

Motivating Better Hygiene Behaviour: Importance for Public Health Mechanisms of Change



Motivating Better Hygiene Behaviour: *Importance for Public Health Mechanisms of Change*

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Abstract

Each year over three million children under the age of five die from diarrhoeal diseases. This, together with other health problems, including malnutrition, schistosomiasis, ascariasis, trachoma and dracunculiasis, result from risky hygiene practices and inadequate facilities for domestic water supply, sanitation and hygiene. Addressing these health problems is of vital importance in achieving the World Summit Goals and the Water and Sanitation Decade Goals set by the member countries of the United Nations and is part of the policy agreed upon in February 1993 by the UNICEF/World Health Organization Joint Committee on Health Policy.

For the last 40 years UNICEF has supported the provision of water supply and sanitation to populations in need. In 97 countries UNICEF has helped to introduce low cost technologies which have brought better conditions, lower morbidity and mortality, time and convenience to millions of people. National policies on water and sanitation are developed through advocacy and working closely with national governments.

Currently, UNICEF is working towards strengthening the hygiene component in water supply and sanitation programmes. The reason is that improved water supply and sanitation facilities alone do not automatically lead to their appropriate use and the adoption of good hygiene. However, adding conventional hygiene education programmes to water supply and sanitation projects is no solution either.

This paper summarizes why conventional hygiene education programmes fail in convincing people to adopt and use safer hygiene practices. It discusses how people change their hygiene behaviour, as individuals and in groups and communities, and what motivating factors play a major role in these processes. It then proceeds by presenting two alternative types of hygiene programmes that aim especially at good practices by 75% of the people in project communities or 75% of the target groups which together make up the programme's audience. Special attention is paid to roles played by differences in socio-economic and cultural conditions and the reasons for a gender approach in all hygiene programmes. The final chapter gives suggestions for politicians and managers, stressing recognition and professionalization of hygiene education programmes, more research and documentation, especially on cost-effectiveness of programmes, and more opportunities for exchange.

The paper has been prepared by the International Water and Sanitation Centre, The Hague. It is one paper in a series of publications dedicated to the improvement of hygiene programmes related to water supply and sanitation. The series, which will include hygiene case studies and a review of sanitation programmes, will form the basis for a Joint UNICEF/WHO strategy on hygiene education as part of improved water supply and sanitation services. The series will culminate in Joint Guidelines for Programme Implementation of Hygiene and Sanitation.

What Difference Good Hygiene Makes to Public Health

A contaminated household environment and risky hygiene practices account for almost 30% of the total burden of disease in developing countries. Within this group, 75% of all life years lost are due to the lack of good water supply and sanitation and the prevalence of risky hygiene behaviour (World Bank, 1993).

These circumstances and practices have not only serious health consequences, they also represent large economic losses and negative publicity for countries and governments. The cholera epidemic in Latin American cities, with deteriorated water supply and hygiene conditions, spurred politicians and administrators, who had thought the disease long overcome, into action. The recent plague epidemic in India cost the country an estimated loss of over US \$ 2 million in export restrictions and decrease in tourism, and the recent cholera epidemic in Peru, 15 months in 1991–1992, cost the country \$200 million in lost lives, decreased production, exports and tourism (Suárez R. and B. Bradford, 1993).

Governments traditionally give priority to treating diseases that have become manifest and to immunization of people against falling ill. Yet, improvements in water supply, sanitation and hygiene are the most important barrier to many infectious diseases, because with safe behaviour and appropriate facilities, people reduce their risk of becoming exposed to disease.

Government attempts to prevent exposure focus mostly on improving the quantity and quality of drinking water. Yet the greatest public health effects come not from amounts

and quality of drinking water supply, but by ensuring that pathogens cannot reach the environment through the unsafe disposal of excreta or are washed off through greater personal cleanliness. Research by Esrey (1994) and Esrey et al. (1991) showed that safer excreta disposal practices had led to a reduction of child diarrhoea of up to 36%. Better hygiene through handwashing, food protection and domestic hygiene, brought a reduction in infant diarrhoea of 33%. In contrast, common engineering goals of improving the water quality limited reductions in childhood diarrhoea by 15% to 20%. Reductions in other diseases, such as schistosomiasis (77%), ascariasis (29%) and trachoma (27%–50%) are also related to better sanitation and hygiene practices, not just a technically better water supply. Only the reduction of guinea worm (78%) can be totally ascribed to better water.

Promoting better excreta disposal and hygiene habits are the most important measure to improve public health and reduce human suffering and financial loss. Yet most technical and hygiene education programmes do not have the measurable improvement of human practices as their prime objective. Funds for behavioural aspects form only a very small percentage of investments, despite the fact that human behaviour is the key determinant for an impact on public health. If investors and implementors want to get the full benefits from improved water supply and sanitation systems for public health, they will have to make usage of improved water, sanitary disposal of waste and better hygiene practices major objectives of their programmes.

Most water and sanitation related diseases can only be prevented by improving a number of hygiene behaviours.

The most significant appear to be:

- *Sanitary disposal of faeces*
- *Handwashing, after defecation and before touching food*
- *Maintaining drinking water free from faecal contamination.*

Why Conventional Hygiene Education Does Not Change Behaviour

Education for sanitation and hygiene is important. According to the WHO, 80% of infectious diseases in developing countries is related to inadequacies in these two areas. Improved water supply and sanitation facilities help, but their introduction does not have a health impact by itself. Proper practices are the most crucial.

To promote better hygiene practices, many hygiene education programmes focus on increasing people's knowledge. Planners and implementors assume that when people know better how water and sanitation diseases are transmitted, they will drop unhygienic practices and adopt improved ones. However, this is often not the case.

Fallacy 1 : Universal hygiene messages can be given

Planners and practitioners of hygiene programmes often think that it is possible to give universal hygiene messages to the population. Such messages are often based on the assumption that knowledge of health educators is always superior to local insights and practices. It is forgotten that people adapt their lifestyle to local circumstances and develop their insights and knowledge over years of trial and error.

In Zambia mothers use a mixture of dark green leaves, millet and fermented beans to wean their children. This is cheap, easy, nutritious and generally known and does not depend on safe water for preparation. Replacing this practice by more western notions of weaning foods for infants has brought a greater risk of diarrhoeal disorders and infant death than the local infant diet (Gordon, in Stamp, 1990:34).

General hygiene messages are often not relevant, complete and realistic. A typical example is the often given advice to boil all drinking water. While scientifically correct, there are strong indications that boiling is

not always needed, because people build up a resistance against the lighter forms of water contamination of their own water sources. Lack of water and soap for handwashing plays a bigger role in the transmission of diarrhoeal diseases than the drinking of unboiled water in one's own environment (Feachem et al., 1986; Gilman and Skillicorn, 1985; WHO, 1993a).

Telling people to boil their drinking water is also unrealistic and incomplete. Boiling water takes a lot of time and resources. Women must collect or buy more fuel, wait for the water to cool, store it separately in a regularly cleaned storage vessel and use a safe way to draw it from the storage vessel. All these steps must be carried out correctly for the measure to be effective and then it can still be less important than washing hands with soap or ashes.

Fallacy 2 : Telling people what to do solves the problem

The methods that are used to get the information across are also often unsuitable to create behavioural change. Many health messages are given in the forms of lectures at health clinics, talks in meetings and gatherings and through one-way mass media like posters, radio talks, brochures and booklets. Even if the educators succeed in reaching the intended audiences by these media, the people are only 'told what to do' and often do not get the chance to relate it to their own experiences. People "make sense of new information in the light of their own meanings, perceptions and cultural backgrounds" (Rivers and Aggleton, 1993). If they do not get the opportunity to think it over, discuss it and relate it to their own concerns, there is little chance they will remember the information, let alone apply it.

Conventional hygiene education messages are often not relevant, realistic and complete. Boiling drinking water is a typical example of an incomplete and unrealistic message with a limited relevance in many cultures.

Increasing people's knowledge does not automatically lead them to change their hygiene behaviour

Fallacy 3 : When people know about health risks, they take action

Many health education programmes teach people about water and sanitation related diseases: what they are, how they are caused and how they are prevented. But education does not, by itself, reduce the risks of transmitting these diseases, only action can. And better knowledge does not, in many cases, lead to action (Bigelow and Chiles, 1980; Burgers et al., 1988; Doucet, 1987; Dworking, 1982; Yacoob, 1989).

Fallacy 4 : Any improvements are equally useful

Review of hygiene programmes shows that setting of objectives for particular changes is rare (Burgers et al., 1988). Hygiene programmes may promote a wide range of hygiene behaviours down to cutting nails and combing hairs. At the same time, there are also many programmes which are limited to the promotion of the construction and use of one type of technical intervention, such as a handpump or latrines, without addressing other hygiene risks.

Although action is needed, it is not very effective when a very wide range of behaviours are targeted, or only point out the multitude of places where water and sanitation related diseases can be transmitted (Figure 1). One will have to concentrate on those risks that are crucial in the transmission of a particular disease.

