constructed, that latrine must not be used. Once used it becomes unpleasant and even dangerous to inspect. The best solution is often to build the demonstration latrine as an exhibit, a full-scale model, perhaps with certain portions cut away to show otherwise hidden details. (The Wanging'ombe project in Tanzania has full-scale models with the whole substructure above ground).

One possibility would be to establish demonstration latrine centres at places where Community Health Workers are to be trained. The demonstration latrines should be built by the trainee health workers as part of their training. Each such centre should provide a range of technical solutions, for instance traditional pit latrine, an improved pit latrine, various types of slabs, VIP, ROEC, and double-vault compost latrine.

7.5 Sanitation and culture

Food handling, housing, practices related to domestic animals and traditions regarding personal hygiene are all heavily influenced by local culture and very important for human health. Careful handling of milk and meat may prevent large numbers of food-borne infections, and safe disposal of animal excreta will reduce transmission of salmonella, campylobacter and many other harmful organisms.

Latrines or other excreta disposal practices must be consistently used by household members and visitors to accomplish a faecal-free environment, and any latrine must be kept reasonably clean and attractive to be used without being itself a source of infection. This can only be achieved when the latrine is perceived as advantageous and culturally acceptable, and this is a slow process in many rural areas, less so in urban and peri-urban settings. McGarry (1977, p 262) concludes that

> "Social design, that is the involvement of the proposed user and incorporation of his attitudes, beliefs, customs and habits in the design process, is as important to the acceptance and continued use of the installation, and therefore success of the programme, as is technical or engineering design."

There is resistance in some areas against men and women or adults and children - or certain in-laws like son-in-law and mother-in-law - sharing the same latrine. Such resistance is usually not absolute, however, and tends to be overcome with time and increased awareness, for instance by seeing properly constructed latrines functioning well in a nearby household or public institution.

Privacy, convenience, security and prestige in addition to improved hygiene appear to be common reasons for installing a household latrine (Omambia et al 1985). Negative attitudes are sometimes based on religious factors. Such habits must be respected when environmental health projects are being designed.

Children are often afraid of latrines, mentioning fear of snakes, darkness, risk of falling into the pit, and these fears may also be overcome by adapting latrine designs or applying other excreta disposal methods such as the "cat method."

Involvement of local communities, studies of current hygiene-related knowledge and practices in target households and plenty of time to educate and motivate household family members is required to overcome common obstacles to improvement. Village chairmen, community health workers, teachers, and social workers are important in this process. This is strongly emphasized in the Primary Health Care strategy but poorly observed by implementors, particularly at central and regional levels. Women, including female heads of poor households, should be actively encouraged to take part in education and training.

7.6 Personal hygiene, health education, and behavioural change

Health education

Health-related education may have rather general purposes (such as increasing knowledge on disease transmission or on the importance of personal hygiene) or more specific objectives (initiating roof catchment of water or making latrines more consistently used by all members of a household). Various institutions have roles to play in these efforts and different methods are applicable. Some degree of coordination is desirable, with a reasonably clean definition of the specific role of each institution or sector.

General raising of knowledge and awareness in the area of environmental hygiene is possible in particular through the schools, through adult education classes, through mass media, and through public meetings with or without participation of health workers. A common constraint is the absence of useful health learning material, particularly in local languages, and relevant teaching material for use by teachers: books, illustrations, posters, and handouts on specific subjects.

A common weakness in relation to general health education as well as to efforts to modify specific practices is lack of information about the existing perceptions, knowledge, and attitudes of the intended target group. Religious beliefs, local cultural habits, socio-economic constraints, and the level of knowledge must be known, at least to some

extent, to those developing a health education strategy or specific hygiene messages to be applied. Pre-intervention studies - which may be small and inexpensive or conducted as sophisticated behavioural research - should be more systematically used and integrated as an early activity in projects.

Health education: "Man is Health"

In 1973 the government of Tanzania carried out a 12-week intensive multi-media health education campaign called "Man is Health" (Mtu ni Afya). The objectives of the campaign were

- to increase participants' awareness, and to encourage group actions on measures which groups and individuals can take to make their lives healthier;
- to provide information about the symptoms and prevention of five specific diseases (malaria, dysentery, hookworm, schistosomiasis, tuberculosis); and
- to encourage the maintenance of newly-acquired reading skills by providing suitable follow-up materials on hygiene and health.

