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# Environmental Sanitation in Developing Countries

A Selected and Annotated Bibliography

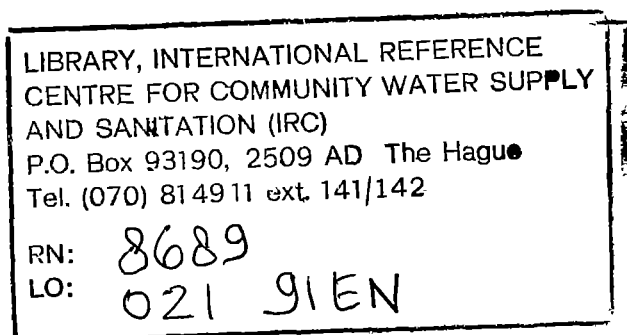
**Karin E. Kemper & Carl Widstrand**

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# Environmental Sanitation in Developing Countries

A Selected and Annotated Bibliography



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## INTRODUCTION

Many sanitation projects and programmes in Africa have been based on the assumption that improved hygiene and sanitation are prerequisites for improved health and quality of life. However, these projects have not always been as successful as expected. One of the reasons may be that many individuals do not share Western conceptions of hygiene and health, another that improvement of sanitation facilities and health education do not necessarily by themselves lead to significant impacts on health.

In this context the Department of Water and Environmental Studies at Linköping University is planning a research programme on environmental sanitation in developing countries with focus on Kenya and/or Tanzania.

One part of the programme will deal with traditions and attitudes concerning hygiene and environmental sanitation, which may lead to a better understanding of how people reason, and, perhaps, to the identification of a traditional basis upon which improvements in sanitation could be built. The point of departure for the other part of the programme is the fact that the installation of on-site sanitation may cause groundwater contamination. This depends on numerous factors, such as type of soil, siting of the sanitation facilities and groundwater flow, climate etc., which up to now have been neglected in sanitation programmes. Notwithstanding, groundwater contamination induced by "improved" sanitation would not only reduce the beneficial effects of a programme but might even entail adverse effects on health.

This bibliography has been compiled in order to provide an overview of the literature concerned with the topics to be dealt with in the research programme. Not unexpectedly, the material turned out to be rather limited. The larger part of the literature on sanitation either concerns the medical side of the subject, i.e. the effects of improved hygiene and sanitation, the technical side, i.e. the spectrum of more or less appropriate technologies, or the operational side, i.e. how to implement sanitation projects. Cultural aspects are seldom considered explicitly, but emerge in connection

with the other subjects. The same is valid for aspects relating to groundwater contamination.

This bibliography consequently consists of selected and annotated titles that may at least have some relation with the topics of interest as well as of titles providing a more general background of the state-of-the-art. Other bibliographies dealing with sanitation are equally included.

The bibliography was compiled by Karin E. Kemper, B.Sc. (Econ.), the research assistant of the project.

*Linköping, June 1991*

Carl Widstrand  
Project director

## LITERATURE SEARCH

The literature search took place in several stages. Firstly, a computer search was carried out by the library of Linköping University. The keywords were "sanitation", "Tanzania and/or Kenya".

Secondly, research institutions as well as international and bilateral aid agencies were contacted and asked for information on published or unpublished material on the subject matter. Finally, manual research in different libraries was carried out.

The response was very positive, several organizations sent computer abstracts from their own data bases, others provided publication lists, papers or articles.

Some of the literature abstracts included in this bibliography originate from the data bases consulted and are marked as such. The sources approached are listed below.

### Databases

AGRIS  
AGRICOLA  
BIOSIS  
CAB Abstracts  
EMBASE  
ENSIC Database  
Enviroline  
Health Periodicals Database  
Libris  
Pascal

### Development Aid Agencies and Projects

DANIDA (Danish International Development Agency),  
Copenhagen, Denmark

DSE (German Foundation for International Development), Bonn,  
Germany

FINNIDA (Finnish International Development Agency), Helsinki, Finland

GTZ (German Agency for Technical Cooperation), Eschborn, Germany

NORAD (Norwegian Agency for International Development), Oslo, Norway

SIDA (Swedish International Development Authority), Stockholm, Sweden

TOOL Transfer of Technology for Development, Amsterdam, The Netherlands

UNDP/PROWESS (United Nations Development Program/ Promotion of the Role of Women in Water and Environmental Sanitation Services), New York, USA

WASH (Water and Sanitation for Health Project), Arlington, USA

World Bank, Washington, USA

### **Research Institutions**

Centre de Formation et de Recherche en Médecine et Santé Tropicales, Marseille, France

Christian Michelsen Institute, Bergen, Norway

ENSIC (Environmental Sanitation Information Centre), Asian Institute of Technology, Bangkok, Thailand

Forschungsinstitut für Hygiene und Mikrobiologie, Bad Elster, Germany



Institute for Social Science Research in Developing Countries (IMWOO), The Hague, The Netherlands

Institut für Afrika-Kunde, Hamburg, Germany

IRC International Water and Sanitation Centre, The Hague, The Netherlands

London School of Hygiene and Tropical Medicine, London, U.K.

Royal Tropical Institute, Amsterdam, The Netherlands

Scandinavian Institute of African Studies, Uppsala, Sweden.

Stichting voor Wetenschappelijk Onderzoek van de Tropen (WOTRO), The Hague, The Netherlands

Swiss Tropical Institute, Basel, Switzerland

Université Claude Bernard, Lyon, France

## REFERENCES AND ANNOTATIONS

Agarwal, A. et al., 1981. *Water, Sanitation, Health - for All?*, 145 pp, London: Earthscan.

This book deals with the prospects for the International Drinking Water Supply and Sanitation Decade. Background facts and statistics are provided and three case studies illustrate the situation in selected countries (Colombia, India and Kenya) Chapters Four and Five are devoted to sanitation respectively the health effects of clean water and sanitation Problems in urban and rural sanitation schemes are treated and some social and cultural factors in different countries affecting attitudes towards sanitation are quoted

Astor, G.J., Kohorst, P. et al., 1987. *Aufklärung und Akzeptanz im Rahmen von Trinkwasserversorgungs- und Sanitarprojekten*, Forschungsberichte des Bundesministeriums für wirtschaftliche Zusammenarbeit (BMZ) No. 83, pp 147, München: Weltforum Verlag.

Aziz, K.M.S. et al., 1990. *Water Supply, Sanitation and Hygiene Education - Report of a Health Impact Study in Mirzapur, Bangladesh*, Water and Sanitation Report Series, UNDP-World Bank Water and Sanitation Program, 91 pp, Washington: The World Bank.

This report deals with a longitudinal study of the health impact of an integrated project comprising handpumps, improved latrines, and hygiene education in a rural area of Bangladesh A detailed description of the study's methodology and results is provided.

The findings suggest that the integrated approach has led to a significant impact on childhood diarrhoeal disease in the study communities There also is evidence that *Ascaris* infections were reduced. Since an improvement of the studied children's nutritional status could not be detected, however, it is concluded that this indicator which is sometimes used in order to measure the impact of programmes aimed at the reduction of diarrhoeal diseases, may not be appropriate

Due to the immense cost of the study the authors call for the development of cheaper and less time-consuming methods which can

measure health improvements. It is suggested that behavioural change is a necessary precondition for positive health impacts of sanitation programmes and that it may suffice to use the degree of behavioural change as an indicator of possible health impacts

Baars, J.K., 1957. "Travel of Pollution and Purification en Route in Sandy Soils," *Bulletin of the World Health Organisation*, Vol. 16, 1957, pp 727-747.

Considering the lack of research on pollution of soils in tropical climates, this article, although dealing with soil pollution in The Netherlands, may be utilized as a source of background information on travel of pollution in sandy soils.

Bajard, Y., Draper, M. and P. Viens, 1978. "Alimentation en eau et l'assainissement en milieu rural," *Development/Focus*, Rome 20, pp 7-12.

Bang, Y.H., Sabuni, I.B. and R.J. Tonn, 1975. "Integrated Control of Urban Mosquitoes in Dar es Salaam Using Community Sanitation Supplemented by Larviciding," *East African Medical Journal*, 1975, 52 (10), pp 578-588.

Barrell, R.A.E. and M.G.M. Rowland, 1979. "The Relationship between Rainfall and Water Pollution in a West African (Gambian) village," *Journal of Hygiene*, 83, pp 143-150.

Baumann, W., and H.J. Karpe, 1980. *Waste Water Treatment and Excreta Disposal in Developing Countries, Report on a Research Project on Behalf of German Appropriate Technology Exchange (GATE)*, 167 pp, Eschborn: German Agency for Technical Cooperation (GTZ).

Benninger, C.C., 1988. "Human Resources Development for the Improvement of Human Settlements," *Ekistics*, Jan-June 1988, v55, N328-330, P12 (19).

Bialosiewicz, G. and J. Burns, 1983. *Game of Childhood Diseases*, Technical Note 23, 13 pp, Amherst: University of Massachusetts, Center for International Education.

Blumenthal, U.J., 1985. *Transmission of Schistosoma Haematobium in Seasonal Pools in the Gambia with Particular Reference to the Role of Human Water Contact*, PhD Thesis, Liverpool: University of Liverpool.

Boesen, J., Kapinga, B.S., Laubjerg, K., Mujwahuzi, M. and O. Therkildsen, 1982. "Vand og sanitet i Tanzanias landdistrikter," *Den Ny Verden*, 1982, v. 16(1), pp 64-84 (Danish text).

In this article it is stressed that improved water supply ought to be made available in Tanzanian villages mainly due to the great work burden women daily have to cope with. It is claimed that reduced distance to the water source is more important to women than improved quality of the water and that, in many cases, improved water supplies are not utilized if they are farther away from household dwellings than traditional sources. However, if an improved water supply is nearer than a traditional source, it is invariably used.

As to sanitation, figures are presented showing that the overwhelming majority of the households in Iringa, Mbeya and Ruvuma regions have pit latrines of the traditional type, *i.e.* simple pits surrounded by fences for privacy.

Furthermore, it is stated that between 90-100% of the adult population and between 85-100% of the children use the latrines. In Wang'ing'ombe region where a study on sanitation was carried out no culturally induced obstacles to latrine usage, *e.g.* the idea that old people do not defecate, or avoidance relationships could be identified.

Based on these results, a UNICEF project promoting the construction of VIP latrines is criticized since these are more expensive than traditional ones and might have a demoralizing effect on the people who are proud of having followed the Tanzanian government's massive campaigns to build pit latrines. Suddenly their efforts appear to be insufficient.

The authors conclude that for the time being the sanitation sector in this region does not need more support.

Boot, M., 1990. *"Making the Links" - Guidelines for Hygiene Education in Community Water Supply and Sanitation*, Occasional Paper Series No. 5, 5th edition, The Hague: IRC International Water and Sanitation Centre.

These guidelines stress the links between water supply, sanitation and hygiene education. Although they were conceptualized for a public standpost water supplies project, they can be utilized and adapted for a variety of water and sanitation projects. The topics covered are promotion of health in the community, prevention of water and sanitation related diseases, and hygiene education and audio-visual aids. The starting point for any project is considered to be the participation by the community from the very beginning as well as the necessity to build on local behaviour and perceptions.

Boukráa, R., 1979. *Sociologisk studie i hygieniskt beteende-monster och kulturella förändringar/Tunisien*, 88 pp, Stockholm: SIDA Industribyrån, (unpublished, Swedish text).

The report describes and analyses 159 households in four Tunisian villages as to their behaviour concerning personal hygiene and excreta disposal. The aim is to relate the practices to cultural and social conditions in the villages and to provide knowledge about the rate of acceptance of multrum toilets as a basis for a planned project. Although the four villages are quite different from each other, they present certain common characteristics. If there is a wish for on-site sanitation it frequently results from augmented population pressure in the area, which no longer allows for privacy in the open. Furthermore, people are influenced by hygiene education and what they have seen in towns and want to achieve a more modern standard. Better housing in general, however, is a greater priority than sanitation and numerous families want to wait until they have larger houses before sacrificing one room for sanitation. Finally, several families are not willing to spend money and time (construction, maintenance, control of correct usage by family members and visitors, cleaning) on toilets as long as it is cheaper and simpler to make use of nature.

Bourne, P.G., ed., 1984. *Water and Sanitation - Economic and Sociological Perspectives*, New York: Academic Press, Inc.

This is a progress report of the International Water Supply and Sanitation Decade, containing 13 chapters contributed by authors belonging to a wide range of disciplines, including e.g. anthropology, engineering and medicine

Cultural considerations are treated in Chapter Nine. (Cf. Simpson-Hébert, M)

Briscoe, J., Feachem, R. and M.M. Rahaman, 1986. *Evaluating Health Impacts: Water Supply, Sanitation, and Hygiene Education*, Ottawa: International Development Research Center.

This publication is the result of a workshop on measuring health impacts of water supply and sanitation programmes held in Bangladesh in November 1983.

The objectives of health impact evaluations are discussed and a host of possible study designs are presented and commented. The book also contains abstracts of the workshop papers as well as a list of the participants.

Buschkens, W.F.L. and L.J. Slikkerveer, 1982. *Health Care in East Africa - Illness Behaviour of the Eastern Oromo in Hararghe (Ethiopia)*, The Netherlands: Van Gorcum.

This publication is based on research conducted during a three-year-period in Ethiopia. Information is provided on health, health behaviour and medical delivery systems in a rural region in highland Hararghe.

The modern health care system in Ethiopia, although insufficient by average standards, is considered to be heavily underutilized. It is found that the utilization of different health care systems, namely the traditional (e.g. healers), transitional (village drugstores) and the modern system (health posts, hospitals) depends on a variety of factors, which are related to the distance to the respective health care system

Thus the geographic, economic and socio-cultural distances to the modern health sector play an important role for its utilization. The perception of morbidity, notably the fact that certain types of illness are considered to be of magico-religious nature and therefore untreatable by conventional health care measures provides an example for socio-

culturally conditioned behaviour increasing the distance to modern health care.

It is recommended to reduce the distances to the modern health sector in a pilot programme in order to augment its acceptance and reduce morbidity and mortality

Cairncross, S. and R.G. Feachem, 1983. *Environmental Health Engineering in the Tropics: An Introductory Text*, New York: Wiley.

Major infectious diseases occurring in tropical countries as well as adequate interventions are described. The book contains sixteen chapters divided into four sections: health and pollution, water supply, excreta and refuse and environmental modifications, and vector-borne diseases. The environmental interventions principally focused on are domestic water supplies and improved excreta disposal.

Cairncross, S., 1986. "Urban Drainage in Developing Countries," *Parasitology Today*, Vol. 2, No. 7, 1986, pp 200-202.

Although considerable attention has been paid to water supply and excreta disposal during the Decade, the question of appropriate standards and technologies for urban rainwater drainage in developing countries has been almost completely ignored.

In view of the health hazards posed by contaminated surface waters more emphasis ought to be put on research concerning appropriate technology for urban rainwater drainage. It is suggested that previously installed drainage systems as well as project approaches in tropical cities be identified and evaluated in order to develop standards for future activities

Cairncross, S., 1989. "Water Supply and Sanitation: an Agenda for Research," *Journal of Tropical Medicine and Hygiene*, 1989, 92: 301-314.

The article provides background information on the state of water-supply and sanitation research. It contains a review of the discussions and results of the Decade as well as suggestions for future research. The author focuses mainly on what he calls "implementation research" which ought to aim at the promotion of more effective implementation

of the findings that research hitherto has led to Keywords for continued research are environment, behavioural factors, children's latrines, water quantity and health impacts, replicable interventions, institutional development and cost effectiveness

Caldwell, E.L., 1938. "Studies of Subsoil Pollution in Relation to Possible Contamination of the Groundwater from Human Excreta Deposited in Experimental Latrines," *Journal of Infectious Diseases*, Vol. 62, 1938, pp 272-291.

This article is based on studies carried out with experimental latrines in the United States. The results provide indications concerning groundwater pollution by latrines in tropical climates

CCTA, 1963. *Symposium on Hygiene and Sanitation in Relation to Housing*, CCTA/WHO, Niamey, Niger, 1961, *Reports and working papers*, publication No. 84, Niamey: CCTA (Scientific Council for Africa).

Chaiken, M.S., 1986. *Traditional Patterns and Modern Dilemmas: Designing Locally Appropriate Health Interventions*, Working Paper No. 442, 20 pp, Nairobi: University of Nairobi, Institute for Development Studies.

This paper describes the environmental, social and economic conditions that contribute to the high rates of childhood mortality, morbidity and malnutrition in Mbita Division, South Nyanza district, Kenya. This information is used to recommend intervention programmes such as the introduction of improved weaning foods using local resources, improved sanitation and health care delivery, and implementation of communication-based health care. These interventions are intended specifically to address identified problems in a feasible and culturally appropriate manner. Ultimately the solutions to community health problems are not technical, but lie with optimal use of human resources. (From: CAB ABSTRACTS)



Chaiken, M.S., 1988. "Anthropology, Nutrition, and the Design of a Health Intervention Program in Western Kenya", pp 237-249, *Anthropology of Development and Change in East Africa*, Brokensha, D W., Little, P.D., eds., Boulder: Westview Press.