According to current epidemiological research, there are three practices which are the most cost-effective in prevention of faecal-oral diseases (WHO, 1993b):

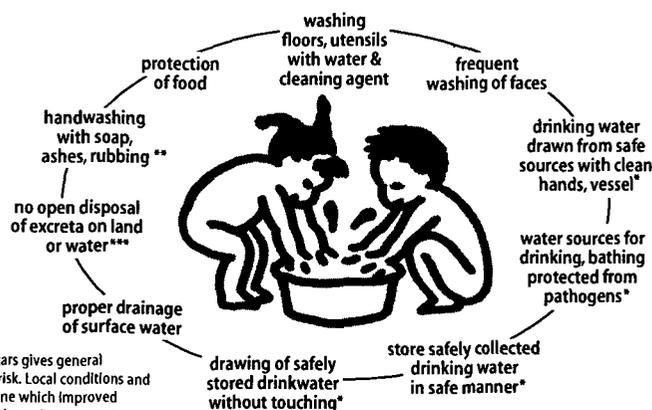
1. Preventing faeces from gaining access to the environment;
2. Handwashing, after defecation and before touching food;
3. Maintaining drinking water free from faecal contamination.

Other common diseases, such as schistosomiasis and trachoma, can also be reduced significantly by better sanitation and hygiene practices.

Improved sanitation, better hygiene and safe water can be considered as three separate, but complementary, interventions for the prevention of the transmission of faecal-borne pathogens. The primary barrier is improved sanitation, or effective containment of faeces, by latrines, nappies or other types of disposal facilities. These practices prevent pathogens, which travel with faeces, from gaining access to family compounds, water supplies and soils. Burying faeces or disposing of faeces in latrines is also beneficial. Personal and domestic hygiene comprise a secondary barrier to pathogen transmission. Hand washing after defecation and before handling food increase the chances that pathogens are washed off of food, hands and objects so they cannot enter people's mouths either directly from hands or via food, objects and water. Hand washing is, however, only effective when hands are rubbed sufficiently and preferably with a cleaning agent (e.g., soap, ashes, soil or certain types of leaves). Just pouring water over hands, as is sometimes done, is not effective in removing pathogens (Boot, 1994). The tertiary behavioral barrier is to make sure that drinking water is safe and clean. Many studies have shown that water, which is safe from faecal contamination at the source, gets contaminated during transport, storage and from drawing water in the home (van Wijk, 1985). Drinking water can be kept clean by making sure that the storage pot, and the water within, cannot be touched by contaminated hands, because water is drawn with a long handled dipper or from a storage vessel with a tap.

FIGURE 1

Behaviours that reduce risks in transmitting water and sanitation related diseases



What Motivates People to Improve Hygiene

If general messages and information on disease transmission don't change practices, what is it that brings people to take action on the risky practices and conditions in their own environment? To answer this question, a look is taken at what has been learned about influencing people's health behaviour during the last fifteen years. In the following paragraphs it is discussed what processes make individual people change their hygiene behaviour. It is shown that new technologies do not necessarily bring the kind of benefits that users look for and that merely promoting these benefits from the viewpoint of outsiders does not make people change. Subsequently, it is discussed that besides individual processes, group processes and community action will lead to behaviour change and that to be successful these processes must begin at the stage where people see themselves. The end of the chapter focuses on the specific factors that motivate people to adopt and sustain new practices in personal and public hygiene.

Individual behaviour change

Authors like Baranowski (1992), Hubley (1993), Jolly (1980) and White (1981) look at the reasons why individual people change their health behaviour. They stress that any new hygiene practices being promoted do not fall on empty ears. People who are exposed to hygiene education programmes already have their own knowledge, beliefs and values. These not only come from their own experiences, but also through social learning channels (i.e., from parents, friends and opinion leaders in the community). Often there are special networks for social learning and in many cultures women play an important role in these networks as protectors and conveyors of local knowledge (Roark, 1980). Hence, before adopting a new hygiene practice, people will ask themselves

how the new practice fits into their ideas and affects their lives.

Hubley calls the process by which individuals change their health practices the BASNEF model (Figure 2). According to this model, an individual will take up a new practice when he or she believes that the practice has net benefits, for health or other reasons, and considers these benefits important. He or she will then develop a positive attitude to the change. Positive or negative views (Subjective Norms) from others in his or her environment will also influence the person's decision to try the new practice. Skills, time and means (Enabling Factors) then determine if the practice is indeed taken up, and when found to be beneficial, is continued.

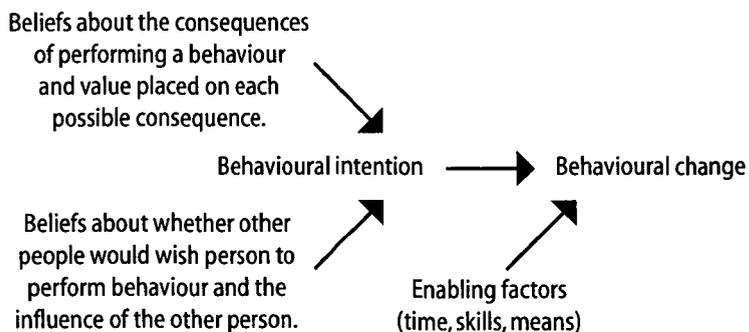
Lessons from technology projects

Insights on why individuals change, or do not change, their hygiene practices have also come from evaluations of completed water supply and sanitation projects. As depicted in the left hand part of Figure 3, planners and implementors of these projects originally had

Behavioural change is a process comprising several steps, from wanting to change and deciding what change to make to deciding to try it out and if positive, maintain it. Before making the actual change, different considerations (own beliefs and values, developed attitude, influence of others, enabling factors) play a role.

FIGURE 2

BASNEF model: How individuals change hygiene behaviour (after Hubley 1993)



Hygiene education programmes cannot coerce people to start using facilities they do not feel are suitable or sustainable. However, hygiene education can play a supporting role in technical projects by creating understanding of the (health) implications of various options and providing follow-up for proper use and maintenance.

a very simplified idea about the relationship between these installations and people's health. They assumed that just designing and constructing better facilities would lead to improved health. When they found that after installation, many people did not use the new facilities, but continued to use their traditional water sources and practice open air defecation, the technologists called for health education, to teach people the health benefits of installed facilities and get them accepted and used.

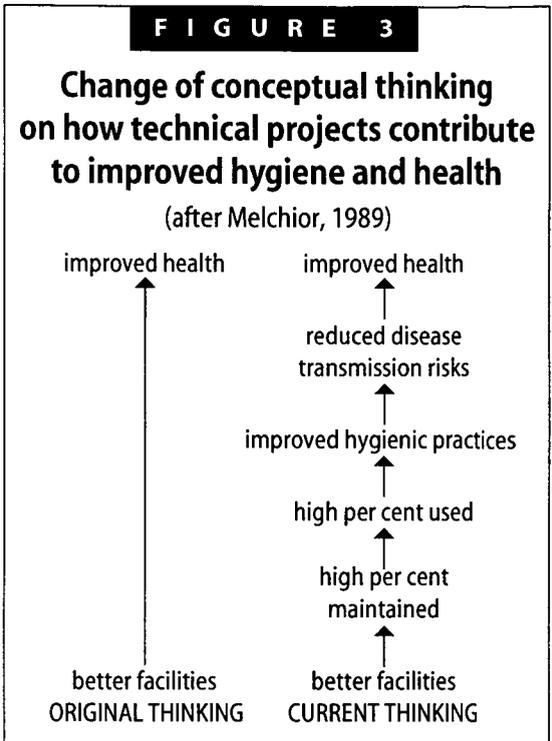
However, when social researchers began to investigate why the people did not use the new facilities, they invariably found that from their own point of view, the people had very good reasons for their behaviours. Not the users, but the approach of the technical projects had to be changed to make general acceptance and hygienic use possible (Melchior, 1989; Boot, 1991)

The studies on water and latrine use have made clear that hygiene education cannot convince people to use facilities that do not bring them net benefits or do not function properly. What hygiene education programmes can do is support participatory projects that install facilities which are used and maintained, by:

- i) assessing if water, sanitation and hygiene have a high priority among the various groups in the community and create understanding of the implications of existing conditions, technical options and maintenance for community and family health;
- ii) before and after facilities are installed, follow up use and hygiene to provide feedback to planners and reduce other transmission risks preventing the realization of health improvements in the communities concerned.

Community action

The BASNEF model helps to understand how individuals change their hygiene practices and start to use better technical facilities. To get an impact on health, such changes have to be adopted by a large number of individuals. For reduced diarrhoeal disease, for example, Bateman and Smith (1991) showed that at



least 75% of the population should practice good sanitation and hygiene. Such behaviour change evidently requires much time and long-term efforts. Moreover, certain practices cannot be achieved by individual change alone, but require concerted action from larger groups and whole communities. A typical example is better sanitation practices in schools. Poor school sanitation is often a great risk to the health of the children. But using the toilets and keeping them clean requires more than the individual belief, willingness, time and means of the children themselves; getting good practices from children needs concerted efforts from not only children, but also teachers, directors, administration and parents (WHO, 1994).

To reduce time requirements for large scale behaviour change and to address changes that need cooperative action, Isely (1978) and White (1981) have advocated the community approach to hygiene behaviour change. The model combines local knowledge of community members about conditions, beliefs and resources with the more scientific knowledge of the hygiene educator. This combination results in a more complete insight for all concerned and leads to a better definition of changes and choice of strategies than when

either party acts by itself ('the whole is larger than the sum of the parts').