The SIDA-supported campaign was organized in close cooperation between different government sectors at central, regional and local level. 75,000 study circles followed 12 radio programmes and 1 million participants were issued with learning aids in the form of two booklets. Group leaders were trained in a staged training system whereby regional teams trained district teams who, in turn, trained the study group leaders at divisional level. To ensure that the control elements of the training message survived the diffusion process there were centrally prepared handouts, prepared flip-over charts summarizing the most important points of training and prerecorded cassettes for role-playing exercises.

The campaign emphasized the imortance of action following study circle discussions. The types of activities which individual groups undertook varied according to the local situation and the priorities of the study circle participants. Examples of actions include the clearing of vegetation around the homes, digging or rebuilding latrines, draining stagnant water, cleaning areas around water supplies and boiling drinking water. In one district (Dodoma) about 200,000 latrines (close to one per house) were built during the campaign period. (This happened in

an area where in the past colonial officers had tried to enforce latrine constructions for nearly 50 years.)

The campaign was thoroughly evaluated and generally regarded as very successful. We suggest that the same approach (multi-media, study circles, actions) is tried again in Tanzania as well as in other countries with SIDA-funded health and hygiene programmes. An alternative to a national campaign might be one restricted to a particular region.

7.7 Vector control, drainage

Malaria, filariasis and certain virus infections are transmitted through vectors (mosquitoes) breeding in water and in wet latrines; schistosomiasis (bilharzia) is also vector-transmitted in ways that should be considered when sanitary facilities are chosen.

Filariasis, which is common along the East African coast, is transmitted by Culex mosquitoes breeding in polluted water. Wet latrines are potential breeding sites as are poor sewage and sullage disposal systems and septic tanks. Dry latrines are preferable in such areas. Latrines with water-seal prevent breeding provided that the septic tank or cesspool is free from cracks and covered. The number of mosquitoes emerging from latrines can be reduced by properly screened ventpipes. Well fitted and functioning screens were, however, quite rare in the VIP-projects we have visited.

Screened ventpipes may also reduce flies such as houseflies and blowflies (Families *Muscidae* and *Calliphoridae*) which breed in latrines and may carry faecal material containing harmful microorganisms on their bodies and in their guts to human food, where organisms could multiply and reach numbers sufficient to cause disease. Many families of fly thrive in sewage systems and in refuse but normally have little contact with man. They help break down and decompose waste and in turn feed birds and other insect-eating animals. While flies are often a nuisance in large numbers it has so far been difficult to find evidence of significantly increased ill-health actually being caused by flies.

Latrines and sewage systems should be designed so as to minimize breeding of harmful insects. The effect of different factors on the breeding of flies and other insects, is an issue for further study. A ventpipe with a durable and well fitted flyscreen will reduce if not eliminate fly breeding and prevent emerging flies from leaving the latrine alive,

provided the latrine is well constructed and the interior of the superstructure is dark.

It is desirable to minimize mosquito breeding in latrines constructed in filaria-affected areas, for instance by keeping the pit contents dry or fitting a screened ventpipe or a water-seal, even though this adds to the cost. Large numbers of houseflies are a nuisance and a potential health risk; fly control through screened ventpipes should be available at cost to households that can afford them but need not be considered a necessary feature of low-cost latrines.

Widespread use of safe excreta disposal may reduce prevalence rates of *Schistosom mansoni* in areas where vector snails are present. Measurable impact can be expected only when human contact with infested surface waters is systematically restricted. This can only be accomplished through strong community participation and health education over a long period of time (Jordan, Webbe 1982, Chapter 11).

7.8 Women and children as target groups and resources

Women and children belonging to low-income households are at maximum risk of poor health and in spite of relatively poor access they constitute a majority of clients seeking care at health facilities. At the same time they represent an important household resource. They draw water, clean house and compound, and prepare food. In a large proportion of households women and children are nowadays the only members residing permanently in the rural home which means that they are constantly exposed to the health hazards of village life, including poor sanitary conditions. Improvements of rural sanitation is likely to provide maximum health benefits to those at highest risk. Privacy and safety against intruders are concerns particularly of women and children and this should be allowed to influence location and design of rural excreta disposal systems.

Most children can be reached through the primary schools. Health education must be included in curricula and textbooks and all schools must have functioning, well-kept latrines and hand-washing facilities.