The state of nutrition, sanitation and public health in five sample communities in Mbita Division/South Nyanza Region is described and suggestions are made with regard to appropriate programmes and intervention designs

Chandiwana, S.K., 1987. "Community Water-Contact Patterns and the Transmission of *Schistosoma Haematobium* in the Highveld Region of Zimbabwe," *Social Science & Medicine*, Vol. 25, No. 5, pp 495-505, 1987.

The article deals with a study designed to describe and analyse the patterns of community water contact and their relationship to *Schistosoma haematobium* infection in the human population as well as in the snail host for *S. haematobium* and *S. mattheei*. The study was conducted in the temperate highveld region of Zimbabwe at twelve human water contact sites located in stream habitats over a 27-month period during 1982-1984

In order to describe the patterns of water contact, water-contact activities were divided according to the degree of exposure of the body surface to water. Domestic activities (washing of clothes and utensils) corresponded to partial contact, bathing and recreation to complete contact and personal activities (collecting water, washing hands, feet and face) to limited contact.

Of the twelve sites observed, the permanent ones which could be used all year round were the most frequented ones. Some of them were almost exclusively used by males, others principally by females. Male water-contact activities consisted mainly of bathing which implied complete exposure to the water, while women's activities mostly were domestic, thus leading to only partial contact. Although the correlation could not be entirely established, there were indications that women were less infected by schistosomiasis than men due to their different activities related to water. The author therefore draws the conclusion that safe water for domestic activities as well as for recreation/bathing is necessary and that when studies are carried out, these must take into account all the water sites in an area due to the gender division

As to seasonal variations, a significant reduction in snail infection rates in the cool dry months was noted. Although no observations could be

made on urination and defecation during swimming and bathing, the author suggests that there may be a correlation between this reduction and less frequent bathing activities during the cool dry months implying that less schistosome eggs enter the water sites

Chandler, C.G., 1989. "Beyond 'Coverage' - An Integrated Approach to Rural Water Supply and Sanitation Projects and Programmes," *Natural Resources Forum*, February 1989, pp 53-58.

The author strives for a clear distinction between projects and programmes. Programmes are characterized by long-term commitment and availability to all target groups that qualify while projects are subject to limited time frames and define their target groups in advance. Thus, the elaboration of a national framework is suggested within which elements of both projects and programmes could be coordinated. The procedure is supposed to entail synergy effects ensuring that the activities go beyond mere coverage of the population with facilities (the project approach), leading to sustained functioning and utilization for long periods of time (the programme approach)

Chauhan, S.K. et al., 1983. *Who Puts the Water in the Taps? Community Participation in Third World Drinking Water, Sanitation and Health*, London: Earthscan.

Cheesmond, A.K. and Fenwick, A., 1981. "Human Excretion Behaviour in a Schistosomiasis Endemic Area of the Gezira, Sudan," *Journal of Tropical Medicine and Hygiene*, 84, pp 101-107.

Chitikitira, D., 1985. *VIP Latrines Take off in Tanzania*, 3 pp, Science and Technology Features Service, Nairobi: All Africa Press Service.

Churchill, A., de Ferranti, D., Roche R., Tager, C., Walters, A. and A. Yazer, 1987. *Rural Water Supply and Sanitation/Time for a Change*, World Bank Discussion Paper No. 18, 111 pp, Washington: The World Bank.

In this discussion paper reasons and procedures for an economic analysis of water and sanitation programmes are presented. It is assumed that the health effects which generally are attributed to such programmes either cannot be proven or are not substantial. According to the authors it is therefore not amazing that the intended beneficiaries in many cases do not accept the projects, which frequently deteriorate as soon as the project teams leave the sites. Therefore it is suggested to take into account other than health benefits that arise from better water supplies and sanitation

As to water supplies, it is proposed to express in monetary terms the time people, especially women, spend on going to water sources, drawing and carrying water. For this it is necessary to estimate how much money they would be able to earn if they could devote their time to income-generating activities instead of to the drawing of water. If there are such possibilities the time spent is more valuable to people than if they could not pursue income-generating activities. Accordingly, in different communities there will be different degrees of willingness to pay for investments as well as varying needs for improvements. In one community one central well will be sufficient, in another private household taps may be appropriate because the women may have more lucrative alternatives for the use of their time

Concerning sanitation the same evaluation procedure is suggested. It is more difficult, however, to find other than health benefits in using latrines. The authors mention the concepts of convenience and privacy but emphasize that research is needed in order to determine the monetary value of these concepts to people before their willingness to pay for sanitary improvements can be estimated. It is assumed that the value people attribute to privacy relates positively to the increase of population density in the community. Thus, it is unlikely that sanitation projects are economically viable in sparsely inhabited rural areas and it is suggested that health and hygiene education precede costly investments

The discussion paper further comprises suggestions concerning institutional development, community participation, involvement of women, public and private sector roles, research as well as appendices with detailed cost/benefit calculation examples

Cole-King, S. et al., 1981. "Organising for Health," 110 pp, *Development Research Digest*, 1981 (No. 5).

Collin, J.J., Brewster, M., Pickford, J., Prost, A., Subrahmanyam, D.V., de Jong, D. et al., 1986. "Dossier: Drinking Water," *The Courier*, No. 96, pp 62-96, Brussels.

Croll, N.A. and J.H. Cross, 1983. *Human Ecology and Infectious Diseases*, 364 pp, London: Academic Press, Inc.

The authors of this book aim at relating cultural, behavioral, anthropological, and social factors to the transmission of infectious diseases. Examples are provided for several diseases, e.g. different types of helminth infections and filariasis, in both Asian and African countries.

Cross, P., 1983. *Community-Based Workshops for Evaluation and Planning Sanitation Programs: A Case Study of Primary Schools Sanitation in Lesotho*, TAG Technical Note No. 7, 23 pp, UNDP, Washington: The World Bank.

Curtis, C.F. and P.M. Hawkins, 1982. "Entomological Studies of On-Site Sanitation Systems in Botswana and Tanzania," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 76(1), 1982, pp 99-108, London.

Deck, F.L.O., 1986. "Community Water Supply and Sanitation in Developing Countries, 1970-1990. An Evaluation of the Levels and Trends of Services," *World Health Statistics Quarterly*, Geneva 39, 1986, pp 2-31.

This review is based on WHO data collected in surveys 1970, 1980 and 1983. The data are compiled in tables and commented upon and projections for 1990 are made.

Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 1989. *Community Participation and Hygiene Education in Water Supply and Sanitation (CPHE)*, five papers, Eschborn: GTZ.

Diabate, M., 1981. *L'impact de l'alphabétisation fonctionnelle sur les attitudes des paysans vis-à-vis de la modernisation agricole, de la santé et de l'instruction en zone O.A.C.V. au Mali*, Projet Ouest-Africain de formation à la recherche évaluative en éducation, Etude 7, 117 pp, Québec: Université Laval, Faculté des Sciences de l'Education.

Dale, J.T., 1979. "World Bank Shifts Focus on Third World Sanitation Projects," *Water Pollution Control Federation Journal*, 51 (4), pp 662-665, Washington, D.C., USA.

Donaldson, D., 1977. "Planning Water and Sanitation Systems for Small Communities," *IRC/CWSS Bulletin*, No. 10, pp 71-103, Proceedings of an International Training Seminar on Community Water Supply in Developing Countries, The Hague: International Reference Centre for Community Water Supply and Sanitation.

Donnelly-Roark, P., 1987. *New Participatory Frameworks for the Design and Management of Sustainable Water Supply and Sanitation Projects*, 30 pp, UNDP/PROWESS, Washington: UNDP.

Dunn, F.L., 1979. "Behavioural Aspects of the Control of Parasitic Diseases," *Bulletin of the World Health Organization*, 57: 499-512, 1979.

The importance of the behavioural sciences in parasitic disease research and control programmes is stressed and the methods and orientations of the behavioural sciences in parasitic disease research and control programmes are discussed

Eckholm, E.P., 1977. *The Picture of Health. Environmental Sources of Disease*, Washington: Worldwatch Institute.

Edwards, D.B. and E. Salt, 1989. *Training Guide for a Management Development Program in Water and Sanitation Institutions*, WASH Technical Report No. 59, Arlington: WASH.

Elmendorf, M. and P. Buckles, 1980. *Appropriate Technology for Water Supply and Sanitation - Sociocultural Aspects of Water Supply and Excreta Disposal*, 52 pp, Washington: The World Bank.

This study was carried out in twelve villages respectively urban slums in Guatemala, El Salvador, Colombia, Nicaragua and Mexico.

Despite the geographical distance of the study sites, the results represent certain common traits concerning perceptions of health, preferences and practices as well as motivation to improve water supplies and sanitation.

The report contains a discussion about social science techniques used for the assessment of people's attitudes and expectations. The importance of taking into account social and cultural aspects in project designs is emphasized.

Elmendorf, M. and R. Isely, 1984. *Role of Women in Water Supply and Sanitation Programmes: Implications for Education. Aids to Programming UNICEF Assistance to Education*, 9 pp, Paris: UNESCO.

El-Katsha, S. et al., 1989. *Women, Water, and Sanitation: Household Water Use in two Egyptian Villages*, Cairo Papers in Social Science, Social Research Center Research Series No. 1, Vol. 12, Monograph 2, Summer 1989, 96 pp, Cairo: The American University in Cairo Press.

This paper is based on research conducted by the Social Research Center in 1986. The study was carried out in two villages in Menoufia, Egypt.

In the paper, water use and hygiene behaviour are described in detail and the findings are related to cultural and socio-economic patterns. It is made clear that the women studied have well-defined reasons for

behaving as they do even if the behaviour does not correspond to "modern" norms of hygiene. When suggesting improvements these reasons have to be taken into account.

Eng, E., Briscoe, J. and A. Cunningham, 1990. "Participation Effect from Water Projects on EPI," *Social Science and Medicine*, Vol. 30, No. 12, pp 1349-1358, 1990, London.

The findings of this study suggest that in addition to the direct health and amenity benefits of a participatory water supply programme, there are other, more subtle benefits to communities. In the case studies, carried out in Togo and Indonesia, communities who had been successfully involved in water projects, showed higher rates of participation in subsequent expanded programmes of immunization (EPI). Since such indirect benefits, e.g. increased capability to make use of other opportunities due to the transformation of the community, may be substantial the importance of community participation is emphasized.

England, R., de Kruijff, G.J. and P. Soni, 1980. *The Pit Latrines of Lamu: 600 Years of 'Illegal' Sanitation*, 45 pp, Nairobi: University of Nairobi, Housing Research and Development Unit (unpublished report).

This report deals with the sanitation system in Lamu, a town on the Kenyan coast that has existed for at least 600 years. The historical sanitation system and its present state are described, analysed from medical, social and cultural points of view and recommendations are made with regard to the maintenance of the system.

It is pointed out that the excreta disposal system encountered in Lamu is well adapted to culture, environmental conditions and economic possibilities of the population. It is satisfactory from a hygienic point of view and some disadvantages which have arisen during the last years due to, *inter alia*, increased use of water in the households could be mitigated by a few inexpensive measures aimed to modify the pit latrines without destroying the system.

Plans to replace the excreta disposal system are strongly discouraged. Instead, it ought to be considered as an example of how traditional ways of solving sanitary problems meet today's requirements in a satisfactory manner.

The report is more critical towards the waste water disposal system in Lamu, which relies on open drainage and is a source of infection.

especially for children playing in the streets More investigations and subsequent improvements are recommended

Esrey, S.A., 1987. *The Effect of Improved Water Supplies and Sanitation on Child Growth and Diarrhoeal Rates in Lesotho*, PhD thesis, Ithaca, NY.

Esrey, S.A. and J.-P. Habicht, 1988. "Maternal Literacy Modifies the Effect of Toilets and Piped Water on Infant Survival in Malaysia," *American Journal of Epidemiology*, Vol. 127, No. 5, pp 1079-1087, Baltimore.

The authors analysed data from the Malaysian Family Life Survey collected in 1977-1979 in order to show the effect of toilets and piped water as well as of maternal literacy on infant mortality The presence of toilets could be related to larger reductions in infant mortality rates than maternal literacy. Maternal literacy, on the other hand, had a greater impact on infant mortality than piped water However, the presence of toilets had a greater effect on families with illiterate mothers while the presence of piped water had a greater impact on families with literate mothers

The authors draw the conclusion that literate mothers protect their children better in an unhygienic environment than illiterate mothers do so that the introduction of a toilet does not exercise such a great influence on infant mortality Similarly, when literate mothers are provided with piped water they know better than illiterate mothers how to make use of the improvement so that the impact on infant mortality is greater than in families with illiterate mothers

Esrey, S. et al., 1989. "The Risk of Infection from *Giardia lamblia* due to Drinking Water Supply, Use of Water, and Latrines among Preschool Children in Rural Lesotho," *International Journal of Epidemiology*, Vo 18, No. 1, pp 248-253.



Esrey, S. and R.G. Feachem, 1989. *Interventions for the Control of Diarrhoeal Diseases among Young Children: Promotion of Food Hygiene*, unpublished document WHO/CDD/89.30, Geneva: WHO.

Esrey, S.A. et al., 1990. *Health Benefits from Improvements in Water Supply and Sanitation: Survey and Analysis of the Literature on Selected Diseases*, WASH Technical Report No. 66, 73 pp, Arlington: WASH.

In this report the authors resume and analyse the results of 144 studies dealing with the impact of improved water supply and sanitation facilities on the following six diseases: diarrhoea, ascariasis, guinea worm, hookworm, schistosomiasis and trachoma. For all the studies where it was possible a percentage reduction in disease was calculated.

The studies are grouped into methodologically better and less elaborated studies. Results are given for all the studies as well as for only the better ones. However, only studies showing reduction rates are subject to further analysis.

The authors conclude that significant health impacts can be achieved by improved water supply and sanitation although the impact varies for different diseases. Guinea worm, Schistosomiasis and diarrhoeal diseases respond more to these measures than for instance hookworm. Furthermore, the impact may be more significant concerning disease severity than disease incidence.

Based on their findings the authors suggest that emphasis on hygiene education (including safe excreta disposal, proper use of water for personal and domestic hygiene) may be more important than the improvement of drinking water quality.

Furthermore, they point to the necessity of cultural appropriateness of sanitation facilities and the importance the distance of water-supply facilities may have on the use of sufficient quantities of water.

Evison, L.M. and A. James, 1973. "A Comparison of the Distribution of Intestinal Bacteria in British and East African Water Sources," *Journal of Applied Bacteriology*, 36/1, 1973, pp 109-118, UK.

Falkenmark, M., ed., 1982. *Rural Water Supply and Health, The Need for a New Strategy, Summary of papers and discussions from the United Nations Interregional Seminar on Rural Water Supply, Uppsala, Sweden, 6-17 October 1980*, 118 pp, Uppsala: Scandinavian Institute of African Studies.

This compilation of papers and discussions from an international seminar held in 1980 illustrates the strategies, goals and hopes with regard to improvements of water supply, health and sanitation in developing countries at the beginning of the Decade.

Falkenmark, M., Lundqvist, J., eds., 1984. *Water for All - Coordination, Education, Participation*, Tema V Report 9, 1984, 279 pp, Linköping: University of Linköping, Department of Water in Environment and Society.

This report, containing an edited version of papers presented at an international seminar held in Linköping, Sweden, deals with water supply and sanitation and problems encountered at the village level. Summaries and conclusions of the seminar are presented in Part I of the report. The papers, compiled in Part II, cover the following topics: coordination and participation, education and health, evaluation, and options for technology and project selection.

Farooq, M. and M.G. Mallah, 1966. "The Behavioural Pattern of Social and Religious Water Contact Activities in Egypt-49 Bilharziasis Project Area," *Bulletin of the World Health Organization*, 35, pp 377-387.

Farooq, M. et al., 1966. "The Epidemiology of Schistosoma Haematobium and S. Mansoni Infections in the Egypt-49 Project Area. 2. Prevalence of Bilharziasis in Relation to Personal Attributes and Habits," *Bulletin of the World Health Organization*, 35, pp 293-318.

Feachem, R.G., Mc Garry, M. and D.D. Mara, eds., 1977. *Water, Wastes and Health in Hot Climates*, 399 pp, Old Woking: The Gresham Press.

The book consists of twenty articles dealing with health and water quality, water supply, institutional development, sanitation as well as effluent re-use and reclamation

The issues are discussed from medical, technical and economic points of view, providing a comprehensive survey of and introduction to the problems related to water, wastes and health in tropical climates.

Although several authors make clear that people get infected by helminths etc. (p 11 and chapter 15, part B), others point out (p 241) that the effects of ameliorated sanitation on health are not clearly established. Other problems are the cultural (p 311) and economic restraints (p 147) for sanitation programmes to be successful.