Making joint choices, assigning responsibilities and monitoring action also increases the commitment of the members to achieve the agreed changes. The representativeness of the group for the various sections in the community ensures that the practices, views and capabilities of each section play a role when the programme of change is planned. It also facilitates getting commitment for the change from a wide cross-section in the community through explanation and promotion by the group's members, and ultimately a wider adoption of the change by the community (Figure 4).

How adults learn

Individuals and groups not only change their hygiene practices under influence of changed belief, attitudes, norms, technical means and group processes. Adult educators have taught that it also makes a difference in what learning stage individuals, groups and communities are when the educational process starts. Figure 5 gives an overview of these stages.

If the people feel they have no problem, it is not useful to try to tell them so with a lot of information that does not fit into their own way of thinking. Being polite, they will probably hear the educator out without disagreeing, but without any real dialogue and learning taking place. In that case it is often much more fruitful to use other techniques and tools, such as games and communal observations, to help them define if there are any problems related to water, sanitation and hygiene, perhaps even without realization, and to determine whether these can be addressed by individual and communal action.

Figure 5 shows that coming with concrete information is more sensible and effective after members of the group have concluded that there is a problem and are interested to do something about it. When they are really interested and the idea is supported by peers, it often turns out that there are more possibilities for taking action than the particular solution the facilitator has in mind and local

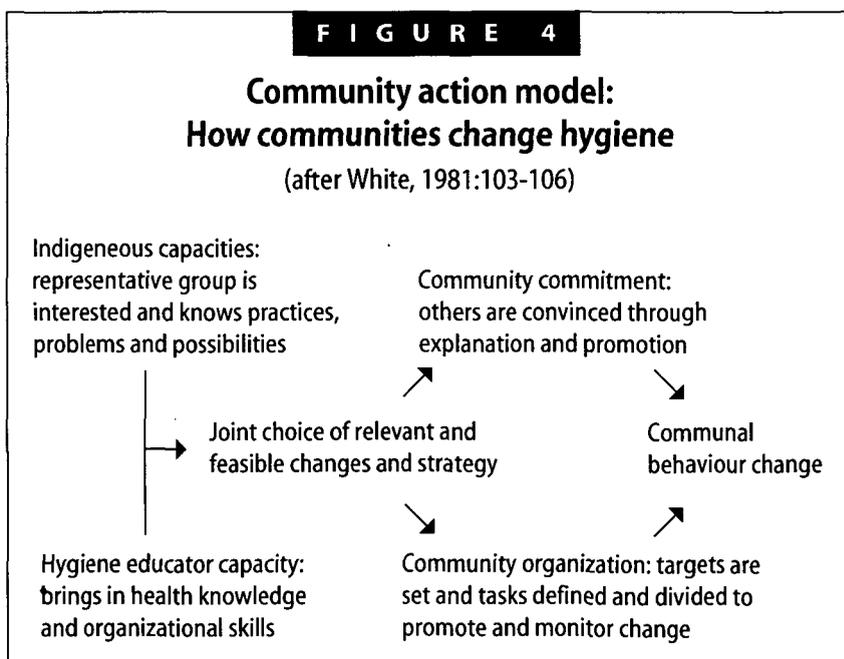
resources and creativeness are loosened, as happened in the case of the waterdippers in Kenya.

Women in a resettlement area in Kenya decided to improve their water storage habits when they were convinced of the benefits of keeping drinking water clean. They already kept drinking water in a separate and covered pot, but for drawing, a communal cup was kept on top of the pot to dip into the water and drink from. Having discussed the risks of touching the water with soiled hands, the women decided to replace the communal cups by longhanded dippers. Since it was not easy to buy inexpensive dippers, they decided to bind off calabashes to give them a bottle-type shape and then cut each calabash overhalf to produce two longhanded dippers for water drawing (pers. exp. C. van Wijk).

For each of the stages in Figure 5, it follows that different educational strategies are needed to meet different educational goals. Srinivasan (1992) distinguishes three educational strategies: didactic teaching, growth-oriented education and education for societal growth (Figure 6).

■ **Didactic teaching** equips people as quickly as possible with the knowledge and coping skills they are believed to lack. In didactic teaching, everyone learns the same things. The educator chooses the contents and

Communal behaviour change is only possible when the community members themselves feel there is a problem and jointly undertake action that will permanently improve the conditions and the behaviours.



When learning, people remember 20% of what they hear, 40% of what they hear and see, and 80% of what they discover for themselves.

(Hope and Timmel 1984:103)

methods, based on what he/she herself finds important and thinks the people need. Modifications of the didactic method, such as social marketing, first segment the learners into different categories, such as men/women, rich/poor, urban/rural and ask them about their beliefs, attitudes and behaviours. Educators use this information to adapt their messages to each segmented category and to use channels and materials that will reach each category and be understood and acceptable to them.

■ **Growth centered education** is primarily concerned with the development of human capabilities and an increased sense of human dignity. Many different group activities are used by which the participants acquire analytical, planning and problem solving skills. The approach can take many forms, but has two commonly observed principles: the groups make their own decisions and the facilitator keeps a low profile. Both principles help the group to identify their own priority

issues and discover and exercise powers and talents available in the group, as illustrated by the example from Kenya.

■ **Education for societal change** was originally developed by Paolo Freire (1971). It seeks to create critical consciousness among the poor. The facilitator first discovers themes that are meaningful to the group and helps the group to analyze their situation. This helps the group to gain critical insights into the structures of power and develop their capacity to organize. The process culminates in action to restructure and control the environment.

Which educational strategy is best depends on the learning goals and the audiences of the programme. Quite often, a mix of different approaches is used. The 'didactic mode' is best to transfer knowledge — facts — to individuals or large groups. Mass media such as posters and radio messages can be used to convey simple facts to large audiences, but

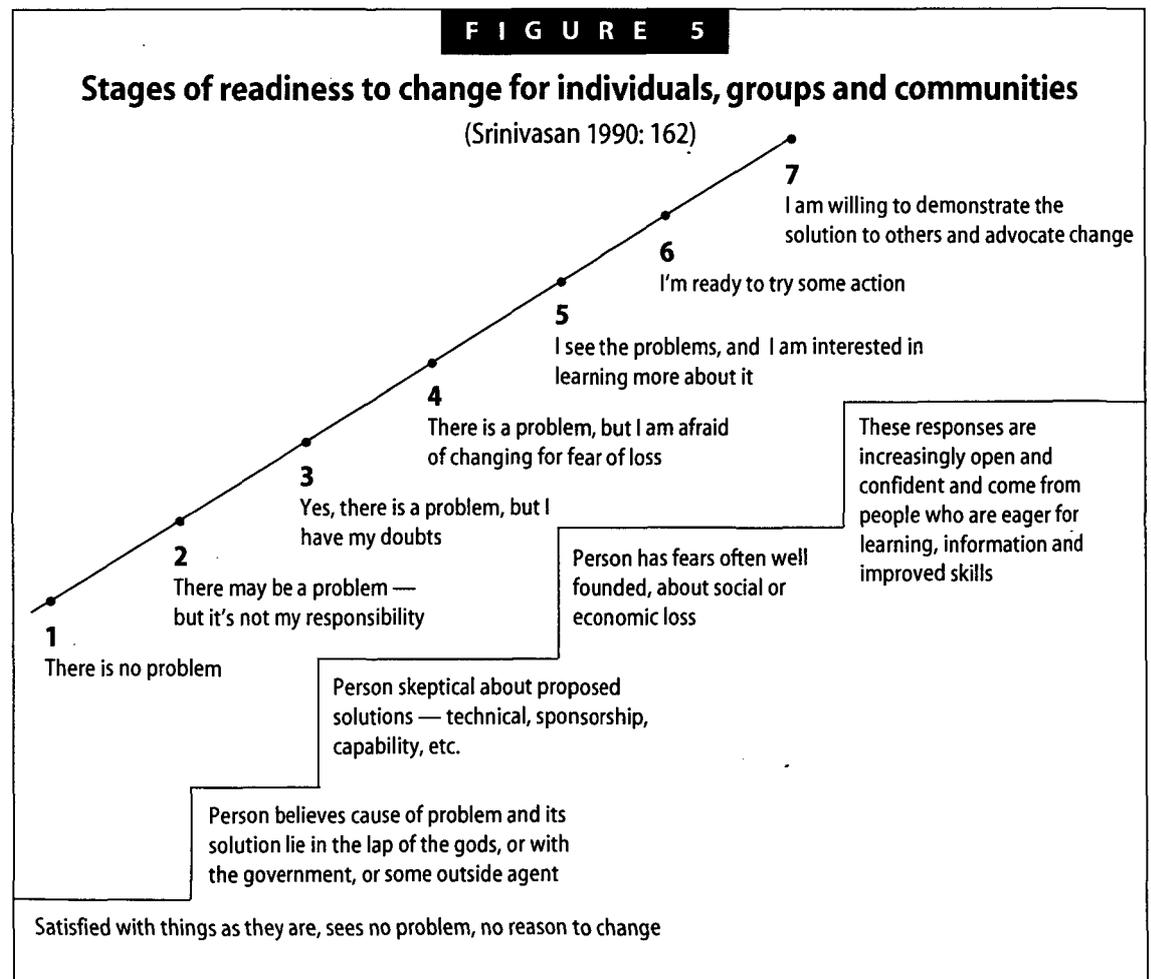
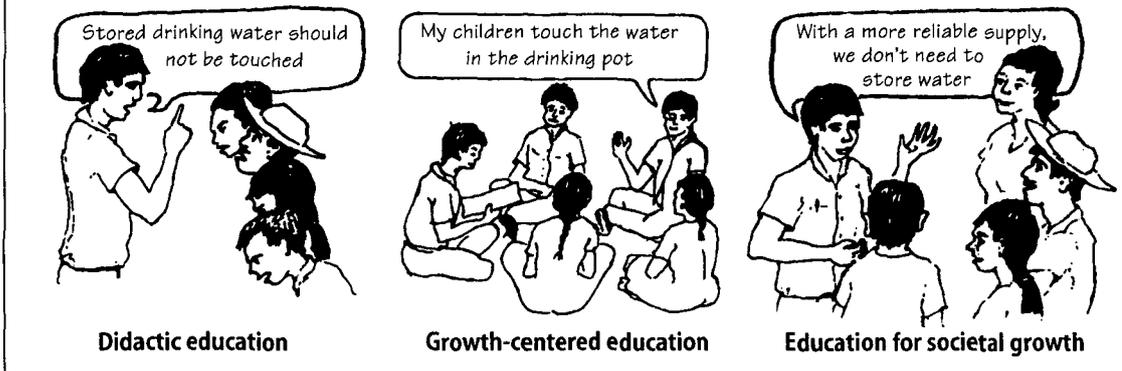