Existing women self-help groups have been used as entry points to local communities particularly in Kenya's Eastern Province environmental health programme. This has helped channelling resources, attention and training to members of these groups, who

tend to belong to the more active, resourceful, and development-oriented households in the local community. This is likely to facilitate support and acceptance of new ideas and technologies but may lead to a certain neglect of the poorest households where needs are greater and the younger women have heavy family commitments. More attention to women and children in the poorest half of rural households is, therefore, desirable in many programmes, and deliberate efforts to identify and involve such households are necessary. This is possible through geographical cluster sampling of households to participate in demonstration projects and also through local Community Health Workers and Traditional Birth Attendants where these have been identified and/or trained. Female Public Health Technicians and Public Health Officers are currently few, but they are important role models and are likely to stimulate development activities among women whether organized or not. There are good reasons to increase the intake of women at schools for their training.

Improved basic education of women is important not just for their capability of protecting their own health but also for their ability to care for the health of other family members, particularly the children. Single women with children are common as household heads, and this is an opportunity as well as a risk.

The legal rights of women and the rules and regulations - and convenient male interpretations of customary or traditional law - tend to put women at a disadvantage as regards access to resources, training, trade and business opportunities, and salaried jobs. Improved sanitation in rural households depends on active involvement of the women - and their clout is related to level of knowledge and legal rights.

Children can best be reached and influenced through the schools although a proportion of poor kids do not attend. Well functioning school latrines are likely to be a powerful demonstration mechanism, at least influencing attitudes and practices of the children themselves in their adult life. Sufficient numbers (at least one per 30 students and separate latrines for boys and girls), appropriate technology and satisfactory maintenance and cleaning are essential.

7.9 Environmental hygiene and PHC

The primary health care strategy is weak in the field of environmental hygiene for several reasons. First, relatively few resources are typically ear-

marked specifically for environmental health both within the Ministry of Health budget and from external funds; second, health personnel at peripheral institutions are generally poorly trained in this field and are therefore reluctant to forcefully pursue environmental health programmes; and third, local community support for preventive health programmes and for Community Health Workers is mostly very weak. All these obstacles have to be systematically addressed by any project or any institution trying to strengthen environmental hygiene regardless of whether it is done within or outside the health care system.

We wish to single out three issues as particularly important in this context. First, local communities must be genuinely involved in influencing the action plan and in selecting community volunteers and craftsmen for training; second, local volunteers must be given relevant training in environmental health, including its practical aspects; and third, a fair amount of resources for mobility (transport and per diem) must be made available to supervisors. In addition, there is the problem of a highly centralized, curatively oriented health sector showing no convincing signs of broad strategic reorientation to rural health problems, preventive programmes and, generally to Primary Health Care. More vocal and more forceful demands from rural districts could accelerate change.

7.10 Food hygiene

Food-borne illness is very common but underdiagnosed in nonindustrialized countries but the problems vary considerably between pastoralists, rural farmers, and urban dwellers.

Rural households consume their own fresh products of animal or plant origin and with varying levels of hygiene. Small-scale buying and selling takes place at local rural market places, usually within 2-3 hours walking distance. Poor hygiene practices are common leading to contamination with bacteria, such as Salmonella, Campylobacter, and Burcella, sometimes to a degree that causes disease. Such disease outbreaks, however, are restricted to one or a few household members in each case. Incidence rates of such episodes are best reduced by gradually improving hygienic practices in households and local communities with regard to care of domestic animals, handling of milk, local slaughter practices, local meat control, food storage facilities, and hygiene habits during preparation of meals. Safe handling and disposal of animal excreta are important in this context as part of an effort to achieve an excreta-free domestic environment.

A different situation exists in cities where large-scale manufacturing and processing of prepacked food is rapidly increasing. The combination of contaminated raw material, long transport distances, poorly trained staff, and insufficient refrigeration presents new risks of spreading food-borne infections to large numbers of distant consumers. Extensive and unskilled use of dangerous insecticides, food additives and other agrochemicals is another risk associated with large-scale food production in developing countries, and these chemicals pose health hazards both to production staff and to consumers. With 2-5 veterinarians per million people in low-income African countries and with bureaucracies too weak to be able to enforce whatever legislation there may be we must admit that the prospects for improvements are poor.

Well trained agricultural field workers and well educated household heads are helpful factors in an effort to improve safe and hygienic practices. Important messages to rural households - apart from safe drinking water and safe disposal of human excreta - include safe disposal or reuse of animal excreta, safe handling and storage of food stuffs, boiling of milk and sufficient cooking of meat, hygienic slaughter practices, and handwashing before preparation of food.