Feachem, R.G., Bradley, D.J., Garelick, H. and D.D. Mara, 1983. *Sanitation and Disease - Health Aspects of Excreta and Wastewater Management*, World Bank Studies in Water Supply and Sanitation 3, 501 pp, New York: John Wiley & Sons.

The aim of this publication is to provide an all-round perspective on sanitation which can be useful for all kinds of professionals dealing with sanitation and public health, such as health planners, economists, environmental hygienists, health educators, epidemiologists or parasitologists. The book is divided into two parts. Part One comprises a presentation of available knowledge about excreta, night soil, sewage, and their effects on health. Part Two deals with environmental biology, epidemiology of excreted viruses, bacteria, protozoa, helminths and with insects and excreta.

Feachem, R.G. et al., 1983. "Excreta Disposal Facilities and Intestinal Parasitism in Urban Africa: Preliminary Studies in Botswana, Ghana and Zambia," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. 77, No. 4, pp 515-521 (1983).

The findings of the studies related in this article indicate that the provision of superior water and sanitation facilities to merely some houses in an area may not protect the households from infection if the over-all level of faecal contamination of the environment is substantial.

Fleetwood, Å., 1977. *Etude préparatoire à l'expérimentation de cabinets à compost en Tunisie*, Stockholm: SIDA (unpublished report).

Follér, M.-L., 1990. *Environmental Changes and Human Health – A Study of the Shipibo-Conibo in Eastern Peru*, Humanekologiska skrifter 8, Göteborg.

Environmental changes influence human health. The Shipibo-Conibo in Eastern Peru live next to the Ucayali river and have adapted their way of life to this environment. Industrialization promoted in the regions upstream as well as population growth lead to chemical and faecal pollution of the river and pose health hazards for the Shipibo-Conibo who use the water for drinking and domestic purposes. Furthermore, diseases are transmitted through the soil due to the unhygienic disposal of human and animal excreta

Franceys, R., ed., 1986. *Water and Sanitation at Mid-Decade: 12th Conference (of the) Water and Engineering for Developing Countries (Group)*, WEDC, University of Technology, Loughborough, Calcutta, 6-9 January, 1986, 247 pp, Loughborough: University of Technology.

Freedman, J., 1980. "Rural Water Supply and Sanitation Projects," pp 411-423, *Proceedings of the Agricultural Sector Symposia January 7-11, 1980*, Washington: The World Bank.

Frelick, G.P. and H.L. Jennings, 1988. *Benin Rural Water Supply and Sanitation Project Review Workshop. May 17-21, 1988*, WASH Report No. 241, Arlington: WASH.

Frelick, G. and S. Frey, 1990. *A Training Guide on Hygiene Education*, WASH Technical Report No. 60, Arlington: WASH.

Garry, M.G. and E.J. Schiller, 1980. "Support to Manpower Development for Water and Sanitation in East and Southern Africa", paper No. 14-5, pp 447-456, *Proceedings AWWA 1980 Annual Conference - Water for the World, Challenge of the 80s*, Atlanta: AWWA.

Gaulme, F. et al, 1989. "La santé en Afrique," *Marchés Tropicaux et Méditerranée*, pp 1921-1965, No. 2277, 30 June 1989, Paris.

Gearheart, R.A., Briscoe, J. and E. Eng, 1982. *Environmental Sanitation Master Plan for Training and Education in Tanzania*, WASH Technical Report No. 58, 90 pp, Arlington: Water and Sanitation for Health Project.

Golladay, F.L., 1983. "Economic and Social Conditions", pp 7-23, *Water Supply and Sanitation in Developing Countries*, U.K.: Institute of Water Engineers and Scientists.

This chapter provides a profile of the group of developing countries and their prospects. It seeks first to highlight the problems that face these countries, and second to indicate the obstacles to resolving these problems. The discussion stresses the imperative of reducing the burden of poor health, especially that due to poor hygiene and inadequate sanitation. It also touches upon some wider problems and issues in order to place efforts to improve water supply and waste disposal in a more general context.

The chapter is divided into five sections. The first describes population changes in the developing countries and the second examines health conditions. The third section outlines obstacles to improving health - especially deficiencies in education, housing, sanitation and nutrition. The fourth section explores the availability of resources to deal with these essential needs. The final section reviews the prospects for longer-term economic development and thus for dealing more fully with needs for improved water supplies and sanitation (From: ENSIC Database)

Golladay, F.L., 1983. *Meeting the Needs of the Poor for Water Supply and Waste Disposal*, Appropriate Technology for Water Supply and Sanitation publication series, Vol. 13, 52 pp, Washington: The World Bank.

This paper examines the role of the household, the community and the government in meeting basic needs. It is stressed that households *e.g.* do not necessarily behave in such a way that their overall benefits are maximized but that diverging interests and needs of the household members as well as the intra-household distribution of power determine behaviour. Thus, there exist social, cultural, economic and political obstacles to meeting the needs of low-income people for water supply and waste disposal. The paper proposes steps to reduce these obstacles on the household, community and government levels.

Government of Zimbabwe, Ministry of Health, 1987. *Manicaland Health, Water and Sanitation Programme*, 14 pp, Harare: Government of Zimbabwe (unpublished).

Project document, workplan and budget of the Manicaland Health, Water and Sanitation Programme for the period 1 April 1987 to 30 June 1988.

Gracey, M., Ostergaard, P., Adnan, S.W. and J.B. Iveson, 1979. "Faecal Pollution of Surface Waters in Jakarta," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. 73, No. 3, 1979, pp 306-308.

In this article the degree and types of faecal pollution of surface waters in Jakarta are described.

Green, E.C., 1984. "Factors Relating to the Presence and Use of Sanitary Facilities in Rural Swaziland," *Tropical Geography and Medicine*, 37, pp 81-85.

Green, E.C. and R.B. Isley, 1988. "The Significance of Settlement Pattern for Community Participation in Health: Lessons from Africa," *Human Organization*, 47 (2), 1988, pp 158-166.

Grover, B., 1983. *Water Supply and Sanitation Project Preparation Handbook 1, Guidelines*, 172 pp, Washington: The World Bank.

Grover B., Burnett, N., and M. McGarry, 1983. *Water Supply and Sanitation Project Preparation Handbook 2, Case Studies. Identification Report for Port City. Immediate Improvement Project for Port City. Pre-Feasibility for Farmville, Pre-Feasibility Report for Port City*, 332 pp, Washington: The World Bank.

Grover, B., Burnett, N. and M. McGarry, 1983. *Water Supply and Sanitation Project Preparation Handbook 3, Case Study, Feasibility Report for Port City*, 288 pp, Washington: The World Bank.

Gunnerson, C.G., Julius, D.A. and J.M. Kalbermatten, 1978. *Alternative Approaches to Sanitation Technology*, paper presented at the Workshop on Water Pollution Problems Arising from Development, International Association for Water Pollution Research, Stockholm, 14 June 1978, 26 pp (unpublished).

This is a progress report of the World Bank's research project on Appropriate Technology for Water Supply and Waste Disposal initiated in 1976. The background of the project, the research approach and early technological results are presented and possibilities as well as constraints are discussed. The latter relate to public health, technological, environmental, economic and institutional factors.

Guoth-Gumberger, M. and R. Guoth-Gumberger, 1987. *Small Projects' Training Manual; 3. Sanitation*, Munuki Water and Sanitation Project, 192 pp, Khartoum: Sudan Council of Churches.

Han, A.M. et al., 1986. "Personal Toilet after Defecation and the Degree of Hand Contamination according to Different Methods Used," *Journal of Tropical Medicine and Hygiene* 1986, 89, pp 237-241.

This study investigated the commonly used methods of anal cleansing in a low-income community in Rangoon, Myanmar and related the method used by mothers to the incidence of diarrhoea and dysentery of their children. The correlation was positive although not statistically significant. It could be established, though, that the hands of mothers using water for anal cleansing were more contaminated after and even before defecation than the hands of those using paper.

The use of paper instead of or in addition to water seemed to be related to the mothers' level of education.

Han, A.M. and T. Hlaing, 1989. "Prevention of Diarrhoea and Dysentery by Hand Washing," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 83 (1), pp 128-131, London.

Hand-washing is probably the most effective intervention in the prevention of transmission of gastroenteritis in developing countries. A controlled trial was undertaken to determine whether in a low socioeconomic community in Burma [Myanmar], hand-washing after defecation and before the preparation of food would significantly reduce the incidence of diarrhoea and of dysentery. [ ] The work-up for observers in recording data and for further reliability checks was substantial, and the monitoring of compliance by weighing remaining soap to ensure that it was being used is intriguing. Both the children and their mothers in the test group were required to wash or to be washed at the given times. Over the 4-month period of the exercise there was about a 30% reduction in the incidence of diarrhoea in children in both the age groups < 2 years and >= 2 years compared with the control groups. However, there was little difference between the study and control children in the dysentery incidence in either age group.

It is concluded that even in relatively primitive surroundings, limited hand-washing has some benefit. (From: *Tropical Diseases Bulletin*, London, abstract 639, 1990).



Hannan-Andersson, C., 1982. *Women, Water and Development in a Pare Settlement, Tanzania*, Research Report No. 52, 119 pp, Dar es Salaam: University of Dar es Salaam, Bureau of Resource Assessment and Land Use Planning.

This report is based on a case study from a small rural settlement consisting of 42 households. Information is presented on water collection, water in the home, sanitation and health aspects, improvements of the water supply in the priority of village needs and the women's opinion of the water supply situation in general. The data gathered is related to a theoretical framework with regard to women, water and development. It is concluded that the probable impact of improved water supplies as a catalyst for women's development would be negligible.

Hannan-Andersson, C., 1984. *Development of Water Supplies in Singida Region, Tanzania - The Realities for Village Women*, Research Report No. 63, 86 pp, Dar es Salaam: University of Dar es Salaam, Institute of Resource Assessment.

The subject of this study, carried out in three villages, is the role of women in improvements of domestic water supplies and the impact of these improvements on women. The data presented includes background information on the general situation of Wanyaturu women and their role in social change. The water supply, sanitation and health education situation as well as previous inputs in these fields are described and evaluated. Possible strategies with a view to increasing the involvement of women are outlined.

Hannan-Andersson, C., 1990. *Gender and Age Aspects in Environmental Sanitation*, paper presented at a seminar on Environmental Hygiene in Development Cooperation - Perspectives, Experiences and Future Orientation, Section for Development Studies, University of Stockholm, August 27, 1990, 16 pp (unpublished).

In this paper varying gender roles in different contexts and the differences between age groups and the implications these factors have for sanitation programmes are highlighted. The author presents possible planning procedures, including adequate target group analyses.

It is pointed out that a detailed knowledge of the culture and area to be dealt with is necessary in order to be able to take into account gender and age aspects and to build on existing behavioural patterns.

Hardoy, J.E., Cairncross, S. and D. Satterthwaite, eds., 1990. *The Poor Die Young*, London: Earthscan Publications.

This book deals with the relation between housing and health in Third World cities. The chapters, written by different authors, cover a wide range of topics relevant in an urban context, *inter alia*, water supply, sanitation and waste disposal, and lack of life-saving services. Case studies are presented in order to illustrate viable solutions. Possible strategies to cope with the increasing problems are discussed

Harpham, T. and C. Stephens, 1990. *Urbanization and Health in Developing Countries*, paper (unpublished).

In this article a large number of studies on the pattern of morbidity and mortality in urban areas of the Third World are reviewed. The authors conclude that most of the studies on health of the urban poor in developing countries focus on the environmental conditions (sanitation, water supply, housing etc.) in which they live. It is pointed out that other factors, such as their lifestyle, e.g. smoking, dietary and drinking habits ought to receive more attention in studies concerned with health aspects in urban areas in the Third World

Harris, R.B. and J.F. Jackson, 1981. *Local Influences and their Effect on the Concept and Design of Sanitation Projects*, presented at Loughborough University of Technology Water, People & Waste in Developing Countries Conference, UK, Sep 23-25, 1981, P61 (6).

Hasan, K.A., 1979. *Medical Sociology of Rural India*, Ajmer: Sachin Publications.

In this study Chnaura, a village in rural India, was examined. Chapters Five and Six deal with the "Sanitary Habits of the People" respectively with "Personal Hygiene" in the village. The villagers' behaviour is described and commented from a modern medical point of view.

The habits observed varied according to, *inter alia*, caste, sex, age and education, variables which in their turn influenced the socioeconomic status of the individuals

Generally speaking, modern concepts of sanitation and hygiene did not play a significant role in village life. Ritual purity, which was of major importance, put more emphasis on the rite than on sanitary effects, *i.e.* one could be ritually clean just by splashing a little water in the face.

In the case of household sullage, people principally agreed that unsanitary disposal caused diseases but considered it to be the task of the government or the chairman of the village assembly to carry out improvements

As to the habits of defecation, distinction has to be made between Muslims and Hindus. All Hindus, men and women, except for one family, went to the fields for defecation, while in the Muslim families solely the men went to the fields and the women used latrines provided in the houses

Most of the Hindu families (88,7%) explained that latrines were unhygienic and were meant for city dwellers who did not have any fields to go to. Besides they would not want to defecate at the same place where they cooked and ate or at a place where there already was excreta of other persons.

Both Hindu and Muslim families saw an obstacle in the fact that the latrine had to be kept clean which implied the employment of a sweeper of the Dom caste for that purpose. The Hindu families preferred the cheaper fields while the Muslim families reduced the expense by letting just the female members, who had to observe seclusion, use the facility. Furthermore, one Muslim elder pointed out that he would not use the latrine where his daughters and daughters-in-law threw their 'menstruating cloth'.

In the Hindu families, women went in groups to defecate in the fields, both out of security but also of social reasons. Twice a day this gave them the possibility of meeting and communicating

After defecation the villagers washed their private parts with water they carried to the fields in bowls. Alternatively, the men would wash themselves in the village pond.

After returning from the field the villagers washed their mouths and faces and cleaned their teeth. The water was taken in the same bowl that was previously used in the field and solely the Hindus washed their bowl with mud before reusing it

Habits described in the remainder of the chapters concern bathing, eating, smoking and sleeping.

Helmer, R., 1975. "Controlling Water Pollution," *WHO Chronicle*, 29:428-434.

The article outlines the problems involved in water pollution control and the types of technical assistance provided by WHO.

Herrera, L., 1987. *Social, Cultural and Economic Circumstances in Three Communities of Western Kenya as Related to Health*, Finland: University of Tampere.

Three communities in western Kenya were studied in order to provide a qualitative, soft-approach complement to previous empirical surveys carried out in the region. The aim was to obtain information on socio-cultural and socioeconomic variables, which could subsequently be used in project formulation and implementation.

The variables studied are, *inter alia*, water (sources, transportation, storage, utilization), hygiene and sanitation (personal hygiene, indoors, outdoors, latrines), nutritional aspects, health perceptions and attitudes, traditional medicine, community activities, leadership, natural environment and employment.

As to sanitation, it is reported that although more than 50% of the households in the studied areas owned latrines, these were not used regularly and mostly proved to be of inadequate standard. Reasons for not using latrines but rather the bush were fear of darkness and snakes as well as in-law taboos which were enforced by "stiff penalties". Especially small children and older people preferred to defecate in the bush.

In the cases where latrines actually were used certain health hazards remained due to the custom of cleaning the anal region with help of fingers which, in the absence of water, were rubbed against the latrine's mud walls.

Hubley, J., Jackson, B. and T. Khaketla, 1988. *The Role of Health Education and Communication in the Sanitation Programmes. A Case Study of the Urban Sanitation Improvement Programme in Lesotho*, 17 pp, Paris: Unesco.

IBRD, 1976. *Village Water Supply*, 96 pp, Washington: The World Bank.

This paper, published in 1976, was a first step of The World Bank to deal with problems of rural areas regarding water supply and sanitation. Up to that time efforts in this sector had been concentrated on urban areas and therefore it is pointed out in the paper "that experience and knowledge are lacking to set specific targets for actions in the next few years".

The paper traces the aspects deemed to be important, such as costs, financial and technical aspects, organization and management, and expected benefits

IBRD, 1979. *Country Studies in Appropriate Sanitation Alternatives*, Washington: The World Bank.

The empirical database for the World Bank research project on Appropriate Technology for Water Supply and Waste Disposal in Developing Countries encompasses 34 studies which were carried out in communities of eleven countries during 1977-78. Countries and communities were selected to obtain a diverse sample of existing sanitation technologies operating under a variety of physical and economic conditions. This report presents the technical and economic information collected by the local field consultants at each site.

IBRD, 1990. *Africa Rural Water Supply and Sanitation Workshop; Documentation-Papers*, Washington: The World Bank.

This documentation consists of papers presented during the workshop held in Abidjan, Côte d'Ivoire May 7-11,1990

IDRC, 1981. *Sanitation in Developing Countries. Proceedings of a Workshop on Training Held in Lobatse, Botswana, 14-20 August 1980*, 172 pp, Ottawa: International Development Research Centre.