FIGURE 6

Three educational strategies

(adapted from Werner & Bower, 1982)



are usually not successful in changing behaviour (Hubley, 1993). However, when messages are practical and concrete and conveyed in an entertaining manner, they can be used to start off discussions among family, peers and friends, and even lead to behaviour change.

Lack of appropriate excreta and garbage disposal results in polluted water sources and is a common cause of water-related diseases in Indonesia. A radio programme for farmers' women used a dialogue between two farm women to promote practical understanding and sanitary self-improvements. Broadcasts were at a suitable time (5:30 a.m.) and in the women's daily language. The scenarios were based on meetings and interviews with the target group before each series of broadcasts. In a survey listeners reported better knowledge and practices, but there were no before/ after observations to confirm these results (Aini, 1991).

The 'conscientization' and 'growth-centered strategy' are better to acquire decision making and problem solving skills. They put more emphasis on the process of learning. For this, they use participatory learning methods: participants are stimulated to think for themselves and to discover underlying principles, through group-discussions, games and role-plays in small groups (10–25 persons). During these activities the participants draw from their own experiences and are encouraged to think of possible solutions adapted to their beliefs and practices.

In conclusion, better facilities and hygiene messages rarely change people's hygiene behaviour by themselves. People change their behaviour when they want and can do so for their own reasons. They also change when change is part of a communal decision process based on the educational stage the group or community is in. In this process, the members themselves decide what they will change and how they will promote and achieve the change. The hygiene educator does not direct the change but helps them to choose the key changes and organize the process of change. Insight into the specific factors that motivate such changes can help to promote this process.

Motivational factors

When people change, as individuals or through group action, which specific factors motivate them to do so? In Table 1, four key benefits are listed which have been found to strongly influence hygiene behaviour change. They are: facilitation, or making life easier; understanding, in one's own mode of thinking, that the change is better for oneself and one's family; influence and support from others, when a new practice is adopted, and autonomy, or the means and control to carry out the practice.

Facilitation

Facilitation, or making life easier, is the most powerful reason why people adopt new hygiene facilities and practices. New water-

Four major factors stimulate people to change behaviour: facilitation, practical understanding, influence from others, and capacity to change. Facilitation is usually the most powerful reason, since the apparent benefits of such actions are greater than the less positive consequences.

When facilitating behaviour change, sustainability is a particular concern. It is best to advocate changes that are sustainable at the local level or create the necessary skills and capacity to improve self-reliance.

points, for example, usually only compete with existing water sources when they are closer and can be easily used, or involve little extra time and efforts for water collection. If these conditions cannot be fulfilled, protection of traditional water sources or facilitation of water collection and storage from new sources will be required. Latrines and other sanitation facilities must also reduce the problems of daily life for the users. Excreta disposal problems of the people are usually not related to health risks, but lack of privacy, safety and longer distances to defecation areas. Moreover, designs and operation have to be easy (e.g., smooth, easy to clean slabs and pan; water for cleaning and flushing; and water and soap/ashes for hand-washing nearby) and latrines usable also by the younger children. Hence, it is essential to know what factors the people find important, not what is important in the eyes of health officials or programme staff.

The challenge in facilitation is to address relevant changes and not be overambitious. Obviously, not all behaviour change can be addressed at the same time. Priority therefore has to be given to those practices that constitute a serious health risk and are considered a felt need by the population.

In dry areas such as on a plateau in Mozambique a shortage of water often goes hand in hand with a high incidence of skin and eye diseases. It was not the diseases, but the scarcity of

drinking water and the long distances that were the first need of the villagers. But when water-points were brought closer and a reliable and predictable service was installed, water use increased for personal hygiene and the washing and bathing of children. A closer water supply or easier water collection thus brought a greater use of water which lead to a significant reduction in skin diseases (Cairncross and Cliff, 1987).

To make better hygiene practices easier, many programmes have issued basic hygiene equipment and materials. Distribution of soap helped mothers in a project in Bangladesh to improve handwashing and significantly reduced the transmission of shigellosis from one member of the family to another (Uddin, 1982). In Thailand, plastic containers with taps facilitated safe water storage and brought a significant reduction of faecal streptococci in finger-tip rinses (Pinfold, 1990). However, such subsidized interventions are rarely sustainable over time and replicable in a larger programme. Therefore, it is best to advocate changes that are sustainable at the local level, or to create the necessary skills and capacity for local production of goods, so that people can be as self-reliant as possible (Cairncross in UNICEF, 1993).

Understanding

This factor differs from the more general health knowledge which is often promoted in

T A B L E 1

Factors inducing people to change their hygiene behaviour

Facilitation	Water sources are closer, supply is reliable and predictable, collection easier and safer. Excreta disposal problems of privacy, safety, bad smells, flies, work and use by children are solved. Solid waste and waste water nuisance from dirt, mud, rats and bad smells are reduced.
Understanding	People conclude that within their own hygiene perceptions certain conditions or practices are unhealthy and should be changed. People perceive economic implications of unhygienic conditions.
Influence	People gain prestige from their new behaviour. Others support the new behaviour / disapprove of different behaviour. The group/community commits itself to the behaviour. People agree on specific punishments or rewards.
Autonomy	Means (time, energy, finances, etc.) are available. The process provides valued skills and resources. The users are free to use their skills and resources.

hygiene education programmes. Health educators who promote general health knowledge usually rely on academic concepts, such as the presence of germs and the symptoms, transmission routes and prevention of water and sanitation-related diseases. Educators which aim for people's understanding have insight into and respect for local knowledge, practices and beliefs and use the health concepts and reasoning of the people themselves. An example is women's beliefs and practices on water source selection.

Like many of their fellow rural women, women in a Tanzanian village classified and used their water sources based on physical characteristics, such as visual cleanliness, taste, flow and absence of practices leading to contamination. On this basis, they preferred river water over handpump water for drinking. Water from the river had a better taste and was considered pure, because it was collected at daybreak, when contaminating practices were not yet taking place. Being restricted in their mobility, the women had not considered that upstream, others were using the river for washing and bathing and that as the water flowed, contaminated water could reach them in the morning. Having analysed this, the women concluded that river water was less clean than they had thought and adopted the handpump for drinking water (pers. exp. author)

Influence

Influence from others is another set of motivational factors for adopting new hygiene practices (Baranowski, 1990; Hubley, 1993). People tend to adopt or discard practices for which they get the approval or disapproval from respected people, or by which they can make an impression on others. For example, ownership and use of latrines is, apart from convenience, strongly associated with notions of respectability and high status (van Wijk, 1981). Health arguments, which external promoters use, usually play a less important role in changing excreta disposal habits (Mukerjee, 1990; Sundararaman, 1986; Tunyavanich et al., 1987; Wellin, 1982).

Influential people can be outsiders respected for their general status, such as public figures or health personnel, but also friends, peers

and local opinion leaders. Steuart (1962) found in a controlled experiment that discussions with local friendship groups were more influential in changing environmental hygiene practices than the usual films, exhibitions and training of formal local leaders. Opinion leadership differs per subject and is closely related to the informal networks of learning which exist in most cultures (Roark, 1980). In Indonesia, for example, local midwives were found to be most influential on behaviours concerning health and hygiene (Amsyari and Katamsi, 1978). Within local learning networks, women in particular have a leadership role. Choosing opinion leaders for promoting hygiene had a positive effect in a project in Tanzania, while failure to do so had disappointing results in a project in Guatemala:

Evaluation of the hygiene education programme showed that the village women had chosen those fellow-women as hygiene promoters, who were already opinion leaders in health and domestic care. Criteria used in their selection were so subtle that the project could not have made the same choice. These women were very effective motivators of environmental changes, which are the responsibilities of women (Therkildsen and Laubjerg in van Wijk, 1985: 91). In villages in Guatemala, the health communicators selected by the water committee made little impact. The committee had probably selected them for their knowledge of Spanish and not for a role in the community's informal health network (Buckles, 1980: 68).