8. PROJECT ORGANIZATION AND IMPLEMENTATION

"Survey and analysis before plan" is a well established concept in physical planning (Patrick Geddes, around 1900). The equivalent in medicine is "diagnosis before treatment". Although these statements today seem obvious, they are rarely followed in the preparation of project documents. Regardless of local conditions, sanitation projects tend to use a standard approach including VIP technology, construction of "demonstration" latrines at public places, and free distribution of squatting slabs and other components. Factors which may have an important influence on project design like climate, soil composition, type of water supply, disease pattern, customs related to personal hygiene, income levels, availability and cost of construction materials, self-help potential, etc are not considered. As a result most sanitation projects make no measurable impact on health and rely too much on donor funds to be replicable once the foreign aid is withdrawn.

The need for sanitary surveys and the usefulness of such surveys as an educational tool was pointed out more than thirty years ago in WHO's "Excreta Disposal for Rural Areas and Small Communities" (Wagner & Lanoix 1958). The monograph contains a comprehensive list of factors to consider, see Appendix II.

9. MONITORING AND EVALUATION

There are several different kinds of evaluations having different objectives. Examples are pre-project appraisals, regular reviews of the implementation process (through written reports or site visits with or without external expertise), mid-term evaluations to guide the planning of the rest of the project period, end-of-project evaluations which again could be restricted to critical review of project implementation against stated objectives (targets) or, alternatively, include assessment of impact, possibly also costs. Different degrees of beneficiary participation and external expert involvement are possible.

Our impression is that too many project documents fail to state clear objectives and targets and that this makes subsequent evaluations difficult and unhelpful. There is a lot of superficial, uncritical and unsystematic project monitoring while methodologically satisfactory end-of-project evaluations are few. It is also becoming increasingly clear that proper assessment of water and sanitation projects impact on health is a methodologically difficult exercise with research-like components, requiring well-trained staff and plenty of time; few projects can accomodate such evaluations, which may, therefore, be more effectively conducted as separate research projects with their own budget. A couple of recent publications on the subject are mentioned in chapter 3 above. This may also help overcome a natural reluctance of those deeply involved in project planning and management, both among donors and recipients, to have poor project design or managerial mistakes scrutinized and exposed. There is considerable room for improvement of SIDA as a "learning institution."

We advocate increased attention to project documents as regards formulation of objectives/targets and as regards monitoring and evaluation procedures. More standardized methods need to be developed for each type of evaluation, for instance concerning beneficiary involvement and use of external experts. There is also a need for simple standardized procedures based on field testing. Important problems tend to escape attention unless monitoring is systematic and professionally done. Who benefits? Are target groups reached? How are the selected technologies applied? Are inputs balanced against each other? What are the views of beneficiaries and non-beneficiaries in project areas? How are resources utilized? A check-list of questions to be raised during project monitoring would probably be helpful in structuring the information collected and in standardizing the methods.

The "Minimum Evaluation Procedure for water supply and sanitation projects" (WHO 1983) has been proposed by WHO to assess function, utilization and impact of facilities. Its methods need to be further refined.

We are of the opinion that impact evaluation of environmental hygiene projects is a difficult exercise requiring considerable planning and resources if it is to be done well; only a few carefully selected projects should be subject to such evaluations. At the same time monitoring and process evaluations may be considerably improved at modest cost, and standard procedures should be developed by SIDA to be applied to is own projects in the future.

10. ISSUES FOR RESEARCH AND DEVELOPMENT

Further applied research and development are required essentially in three areas: technology, socio-cultural factors, and organization/management.

With regard to technology we need to know more about latrine construction under difficult conditions (high groundwater table and scarcity of funds, skills, and/or materials) and about breeding of flies and mosquitoes in different types of latrines and under different circumstances; there is a need to study the feasibility of composting; and studies are also needed regarding the efficiency of different environmental actions in reducing disease vector populations and rates of disease transmission.

Locally relevant socio-cultural factors are more or less serious obstacles to desirable behaviour change, and they need to be known to be reduced and overcome. Willingness to use decomposed human excreta as manure, household resources including free time, children's reluctance to use certain types of pit latrines and willingness to contribute scarce household resources to hygiene improvement, are examples of issues to be studied. Low-cost methods for such studies need to be developed and tested, and the usefulness of the findings to health educators needs to be determined.

Little research and development have so far been done on extension. Appropriate technologies for environmental hygiene are not enough. They must be accompanied by effective supplementation strategies including training of extension workers and health education of target populations.