Proceedings of a workshop aimed at the dissemination of information on low-cost technologies and at the discussion of the implementation of curricula changes and training needs recommended at preceding regional meetings

IDRC, 1985. *Women's Issues in Water and Sanitation: Attempts to Address an Age-Old Challenge*, 104 pp, Ottawa: International Development Research Centre.

A seminar on "Women's Issues in Water and Sanitation" was held in Manila, Philippines, 24-26 September 1984 to discuss the problems and constraints that have limited women's participation in water and sanitation activities in the past and identify ways in which their roles can be enhanced in the future. This publication documents the results of the seminar by reviewing women's past efforts in water supply and sanitation activities and presenting abstracts of papers about on-going research. In addition, the 62 representatives from Africa, Latin America, Middle East, and Asia were divided into four working groups and asked to develop ideas for future research. These preliminary proposals are also presented in the form of "project leads" (From: ENSIC Database)

Ince, M., ed., 1986. *11th WEDC Conference, Dar es Salaam 15-19 April 1985. Water and Sanitation in Africa. Proceedings*, 171 pp, Loughborough: University of Technology.

IRC, 1982. *Practical Solutions in Drinking Water Supply and Wastes Disposal for Developing Countries*, IRC/CWSS Technical Paper No. 20, The Hague: International Reference Centre for Community Water Supply and Sanitation.

IRC, 1987. *Training Course - Evaluating Water Supply and Sanitation Projects - Course Modules*, Training Series No. 2, 104 pp, The Hague: UNICEF/IRC International Reference Centre for Community Supply and Sanitation.

The objective of this training course is the improvement of knowledge and skills in organizing and conducting practical evaluations of water supply and sanitation projects. Fifteen modules, which are designed as reference material for use during and after the course, provide information on the different steps of the evaluation process

IRC, 1987. Training Course - Evaluating Water Supply and Sanitation Projects - Guide for Course Moderators, Training Series No. 2, 91 pp, The Hague: UNICEF/IRC International Reference Centre for Community Water Supply and Sanitation.

The aim of this guide is to provide course moderators with information on how to run a course on evaluation of water supply and sanitation projects

IRC, 1988. *Water Supply and Sanitation in Primary School Education in Developing Countries - A Preliminary Study*, 42 pp, The Hague: International Reference Centre for Community Water Supply and Sanitation.

Islam, M.S., Bhuiya, A. and M. Yunus, 1984. "Socioeconomic Differentials of Diarrhoeal Morbidity and Mortality in Selected Villages of Bangladesh," *Journal of Diarrhoeal Diseases Research* 2, (4), pp 232-237.

Isely, R.B., 1985. *Linking Water Supply and Sanitation to Oral Rehydration Therapy in the Control of Diarrheal Diseases*, WASH Technical Report No. 31, Arlington: WASH.

Johnson, R W., 1990. *Guidelines for Cost Management in Water and Sewerage Institutions*, WASH Technical Report No 54, Arlington: WASH.

Kalbermatten, J.M., Julius, D.S. and C.G. Gunnerson, 1980. *Technical and Economic Options*, Appropriate Technology for Water Supply and Sanitation publication series, Vol. 1, Washington: The World Bank.

Kalbermatten, J.M., Julius, D.S., Mara, D.D. and C.G. Gunnerson, 1980. *A Planner's Guide, Appropriate Technology for Water Supply and Sanitation* publication series, Vol. 2, Washington: The World Bank.

Kalbermatten, J.M. and R.N. Middleton, 1991. *Future Directions in Water Supply and Waste Disposal*, Revised Draft, Washington: Kalbermatten Associates.

Kao, I.S.W., 1979. *Notes on Rural Water Supply and Sanitation*, Malaysia: Environmental Health & Engineering Unit, Kementerian Kesihatan.

Karunadasa, H.I., 1982. *Domestic Use of Water and Sanitation - A Behavioural Study in two Selected Areas of Sri Lanka*, Ratmalana: National Water Supply and Drainage Board.

This study describes the behavioural patterns related to domestic water use and sanitation of low income groups in two Sri Lankan villages. Attitudes, beliefs and practices are discussed and the need for health education is emphasized.

Kaseje, D.C.O., Sempebwa, E.K.N. and H.C. Spencer, 1987. "Community Leadership and Participation in the Saradidi, Kenya, Rural Health Development Programme," *Annals of Tropical Medicine and Parasitology*, 1987, 81/suppl. 1, pp 46-55, UK.

Keinanen, A., 1983. *Environmental Hygiene and Health Aspects of Rural Water Supply and Sanitation Project; A Case Study in Sri Lanka*, Water and Society, Harispattuwa Development Programme. Report 2/83; 13, Institute of Development Studies. Helsinki: University of Helsinki.



Kia, B., 1984. "Help People Reach Up: Program Delivery and the Water and Sanitation Decade," *Water Quality Bulletin*, 9 (2), pp 106-116, New York: UNDP.

With some exceptions, developing country bureaucracies remain characterized by their top-down attitude, blocked communication, and preference for pre-cooked solutions. The Water & Sanitation Decade has found considerable appeal. Many countries have incorporated new strategies for the implementation of the Decade. Sadly, governments are not providing better services than before. Both the top-down and the Decade strategy mock the very reason they were formulated. To set the process of community participation in motion, it is necessary to (i) establish the rural poor's trust; (ii) choose and support village-level front-line workers; (iii) create a strong and dynamic community organization, and (iv) sustain two-way dialogue between the community and the front-line worker. Supportive measures to be pursued are (i) devolution of administration and planning; (ii) redistribution of resources; (iii) enhanced government commitment; (iv) integration, and (v) devolution of information and two-way communication (From ENSIC Data Base)

Kilama, W.L. and U. Winblad, 1978. "Compost Toilets in the Tropics: A Review and Appraisal," *Progress in Water Technology*, v11 No. 2, 1979, UK.

Kjær-Olsen, P., 1980. *Environmental Sanitation and Protection Project. Report on Baseline Study Social Survey of Pilot Villages*, 70 pp, USAID (unpublished report).

The Environmental Sanitation and Protection Project was an experimental pilot project involving six villages in two districts in Botswana. The background for the project was the unhygienic disposal of human and animal wastes in rural Botswana and the subsequent transmission of faecally transmitted diseases.

The baseline study provides a general picture of village life as well as of local hygiene habits concerning childcare, disposal of human wastes, grey water and animal wastes.

Traditional beliefs about illness and their implications for attitudes towards faecally-transmitted diseases are touched upon

Kochar, V., 1978. "Culture and Hygiene in Rural West Bengal," pp 176-185, *Sanitation in Developing Countries*, Pacey, A., ed., London: John Wiley & Sons Ltd.

As a starting point the author takes a study carried out in twelve villages in West Bengal in order to illustrate that traditional hygiene practice can contain positive elements which ought to be taken into account when propagating for improved sanitation

In this approach hygiene habits are classified as 'risk factors' respectively as 'protective factors'. Risk factors promote the spreading of disease, in the author's example hookworm, while 'protective' factors restrict it. In the case of the villages studied a list of 22 protective factors could be compiled that almost all played some part in the natural regulation of hookworm infection.

It is proposed that suggestions concerning improved sanitation ought to incorporate these instead of relying on purely technological solutions

According to the author "Both risk factors and protective factors are simultaneously present in the culture. Yet epidemiology and public health have become concerned with the risk factors only. This has led to a negative view of indigenous cultures" Thus, traditional habits should be looked upon in a more positive way and be considered as possibilities and not merely as problems.

Kshirsagar, S. R., 1984. "Risk of Groundwater Pollution Through On-Site Sanitation in Developing Countries," *Journal of the Institution of Engineers*, Calcutta: Environmental Engineering Division.

The increased use of on-site sanitation systems propagated during the International Drinking Water Supply and Sanitation Decade does not necessarily improve health. The author of this article wants to draw attention to the fact that the extensive use of unsewered disposal systems may cause groundwater contamination either by the spread of pathogens found in human excreta or by the elevated occurrence of carcinogenic nitrates.

The risk of contamination depends, however, on numerous factors. Groundwater in unconfined and semi-confined aquifers is concerned in the first place. Secondly, the hydraulic conductivity of water varies in different types of soils, which influences the movement of pathogens. Other factors influencing the movement of bacteria and viruses through soil are soil composition, cations, soluble organics, rainfall, pH, and the flow rate. Furthermore, attention needs to be paid to the factors

influencing the survival of pathogens while passing through soils and in groundwater. The most dominating ones are moisture and temperature of the soil, but even adsorption, pH, evaporation, organic matter and soil microflora play important roles.

The author distinguishes between travel of pollutants in unsaturated and in saturated zones. "Generally, the risk of faecal groundwater pollution is minimal when the thickness of relatively fine (less than 1 mm), continuous unsaturated soil (unconsolidated strata) beneath the base of the latrine is greater than 2 m, and provided the hydraulic loading does not exceed 50 mm/day" (p 20).

As to saturated zones, bacterial numbers decrease primarily due to die-off while it is not sure yet which mechanisms are responsible for the loss of viral infectivity. This may be due to degradation by bacteria or to environmental stress causing physical damage to the viral ribonucleic acid.

The article draws heavily from Lewis, Foster and Drasar, 1982

Kunguru, J., 1988. "Innovative Approaches to Poverty Alleviation: Provision of Water to Rural Women in Kenya," *Development*, No. 4, 1988, pp 83-85.

Lachenmann, G., 1982. *Primary Health Care and Basic-Needs Orientation in Developing Countries*, Berlin: German Development Institute.

Lawrence, J.E.S. and J.B. Tomaro, 1988. *Human Resource Development Planning: Guidelines for the Water Supply and Sanitation Sector*, WASH Technical Report No. 20, Arlington: WASH.

Lewis, W.J., Farr, J.L. and S.S.D. Foster, 1980. "The Pollution Hazard to Village Water Supplies in Eastern Botswana," *Proceedings of the Institute of Civil Engineering*, Part 2, 1980, 69, June, pp 281-293, London.

This study, carried out in eastern Botswana, illustrates that on-site sanitation can lead to serious contamination of groundwater caused by

nitrites and faecal bacteria. The authors come to the conclusion that the 30-metre rule of thumb generally accepted as a guideline for the siting of latrines in relation to wells would not be sufficient in eastern Botswana but that a reduction of the pollution hazard could be achieved by the establishment of pollution protection zones of 200 m radius around each water-supply borehole. However, this recommendation is valid only in the hydrogeological environment studied. The importance of the health hazards posed by the indiscriminate siting of pit latrines demands integrated planning by taking into account local hydrogeological conditions when introducing low-cost village water supplies and sanitation schemes.

Lewis, J.W., Foster, S.S.D. and B.S. Drasar, 1982. *The Risk of Groundwater Pollution by On-Site Sanitation in Developing Countries - A Literature Review*, IRCWD-Report No. 01/82, Duebendorf/Switzerland: International Reference Centre for Wastes Disposal.

On the basis of their literature review the authors establish that groundwater pollution in developing countries resulting from the use of on-site sanitation has been reported and researched on merely in few cases. Most literature originates from studies in temperate climate and is concerned with sanitation technologies that are of subordinated importance in developing countries, for instance septic tanks.

This report deals with pit latrines and pour flush latrines. Conditions affecting groundwater contamination by bacteria, viruses and nitrites, e.g. saturated/unsaturated soils, climate, etc. are treated.

However, since such a negligible part of available data and experience are derived from developing countries, the authors conclude that "no comprehensive guidelines for the safe separation between a water supply well and an on-site sanitation unit could be established from the literature review". They point out that monitoring of groundwater consequently proves to be essential prior to the implementation of on-site sanitation programmes. Due to the high costs incurred by such a procedure, however, research aiming at the classification of hydrogeological environments in relation to pollution risk is suggested in order to provide guidelines for the design of safe on-site sanitation schemes.

Lexow, J. and E. Skjonsberg, 1989. *Good Aid for Women? A Review of Women's Issues in Three Selected Norwegian Bilateral Development Projects*, Oslo: NORAD.

Lima e Costa, M.F.F., Rocha, R.S., Magalhães, M.H.A. and N. Katz, 1985. "A Clinico-epidemiological Survey of Schistosomiasis *Mansoni* in a Hyperendemic Area in Minas Gerais State (Comercinho, Brazil). 1. Differences in the Manifestations of Schistosomiasis in the Town Centre and in the Environs," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, No. 79, pp 539-545, London.

The findings of the study suggest that the socio-economic situation of households influences the prevalence of schistosomiasis. The rate of infection was significantly higher in the environs of the town where the head of households were predominantly manual workers. Most houses were of inferior quality and less than 10% had piped water supply

Lima e Costa, M.F.F., Magalhães, M.H.A., Rocha, R.S., Antunes, C.M.F. and N. Katz, 1987. "Water-Contact Patterns and Socioeconomic Variables in the Epidemiology of Schistosomiasis *Mansoni* in an Endemic Area in Brazil," *Bulletin of the World Health Organization*, 65 (1): 57-66 (1987).

In the study, carried out in Comercinho, south-east Brazil, it was found that water-contact patterns and socioeconomic variables influence the prevalence of schistosomiasis in different households. The main risk factors for splenomegaly were the absence of piped water, intense water contact, bathing in streams and daily contact with water. A positive correlation could be established between the rates of *Schistosoma mansoni* infection respectively splenomegaly in households whose heads were manual workers, in individuals living in houses without piped water and of poor construction and in those who were born in Comercinho. Water contacts occurred mainly for household activities or bathing (75%) and for leisure (21%). Thus, it is concluded that the extension of piped water to houses should decrease the incidence of splenomegaly in the area

Lindskog, P. and J. Lundqvist, 1989. *Why Poor Children Stay Sick. The Human Ecology of Child Health and Welfare in Rural Malawi*, Research Report No. 85, 111 pp, Uppsala: Scandinavian Institute of African Studies.

This report is based on a study aimed to evaluate the impact of an improved method of water supply and of a health education and sanitation promotion programme upon child health. Significant health impacts could not be traced despite the important changes observed in the area where the intervention took place. A general decrease in diarrhoeal diseases during the post-intervention period could be noted, however

The report concentrates on the significance of social and cultural systems in relation to water supply and health. The physical environment as well as demographic, social, economic and cultural characteristics of the population are described and related to water handling and hygiene behaviour.

It is concluded that in spite of relevant knowledge among people concerning aspects of water quality and a motivation to contribute to an improvement in the water supply situation, problems remain with regard to water storage and hygiene behaviour.

The bacteriological quality of the water after storage and handling in the household was, for instance, significantly worse than when it was drawn at the water point.

The problems are attributed to insufficient education and stimulation to improve hygiene behaviour.

As to the design of development programs, it is suggested to take into consideration the implications of climatic seasonality with regard to, *inter alia*, the distribution of diseases, medical care and food.

Lindskog, P., *Why Poor Children Stay Sick - Water, Sanitation, Hygiene and Child Health in Rural Malawi*, Linköping Studies in Arts and Science, No. 16, 208 pp, Linköping: Linköping University.

This thesis is based on six papers, originating from a study on water, hygiene and child health in Malawi. Paper One, also separately published in as the report summarized above, is followed by papers on evaluation problems of education programmes in developing countries, the bacteriological contamination of water in rural areas, child morbidity respectively child growth in relation to household water and childhood mortality in relation to nutritional status and water supply.

Loening, W.E.K., Coovadia, Y.M. and J. Van den Ende, 1989. "Aetiological Factors of Infantile Diarrhoea; a Community-Based Study," *Annals of Paediatrics*, 9 (4), pp 248-255, UK.

A community-based study was undertaken [in Durban, South Africa] to compare the organisms responsible for diarrhoea in children living in formal housing with indoor water supply and sanitation with those from a deprived environment. The role of "home remedies" was also assessed. Among 373 children with diarrhoea, rotavirus was detected in 15 % (in 371 symptom-free controls, 9 %) and proved to be the single most common causative agent. Bacterial pathogens were found in 20 % of patients, with enteropathogenic *Escherichia coli* (EPEC) being isolated most frequently (9%, controls 3%), followed by *Shigella* species (4%; controls 1%), *Campylobacter jejuni* (4%; controls 1%), *Salmonella* species (2%, controls 1%) and enterotoxigenic *E. coli* (ETEC) (2%; controls 1%). *Giardia lamblia* and *Cryptosporidium* were detected in 6 % (controls 6%) and 3 % (controls 1%) harboured more than one enteropathogen and no pathogens were detected in 58% (controls 78%) [The proportion of children infected with the common enteric pathogens (rotavirus, EPEC, *C. jejuni*, and *Ascaris*) was similar in the two environments. However, a slightly higher proportion (58%) of the children with diarrhoea came from the deprived area compared with the control children (50%,  $p < 0.05$ ). The vast majority (>90%) of both patients and controls received some form of "home remedy" which included disinfectants and traditional herbs. The findings of this study therefore confirm the extremely complex nature of diarrhoea in developing communities and indicate that environmental factors are compounded by other issues (From: *Tropical Diseases Bulletin*, London, abstract 637, 1990)

Lomøy, J., 1984. "*Maji ni karibu na mazuri, lakini kuna shida sana ya kuni...*" ("The water is near and good, but wood is a big problem..."). *The Social Importance of Improved Water Supply and Sanitation in Rural Areas of Developing Countries*, lecture at Norwegian Peace Corps Association's autumn seminar, Trondheim, 20-21 October 1984, Trondheim: University of Trondheim, Department of Geography (Norwegian text).