A further influence factor is the use of positive and negative sanctions to stimulate hygienic behaviour and reduce unhygienic practices. Projects have used gifts, subsidies and price reductions, as well as material incentives, such as certificates to stimulate change (Burgers et al., 1988; Elmendorf and Isely, 1981). Fines and conditions ('no latrines built, no water supply project') have also been used (Burgers, 1988; Williamson, 1983). Occasionally, communities reward positive practices (Fanamanu and Vaipulu, 1966), but more usually they establish negative sanctions, such as fines.

While influence, status and sanctions are important, practices adopted only for these

Experience shows that practices adopted only under the pressure of others or for status are sustained less than when adoption is motivated by factors of facilitation and inner conviction.

Even when people agree to the new behaviour because it addresses a particular problem, they may be unable to change present practices because of lack of an enabling environment.

reasons are sustained less than when adoption is also motivated by factors of facilitation and inner conviction. For example, as soon as control from health inspectors or pressure from an external project to construct and use latrines fell away, they were no longer, or only partially, used (Bigelow and Chiles, 1980; Feliciano and Flavier, 1967; PRAI, 1968; Williamson, 1983).

Autonomy

Having not only the desire but also the means for an improved hygiene practice is an important stimulus for a new hygiene behaviour. However, as was seen above under facilitation, provision of subsidized means is often not a long term answer. This is why a number of hygiene education programmes have focused on first creating time and resources and/or have trained the people to produce their own hygiene equipment, such as water filters, long-handled water dippers, drying frames and latrines (Booth and Hurtado, 1992; Curruthers, 1978; Karlin, 1984; McSweeney and Freedman, 1980; Singh, 1983).

Having the resources for change is however not merely a matter of access, but also one of control. In 'The long path', Margaret Jellicoe

describes how young girls could not practice hygiene principles they had learned in school, because their husbands did not support them (Jellicoe, 1978). And in a trachoma prevention programme mothers felt they could not spend extra time on collecting water and washing their children's faces. They were afraid to be criticized by their husbands and mothers-in-law for neglecting their main duty, namely providing enough food for the family.

When the health workers found out that the mothers did not want to wash the faces of their children more often, because it would cost them too much time to fetch the perceived extra water needed, they designed an exercise for the villagers to see and try for themselves how little water was actually needed. Making it into a competition, fathers managed to wash some 12 faces with one litre of water and mothers more than 30 faces. Everyone was surprised to find that face washing needed much less water than previously believed (McCauley et al., 1990, 1992).

Similar experiences in many other hygiene education programmes learn that motivating changes in hygiene practices also mean addressing issues of means, control and power in hygiene practices.

How Programmes Can Help

How are the insights described above applied in actual hygiene education programmes? Two types of programmes are described: programmes in which hygiene changes are managed by the communities themselves and programmes which use public health communication to change hygiene behaviours. Each type of education programme is illustrated by a country case study on hygiene education; one is the community programme in Zambia, the WASHE project; the other is a public health communication and sanitation programme in Bangladesh.

Community-managed hygiene programmes

In community-managed programmes for hygiene change, trained local or external health educators help communities or local groups to establish and manage their own programmes and organizations to realize the changes they want. In doing so, they use the community organization approach to health and hygiene, and insights and methods from adult education.

Identifying key problems

In Figure 5 it could be seen that the basis for planning change with a group or community is that the educator finds out if the people themselves see any problems and think it is necessary and possible to do something about them.

In small and homogenous communities it is often possible to do so together with a single representative community organization, such as a water and sanitation or health committee, which has male and female representatives of all groups in the community and includes also the opinion leaders on health and hygiene. To find out who are opinion leaders, one can make use of focus interviews (Box 1). Another possibility for identifying key problems in environmental hygiene practices and conditions is to hold

local gatherings for assessing problems and getting people's views. In larger and more heterogenous communities forming several, neighbourhood-based consultative groups or holding separate neighbourhood meetings can be more practical.

Together the consultative groups or participants of the gatherings and the project staff then review the current conditions and identify those practices and risks which all agree need change first. As seen, this requires an understanding of what motivates people for wanting these changes: convenience, status, the local health concepts and the means they have to implement and sustain the changes and replicate them by themselves when the community expands, so that the percentage of use is maintained.

In the WASHE project, the identification of hygiene problems is done with the help of unserialized posters. The posters are simple line drawings made by a local artist. In the session, the project's team spread the posters on the ground and the participants select the ones they want to discuss and place them in a meaningful sequence. The posters show local condi-

In community-managed hygiene programs, trained health educators help local groups to plan and manage their own programmes and value the changes they want.

B O X 1

Focus group discussions

Focus group discussions are commonly used to find out what the views and opinions of the various population groups in a community are (men, women, youths, different ethnic, economic and religious groups), and who their opinion leaders on hygiene behaviour are. The health educator organizes discussions with small groups of people in each group. The educator then engages the group members in free discussions on the desired topics by asking some key questions, drawing conclusions from the conversation between the group members. Focus group discussions require an experienced interviewer who can put people at ease, knows what she or he wants to learn and why, and is sensitive to slight contradictions (Dawson, 1992; Rudqvist, 1991).

Each village or urban neighborhood will have its own risky conditions and practices. Bringing together indigenous knowledge and the hygiene educator helps to select priorities for change that combine greatest felt needs with greatest health impact.

tions and practices and also bring up issues of means and control. Thus, some drawings show a very tired woman with a baby on her back, which frequently leads into a discussion on why mothers are tired and how this affects hygiene practices.

The use of participatory techniques, such as serialized posters, facilitates active participation of all and makes the analysis more interesting and fun for everyone than when just discussions are held. They also help men and women to use and enhance their practical understanding on health and hygiene and give the health educators much insight in a short time in the hygiene concepts, concerns and constraints of the people and on the stage of problem definition they are in, as de-

icted in Figure 5. Several other participatory tools for this purpose are described in Box 2.

Selecting priorities

Figure 1 showed that a wide range of risky hygiene conditions and practices may have to be changed. Each will pose varying nuisances and health risks for the community. All of these problems cannot be addressed at the same time. Thus, it is usually necessary to set priorities for change. Bringing together the indigenous knowledge and the knowledge of the hygiene educator, as described in Figure 4 helps to set priorities for change which combine locally felt urgency with good potential health benefits from an epidemiological point of view.

B O X 2

Participatory tools to create practical understanding

To identify risky practices, underlying beliefs, possible solutions and set priorities for change, several participatory techniques can be used. (For the principles and more examples of participatory techniques related to hygiene, see L. Srinivasan, 1990.)

Story with a gap

The facilitator presents a poster showing a problem situation and invites the participants to build a story around it, including possible reasons that caused the problem. He/she then presents a 'problem-solved' poster and asks the group to think of steps the people in the picture took to solve the problem. If necessary, the facilitator distributes pictures of in-between steps.

Interpretation of drawings

The facilitator has a set of drawings with a range of risky conditions and practices in the particular area. The hygiene educator asks the group to discuss the drawings and select those which depict practices for change in their own community. These are then sorted in order of feasibility of change.

Case-studies

The facilitator presents a case-study of a risky hygiene behaviour as seen through the eyes of two groups of people with different views. The participants review the opinions of both groups and propose possible solutions.

Open-ended problem drama

The facilitator presents two stories about problems a certain person faced, one problem was solved, the other not. The participants are asked to reflect on the stories and to fabricate a story about a different person

with unresolved (hygiene) problems and 2 or 3 other characters giving him/her contradictory advice. What will he/she do?

Critical incident

The facilitator presents three posters that illustrate a problem situation and asks the participants to reflect on possible causes and solutions. Pros and cons of different options are discussed and conclusions drawn.

Pocket chart voting

Yet another technique is to hang drawings of risky conditions on a wall with an open envelope under each drawing. After discussing the meaning of each drawing, each participant is given five tokens to place in envelopes under risks thought to be most risky ('pocket voting'). In mixed groups, a gender-specific approach is possible by giving men and women tokens of a different colour and summarizing replies by gender. The same technique is also suitable to assess the importance of hygiene changes in comparison with other development interests.

Environmental walk

Suitable with smaller groups is to make an 'environmental walk' and to visit all places where risky practices may be found. Open and respectful discussions on observed risks offer a good opportunity to exchange knowledge and increase appreciation of reasons underlying such conditions or practices. It is fruitful to combine observations with informal talks, because the two together can add to a more complete understanding.

Selection is done using the same participatory techniques as before (unserialized posters, pocket voting, environmental walk), but now asking the participants to select the most important changes. Where more groups are involved, common priorities can emerge. Apart from felt seriousness, also degree of impact, local beliefs on benefits and

ability and complexity of change will play a role, when selecting key practices for change in the local situation. Box 3 gives a tool for assessing the feasibility of hygiene change in a particular context. Use of behaviour analysis scales helped a handwashing project in Guatemala to select changes that were most crucial and realistic (WHO, 1993a).

Participatory techniques are excellent tools to help people realize problems, select priorities, and plan for change.