> "All parties involved in the International Drinking Water Supply and Sanitation Decade

> have placed special emphasis on reaching rural populations with improved services. Yet a review of experience shows that few countries have programmes that are replicable on the scale required to reach any significant fraction of the rural population within any reasonable time frame..."
>
> (Churchill 1987)

In the field of programme organization and management we need to know much more about attitudes in relevant sectors (water supplies; health; agriculture; social services) to closer cooperation and to joint programme management, about the managerial capabilities and resources of district water engineers and district public officers, about local community groups and institutions, their involvement in development efforts, their purposes, membership, and resources. Instruments for standardized district or subdistrict environmental hygiene profiles (existing infrastructure; unexploited resources; health problems; local attitudes) need to be developed and tested for usefulness in planning. Similarly, methods for monitoring and process evaluation of projects need to be reviewed, and improved procedures tested.

These issues should be discussed jointly by SIDA and SAREC and raised during consultations with bilateral and international organisations.

11. CONCLUSIONS AND RECOMMENDATIONS

General

At the policy level the situation is clear: environmental hygiene is an important part of rural water supply programmes funded by SIDA and other donors. In reality, however, environmental hygiene is playing an insignificant role in most programmes. The relatively low priority given to environmental hygiene is reflected in the allocation of staff and other resources. The efforts have been characterized by extremely low levels of activity, unsuitable technology, no research and development for adaptation to local conditions, insufficient basic and continuing training of extension workers, failure to reach the target population and a high degree of dependence on donor funds.

The major shortcoming of current donor-funded environmental hygiene programmes in Africa is that none of them provides a model for large-scale implementation through local or national efforts. This is partly due to unsatisfactory problem analysis and

policy formulation both within LDC institutions and within donor agencies; a wealth of experience is not effectively utilized

Larger share of health and water sector funds to environmental hygiene

The share of SIDA's water sector funds allocated to environmental hygiene should be increased so that progress in health education, latrine construction, drainage and vector control has a fair chance of effectively matching progress in water supply improvement. Moreover, in view of their likely impact on the burden of illness in low-income countries environmental health programmes should be given a larger share of health sector resources.

Survey before plan

Community environmental hygiene surveys must precede the formulation of project documents and action plans. The surveys must pay particular attention to existing disease patterns, local socio-cultural circumstances, existing sanitary conditions and resources available, including potential resources and institutions for self-help (see WHO recommendations from 1958, Appendix II). Standardized formats for such descriptive surveys should be available at national, regional and district level; development and testing of such instruments is required in some countries.

Detailed project documents

Project documents are often remarkably vague about exactly what is to be done in sanitation and health education. Objectives and targets are not sufficiently precise, and this presents problems to implementors and evaluators alike. There is a need to go beyond general statements like:

- Promote improved methods for sanitation
- Have demonstration latrines of suitable type constructed at selected sites
- Carry out health education and appropriate water use information.

The projects are usually implemented by national and international staff with expert knowledge and wide experience of water supply but with little experience of community mobilization, sanitation, health education and vector control. The project document and its plan of operation should therefore not only

state clearly what is to be done but also specify how, by whom, when and at what cost.

Mobilization of community participation

The purpose of this phase is to create a demand for improved environmental hygiene within the target community. This should be long-term educational efforts through schools, adult education programmes and regular health-related education sessions by health workers and by staff in other sectors. This could be supplemented from time to time by a short, intensive campaign aimed at all adults of the community.

A possible approach, as yet untested, was proposed in a recent report (Winblad 1987, pp 6-7) on SIDA-funded environmental hygiene programmes in Kenya.

> "Use roundworms (*Ascaris lumbricoides*) as the entry point in mobilizing the local community. Ascariasis is one of the most common parasitic infections in Kenya. Most mothers have seen the worm in the children's stools. There is a direct relation between faeces and ascariasis. The clear and blunt message should be: You get roundworms from eating faeces. To avoid getting roundworms, make sure that there are no faeces on the ground, and wash your hands!
>
> Each health worker involved in village level health education should have the flannelgraph "Roundworms" produced by TALC (Teaching Aids at Low Cost) in London. (This is a superior teaching aid for village level work: easily carried, needs no electricity, can be adapted to local situations and, most important of all, encourages audience participation.)
>
> "Once the message has been absorbed, encourage the community to set a target date: 'No human excreta on the ground by May 1990!,' or whatever date the community prefers. It must be made clear that the target can be achived even without latrines. A faecal-free environment can be created as soon as all stools are buried immediately."