The paper discusses socio-economic effects of improved water supplies and sanitation. The author holds that local people's expectations concerning such projects generally differ from extension workers'. Water or sanitation is a goal in itself and not necessarily connected with development in general.

Furthermore, it is pointed out that the effects of improved water supply and sanitation are difficult to measure and that improvements in one sector alone do not suffice to drastically change people's lives. Therefore it is suggested to incorporate water and sanitation projects in larger development efforts.

London School of Hygiene and Tropical Medicine, 1991. The following papers were prepared for the *Workshop of Measurement of Hygiene Behaviour, April 8-12, 1991, Queen's College, Oxford University*. A compilation of these papers and of the workshop results will be published by the IRC, The Hague.

Allan, A K., University of Wales College of Medicine, Cardiff. *Studying Stigmatised Behaviour - Defecation*, 3 pp

Baltazar, J C : *Measurement of Hygiene Behavior*, 10 pp

Bateman, O M , Water and Sanitation for Health Project, Arlington, USA. *Health and Hygiene Behavior Hygiene Behavior in Epidemiologic Perspective*, 17 pp.

Bentley, M E , Stallings, R Y. and J Gittelsohn, The Johns Hopkins University, Department of International Health, Baltimore, USA: *Guidelines for the Use of Structured Observations in Health Behavior Intervention Studies*, 119 pp

Brieger, W . *Measuring Effective Hygiene Behaviour in Rural Nigeria*.

Ekanem, W.W. and C O. Akitoye, Department of Community Health, College of Medicine, University of Lagos, Lagos, Nigeria. *Measurement of Food Hygiene Behaviour*, 4 pp.

El-Katsha, S : *Women, Water and Sanitation, Measuring Change in Hygiene Behaviour*

El-Sebaie, O , Alexandria University, Environmental Health Department, High Institute of Public Health, Alexandria, Egypt: *Measurement of Hygiene Behavior*, 7 pp

Esrey, S.A , Mc Gill University, Ste Anne de Bellevue, PQ, Canada *Analyzing Hygiene or Washing Dirty Data*, 15 pp



Gwatirisa, P.: *Madziwa Schistosomiasis Control Project: A Community Based Approach - An Evaluation of the Impact of Water and Sanitation Facilities on the Prevalence of Schistosomiasis in Madziwa and Bushu Communal Lands*, 20 pp.

Haggerty, P.A., Rome, Italy: *Community Based Hygiene Education to Reduce Diarrhoeal Disease in Rural Zaire. Measurement of Hygiene Behaviour Before and After the Intervention*, 17 pp.

Hoque, B A and R.B. Sack: *International Center for Diarrhoeal Disease Research, Bangladesh, Monitoring Water Use in Rural Bangladesh*, 14 pp.

Huble, J, Leeds Polytechnic, UK. *Evaluating Hygiene Education - What Do We Measure?*, 9 pp.

Hurtado, E., Institute of Nutrition of Central America and Panama (INCAP). *Measurement of Water-Related Behaviors Including Hygiene Behaviors*, 13 pp.

Huttly, S, London School of Hygiene and Tropical Medicine, Maternal and Child Epidemiology Unit, London, UK.: *Raising Some Issues on Sample Size and Sampling Procedures in Observational Studies of Hygiene Behaviour*, 8 pp.

Jenkins, C, Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea: *Methodological Issues in the Measurement of Hygiene and Sanitation-Related Behavior: Lessons from Papua New Guinea*, 5 pp

Kaltenthaler, E, Nyangabgwe Hospital, Francistown, Botswana: *Contribution to Workshop on Measurement of Hygiene Behaviour* (Description of an ongoing study in northern Botswana. "The Role of Hand-Washing and Other Personal and Domestic Hygiene Behaviours in the Prevention of Childhood Diarrhoeal Diseases in Botswana"), 12 pp.

Kanki, B., Curtis, V, Mertens, T., Cousens, S and E. Traoré, London School of Hygiene and Tropical Medicine/ Ministry of Health in Burkina Faso, Centre Muraz in Bobo-Dioulasso/ Université de Bordeaux II: *Measuring Hygiene Behaviours: Experiences of a Comprehensive Approach in Burkina Faso*, 10 pp

Kendall, C and J. Gittlesohn, Center for International Community-based Health Research, Department of International Health, Johns Hopkins University, Baltimore, USA : *A Discussion of the Reliability of Measures*

of *Hygiene Behaviors: The Case of the Health Behavior Intervention Project, Lima Peru*, 18 pp.

Kochar, V, University of Hyderabad, India: *Getting the Socio-Behavioural Research Done (Some Hints for the Programme Managers to Plan and Conduct Research on Hygiene Behaviour)*, 14 pp

Lanata, C.F.: *Problems in Measuring Hygiene Practices and Compliance during a Hygiene Intervention Study.*

Martines, J.: *Promotion of Personal and Domestic Hygiene.*

McCormack, C, Department of Anthropology, Bryn Mawr College, Bryn Mawr, Pennsylvania, USA. *Health Constraints and Empowerment*, 5 pp

Mtero, S, Blair Research Laboratory, Ministry of Health, Zimbabwe *Hygiene, Hygiene Behaviour - Past and Present Experiences*, 8 pp.

Peasey, A and U. Blumenthal, Tropical Health Epidemiology Unit, London School of Hygiene and Tropical Medicine, London, UK: *Use of Time-Point Direct Observation in the Measurement of Hygiene Behaviour Associated with Irrigation with Wastewater*, 9 pp.

Pedersen, D, Health Sciences Division, IDRC: *Qualitative and Quantitative: Two Styles of Viewing the World or Two Categories of Reality?*, 20 pp

Pelto, P J: *The Qualitative Quantitative Mix in Research on Hygienic Practices*, 11 pp.

Pickering, H., London School of Hygiene and Tropical Medicine, London, UK: *Anthropological Methods Used in the Gambian MRC AIDS Research Programme*, 6 pp

Pinfold, J V, Leed University, UK. *Measurement of Hygiene Behaviour*, 9 pp

Quarry, W : *Hygiene Education Does it Change Behavior?*, 12 pp

Saenz de Tejada, S, Institute of Nutrition of Central America and Panama (INCAP). *Assessing Food Hygiene - A Pilot Study in Guatemala*, 13 pp

Simpson-Hébert, M: *Some Indicators of Hygiene Improvement Based on Experience from Thailand*, 14 pp.

Tempongko, S.B.: *Extended Observation: Its Uses and Limitations in Studies of Hygiene Behavior*, 10 pp

VanDerslice, J., Carolina Population Center and Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, USA: *Estimating Hygiene-Related Water Consumption. Experiences from two Studies in the Philippines*, 14 pp

Widstrand, C., Department of Water and Environmental Studies, Linköping University, Linköping, Sweden: *Some Measurement Problems in Hygiene Behaviour*, 11 pp

Zeitlin, M.F.: *Data Management and Analysis Issues in the Use of Summary Measures of Longitudinal Data to Detect Associations between Hygiene Behaviors and Diarrheal Disease*, 13 pp.

Zeitlyn, S.: *Measuring Hygiene Behaviour. The Importance of Definition and Meaning*, 7 pp.

Lövfors, M., 1990. *Nar dassen kom till byn - Aymara-indianerna i Tallija på det bolivianska hoglandet berättar hur det egentligen gick till*, Thesis, 37 pp, Göteborg: Journalisthögskolan i Göteborg (Swedish text, unpublished).

An unsuccessful latrine project is the starting point for this thesis. It is used as an illustration of how different cultures, urban and rural, within the same country can have adverse effects on communication between projects donors and recipients.

The Aymara Indians' opinions on government interventions, hygiene, culture and their future prospects are briefly touched on.

Maina-Ahlberg, B., 1979. "Beliefs and Practices Concerning Treatment of Measles and Acute Diarrhoea among the Akamba," *Tropical and Geographical Medicine*, 31 (1979), pp 139-148.

This article deals with a study carried out among the Akamba in Kenya. It was part of the Machakos project studies concerned with agents affecting health of mother and child in rural Kenya. This investigation aimed at finding out what mothers believed about measles and diarrhoea and how they treated their children when they contracted the diseases.

Both diseases were classified as 'God's diseases' which, in contrast to 'man's diseases' could be treated and were not supposed to be witchcraft. A variety of treatments based on indigenous knowledge were given to the sick children, but in most cases these were combined with modern medical care. No direct relation could be established between the age and/or education of mothers and the acceptance of modern medical care. According to the author the fact that both diseases were classified as 'God's diseases', *i.e.* diseases which could be treated, rendered the Akamba more open towards innovations which might be adopted if they worked. Since certain of the traditional practices were detrimental to child health such a change would be considered as positive. However, no mention is made of possible positive effects of the traditional treatments.

Mann, H.T. and D. Williamson, 1983. *Water Treatment and Sanitation - Simple Methods for Rural Areas*, 96 pp, London: Intermediate Technology Publications Ltd.

This handbook is intended as a help for laymen in developing countries who want to develop water supply and waste disposal schemes for their own use or for their communities.

Water supply, water and sewage treatment and disposal are dealt with and one chapter is devoted to excreta disposal. Latrine systems are seen as essential and different kinds of latrines are described. Emphasis is put on the siting of pit privies and it is recommended to carefully examine soil conditions in order to be able to determine a safe distance from water sources to prevent bacterial pollution. It is mentioned that under certain conditions bacterial contamination has been known to travel 2000 metres. Thus, simple rules of thumb are not applicable and rural experience should be consulted if pits cannot be made watertight.

Mara, D.D., 1977. *Current Design Capabilities in Appropriate Sanitation Technologies, Proceedings from Conference on Sanitation in Developing Countries Today, 5-9 July, Oxford*, London: OXFAM and London School of Hygiene and Tropical Medicine.

Mara, D.D., Kalbermatten, J.M. and D.S. Julius, 1978. *Appropriate Sanitation Alternatives: A Field Manual*, Washington: The World Bank.

Mara, D.D., 1985. *The Design of Pour-Flush Latrines*, TAG Technical Note No. 15, Washington: The World Bank.

McCullough, F.S. et al., "Analysis of Factors Influencing the Epidemiology and Control of Human Schistosome Infections in Mwanza, Tanzania," *East African Medical Journal*, August 1972, 49 (8), pp 568-82.

McGarry, M. and N. MacMillan, eds., 1988. *Information and Training for Low-Cost Water Supply and Sanitation*, Washington: The World Bank (unpublished).

A compilation of articles on water, wastes and health, alternative technologies as well as project planning and community health. The articles are meant to stimulate engineers to become involved in low-cost, participatory approaches to water supply and sanitation.

McGranahan, G., 1990. *Environmental Problems and the Urban Household in Developing Countries*, Research Memorandum (draft), Stockholm: The Stockholm Environment Institute.

The environmental problems affecting urban households in developing countries which are identified and commented on in this paper are water and sanitation, air pollution, food contamination, solid waste disposal as well as insects and pesticides.

McJunkin, F.E., 1983. *Water and Human Health*, Prepared by National Demonstration Water Project for the U.S. Agency for International Development, second edition, New York: USAID.

The book aims to provide an overview of the topic "Water and Human Health". It covers ten sections introducing the reader to the historical development of "Water Understanding of Disease", to diseases caused by water, to (waste) water treatment and to studies concerning the health impacts of improved water supplies. Every section is followed by an extensive bibliography.

As to excreta disposal, the section is largely based on Feachem (1978, 1980) More interesting is the section about studies conducted in the field of excreta disposal

McNeil, M., 1989. "Latrine Building in Zimbabwe: A Source of Income and Pride," *Source*, Vol. 1, No. 1, June 1989, pp 12-14.

This article implies that latrines do not solely have direct beneficial health effects but that indirect benefits may be achieved if latrine building becomes an income-generating activity

McPherson, H.J., and M.G. McGarry, 1987. "User Participation and Implementation Strategies in Water and Sanitation Projects," *Water Resources Development*, pp 23-30, 3 (1), 1987.

The International Drinking Water Supply and Sanitation Decade had focused attention on the urgent need for water and sanitation in the developing world. However, an alarming number of existing systems, in some countries one third to one half, are broken down or not working. Non-participation by the users has been singled out as a major cause of this high rate of project failure, and increasingly donor agencies and local governments are insisting that the intended beneficiaries be involved in projects. This study analyses user participation in a variety of water supply and sanitation projects in Africa, Asia and Central America. The common key factors which have resulted in some very successful projects are identified and suggestions made on how to implement a user participatory project (From ENSIC Data Base)

Melchior, S., 1989. *Women, Water and Sanitation or Counting Tomatoes as well as Pumps*, PROWWESS/UNDP Technical Series, Involving Women in Water and Sanitation, Lessons, Strategies, Tools, New York: UNDP.

This paper stresses the importance of sanitation and the involvement of women in sanitation projects. Projects ought to use a participatory approach, which involves communities right from the beginning. The author distinguishes the participatory approach which has the aim "to strengthen and enlist local problem-solving and decision-making capacity", from a purely didactic one and from the social-marketing

approach. The latter is defined as an approach which essentially relies "on extensive research on beneficiaries' views, beliefs and skills, and tailors education programmes to overcome obstacles in accepting the planned programme".

The paper further discusses problems and questions encountered when implementing the participatory approach, presents small case studies and suggestions for problem solutions. It is stressed that beneficiaries of projects emphasize the economic benefits even of projects that were "only" intended to promote health. "Water/sanitation projects will be more successful, and be seen as more successful, if they are seen and planned as entry points for development - meaning, development in the directions that communities themselves define and seek"

Metametrics, Inc., 1981. *Rural Sanitation in the Arab Republic of Egypt*, Prepared for the U.S. Agency for International Development, Work Order No. 5, AID/SOD/POC/C-0178.

Meybeck, M., Chapman, D. and R. Helmer, eds., 1989. "Pathogens in Freshwater," *Global Freshwater Quality - A First Assessment*, Chapter 5, pp 59-78, Oxford: Blackwell Reference for WHO/UNDP.

Middleton, R.N., Mara, D.D., Feachem, R. G. and G.H. Read, 1981. "Appropriate Sanitation", pp 79-81, *Appropriate Technology in Civil Engineering. Proceedings of the Conference 14-16 April 1980*, London: Thomas Telford Ltd.

Ministry of Health, Kenya, Division of Environmental Health, 1988. *SIDA Aided Environmental Health Project in Eastern and Rift Valley Provinces of Kenya (Implementation 1987-1990)*, Revised Edition, 72 pp, Nairobi: Ministry of Health (unpublished).

The document provides a definition of objectives, strategies of implementation, monitoring, evaluation and budget of a SIDA aided environmental health project in two Kenyan provinces.

As regards sanitation, it is stipulated that appropriate technologies are to be identified and promulgated with the help of demonstration units

In order to augment people's interest in improved hygiene potential health benefits are to be demonstrated at both the household and the public institution level.

Ministry of Health, Kenya, 1990. *SIDA Supported Health Programmes in Kenya, Plan of Operation 1990/91-1993/94*, 310 pp, Nairobi: Ministry of Health (unpublished).

This revised Plan of Operation provides the base for a 'Specific Agreement on Health Sector Support' between the governments of Sweden and Kenya.

Mölbäck, K., Höjling, N., Jepsen, S., Gaarslev, K., 1989. "Bacteriological Contamination of Stored Water and Stored Food: a Potential Source of Diarrhoeal Disease in West Africa," *Epidemiology and Infection*, 102 (2) pp 309-316, UK.

During a house-to-house "diarrhoea survey" in 1983, an assessment of food and water hygiene was made in two Liberian communities, one in an urban slum and the other in a rural subsistence-farming area. The overall concentration of Enterobacteriaceae was significantly greater in stored household drinking water samples compared with the water source(s) ( $P < 0,025$ ). Food hygiene standards were low, especially in the urban slum where a high level of bacterial activity was detected in cooked food that had been stored for long periods; the proportion of households storing food was significantly lower in the rural area ( $p < 0,0001$ ).

The authors conclude that. "when water supply programmes are planned, the presence of other risk factors for water-related diseases should be investigated, [and furthermore that] to ensure maximum health benefits, water projects should as a rule be accompanied by other interventions" (From *Tropical Diseases Bulletin*, London, abstract 643, 1990).