B O X 3

Criteria for evaluating likelihood of behaviour change

<p>Health impact of behaviour</p> <ol style="list-style-type: none"> 0. No impact on health 1. Some impact 2. Significant impact 3. Very significant impact 4. Eliminates the health problem 	<p>Complexity of the behaviour</p> <ol style="list-style-type: none"> 0. Unrealistically complex 1. Involves a great many number of actions 2. Involves many actions 3. Involves several actions 4. Involves few actions 5. Involves one action 	<p>Positive consequences of the behaviour</p> <ol style="list-style-type: none"> 1. None which mother could perceive 2. Little perceptible consequence 3. Some consequences 4. Significant consequences 5. Major perceptible consequences
<p>Frequency of behaviour</p> <ol style="list-style-type: none"> 0. Must be done at unrealistically high rate to achieve any benefit 1. Most be done hourly 2. Most be done every few days 3. May be done every few days 4. May be done occasionally and still have a significant value 	<p>Cost of engaging in the behaviour</p> <ol style="list-style-type: none"> 0. Requires unavailable resources or demands unrealistic effort 1. Requires very significant resources or effort/expenditure 2. Significant resources or effort 3. Some resources or effort 4. Few resources or little effort 5. Requires only existing resources 	<p>Persistence</p> <ol style="list-style-type: none"> 0. Requires compliance over an unrealistic long period or time 1. Requires compliance for a week or more 2. Requires compliance for several days 3. Requires compliance for a day 4. Can be accomplished in a brief time
<p>Compatibility with existing practices</p> <ol style="list-style-type: none"> 0. Totally incompatible 1. Very significant incompatibility 2. Significant incompatibility 3. Some incompatibility 4. Little incompatibility 5. Already widely practiced 	<p>Observability</p> <ol style="list-style-type: none"> 0. Cannot be observed by an outsider 1. Is very difficult to observe 2. Is difficult to observe 3. Is observable 4. Is readily observed 5. Cannot be missed 	<p>Approximations available</p> <ol style="list-style-type: none"> 1. Nothing like this is now done 2. An existing practice is slightly similar 3. An existing practice is similar 4. Several existing practices are similar 5. Several existing practices are very similar

Using the criteria

For each proposed behaviour change score 0-5 for each of the nine sections. Aggregate the total score for each behaviour change. If the score for each behaviour is less than 20, it is highly unlikely that the

audience will make the change. Different goals must then be set. If the score is over 36 it is highly likely that the goal will be achieved (Source UNICEF, 1993).

An important part of planning is to choose a few objectives for measurable change in hygiene conditions and practices and decide how their achievements will be measured.

Objectives, indicators and baseline

Having decided on the topics for behaviour change, it is necessary to choose the objectives and determine how their achievement will be measured before the programme starts and as the work progresses. The setting of measurable objectives and the monitoring of their realization is often a weak element: many hygiene education programmes focus only on developing and monitoring of inputs: the type and number of educational materials developed and produced, the type and number of educational sessions, the number of participants. This occurred in the WASHE project; only one village collected data before the project had been carried out.

Baseline data from a hygiene study in Ilundu village on 23 April 1988 showed that the twenty-one households had 1 pit latrine, 2 bath shelters, 1 refuse pit and no drying racks (Rogers, 1993).

To know the programme's results, the groups planning the changes need to decide in the beginning what they want to achieve, what targets they have and how they will assess progress and results. The usual procedure is that the groups choose a few hygiene objectives, select some appropriate indicators and carry out a baseline study to determine the situation at the start of their programme. Indicators are needed, because not all objectives are easy to measure in an objective and valid manner. Box 4 gives an

B O X 4

Measurable objectives and indicators for improved hygiene behaviours

Objective:	General use of safe water sources, at least for drinking
Indicators:	% of households with a protected waterpoint within competing distance of unprotected ones; no. of (recorded) times that the protected waterpoints gave no water for more than a day. Unprotected sources no longer in use for drinking water; traditional sources remaining in use are protected.
Objective:	Safe storage of drinking water in the homes
Indicators:	% of households with a separate storage container for drinking water present; with a cover on container; with long-handled dipper to draw water present and above the floor; without communal drinking cup at the container; % of households whose hands cannot touch water when demonstrating how they draw water
Objective:	Users keep the area around the water sources in a sanitary condition
Indicators:	% of waterpoints with a sloping slab and drainage channel, which works when tested; with drain and surrounds free from garbage/sediments/mud/stagnant water; with a fence in place and complete; a cleaning and caretaking system present.
Objective:	Waste water is used for irrigating vegetable garden
Indicators:	% waterpoints with garden, % households with garden in home compound, no. of garden co-operatives formed and active
Objective:	All households have and hygienically use sanitary excreta disposal practices;
Indicators:	No visible human excreta in likely sites; % households with latrine present and observed to be in use; % latrines with no soiling on walls and floors.
Objective:	Hands are washed with cleaning agent after toilet use/before cooking and eating
Indicators:	Presence of water for handwashing in or near kitchen; presence of soap, ash or other cleaning agent near latrine and in kitchen

Adapted from UNICEF (1985) and monitoring system Morogoro/Shinyanga rural water supply and sanitation programmes (1990) in INSTRAW, 1991.

example of a range of behavioural objectives and indicators used in various programmes.

Indicators which rely on observations, such as the absence of human excreta and the presence of long handled water dippers, are usually more reliable than questions and easier to use by community members. Care is needed that these indicators are valid and reliable. Invalid observations have occurred when the observer interpreted the observed phenomenon different from what it meant. For example, water at a latrine may be thought of as water for handwashing, while in practice it is for anal cleaning or for flushing. Problems of reliability have occurred when the observer defined something as clean or unclean.

Cleanliness is quite a subjective concept: what one observer finds clean, another finds unclean. The definition of cleanliness also varies over time: the same condition judged as clean at the beginning of a programme in Indonesia was later, when norms on cleanliness became stronger, judged as unclean. Objective criteria, such as no visible smears, are then a more reliable indicator. A publication by Boot and Cairncross (1994) gives more information on these and other methods for measuring hygiene behaviours.

Deciding on activities, tasks and schedules

Once the changes have been decided and objectives set, specific plans need to be formulated as to how the group will bring about intended changes in the households and community, what motivation factors are used and how constraining factors are dealt with. Emphasis is thereby put on what the households, groups and communities can do themselves, avoiding any lasting help from outside to sustain changes.

Latrines are a common example. Often, new ones are no longer built and existing ones not maintained and used when outside support and monitoring are discontinued. In the WASHE project, emphasis has been placed on promoting those hygiene changes that can be made with local means, such as construction and hygienic use of simple household pit latrines, building and keeping school pit latrines clean and building bathing enclosures to promote water use for personal hygiene.

Progress is monitored by villagers and programme staff.

Evaluating results

Periodic evaluation indicates what progress has been made and what changes have been realized.

In Ilundu, one of the villages in the WASHE project, an evaluation showed that between 1988 and 1991, latrine coverage had increased from 1 out of 21 households to 7; bathing shelters from 2 to 15, refuse pits from 1 to 13 and drying racks from 0 to 13. No indicators were measured on the hygiene and use of latrines and bathing shelters (Rogers, 1993).

Piles of unprocessed data from previous studies demonstrate that the amount of data and frequency of evaluations are best set very low. Participatory monitoring and evaluation, including reasons for change or non-change are very useful, because the process also has a strong self-educating effect. But they also have the risks of too high expectations from, and overburdening of, the groups carrying out the monitoring, especially the women. Discussing this beforehand helps, because the women can then choose those who combine commitment and influence with more time and freedom of movement and suggest ways in which the amount of work can be reduced. Otherwise, additional techniques are needed to enable the group or community to measure changes and use the information for the further management of the hygiene improvement process.

Public health communication programmes

For behaviour change, a personal approach using a combination of motivational factors is the most effective (Burgers et al., 1988; Hubley, 1993). But this approach also requires intensive work with local staff, who are well-trained in the various skills required. The question is, therefore, if one could also use the larger-scale and less staff-intensive methods of public health communication.

Programmes using public health communication combine the use of mass media with personal contacts to stimulate large numbers

In community-managed programmes, a community or community group makes the plan for bringing about the selected changes. Educators only help.

Public health communication programmes investigate target groups on practices and views and select channels, messages and products most suitable for each group.

of individuals and households to change specific behaviours directly, without formulating their own programmes and forming their own hygiene management organizations. The programmes follow a systematic process whereby the key risks are selected and target groups are investigated on their practices and views and segmented into different categories. For each category the different channels, messages and products are chosen that are most easy to disseminate and convince the groups concerned, so that they will adopt the altered behaviours.

Public health communication has been used to promote selected practices in a number of countries. In Honduras and the Gambia, oral rehydration for children with diarrhoea was promoted through mass media backed up by demonstrations and group meetings. The campaigns promoted the use of home-made mixtures or ready-bought packages depending on the capacities of the target groups (Foote et al., 1983; Vigono, 1985). In Burundi, three month promotion campaigns have been carried out by teams of hygiene promoters who visited households and distributed printed materials. Each campaign focused on three selected behaviours, identified from a baseline study of the target groups and was evaluated afterwards (pers. com. I. Ntaganira). An extensive programme exists also in Bangladesh.

The Bangladesh programme for the promotion of sanitation and hygiene consists of three interlinked components: advocacy, to get support for the programme from political and administrative leaders; social mobilization, to involve a wide range of actors, such as government staff, NGOs, schoolteachers and voluntary organizations in promotion activities, and a public health communication programme. Under the latter, standard hygiene promotion packages are developed for the various types of promoters and target groups, each with a few specific messages based on field studies and small test projects (Boot, 1993).

Risk and audience studies

Public health communication programmes follow a carefully structured approach. Because the programmes aim at behaviour

change by large numbers of individual people and households, they focus on the processes of individual behaviour change and rely less on participatory analysis, planning, organization and action, which are so important in community- or group-managed hygiene changes.