Other ways of mobilizing rural populations are represented by the "Mtu ni Afya" multi-media campaign in Tanzania in 1974 (Hall 1980) and the study circle approach currently used in the HESAWA programme (HESAWA 1988, pp 34-35).

Application of appropriate technology

Appropriate technology means a technology that is *acceptable* to the local population, *affordable* to the target group and *sustainable* through local resources.

Each community must decide for itself what is appropriate. One task of the project staff is to present available alternatives and their consequences in terms of performance, cost, operational and maintenance requirements and durability.

SIDA-funded programmes have a tendency to adopt solutions, such as the VIP latrine, advocated by large international agencies, such as UNDP and the World Bank. We strongly advocate the simultaneous use of a range of technical solutions within any given project with the final selection made by the target households.

For institutions, particularly schools and health facilities, we recommend all programmes to adopt the Blair multi-unit latrine even if the technology is not immediately affordable by the local community. School latrines should be provided at a rate of at least one unit per 30 students.

Appropriate technology is required not only for sanitary disposal of human excreta but also for animal excreta, hand washing arrangements, water storage, drainage and vector control. Water storage in homes must not provide opportunities for mosquito breeding and as far as possible prevent contamination of drinking water.

Vector breeding should be minimized mainly through environmental means (drainage, bush clearing, safe water storage etc) while the use of imported chemicals should be heavily restricted.

Health education focusing on women and school children

The purpose of health education is to change behaviour. Health education must therefore be conceived and planned as a long-term intervention. The primary target groups should be mothers, teachers and school children. Primary schools ought to play a much more prominent role in SIDA-funded environmental hygiene programmes. Education authorities at national, regional, and local levels should be co-opted into the programmes at an early stage. Environmental and personal hygiene must be given more emphasis in the syllabi. Within the SIDA-funded

programmes teachers should be trained, teaching and learning aids should not only be produced but also widely distributed and all schools provided with a sufficient number of well-functioning and easily maintainable latrines built of permanent materials.

Technology transfer to rural households

Technology transfer implies training of change agents at the village level: members of the health (or development) committee, community health workers, private craftsmen and teachers. SIDA-funded projects should initiate discussions with local communities on what kind of technology transfer is required (pit stabilization, slab making etc) and how it may be carried out by whom, through aided self-help, or through commercial production of slabs. In many cases some action-oriented research and development will be required in order to adapt known technologies to specific local conditions. This must be allowed for in the project budget and time plan.

Manpower training

We would like to make three recommendations in relation to manpower training. First, sanitarians with tutor training should be part of the teaching staff at health training institutions where environmental health is part of the syllabus. Second, practical field training needs to be allocated sufficient resources as part of basic training programmes. And third, regular refresher training is much needed, with syllabi influenced by the trainees.

Monitoring and evaluation

In addition to measuring the number of improved or new installations, SIDA-funded environmental hygiene programmes should include regular monitoring of some health indicator(s), for instance Ascaris ova in the stools of pre-school children. Such monitoring, preferably carried out by staff of the nearest health facility, could be used to reinforce a community's determination to achieve a faecal-free environment (as suggested under "Mobilization" above).

We also recommend the use of participatory evaluation (Feuerstein 1986). Its purpose of increasing the involvement is to provide a suggestive and corrective mechanism at the village level and feedback to all levels of the project organization. Participatory evaluation is a logical consequence of community participation in environmental hygiene pro-

jects. All those involved with the project should take part in the evaluation process. "Evaluation becomes a cooperative effort of self-criticism and reflection" (Werner, Bower 1982, p 9:11). Information is gathered through dialogue and mostly without the use of intermediary instruments such as questionnaires and forms.

Project organization

Programmes should be implemented through existing organizational infrastructures rather than by ad-hoc project implementation bodies set up specifically for one project. Channelling of project funds is best done separately through each participating ministry system.

Phasing out donor support

Most of today's SIDA-funded environmental hygiene programmes are likely to cease when external funding comes to an end. New programmes must from the very beginning be planned with (national/local) self-sustainability in mind. This means a policy of austerity for many years to come. Existing programmes should be required to work out a plan for the continuation of programme activities based on available local resources. This includes the phasing out of subsidies, finding local substitutes for imported items (like for stainless steel flyscreen in a VIP latrine), reducing transport requirements, etc.