Moore, H.A., de la Cruz, E. and O. Vargas-Mendez, 1965. "Diarrheal Disease Studies in Costa Rica. IV. The Influence of Sanitation upon the Prevalence of Intestinal Infection and Diarrheal Disease," *American Journal of Epidemiology*, Vol. 82, No. 2, pp 162-184.



The findings of this study indicate that a good level of sanitation can reduce the incidence of diarrhoea, the prevalence of Shigella infections and parasitism

However, despite the general use of pit privies extensive parasitism was encountered in the communities studied. It is suggested that good hygiene behaviour in general, e.g. concerning the sanitary disposal of children's feces, is necessary in order to achieve better health.

Morgan, P. and E. Chimbunde, 1982. "Improved Ventilated Pit Latrines for Rural Areas," *Appropriate Technology*, Vol. 9, No. 2.

Morgan, P., 1990. *Rural Water Supplies and Sanitation/ A Text from Zimbabwe's Blair Research Laboratory*, 358 pp, London: Macmillan Education.

In this practical handbook the author presents technologies suitable for rural water supplies and rural sanitation in developing countries. The book contains explanations on different ways to solve water and sanitation problems adapted to the financial possibilities of individuals and communities. The reader is introduced to the technique and construction of various types of hand-dug wells and handpumps as well as to the widely known Blair or VIP Latrine. The text is accompanied by numerous photos and illustrations.

As to the siting of latrines, it is recommended to locate them downhill of a well site and at least 30 m from the nearest water point (pp 23, 251, 293) in order to avoid that contaminated water drains through the ground into the well. Besides it is advised that the "ideal water point, such as a tubewell should be well grouted, and the cover slab strong and complete, without cracks, and sloped so that water runs to waste down a long well-sealed water run-off and enters a shallow soakaway or seepage area. Under these ideal conditions the source of the water is unlikely to be contaminated to any extent, either from underground, or from the surface." (p 251). The recommendation on the siting of latrines represents a rule of thumb and no suggestions concerning the distance from water sites are made regarding the geohydrological conditions prevailing in the respective area.

Myhrstad, J.A. and O. Haldorsen, 1984. "Drinking Water in Developing Countries - the Minimum Treatment Philosophy. A Case Study," *Aqua*, No. 2, 1984, pp 86-90, Oxford.

Based on a water quality study for the Kigoma Region in Tanzania it is concluded that bacteriological contamination is a more important factor influencing water quality than chemical pollution. A priority list for the selection of water sources as well as water treatment measures are presented

With regard to groundwater protection the establishment of graded zones in order to prevent pollution in the groundwater infiltration area is suggested

In zone 1, the nearest area up to 30 metres from the well, all activities would thus be forbidden Zone 2 would be defined as the certain infiltration area where excreta disposal facilities ought not to be established closer to the well than 50-70 metres, agricultural activities closer than 100 metres should not be allowed and houses should not be built closer to the well than about 100 metres

Myklebust, O. et al, 1988. *Report of the Joint Annual Review of TAN 055 Water Supply and Sanitation Development, Kigoma Region*, 22 pp, Oslo: NVE (Norges vassdrags- og energiverk).

Narayan-Parker, D., 1988. *People, Pumps and Agencies*, Prowess/UNDP Technical Series, 32 pp, New York. UNDP.

This case study describes and analyses the south coast hand pumps project in Kwale District/Kenya The author bases the analysis on a planning and evaluation framework named PEGESUS (Partnership to Evolve and Grow Effective and Sustained Utilization of Systems) which sets three main criteria for success, namely effective and sustained utilization, sustainability and replicability

According to the paper, these criteria are essentially met by the project although replicability has not been tried on the national level yet The reasons for the satisfactory results are sought in the community management approach, the ability of all parts involved to learn from experience ("need for change was not viewed as a sign of failure", p 26), the close collaboration between the government agencies, NGO and donor agencies, and cost recovery Even in this paper it is mentioned that the beneficiaries of the project regard water supply and sanitation mainly

as a first step to development and look for more, "economic" development.

Narayan-Parker, D., 1989. *Goals and Indicators for Integrated Water Supply and Sanitation Projects in Partnership with People*, PROWESS/UNDP Technical Series, Involving Women in Water and Sanitation, Lessons, Strategies, Tools, 20 pp, New York: UNDP.

This paper is intended to present the PEGESUS framework which can be used to analyse how the water supply, sanitation, health, community participation, economic, environmental, and related situations are being affected by programme activities

Three main indicators are identified, namely effective utilization, sustainability and replicability.

Project managers are supposed to base their work on broad guidelines which become more detailed during the implementation phase. In this way communities, especially women, can be effectively involved in planning, implementation and evaluation of projects.

National Council for International Health, 1983. *Guide to U.S. Based Organizations Involved in Water Supply and Sanitation in Developing Countries*, Arlington: WASH.

NORAD/NVE, 1990. *Vann og sanitaer: NORADs policy ved slutten av vanndekaden*, unpublished report, Oslo: Norwegian Agency for Development (NORAD).

Compilation of contributions made during a one-day seminar concerning Norway's experience with the International Drinking Water Supply and Sanitation Decade as well as future strategies in the water and sanitation sector.

Nordberg, E. and D. Finer, eds., 1990. *Society, Environment and Health in Low-Income Countries*, 186 pp, Stockholm: Department of International Health Care Research (IHCAR).

The book consists of fifteen articles by different authors dealing with health in developing countries. The topic is analysed from, *inter alia*, social, cultural, historical, medical, demographic and environmental points of view so that an overview of numerous factors affecting health is provided. Several articles contain suggestions on how to incorporate present knowledge in development projects

Nordberg, E. and U. Winblad, 1990. *Environmental Hygiene in SIDA- Supported Programmes in Africa - Review and Recommendations* (unpublished).

This consultancy study is a first step in SIDA's elaboration of improved guidelines concerning water supply, environmental hygiene and health education. The report aims at providing a picture of the development related to environmental sanitation that has taken place in Kenya, Ethiopia, Tanzania and Zimbabwe

It contains a brief literature review, an overview of country-specific experiences as well as comments and suggestions on topics such as service delivery systems, subsidies, replicability, demonstration latrines, cultural aspects, health education, vector control, food hygiene, project organization, evaluation etc

The authors point out that the priority accorded to environmental hygiene has become insufficiently visible in budgets or in action and suggest improvements in this regard.

Norwegian National Committee for Hydrology, 1987. *Arusha Seminar on Implementation of Rural Water Supply and Sanitation in Tanzania, 1986*, Oslo.

Ntezinde, N.M., Hoadley, A.W. and M. Mayisela, 1990. "Water Supply and Sanitation in Rural Swaziland: a Case Study for the Remainder of the Decade and beyond," *World Water '89, Managing the Future Learning from the Past, Proceedings of an International Conference Organized by the Institution of Civil*

*Engineers and Held in London on 14-16 November 1989*, London Thomas Telford.

In this paper the development of a water supply and sanitation programme carried out in Swaziland during the period 1979 to 1989 is described. The authors emphasize the necessity of sectoral development. The success of the program is essentially attributed to the fact that institutional capacity was built up in order to be able to cope with all the parts of the project, namely planning, construction, health education, and community involvement.

Furthermore, the willingness of international donors to accept as well a long-term commitment as the recipient country's priorities and to merely play an advisory role is considered to be crucial.

The authors hope that the case of Swaziland can serve as an example for projects in other countries.

Obeng, L., 1977. "Water and Health," *The Courier*, No. 43, pp 60-663, Brussels.

Okun, D.A., 1987. *The Value of Water Supply and Sanitation in Development: An Assessment of Health-Related Interventions*, WASH Technical Report No. 43, Arlington: WASH.

Omambia, D.O., 1984. *Ministry of Health Pilot Latrine Project Magombe Sub-Location, Busia District, Western Province - Report of a Socio-Cultural Survey on Sanitation Practices* (unpublished), Nairobi: AMREF.

This survey was carried out prior to a latrine project initiated by the Ministry of Health in Kenya. The aim was to identify social and cultural factors that had to be taken into account if the project was to be successful. The study provides a background of latrine ownership in the region as well as of attitudes and practices concerning latrine usage, defecation behaviour and children's defecation.

Several cultural constraints are mentioned that do not favour the easy adoption of latrines, e.g. avoidance relationships which may apply to father-in-law/daughter-in-law, father/married son, mother/son older than 6-8 years and/or husband/wives relations. These avoidance relationships imply that even if a latrine exists in the home, not all of the

family members are going to use it. Thus, the impact on family health may be very limited.

Furthermore, people may have problems in handling other adults' faeces. In Magombe, women are responsible for cleaning the latrines while the men build them. If the latrine is used by both adults and young children, the women in the household will be reluctant to clean faeces lying on the latrine floor. The maintenance of the latrine, especially in large families, will thus be quite poor.

Since children's faeces are considered to be harmless, these are generally not perceived as a problem or a health hazard. Children are consequently allowed to defecate anywhere while they are still very young, and when they are older, they are not required to use the existing latrine if they are afraid to do so because of darkness or fear of snakes. The faeces are then removed by their mothers.

The author equally describes the status of school sanitation in the area, community organization, village health committees and voluntary groups.

The findings of the study are related to the planned sanitation programme and recommendations are made in order to facilitate implementation.

Omambia, D., 1984. *Social and Cultural Factors in Disease Control*, paper presented at the Seminar for Review and Development of Curriculum for Public Health Officers in Kenya at Kenya Institute of Administration - Kabete, 3-14 December 1984, 15 pp (unpublished).

The author of this paper emphasizes the social and cultural aspects in environmental health. Examples from Kenya are provided and the necessity of community participation in health and sanitation programmes is stressed.

Ouma, J.H., 1988. *Transmission of Schistosoma Mansoni in an Endemic Area of Kenya, with Special Reference to the Role of Human Defecation Behaviour and Sanitary practices*, Index to Theses Accepted for Higher Degrees in the Universities of Great Britain and Ireland 1988. 37 (4): 1695 (Abstract of Thesis, University of Liverpool, Liverpool, UK).

In this thesis schistosomiasis transmission is described and related to aspects of environmental sanitation. The sickness, routes of transmission as well as sanitary practices encountered in the region studied are presented in detail.

Pacey, A., ed., 1978. *Sanitation in Developing Countries*, 238 pp, London: John Wiley & Sons Ltd.

The book consists of papers presented at a conference held at Pembroke College, Oxford, July, 5-9, 1977. Mainly technological aspects concerning sanitation are dealt with. Some papers emphasize, however, that personal and institutional factors determining human behaviour must be considered (Cf. Kochar, V)

Pacey, A., 1980. *Rural Sanitation: Planning and Appraisal*, 68 pp, London: Oxfam and Intermediate Publications Ltd.

This booklet is directed mainly at hospital staff and community development workers in developing countries who may be planning programmes to improve sanitation or hygiene in rural areas.

The starting point for the approaches devised (regarding options for sanitation, technical assistance, latrine design, evaluation), is that appropriate technology alone is no guarantee for improved health since people's hygiene-related behaviour is of vital importance for a sanitation programme's success. It is, *inter alia*, recommended to consider local cultural values and to build a programme on positive customs and beliefs found in local hygiene culture.

Furthermore, it is pointed out that local people may have their own social goals that they want to achieve by a project, which need not necessarily be related to health improvements. These goals ought to be identified and taken into account.

Paret, H., 1984. *Planification de la santé en Afrique*, Paris. Harmattan.

Parlato, R., 1984. *A Monitoring and Evaluation Manual for Low-Cost Sanitation Programs in India*, TAG Technical Note No. 12, Washington: The World Bank.

Pene, P., Sankalé, M. and B. Diop, 1960. "L'éducation sanitaire en milieu urbain," *Médecine d'Afrique Noire*, No. 1, January 1960.

The unsatisfactory situation regarding environmental sanitation in selected areas of Dakar is described. It is pointed out that the improvement of environmental sanitation is a function not only of preventive education but also of economic development, adequate policies, administrative structures as well as of cultural and religious values

Perrett, H.E., 1984. *Monitoring and Evaluation of Communication Support Activities in Low-Cost Sanitation Projects*, TAG Technical Note No. 11, UNDP, 26 pp, Washington: The World Bank.

Peti, P.L., 1985. "Problems of Rural Health Workers," *Tropical Doctor*, 1985, 15/1, pp 44-45, UK.

Pickering, H., 1985. "Social and Environmental Factors Associated with Diarrhoea and Growth in Young Children: Child Health in Urban Africa," *Social Science & Medicine*, 21:2, Oxford: Pergamon Press.

The article deals with a study carried out in an urban area in The Gambia, investigating the relationship between social and environmental variables and diarrhoea and growth in children aged between 6 and 36 months. Although there were important differences in disease incidence among the children, these could not be consistently related to the social and environmental variables examined. The only valid variable turned out to be the mothers' concern for diarrhoeal diseases, *i.e.* women who were concerned about diarrhoea usually had children who frequently suffered from it

Since the other variables like family wealth, own tap near the house etc. did not prove to be reliable, the author suggests that high economic status does not necessarily imply improved living conditions because refrigerators, private standpipes etc may be bought but not used in a way that would improve health. Instead, traditional living patterns are preserved. Therefore, a host of conditions must be changed if health is to be improved effectively.



Pickering, H., Hayes, R.J., Ng'andu, N. and P.G. Smith, 1986. "Social and Environmental Factors Associated with the Risk of Child Mortality in a Peri-urban Community in The Gambia," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, No 80, pp 311-316, London.

In this study merely two out of 29 social, economic and environmental variables could be related in a statistically significant way to child mortality in Bakau, a peri-urban area in The Gambia. Children of mothers who were self-employed seemed to incur higher risks than those of mothers with paid jobs or being housewives. Furthermore, those children living in compounds in which chickens, ducks or goats were kept appeared to be at higher risk than children living in compounds without these animals.

The authors conclude that self-employed women who leave their home for only a few hours per day frequently leave their infants with unexperienced older sisters so that they do not get the care they need. In contrast, mothers who are in paid employment and who are not at home during the whole day leave their infants with older women who know how to take care of them. Housewives, finally, are able to take care of their children all day.

As to the finding that animals in the compound influence the risk for child mortality, the authors draw the vague conclusion that not the animals themselves pose a risk but rather that their presence indicates a generally lower level of sanitation in the household, which is detrimental to child health.

Further factors correlated with each other and obviously affecting child mortality were knowledge of cause of diarrhoea of the mother, stand-pipe in compound, number of rooms in the house, where the mother was born and where the child was born.

Pickering, H., Hayes, R.J., Tomkins, A.M., Carson, D. and D.T. Dunn, 1987. "Alternative Measures of Diarrhoeal Morbidity and their Association with Social and Environmental Factors in Urban Children in The Gambia," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 81, pp 853-859.

Based on a study of child morbidity in an urban area in the Gambia, the implications of using different measures of diarrhoeal morbidity are discussed.

Pickford, J., 1983. "Sanitation for Urban Squatters and Slum Dwellers", *Vierteljahresberichte*, No. 94, 12/1983, pp 385-393, Bonn.

Pillsbury, B., Yacoob, M. and P. Bourne, 1988. *What Makes Hygiene Education Successful? Experience from Togo, Sri Lanka, and Yemen and Its Relevance for Project Design*, WASH Technical Report No. 55, Arlington: WASH.

Pineo, C.S. and D.V. Subrahmanyam, 1975. *Adduction d'eau et évacuation des excréta dans les pays en développement - quelques réflexions*, Geneva: World Health Organization.

Pineo, C.S., Schnare, D.W. and G.W. Miller, 1981. *Environmental Sanitation and Integrated Health Delivery Programs*, Monograph Series No. 4, Washington: American Health Association, International Health Programs.

Pinfold, J.V., 1990. "Faecal Contamination of Water and Fingertip-Rinses as a Method of Low-Cost Water Supply and Sanitation Activities on Faeco-Oral Disease Transmission. I. A Case Study in Rural Northeast Thailand," *Epidemiology and Infection*, 1990, 105: 363-375.

Pinfold, J.V., 1990. "Faecal Contamination of Water and Fingertip-Rinses as a Method of Low-Cost Water Supply and Sanitation Activities on Faeco-Oral Disease Transmission. II. A Hygiene Intervention Study in Rural Northeast Thailand," *Epidemiology and Infection*, 1990, 105: 377-389.

Prins, A. and M. Yacoob, 1988. *Adding Guinea Worm Control Components: Guidelines for Water and Sanitation Projects*, WASH Technical Report No. 51, Arlington: WASH.

Rajagopalan, S. and M.A. Shiffman, 1974. *Guide to Simple Sanitary Measures for the Control of Enteric Diseases*, Geneva World Health Organization.

Ree, G.H., 1982. "Schistosomiasis and Human Behaviour," *Ecology of Disease*, 1: 132-133, 1982.

Roark, P. et al., 1987. *Privatization Study of the Village Water Supply and Sanitation Project, Lesotho*, WASH Field Report No. 215, Arlington: WASH.