In public health communication programmes the audience is at the centre of the programme. Before designing the communication package, it is first investigated what hygiene risks are most crucial and what benefits and media will motivate what groups most to adopt the new practice(s). In Bangladesh the main health risks found were not, as previously thought, drinking non-tubewell water, but absence of latrines, latrines not being used exclusively and hygienically by all family members and lack of handwashing with soap, mud or ash (Boot, 1994). In Guatemala, handwashing by those caring for children (mothers, older siblings) and safe home storage of drinking water were identified as the most risky practices (WHO, 1993a).

What benefits are considered most important, what media are most accessible and appreciated and what constraints need to be overcome is also not the same for all the people, but varies for different groups of people. To find the most suitable messages, products and channels of communication for each category, public health communication programme planners segment their programme audience into different groups. They then investigate for each group what they do and want and what means of control they have over the resources they have. The study gives valuable information on what messages and products are most relevant for each group, what an affordable price is and how the messages and products are disseminated best to reach and convince members of each group (WHO, 1993a).

In Guatemala the planners found that parents saw clean children as attractive and happier, but not necessarily healthier. Handwashing was believed to be good, but enabling factors were lacking. Soap, water, towels were scattered and handwashing placed demands on mothers' time, energy and resources. Mothers were inter-

ested in hygiene education. They wanted information materials in their own language and in Spanish and preferred 10 minute home visits over large meetings. Approval from fathers was crucial to make changes because fathers objected to higher water consumption for hand-washing (Booth and Hurtado, 1992).

Implementation strategies

Public health communication seeks to change a few key behaviours that form the greatest local risks in transmitting key hygiene related diseases. A limited number of key messages and a single product to facilitate behaviour change are selected for reaching many people in a limited time. In Guatemala these messages were handwashing with soap, together with installing a 'smart corner' in the house, with soap, towel and a 'tippy tap', a small water container originating from Africa that can be tipped upside down to draw water for handwashing. In Bangladesh the messages concern handwashing and construction and use of pit latrines, together with the buying of a movable latrine slab made and sold in special UNICEF production centres and by private entrepreneurs. Promotion is by a combination of specially developed information, education and promotion packages and personal visits from development workers, NGO staff and local voluntary groups. Mass media messages are brought by influential public figures from sport, films and public life. Small tests and regular studies give feedback on the cost-effectiveness of the programme.

Socio-economic and cultural context

Motivational factors for behaviour change can be applied in all hygiene programmes. However, in operationalizing them one has to take into account that programme populations are seldom homogeneous, but belong to different socio-economic categories and that what motivates different groups also varies from culture to culture. Socio-economic diversity in caste and class exists for income and other resources, such as land and water, education, access to communication and level of power/influence. Culture refers to the common ways of thinking and acting of members of a particular society,

their concepts on health and hygiene, their beliefs on how particular illnesses are caused and transmitted, their arrangements for training their children, their roles for men and women.

Socio-economic conditions

Esrey (1994) has shown that improved hygiene practices only have an impact on public health when they can and are being adopted and sustained by the major part of the women and men, girls and boys. Hence, both community managed hygiene programmes and public health communication programmes will have to promote those facilities and practices that solve the felt problems and are within the means of not one, but all socio-economic groups. In practice, many hygiene programmes reach only the higher-income groups because they have the time, education, economic means and sufficient independence to try and adopt new technologies which facilitate improved hygiene practices.

Hygiene programmes with women's groups, for example, often mean that only higher class women are involved, because poor women are not a member of these groups and have little time for meetings, nor the means to adopt the promoted practices (van Wijk, 1985: 93).

At the same time, subsidies and gifts which enable lower income groups to practice a certain hygiene behaviour are often temporary or only for a small group (Pinfold, 1990, Tonon, 1980, Uddin, 1982). For permanent changes which continue without external support it is essential that improved hygiene practices in project villages become as self-sustained as possible.

How can one ensure that promoted practices and products are attractive and facilitative for the poor, reach them and be adopted by them? Community managed programmes have addressed this question by involving the poor in the planning and management of the programmes and base programmes on the needs and opportunities of all sections in the community. This has led to various adaptations, such as choice of other communication channels, promotion of practices affordable to all, introduction of cheaper models and

Both community-managed and public health communication programmes have to ask what the felt problems are and what solutions are within reach of all socio-economic groups, without dependence on external subsidies.

Promotion of hygiene requires understanding of, and respect for, the local culture.

help from households with more resources or from local authorities to households with less resources. Public health communication programmes have taken socio-economic factors into account by investigating the views and means of also poor people and making sure that messages, products and channels were based on their reality, while including facilitation and status symbols. Feliciano and Flavier (1967), for example, mention how jet-shaped footrests became one of the attractions of their low-cost latrine design in the Philippines, while Pineo (1984) mentions how a white porcelain pot and not the flushing mechanism motivated low-income rural households in Honduras to have a latrine in their home.

Cultural influences

In hygiene practices and the factors that motivate people to change these practices, cultural concepts also play a role. Existing hygiene practices do not stand by themselves, but are part of more general beliefs and values (e.g., on contamination, privacy, transmission of disease and preserving resources).

Hindu religion links practices on personal and environmental hygiene with notions on purity of the soul and rebirth in a better position. As a result personal hygiene is strictly observed, but cleaning wastes is seriously hampered by the belief that the action contaminates the soul and threatens the chances to return in a better position in the next life. This is one of the reasons why a project in Northern India helps local theatre groups and traditional singers to adjust religious songs and drama so that their text and symbols support new environmental hygiene practices (De et al., forthcoming)

Motivating new practices requires a good understanding of the local culture. Programmes that promoted better hygiene in areas where water was scarce, as in the earlier mentioned scabies control programme in Tanzania, or expensive, as in the handwashing programme in Guatemala, found that one reason why they were successful was that the practices promoted were congruent with the people's values on economic use of water. Research into cultural differences which affect hygiene practices has developed sub-

stantially, resulting in greater insights into the varying norms and beliefs regarding excreta disposal, food and water boiling, and causes of water and sanitation related diseases (Adeniyi, 1972; Curtis, 1977; Dube, 1956; Khare, 1962; Omambia, 1990; Yoder et al., 1993; Zimicki, 1993)

Gender

A cultural factor of particular importance in improving hygiene practices is gender. Gender is the culturally defined division of work and areas of responsibility, authority and cooperation between men and women. For every improvement related to health and hygiene one must therefore ask if it concerns men, women or both and whether either category has specific needs, priorities and resources. Dealing with gender means that in public health communication programmes, men and women must be interviewed separately (Box 5) and, as in the Guatemala programme, communication channels and messages developed for women and for men.

A gender strategy is also needed in community managed hygiene programmes, because what motivates men to support and adopt hygiene changes differs from the factors which stimulate women. Without a gender strategy women also often find that their physical work in hygiene has increased, while decisions and management positions have gone to the men (van Wijk, 1985). A gender strategy helps men and women both take part in decisions and find common solutions for conflicting interests, as occurred in Northern Ghana.

In a project in Northern Ghana, men and women disagreed about the location of the new water reservoir and wells. The young women preferred an area near to the village; the men were in favour of a location approximately two kms. from the village. Their main concern was to have enough water for the cattle year round. The older women were divided. The project staff tried to convince the men of the benefits of the nearby location. They feared that, if the new waterpoints were located far away, the young women — who decide where to draw water — would first use all ponds and pools nearby until these dried up and they would have to go to the

new wells to fetch water to drink. All pools/ponds in the area were guinea worm-infested, but still used, because the population did not believe they could get guinea worm from drinking infested water. Finally it was agreed to situate the drinking water reservoir near to the village and improve the old dam for the cattle to use year round (Murre, 1989).

When dealing with gender, it is important to note that women and men do not necessarily belong to homogeneous groups, but may have different concerns according to age, class, economic and educational status and ethnic and religious group. It is not enough to consult and plan separately with men and women without distinguishing also between wealth, age, and other socio-economic and cultural divisions in the society.

In the areas of domestic hygiene the women are most involved. They do the work, take management decisions in and around the house, educate the children and are change agents in contacts with other women (Elmendorf and Isely, 1981; Roark, 1980). There is, however, considerable evidence that in management decisions and work concerning public hygiene, women play a greater role than previously thought (IRC and PROWESS, 1992). Cases from the Pacific, Nepal, Sri Lanka, Guatemala, Burkina Faso and East Africa demonstrate that women's

involvement in water resources management is found especially in areas with a shortage of water, a strong water culture and/or a strong position of women in health management (van Wijk, 1985). A case from the Pacific illustrates this point further:

In two of the three villages in Tonga, where a sanitation programme had been started, the women had been left out from discussions to improve insect control and excreta disposal measures. After initial good progress the implementation of the programme soon came to a halt. Analysis showed that the project had neglected women's managerial roles in environmental health. Hence, in the third village, the women were invited to take part in the meetings to discuss the results of the social survey and to plan the subsequent actions. The women's health committee was made responsible to implement the programme and tasks were divided between men, women and children. After three months, all families had completed latrine construction and the evaluation after twelve months showed a general upkeep of excreta disposal and insect control measures (Fanamanu and Vaipulu, 1966).