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UTVECKLING AV RIKTLINJER FÖR OMGIVNINGSHYGIEN

Bakgrund

Under det senaste decenniet har SIDA genom olika hälsoprogram och integrerade vattenprojekt medverkat i aktiviteter relaterade till omgivningshygien. Behovet för precisering av biståndets metod och inriktning inom detta fält upplevs som viktigt både inom berörda byråer och hos SIDAs samarbetsinstitutioner/resurspersoner.

Den samlade internationella erfarenheten pekar på att vatteninsatser uppnår begränsade resultat i hälsoförbättringar om inte dessa insatser samordnas med hygienutbildning och förbättringar i omgivningshygienen. Likaså pekar alla erfarenheter på att förbättrad omgivningshygien är en utomordentligt viktig komponent i satsningen på förebyggande hälsovård.

SIDAs grundläggande policies relaterade till omgivningshygien finns framför allt angivna i två SIDA-dokument: Policy för SIDAs hälsobistånd och Strategi för hushållsvatten, hälsoutbildning och omgivningshygien. Den övergripande inriktningen bedöms som tillfredsställande men mer konkreta riktlinjer kan utarbetas för utformning av framtida projekt och program. Samspelet mellan vattenförsörjningens utveckling, den sanitära förbättringen, hälsorelaterad kunskapsökning och beteendeförändringar är avgörande för resultatet i form av hälsoförbättring.

Erfarenheter

SIDA har längre erfarenhet av samarbete inom omgivningshygiensområdet med bl a Kenya och Tanzania. Hesawaprogrammet (Tanzania) och Kwaleprojektet (Kenya) är integrerade insatser där såväl vatten- som hälsoministerierna har ansvar för genomförandet. Båda programmen bygger på principen om folkligt deltagande och är koncentrerade till ett geografiskt område. Bland SIDAs erfarenheter inom omgivningshygiensområdet bör också innefattas omfattande förstudier och projektarbete med Kenyas "Eastern Province Project".

Syfte

Det övergripande målet är att utarbeta förbättrade riktlinjer för SIDA-insatser realterade till vattenförsörjning, omgivningshygien och hygienutbildning. Som ett första steg måste SIDAs samlade erfarenheter dokumenteras. Denna studie avser i första hand att genom konsultmedverkan få en realistisk bild av den utveckling som skett inom omgivningshygienområdet i Kenya och Tanzania. Erfarenheterna skall analyseras framför allt med avseende på aspekterna "sustainability, replicability och affordability" - sett ur mottagarens perspektiv.

Studien skall ge en bas för fortsatta diskussioner om riktlinjer relaterade till omgivningshygien inom SIDA och närkonsultkretsen.

Uppdraget

Uppdraget bör utföras av de konsulter (E Nordberg, U Winblad) som mest aktivt samarbetat med SIDA och som har en god samlad bild av erfarenheterna i sektorn. Kortfattat kan studien beskrivas som en inventering och erfarenhetsredovisning av pågående och avslutade insatser inom omgivningshygiensområdet med påföljande analys av erfarenheterna.

Uppdraget skall innefatta (men är ej begränsat till):

- Studier av relevant litteratur beträffande sanitet och omgivningshygien i framför allt Kenya, Tanzania.
- Fältbesök i Kenya november 1988. Särskilt skall erfarenheter från Kwale och Eastern Province Project studeras.
- En inventering skall göras av andra projekt i Kenya relaterade till omgivningshygien och erfarenheter av dessa.
- Analys av metod, teknik, kostnad baserad på hushållens behov och resurser.
- Studie av lämplig organisationsform, roller och ansvarsområden i genomförandet (underhåll). Samhällets stöd till hushållen.
- Diskussion om nyttoaspekter.
- Socio-kulturella aspekter på latrinanvändning och avfallshantering.

- Diskutera integrerade program i relation till enkelt genomförande, enkel organisation.

- Presentera för SIDA en syntes av erfarenheterna i form av rapport. Leda seminarier och delta i en fortsatt diskussion om verkets riktlinjer beträffande omgivningshygien..

Tidplan/rapportering

Studien skall genomföras under våren och hösten 1988. Diskussioner om framtida riktlinjer föreslås äga rum under våren 1989. Resan till Kenya äger rum 22 november - 5 december 1988.

I Kenya skall konsulterna samla in erfarenheter från biståndskontor, myndigheter, AMREF med representanter för Världsbanken/UNDP, UNICEF och andra relevanta organisationer.