Roark, P. et al., 1988. *Final Evaluation of the USAID/Togo Rural Water Supply and Sanitation Project*, WASH Field Report No. 228, Arlington: WASH.

Roy, A.K. et al., 1984. *Manual on the Design, Construction and Maintenance of Low-Cost Pour-Flush Waterseal Latrines in India*, TAG Technical Note No. 10, UNDP, 109 pp, Washington: The World Bank.

Ryan, B.A. and D.D. Mara, 1983. *Ventilated Improved Pit Latrines: Vent Pipe Design Guidelines*, TAG Technical Note No. 6, UNDP, 16 pp, Washington: The World Bank.

Rybczynski, W., 1977. *Appropriate Sanitation for the World's Poor, Proceedings 7th Annual Composting and Water Recycling Conference, 4-6 May, Amherst, USA*, Amherst: University of Amherst.

Sabwa, D.M., and A.K. Githeko, 1985. "Faecal Contamination of Urban Community Water Supplies and its Public Health Implications," *East African Medical Journal*, 1985, 62/11, pp 794-801, Kenya.

Sang-Bok, H. et al., 1988. *Water Supply and Sanitation in Korean Communities*, 162 pp, Seoul: The Population and Development Studies Center, Seoul National University.

The aim of this study was to identify the socio-cultural linkages between water supply systems, sanitation and health in South Korean villages. Five communities in different ecological and social environments were selected and studied during one year. The analysis was carried out on community level rather than on household or individual level.

Among other things, it was established that the improvements in water supply and sanitation started by the South Korean government in the early 1970s in several cases were accompanied by negative impacts. In some cases, accompanying industrial projects led to new health problems, in others the improvements in water supply and sanitation disrupted the traditional ways of handling human and animal wastes without really representing viable alternatives.

Institutional and administrative weaknesses led to insufficient management of the new facilities.

Generally speaking, people were well aware of the sanitary situation in their environment but lacked, according to the authors, knowledge and financial means to carry out improvements themselves. It was interesting to note that villagers depending on cash income were more concerned with their health than subsistence farmers who could rely on the extended family and labour exchange in case they fell sick. Emphasis was put, however, on curative care rather than on preventive measures.

Sankale, M., Baylet, R. and B. Diop, 1967. *Importance du péril fécal en Afrique Noire*, Deuxième congrès international des africanistes, Dakar.

The subject of this paper are the dangers of faecal pollution (bacteria, viruses, parasites) and its effects in the Dakar region as well as in selected rural areas of Senegal. It is pointed out that the incidence of faecally transmitted diseases in the examined areas is considerable and measures to be taken are suggested.

Saugestad, S., 1989. *Patterns in Water Use: the Manicaland Integrated Rural Water Supply and Sanitation Programme, Zimbabwe*, 131 pp, Tromsö: Tromsö University.

Goals and achievements of the programme are described and analysed  
The main focus of the report is on the water supply aspects, however

Schiller, E.J. and R.L. Droste, eds., 1982. *Water Supply and Sanitation in Developing Countries*, Ann Arbor/Michigan: Ann Arbor Science.

This book consists of material from a course given at the University of Ottawa during June 1981. It aims to give a comprehensive coverage of the technical and management aspects of implementing water supply and sanitation schemes in developing countries

Schleberger, E., 1986. *Wasser für Alle. Flachendeckende Trinkwasserversorgung mit begleitenden Sanitärmaßnahmen in der nördlichen Trockenzone Sri Lankas/ Drinking Water Supply and Sanitation Project in Sri Lanka*, Schriftenreihe der GTZ No. 183, 108 pp, Eschborn: GTZ (text in English and German).

The book contains the description of a GTZ project in Sri Lanka. The main focus of the project is on improved water supply, i.e. the construction of more than 600 drilled wells. It also comprises a latrine programme that has led to the construction of 1600 latrines in the region. Both parts of the project were actively supported by sanitary and health education. Due to problems concerning the latrine programme it had to be restructured during the implementation phase, leading to more economic support for the beneficiaries than originally planned. The author judges the programmes to be successful mainly due to the participatory approach.

Shuval, H.I., Gunnerson, C.G. and D. S. Julius, 1981. *Night-Soil Composting*, Appropriate Technology for Water Supply and Sanitation publication series, Vol. 10, 81 pp, Washington: The World Bank.

Simpson-Hébert, M., 1983. *Methods for Gathering Socio-Cultural Data for Water Supply and Sanitation Projects*, Technology Advisory Group (TAG) Technical Note No. 1, 29 pp, Washington: UNDP.

This paper aims to provide engineers engaged in water supply and sanitation projects with basic information about social science methods

Simpson-Hébert, M., 1984. "Water and Sanitation: Cultural Considerations," pp 174-198, *Water and Sanitation - Economic and Sociological Perspectives*, Bourne, P.G., ed., New York: Academic Press, Inc.

In this chapter it is argued that social or cultural factors need not be obstacles to successful implementation of water and sanitation schemes. Numerous examples are given in order to illustrate that project failures could have been avoided if social and cultural factors had been assessed prior to implementation. An important part of the chapter consists of recommendations how to do better.

Simpson-Hébert, M. and M. Yacoob, 1987. *Guidelines for Designing a Hygiene Education Program in Water Supply and Sanitation for Regional/District Level Personnel*, WASH Field Report No. 218, Arlington: WASH.

Sloof, R. and T.W.J. Sculpen, 1978. "Machakos Project Studies. Agents Affecting Health of Mother and Child in a Rural Area of Kenya. VI. The Social and Hygienic Environment," *Tropical and Geographical Medicine*, 30 (2), pp 257-274.

Stanton B. et al., 1987. "An Educational Intervention for Altering Water-Sanitation Behaviours to Reduce Childhood Diarrhoea in Urban Bangladesh: Formulation, Preparation and Delivery of Educational Intervention," *Social Science and Medicine*, Vol.24, No. 3, pp 275-283, 1987.

Staugård, F., 1990. *The Role of Women in Health Development*, Göteborg: The Nordic School of Public Health.

Stenström, T.A. and S. Hoffner, 1979. *Patogener och indikatororganismers överlevnad och transport i mark och grundvatten - litteraturstudie*, 127 pp, Stockholm: Svenska Naturvårdsverket (Swedish text, unpublished report).

This is a review of literature about pathogen and trace organism survival and transport in soil and groundwater English, German, French and Scandinavian literature is covered

Stenström, T.A., Hoffner, S. and U. v. Brömssen, 1980. *Reduktion av bakterier och virus vid avloppsvattenfiltration i mark - en kunskapsammanställning*, PM 1329 (1980), 34 pp, Stockholm: Statens naturvårdsverk (Swedish text).

This report compiles knowledge about pathogens in water, soil, urine and intestines, risks for infection by waterborne pathogens, methods of analysis, factors influencing pathogen survival, virus adsorption as well as long-term effects of soil infiltration.

The information provided is based on experience from temperate climate

Stenström, T.A., 1985. *Infiltration i mark - mikroorganismers transport och överlevnad*, Rapport 3051, 52 pp, Stockholm: Statens naturvårdsverk (Swedish text).

In this report the results of a study of the survival and adsorption of indicators and disease-causing faecal bacteria are presented The study was carried out by using laboratory models, soil columns, sandfilter trenches and soil infiltration units

Stephenson, S. L.s et al., 1986. "III. Water, Sanitation, and Knowledge about Urinary Schistosomiasis in a Kenyan Coastal Community: A Study Combining Ethnographic and Survey Techniques," pp 70-152, *Schistosomiasis and Malnutrition*,

Stephenson, L.S., ed., Cornell International Nutrition Monograph Series, No. 16 (1986), Ithaca: Cornell University, Division of Nutritional Sciences.

In this report the studied community's knowledge about schistosomiasis, their water resources and sanitation are described. Furthermore, the incidence of schistosomiasis infection in primary school children is related to their mothers' knowledge about cause, prevention, and treatment of *S. haematobium* infection as well as to socioeconomic indicators, latrine usage, and utilization of water resources.

Subra, R., 1982. "The Distribution and Frequency of *Culex Pipiens quinquefasciatus* Say 1923 (Diptera, Culicidae) Breeding Places on the Kenya Coast in Relation to Human Sociological Factors," *Journal of Tropical Medicine and Hygiene*, 1982, 85 (2), pp 57-61.

On the Kenya coast three main types of *C. p. quinquefasciatus* breeding places can be identified, namely pit latrines reaching the groundwater table, cesspools for used water, and 'birikas', uncovered cement containers for ritual ablutions.

In this article it is pointed out that several major factors, especially improved standard of living and increasing size of human settlements lead to an augmentation in the number of pit latrines and thus to more potential breeding places for the mosquito.

Since this development must be considered to be detrimental to health it is suggested that appropriate technologies, e.g. sanitation without water are propagated if negative effects are to be avoided.

Svenska Naturvårdsverket, 1985. *Avloppsvatteninfiltration - Förutsättningar, Funktion, Miljökonsekvenser*, Stockholm: Svenska Naturvårdsverket and Nordiska ministerrådet (Swedish text).

The publication deals with the preconditions, functions and environmental consequences of wastewater infiltration.

In Chapter 3 the reduction and transport of intestinal microorganisms are treated.



SWECO, 1980. *Continuous Compost Toilets in Tunisia - Part One*, Stockholm: SIDA.

Tanner, M., Degremont, A., de Savigny, D., Freyvogel, T., Mayombana, C. and S. Tayari, 1987. "Longitudinal Study on Health Status of Children in Kikwawila Village, Tanzania: Study Area and Design," *Acta Tropica*, June 1987, 44(2) pp 119-36, Basel.

Tanzania, Ministry of Water Development, Energy and Minerals, and SIDA, 1979. *Rural Water Quality Programme in Tanzania*, Final Report, Main Text, 328 pp, Sweden: Brokonsult AB (unpublished).

In this report detailed information and recommendations for action, organization, legislation, training and engineering with respect to Tanzania's Rural Water Quality Programme are given

The report contains, *inter alia*, information about water quality and use, water supplies and treatment, water laboratories, and the relation between water quality and health. Cost estimates as well as a cost/benefit approach are provided and current legislation is reviewed.

Tanzania, Ministry of Water Development, Energy and Minerals, and SIDA, 1979. *Rural Water Quality Programme in Tanzania*, Final Report, Annexes 1-10, Sweden: Brokonsult AB (unpublished).

Taylor, D. et al., 1981. "Pure and simple. Water and the Fight for Life," *New Internationalist*, No. 103, 9/1981, pp 7-28, London

Turner, J. E. and S. Buzzard, 1987. *Mid-Term Evaluation of the CARE Water Supply and Sanitation Project in Belize*, WASH Field Report No. 105, Arlington: WASH.

UNDP, 1983. *Strategies for Enhancing Women's Participation in Water Supply and Sanitation*, 15 pp, USA: United Nations Development Programme.

This strategy document addresses itself to planners, decision makers and implementors of Decade programmes at the national and international levels. The strategy envisages involving women at the policy making, management, and technical levels for the programming, monitoring and evaluation of existing or future Decade activities (From: ENSIC Database)

UNDP-World Bank Water and Sanitation Program and PROWESS, 1989. *Rural Sanitation in Lesotho - From Pilot Project to National Program*, Discussion Paper Series, 26 pp, Washington: UNDP.

The paper traces the evolution of the UNDP-PROWESS programme in Lesotho from a pilot project to a national programme. It is considered to be a success story because of its relatively high coverage rates and its expected long-term sustainability.

According to the paper, the reasons for the good performance of the project are, *inter alia*, the participatory approach, which is described extensively, as well as the fact that the construction of the VIP latrines was entirely left to the private sector once latrine builders had been trained and the first demonstration latrines had been built.

This implied that beneficiaries could pay for their own latrines without being required to build them themselves. Instead, they were able to hire a latrine builder. The advantage was, on the one hand, that this approach created a feeling of responsibility for the investment and, on the other hand, working opportunities for a part of the population. A full-time latrine builder was able to earn the mean monthly income in Lesotho without having to leave the village, as generally was the case for people working in South Africa. It seems that the latrine builders realized their private interest in installing and selling latrines to their communities which led to a considerable "marketing effort" from their part to create demand. The extensive health and hygiene education programme carried out as a part of the project in order to create awareness and demand for better sanitation facilities was thus effectively supported by the latrine builders.

A disadvantage might be seen in the fact that 25% of the population, according to estimates, would not be able to afford a VIP latrine without partial or full subsidization, while 30% needed credit arrangements.

(which were provided in different forms) Merely 45% could afford a latrine without financial help

It is indicated that Lesotho might be a special case due to the fact that its economy is more monetarized than the economies of other African countries

According to the paper, this project demonstrates that sanitation, water supply, health care and hygiene belong together and that the right components can lead to success even in large-scale projects

UNECA, 1980. *Report of the African Regional Meeting on Problems and Needs of Africa in Community Water Supply and Sanitation, Addis Ababa, Ethiopia, 4-8 August 1980*, United Nations Economic Commission for Africa.

During this meeting an assessment of the current status in the field of community water supply and sanitation was made. Furthermore, requirements concerning, *inter alia*, technical assistance, advisory services, investments, and manpower in view of the International Water Supply and Sanitation Decade were dealt with.

UNECA, 1989. *Economic Aspects of Drinking Water Supply and Sanitation in Africa with Particular Reference to Rural Areas*, United Nations Economic Commission for Africa.

This book provides an overview of the situation concerning drinking water supply and sanitation at the beginning of the Decade. Required implementation rates to achieve the objectives set are given and the actual performance by 1988 is evaluated. Issues that affected implementation are discussed.

UNESCO, 1983. *Involving School Children in Community Health. Suggestions for Curricular and Co-Curricular Activities. Aids to Programming UNICEF Assistance to Education*, Paris: UNESCO/UNICEF.

UNESCO, 1988. *Sub-Regional Workshop in Support of Child Survival and Development through Environmental Education, Including Population Education in Eastern and Southern Africa, Green Hills Hotel, Nyeri, Kenya, 6-12 September, 1987*. Workshop Report, 148 pp, Nairobi: UNICEF Regional Office.

UNICEF, 1982. "Wasser- und Sanitärversorgung für alle," *Neue Entwicklungspolitik*, pp 2-16, Wien.

UNICEF, oct. 1982. *Appraisal Report on the Wang'ing'ombe Sanitation Project, Tanzania*.

University of Peradeniya, Sri Lanka, 1983. *Socio-Cultural Dimensions of Water Supply and Sanitation: A Study Made in Sri Lanka*. Water and Society - Harispattuwa Water Development Programme. Report 3/83, B, IDS, Institute of Development Studies. Helsinki: University of Helsinki.

University of Tampere, 1986. *Water, Sanitation, and Health Care Survey, Kenya-Finland Primary Health Care Programme, West Province, Kenya*, 39 pp, Tampere: University of Tampere, Dept. of Political Science, Unit of Peace Research and Development Studies.

Utsunomiya, A., Mori, K., Hayashi, T. et al., 1982. "Bacteriological Study on the Diarrhoeal Diseases in Kwale District, Coast Province, Kenya," *Tropical Medicine*, 1982, 24/4, pp 235-252.

Vaa, M., 1990. *Technology Choice of Development Aid Organisations in Water and Sanitation Projects*, Paper presented at the 6th General Conference of EADI, Oslo 27-30 June 1990 (unpublished).

The subject of this paper is technology transfer between developed and developing countries. The water and sanitation sector is taken as an example and it is argued that the failures observed during the last decades ought not simply to be attributed to cultural factors in receiving countries as in conventional analyses but that a large part of the failures can be attributed to cultural, institutional and professional factors in donor countries. That would explain why procedures of crucial importance for project implementation, e.g. community participation, are widely recommended in the literature and incorporated in project documents but seldom carried out in reality.

Vanek, E., 1967. "Verbreitung von Darmhelminthen bei ostafrikanischen Kindern. Lebensgewohnheiten als begünstigender bzw. hemmender Faktor," *Münchener Medizinische Wochenschrift*, March 3, 1967, 109 (9), pp 452-455 (German text).

An examination for intestinal helminths of fifty children living in a rural area in south-west Tanzania showed that the most predominant infections were due to worms entering through the skin. This could be explained by the general absence of footwear, sanitary facilities as well as by children's predilection for bathing.

Unexpectedly low rates of ascaris and enterobia infestation were attributed to the habits of not eating raw vegetables ("Only animals and Europeans eat greenstuff."), of thorough anal cleansing as well as of eating meals late during the day.

It was equally noticed that worm infestation was less frequent during the first four years of life which was assumed to be related to the fact that during this time the children were especially protected by their mothers and relatives and still carried around frequently.

Vanlankveld, H.M., 1981. *Migration and Squatting and the Implication this Has on Water Supply and Sanitation*, paper presented at Water, People & Waste in Developing Countries Conference, 23-25 September 1981, P 105 (4), Loughborough: Loughborough University of Technology.

Van Nostrand, J.s, ed., 1983. *Handbook for District Sanitation Coordinators*, TAG Technical Note No. 9, Washington: The World Bank.