Resor skall ske till Kwale-projektet och Eastern Province programmet. Muntlig avrapportering skall äga rum hos myndighet i mottagarlandet, på biståndskontor och SIDA-S. Kenya och Tanzania erfarenheter skall redovisas samlade i skriftlig rapport senast 15 mars 1989. Konsulterna skall medverka i förberedelse och genomförande av ett seminarium där erfarenheter diskuteras och nya riktlinjer skisseras. Utöver 2 veckors vistelse i Kenya beräknas analys, sammanställning, redovisning ta 2 veckor per konsult (totalt 4 konsultveckor) i anspråk.

Logistik

Konsulterna förutses lösa bokningar, transporter m m på egen hand i Kenya, ev i samråd med bk.

Referenser:

- Policy för SIDAs hälsobistånd 82 04 05

- Vattenstrategi - Landsbygdens vattenförsörjning. Hushållsvatten, hälsoutbildning, Omgivningshygien. SIDA Andra upplagan januari 1987

- Projektdokument relaterade till Kwale

- Projektdokument relaterade till Eastern Province Project

- Evalueringsrapport från Kwale (evaluering genomföres i september under ledning av G Schultzberg)

UPPDR/KP

Community Sanitary Surveys

In most rural areas, community sanitary surveys are usually necessary to obtain first-hand information concerning local sanitary conditions and needs. Such surveys, undertaken with the participation of local leaders of the community, will be of immense help in programme planning and evaluation. Depending upon the particular situation at hand, they may cover the following factors in part or in whole.

A. *Description of area*

(1) location, topography, climate, character, communications, maps;

(2) geology and hydrology, with particular reference to nature of top and underground layers of the soil, its porosity, presence and abundance of ground water (if any), direction of flow, level of ground-water table, its appearance and potability, estimation of yields of springs, rivers, and so on;

(3) population—number, constitution by age-groups and sex, density, growth;

(4) industries and agriculture, with particular reference to irrigation, drainage, and soil fertilizing practices;

B. *Medical and sanitary data*

(1) general health of the population, with special emphasis on communicable diseases and on intestinal infections, helminth infestations, and trachoma and acute conjunctivitis in infants and children;

(2) vital statistics, mortality and morbidity data;

(3) health and sanitary administration, with reference to organization, personnel, budget, and activities of voluntary or other agencies in the field of sanitation;

(4) existing sanitary conditions in the area, with reference to description of private and public latrines, their distribution and use; to wells, springs, and other systems of water supply (including such information as number of persons served by piped water-supplies, and by wells, the consumption and uses of water, number of dwellings with private water supply, etc); to wastes collection, disposal, and composting; to milk and food sanitation; to insects (flies, fleas, lice, mosquitos); to health aspects and standards of housing; and to school sanitation.

(5) sociological and cultural patterns, with particular reference to community and family organization, leadership; customs, beliefs, and habits bearing on personal hygiene and community sanitation; present methods (if any) of health education of the public.

C. *Resources available*

(1) general economic level of the population; average income *per caput*;

(2) co-operation expected from agricultural, educational, and other agencies or groups for training and health education of the public;

(3) housing and vehicle transport for programme, vehicle and equipment repair and maintenance facilities; sources of power (electricity, fuel);

(4) local construction materials and their costs;

(5) local craftsmen and wages;

(6) potential resources for self-help.

This information has an important bearing on the project and makes it possible to draft a reasonably accurate cost estimate. Such a survey is a useful educational tool and also serves to acquaint the sanitation personnel with the families and with their customs, beliefs, interests, and attitudes. In short, it helps to prepare a " social map " of the community.

W&L, WHO 1958

APPENDIX III

ABBREVIATIONS

AMREF	African Medical and Research Foundation
FIM	Finnish Mark
HESAWA	Health, water supply and sanitation (SIDA-supported project in Lake Regions, Tanzania)
KSH	Kenya shilling
MoH	Ministry of Health
NGD	Non-Government Organization
PHC	Primary Health Care
ROEC	
SEK	Swedish Kronor
SIDA	Swedish International Development Authority
TALC	Teaching Aid at Low Cost
TAS	Tanzania shilling
UNDP	United Nation Development Programme
UNICEF	United Nations
VHW	Village Health Worker
VIP	Ventilated Improved Pit (latrine)
WHO	World Health Organization
ZD	Zimbabwe Dollar