Van Nostrand, J. and J.G. Wilson, 1983. *The Ventilated Improved Double-Pit Latrine: A Construction Manual for Botswana*, TAG Technical Note No. 3, Washington: The World Bank.

Van Wijk, C., 1984. *Participation and Education in Community Water Supply and Sanitation Programmes: A Literature Review*, IRC Technical Paper No. 12 (second edition), The Hague: World Health Organization-International Water and Sanitation Centre.

Varkevisser, C.M., 1973. *Socialization in a Changing Society*, CESO: The Hague.

Socialization in Sukumaland (Tanzania) is described and analysed. Among other things, the acquisition of bathing and personal hygiene habits as well as toilet training of infants are dealt with.

Wahome, N., 1986. *Methods of Excreta Disposal in Areas of Less Abundant Supply of Piped Water: a Case Study of Mathira Division*, thesis (B.A. Building Econ.), Nairobi: University of Nairobi.

Wanasinghe, Y.A.D.S. and T.E.J. de Fonseka, 1989. *Critical Review on Studies on Community Environmental Health in Sri Lanka*, Colombo: Central Environmental Authority.

Wang'ombe, J.K., 1984. "Economic Evaluation in Primary Health Care: the Case of Western Kenya Community Based Health Care Project," *Social Science and Medicine*, 1984, 18 (5), pp 375-385.

Ward, C., 1989. "Groundwater Quality Monitoring in Relation to On-Site Sanitation," *Waterlines*, Vol. 8, No. 4, pp 11-14.

The point of departure for this article is the assumption that the introduction of on-site sanitation facilities, due to increased groundwater pollution risk, does not necessarily lead to improved health

Therefore the author suggests the introduction of groundwater quality monitoring in all projects in order to detect, predict and prevent groundwater pollution. Several factors are mentioned why groundwater monitoring has not been incorporated in all sanitation programmes yet, for instance the general ignorance about groundwater, absence of a reported appropriate methodology and unwillingness on the part of organizations to assume the responsibility. Thus, suggestions are made on how to build up an effective monitoring programme

Ward, C., 1989. "Groundwater Quality Monitoring in Relation to On-Site Sanitation in Developing Countries," *Water and Environmental Management*, Vol. 3, No. 3, June 1989, pp 295-302, London.

Another article emphasizing the crucial importance of groundwater quality monitoring and demonstrating its feasibility even in low-cost projects in developing countries.

Warner, D.B., 1981. *Social and Economic Preconditions for Water Supply and Sanitation Programs*, WASH Technical Report No. 10, Arlington: WASH.

Warner, D.B., Hafner, C.R. and D. Campbell, 1986. *PVO Effectiveness in the Water Supply and Sanitation Sector*, WASH Field Report No. 183, Arlington: WASH.

WASH, 1981. *Evaluation Methods for Community Rural Water Supply and Sanitation Projects in Developing Countries: A Synthesis of Available Information*, Technical Report No. 4, 29 pp, Arlington: Water and Sanitation for Health Project.

WASH field reports (25 reports: nos. 73, 75, 77, 78, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 99 (supplement), 100), 1983. Water and Sanitation for Health Project, Camp, Dresser & McKee Incorporated, 1611 N. Kent Street, Room 1002, Arlington, Virginia 22209, USA.

The "WASH" project is operated by a private consultancy in collaboration with sub-contractors on behalf of the US Agency for International Development (USAID). The material reported on here comprises 23 country reports and two evaluation studies on technical/economic and programme aspects. The country studies cover Botswana (1), Burundi (1), Cameroon, Central African Republic (1), Dominican Republic (1 - in Spanish only), Haiti (2), Honduras (2 - one of which in Spanish only), Indonesia (2), Malawi (2), Peru (1), Senegal (1 - in French only), Sri Lanka (1), Tanzania (1), Togo (2), Tunisia (2), and Zaire (2).

The reports cover training courses and seminars, project descriptions/plans/evaluations/final reports, and technical assistance rendered to governments and local manufacturers of pumps, etc. The technical subject matters comprise public health and public health and sanitation education, rural water supply for irrigation and domestic use; drainage schemes, provision of wells, pumps etc.; sanitation - construction of latrines, etc. The two evaluation reports are, No 80: Comparative costs of two types of pump; and No 86. An assessment of the Water and Sanitation Sector in the Peace Corps Program: the role of the Office of Program Development (From. CAB Abstracts)

WASH Staff, 1989. *Socioeconomic Research of Household Sanitation and Guidelines for Program Planners*, WASH Field Report No. 262, Arlington: WASH.

WASH Staff, 1989. *Strategy Recommendations for Water Supply and Sanitation in Africa*, WASH Field Report No. 290, Arlington: WASH.



WASH, 1990. *Lessons Learned from the WASH Project - Ten Years of Water and Sanitation Experience in Developing Countries*, 100 pp, Arlington: WASH.

This paper is a summary of ten years' experience of water and sanitation in developing countries. It consists of nineteen "lessons" based on four principles based on the key terms *technical assistance*, *effective linkage*, *system sustainability* and *shared responsibility*. Although the paper originates from the WASH project the lessons are based on the experience of a variety of sources and may represent the "conventional wisdom" prevailing in the water and sanitation sector at the end of the Decade.

Weir, J.M. et al., 1952. "An Evaluation of Health and Sanitation in Egyptian Villages," *Journal of the Egyptian Public Health Association*, 27: 55-122 (1952).

White, A., 1981. *Community Participation in Water and Sanitation. Concepts, Strategies and Methods*, Technical Paper 17, Rijswijk: International Reference Center for Community Water Supply and Sanitation.

Widstrand, C., 1979. *Some Social and Cultural Aspects of Diarrhoeal Disease Prevention*, paper presented to the WHO Scientific Working Group on Environmental Health and Diarrhoeal Disease Prevention, Kuala Lumpur, 3 to 6 July 1979, 15 pp (unpublished).

This paper stresses the importance of socio-cultural aspects of hygiene behaviour and the necessity of genuine community participation if sanitation programs are to have any impacts. Education programmes making use of, *inter alia*, mass media are suggested in order to induce behavioural change.

However, it is equally proposed to carry out research on existing cultural and social structures that could be used especially in diarrhoeal prevention programmes.

Williams, G., 1989. *All for Health. A Resource Book for Facts of Life*, 73 pp, Oxfordshire/U.K.: P and LA; New York: UNICEF House, Facts for Life Unit.

Winblad, U., Kilama, W. and K. Torstensson, 1980. *Sanitation without Water*, 133 pp, Stockholm: SIDA

The focus of this book is on compost latrines and improved pit latrines. After two introductory chapters dealing with the relation between sanitation and disease, thirteen different dry sanitation systems from various parts of the world are presented. The last part of the book is to be used as a manual with instructions on how to select, locate and construct a latrine.

When siting the latrines, it is recommended to take into account prevailing soil conditions, the type of latrine as well as housing density. A latrine with a tight receptacle which is more than 15 m above the groundwater table is said not to pose any groundwater pollution risk. In other cases siting downhill from wells is advised.

Winblad, U., 1984. *Botswana-Sanitation/Hygiene Consultancy Study*, Stockholm: SIDA.

Consultancy study with the aim to give recommendations concerning SIDA's continued engagement in Botswana. The author recommends to focus on sanitation education and support to existing programmes. Without education the campaign on-going at the time for the study would lose its effect.

As to latrines it is pointed out that there still do not exist any appropriate latrines for Botswana, *inter alia* because the soil is too hard to be manually dug. Besides it is not so important to have latrines because of the hot, dry climate and low population density. Therefore general health work is emphasized, which "must be carried out at the village level" and more actively involve the poor and not the privileged villagers since the latter generally have quite a satisfying health situation.

Winblad, U., Olsson, P. and G. Edstrom, 1988. *Manicaland Health, Water and Sanitation Programme - Mid-Term Assessment and Pre-Feasibility Report*, 17 pp, Stockholm: SIDA (unpublished).

The results of the programme are described as satisfactory. The report concentrates on physical results, however, and it is not mentioned if the latrines built are really used.

Wirojanagud, W. et al., 1989. *Evaluation of Rainwater Quality: Heavy Metals & Pathogens*, 104 pp, Thailand: Faculty of Engineering Khon Kaen University and IDRC (Canada).

In the Northeast of Thailand rainwater roof catchments are extensively used in order to secure the water supply during the year. This study examined the possible contamination by heavy metals and/or pathogens of the rainwater collected

The findings suggest that contamination is due rather to bacterial contamination than to contamination by heavy metals. While the heavy metal concentrations taken from the sampling points mostly compared favourably with the WHO drinking water standards all of the rainwater samples collected were bacteriologically contaminated. However, solely the samples taken from in-door storage containers had been subject to contamination of both animal *and* human origin

By taking into account information gathered on sanitary practices in the sample villages it is concluded that both personal hygiene habits and unhygienic handling of water as well as initial pollution by animals play an important role in the contamination of rainwater while heavy metals do not pose a health risk

Wisner, B., 1983. "Reflections on the Political Economy of Water Supply and Sanitation Programs in Eight African Nations," *Vierteljahresberichte*, pp 323-333, No. 94, December 1983, Bonn.

Woodhouse, M., 1990. "Consumer Involvement in Bacteriological Testing of Well Water in Kibwezi, Kenya," *Waterlines*, Vol. 8, No. 4, pp 22-24.

In this article it is illustrated how close involvement in bacteriological testing of well water helped local people to realize the nature and

implications of bacterial water pollution. Based on this experience subsequent action and behavioural change on the part of the consumers is facilitated.

World Health Organization, 1967. "Effects of Environmental Health," *WHO Chronicle*, October 1967, 21 (10), pp 442-3.

World Health Organization, 1975. *Minimum Requirements for Basic Sanitary Services in Human Settlements in Developing Countries*, Second Draft, 66 pp, Geneva: World Health Organisation.

World Health Organization, 1983. *Minimum Evaluation Procedure (MEP) for Water Supply and Sanitation Projects*, pp 51, Geneva: World Health Organization (unpublished).

World Health Organization, 1985. *The International Drinking Water Supply and Sanitation Decade*, WHO/BMZ European Donor Consultation, Koenigswinter/ Rhein, 16-18 October 1984, organized by Carl-Duisberg-Gesellschaft. Report by the Secretariate Bonn, 75 pp, Geneva: World Health Organization.

World Health Organization, 1986. *The International Drinking Water Supply and Sanitation Decade. Review of Regional and Global Data (as at 31 December 1983)*, Offset Publication 92, 30 pp, Geneva: World Health Organization.

World Health Organization, 1987. *Technology for Water Supply and Sanitation in Developing Countries, Report of a WHO Study Group*, Geneva: World Health Organization.

Wright, A.M., 1977. *Report on an International Technical Advisory Group Meeting on Rural Latrines, Kumasi, Ghana, 12th-15th July 1977*, Ottawa: IDRC.

Yacoob, M. and R. Porter, 1988. *Social Marketing and Water Supply and Sanitation: An Integrated Approach*, WASH Field Report No. 221, Arlington: WASH.

Yacoob, M., Brieger, W.R. and S. Watts, 1990. "What Happened to Guinea Worm Control? An Issue of Water Quality and Health Improvements," *Water International*, Vol. 15, No. 1, March 1990, pp 27-34.

In view of the devastating effects resulting from guinea worm disease the authors of this article hold that participatory programmes for improved water supply are of greater importance than the more popular, and only apparently cheaper, primary health care programmes currently being implemented in developing countries

The authors refer to studies suggesting that participatory programmes enhance communities' capabilities to take advantage of further development efforts

Zajac, V. et al., 1984. *Urban Sanitation Planning Manual Based on the Jakarta Case Study*, World Bank technical papers, No. 18, Washington: The World Bank.

Zeitlyn, S. J. and F. Islam. *The Use of Soap and Water in Two Bangladeshi Communities: Implications for the Transmission of Diarrhoea*, forthcoming publication.

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Andersson, I., 1983. *Domestic Water Supplies in Tanzania: a Bibliography with Emphasis on Socio-Economic Research*, Institute of Resource Assessment, Research Paper No. 1, 341 ref., 79 pp, Dar es Salaam: University of Dar es Salaam.

The bibliography, although principally focusing on literature dealing with domestic water supplies, also includes titles on sanitation. Part One of the bibliography consists of general literature while Part Two is a compilation of titles dealing specifically with the Tanzanian context.

Arriens, W.T.L., 1982. *Planning and Evaluation for Community Water Supply and Sanitation. Literature Review and a Selected and Annotated Bibliography*, The Hague: International Reference Centre for Community Water Supply and Sanitation.

Grimwall, A., 1983. *Dricksvatten och hälsa - en kommenterad bibliografi*, Tema V Report 4, 1983, 101 pp, Linköping: Department of Water and Environmental Studies (Swedish text).

The bibliography aims at providing an overview of international research on drinking water and health in industrialized countries. References and comments on trace organics, heavy metals and microorganisms in drinking water are included.

Kendall, E.M., 1982. *Community Participation and Women's Roles in Water Supply and Sanitation in Developing Countries: A Three-Part Bibliography by Author, Subject, and Country*, 80 pp, WASH Technical Report, No. 18, Arlington: WASH.

Rybczynski, W., Polprasert, C. and M. McGarry, 1982. *Low-Cost Technology Options for Sanitation. A State-of-the-Art Review and Annotated Bibliography*, 184 pp, Ottawa: International Development Research Centre.

This bibliography emphasizes the technological aspects of sanitation. It is pointed out that low-cost technology alternatives for developing countries are not well-documented and not easily accessible. The review, covering 531 titles, is an attempt to change this situation.

Secrétariat des Missions d'Urbanisme et d'Habitat, Paris, 1977. *A Bibliography on Sanitation and Water Supply in Developing Countries*, 139 ref., 44 pp, Paris: Secrétariat des Missions d'Urbanisme et d'Habitat (French text).

This is a bibliography of 139 entries with short abstracts of primarily French language literature dealing with both sanitation and water supply (From: ENSIC Database)

Smith, A.J., 1984. *Women's Roles in Water and Sanitation in Developing Countries: A Four-Part Bibliography by Author, Subject, Phase of Development, and Country*, WASH Technical Report No. 21, Arlington: WASH.

White, A.U. and C. Seviour, 1974. *Rural Water Supply and Sanitation in Less-Developed Countries - A Selected Annotated Bibliography*, 81 pp, Ottawa: IDRC.

This bibliography comprises literature on rural water supply and sanitation in less-developed countries. The titles are listed under the headings, general topics, technology as well as health and diseases. Other bibliographies on the subject of rural water supply are also included.









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In the Faculty of Arts and Science at Linköping University research is pursued and research training given within five broad problem areas known as themes, in Swedish tema. These are: *Child Studies, Health and Society, Communication Studies, Technology and Social Change* and *Water and Environmental Studies*. Jointly they produce the series Linköping Studies in Arts and Science.

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Reports in this series:

1. U. Lohm (ed). *Water Legislation and Realities of Natural Laws* (1982).
2. L. Gottschalk, U. Lohm & J. Lundqvist. *Vatten — en resurs ur många perspektiv* (1982).
3. M.M. Karunanayake. *Irrigation systems in Sri Lanka: A survey* (1983).
4. A. Grimvall. *Dricksvatten och hälsa — en kommenterad bibliografi* (1983).
5. R. Castensson, S. Karlsson, H. Lonegren, S-O. Ryding, P. Sandén & G. Zachrisson. *Samordnad mark/vattenöversikt — Planeringsunderlag och analysmetoder* (1983).
6. R. Castensson (red.). *Vattnet bar livet — funktioner, föreställningar och symbolik* (1984).
7. U. Lohm (ed). *River Basin Strategy* (1984).
8. R. Castensson, H. Lonegren & C. Schaar. *Mark- och vattenanknuten naturvård — analyser av översiktsplaner for FRP-sjöar och skötselplaner for våtmarker* (1984).
9. M. Falkenmark & J. Lundqvist (eds). *Water for All — coordination, education, participation* (1984).
10. A. Romås. *Vattenkvalitet och regional utveckling — bidrag till 100 års svensk vattenvårdshistoria med exempel från Motala Ström och dess tillfloden* (1985).
11. R. Ejvegård. *Korporatism, administration, aktorer och intressen. Analys och diskussion av några begrepp med anknytning till vattenvårdsproblematik* (1986).
12. G. Lohammar. *Sjön Tåkerns vegetation och flora*. Utgiven av U. Lohm och C. Widstrand (1988).
13. H. Forsberg. *Ordnad exploatering. Fysik riksplanering växer fram.* (1989).
14. Malin Falkenmark, Jan Lundqvist & Carl Widstrand. *Water Scarcity - an Ultimate Constraint in Thurd World Development. A reader on a forgotten dimension in dry climate tropics and subtropics* (1990).
15. Karin E. Kemper & Carl Widstrand. *Environmental Sanitation in Developing Countries. A Selected and Annotated Bibliography* (1991).



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