Taking account of the central role of women in health and hygiene, it is logical that most hygiene education programmes work mainly with women. Unfortunately, this means that in hygiene changes, men are seldom in-

Experience has taught that both genders have to be involved in public and domestic hygiene management and decision-making.

B O X 5

Points to take into account when interviewing women

(Wakeman, 1994)

When interviewing women, it is wise to keep certain procedural guidelines in mind. Women interviewers are likely to obtain better access and more accurate information from women than would male interviewers. This is particularly the case where women have limited social contact with men outside their immediate family. The age, social class and cultural match of the interviewer have to be considered to make sure that the interviewer will be trusted and understood.

The interview situation is also important. Women may find it easier to answer questions in their work environment — the field, or the kitchen. Normally it is advisable to try to interview women when their husbands are not present, but in some cultures

women may be unwilling to agree to this, even with a female interviewer. The possibility of group interviews wherever women gather (for instance, in mothers' clubs, literacy classes or adult education classes for women) should be taken advantage of, particularly where these people already have a fairly close relationship with each other and can enter into a lively discussion on the questions asked. This technique will be particularly useful at the pre-feasibility stage during rapid assessment (where there is not always an opportunity for proper sampling of the population nor for interviewing large numbers of people). However, people who belong to such groups may not be representative of the population as a whole; this needs to be kept in mind.

Men need to be involved more in hygiene programmes to make investments, change own practices, reflect gender divisions in physical tasks and not burden women with the sole responsibility for health and hygiene.

volved. Yet all hygiene programmes need to address men as well as women (Box 6). One reason for a gender approach in hygiene behaviour programmes is that for some decisions and changes, women also need the cooperation of the men. Decisions for improvements which require monetary investments, for example, are in many cultures taken by the male head of the household, or by male and female heads together (van Wijk, 1985:44) If men are not well-informed about the benefits of these improvements they often give these improvements a low priority in comparison with other needs.

Moreover, for an impact on public health, male hygiene practices also have to change.

But in many cultures it is difficult for women to influence male health behaviour. The programmes thus have to address males separately, taking into account their behaviour and responsibilities and the factors that motivate them to adopt better practices themselves and also support improvements in the household. Yet another reason for involving men is that many cultures have a gender-based division of labour for certain improvements, such as the building of latrines, so that improvement is only possible if men and women are involved. And finally, a gender approach in hygiene education ensures that extra work and responsibilities in hygiene are not shouldered by women alone, but that they are divided better between men and women.

B O X 6

Six practical steps for a gender approach in hygiene programmes

- Assess with men and women what male and female hygiene practices need to be changed and who has the responsibilities, authority and means for action.
- Choose and test key messages, products and communication channels for change on relevance for and applicability by women and men.
- Get understanding and acceptance from men for women to take part in the consultation process and in management decisions and functions.
- Assess whether the programme addresses also men to improve their own hygiene practices and support hygiene improvements of their children and in their home and community.
- Ensure that the programme does not increase women's burden, but contributes to a better division of work, means and responsibilities between women and men.
- Ensure equal representation of men and women in training programmes and adjust training events to overcome cultural limitations for women's participation.

What Policymakers Can Do

A greater focus of hygiene education on measurable behavioural change and conscious utilization of the factors influencing such change also requires greater thought and action at higher levels. This section discusses four such changes: more commitment to health education in general; greater recognition and professionalism in hygiene education as a specialization within health education; more evaluations and applied research on how behavioural change is achieved, and more documentation and exchange of information among professionals.

Commitment and integration

Programme planners and external support agencies agree that improved water supply and sanitation alone seldom bring about full changes in hygiene behaviour. Hence, adding a health education programme is becoming more common.

However, many hygiene education programmes still have the character of an add-on to technical interventions. Funds are limited and there is little measuring of concrete results beyond the development and production of materials and the implementation of educational activities.

Another consequence of tagging-on health or hygiene education is that technical and educational staff do not work as one team together with the communities and users, but each does his or her work parallel to, and uninfluenced by, the other. Health educators usually have two roles: preparing users to accept what technical planners have decided, or changing health behaviour afterwards when the technology does not result in the desired practices. There is, however, much evidence that health behaviours will not occur until technologies are adapted to practices and requirements of the users. The ultimate aim of engineering projects is hygiene behaviour and this can only be achieved when working as one team, comprised of health and social staff and community members.

Specialization and professionalism

The recent character of hygiene education as a specialization probably explains why many programme staff dealing with behavioural aspects in water supply, sanitation and hygiene do not have a health education background. A small survey among 43 professionals showed that only six among them had a health education background, something which they themselves saw as one of the limiting factors in their work (van Driel, 1993). Moreover, within health education, hygiene education is still little recognized as a valuable specialization and career opportunities are quite limited (Bertens et al., 1993). This situation might improve when hygiene education programmes show concrete results and move from the increase of knowledge to the demonstrated improvement of hygiene conditions and practices.

Capacity-building, which equips programme planners and managers for programme development focusing on measurable change, is thus an essential requirement for strengthening this part of the water and health sectors. Several activities have already been undertaken in this direction. In 1991, WHO, UNDP, London School of Hygiene and Tropical Medicine and ODA organized a workshop on the measurement of hygiene behaviour. The papers and discussions of this workshop have been used to prepare a practical document (Boot and Cairncross, 1993).

Another recent development is the establishment of a short training course on planning and management of a hygiene education programme as part of, or associated with water supply and sanitation projects (IRC, 1993). And on request of the 29th Meeting of the UNICEF/WHO Joint Committee on Health Policy, UNICEF and WHO are developing a joint strategy for hygiene education in water supply and sanitation for the 1990s.

Strengthening the professionalism of hygiene educators and adaption of a team approach of engineers, health staff and users will optimize the impacts of water and sanitation projects.

Evaluations on use and hygiene should become a standard part of all implementation programmes.

Evaluation and research

What sense do water supply and sanitation projects make when only a small proportion of the population practices the better hygiene which these projects were intended to produce? Yet so far, very few water supply and sanitation organizations take the trouble to find out the effect of their work on human practices. Their responsibility ends with the establishment and, for water systems, the exploitation of the service; use and hygiene for all, which are the underlying development goals are seldom investigated.

It would be a great improvement if implementing organizations would regularly carry out or commission evaluations on use of facilities and hygiene practices, so that they can see what they are actually achieving. Several valuable tools for such evaluations have been developed, but so far these are mainly used for external evaluations. Awareness raising and capacity building for water use and hygiene studies by implementing organizations have received no financial and technical support.

Besides evaluations there is also a need for more fundamental research. Very little is known on what are the most cost-effective methods in motivating people to change behaviour. What is the role and effectiveness of the four mentioned motivational factors in public health communication programmes? We also need to know better how to deal with gender differences, including how to develop educational strategies which also change men, not only women, for almost all hygiene improvements. More research on hygiene behaviour change by men, women and children can make water supply, sanitation and hygiene education projects more successful. They can result in better conditions and practices, which in turn would result in better health, lower health costs, and greater productivity due to less sickness in households, communities and countries.

Documentation and exchange of information

There may yet be another reason why so few water supply and sanitation projects and health education programmes include measurably improved hygiene practices among the aims of their programmes. This is the sector practitioners' lack of access to documentation on this issue and the absence of a tradition to make use of documented experience. Most organizations working in the sector do not have literature on hygiene and hygiene behaviour change in their organizations and if it is present, it is rarely used in designing projects. Neither do staff have the chance to hear about such developments through their other forms of information exchange, such as technical journals and conferences. It would make a major difference if publishers of engineering journals and organizers of technical conferences would also pay attention to the impact of infrastructure projects on human behaviour and the ways these impacts are enhanced.

Similar problems are faced by those dealing directly with hygiene education in the water supply and sanitation sector. Limited staff, low budgets and high implementation pressure make it difficult to keep informed of new developments and have contacts with colleagues dealing with the same issues in other projects. It would, therefore, be a great help if agencies which finance implementation projects would give those involved in formulating and designing hygiene programmes the opportunity to draw on existing information before they draw up and implement another programme. If we want water supply, sanitation and hygiene education programmes to result in improved hygiene conditions and practices, we shall also have to invest more into knowledge compilation, use and exchange.

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Transmission patterns and preventive measures for water and sanitation-related diseases

Source: Boot & Cairncross, 1993:10-11

Infection	Transmission pattern	domestic hygiene					wastewater disposal and drainage
		safe human excreta disposal	personal hygiene	and animal management	water hygiene and food hygiene	safe water consumption	
Various type of diarrhoeas, dysenteries, typhoid and paratyphoid	From human to mouth (faecal-oral) via multiple routes of faecally contaminated water, fingers and hands, food, soil and surfaces (see Figure 1). Animal faeces (e.g. from pigs and chickens) may also contain diarrhoeal disease organisms.	■	■	■	■	■	
Roundworm (Ascariasis), Whipworm (Trichuriasis)	From faeces to mouth: Worm eggs in human faeces have to reach soil to develop into an infective stage before ingested through raw food, dirty hands and playing with things that have been in contact with infected soil. Soil on feet and shoes can transport eggs long distances. Animals eating human faeces pass on the eggs in their own faeces.	■	■	■	■		
Hookworm	From faeces to skin (especially feet): Worm eggs in the faeces have to reach moist soil, where they hatch into larvae which enter the skin of people's feet.	■		■			
Beef and pork tapeworms	From faeces to animals to humans: Worm eggs in human faeces are ingested by a cow or pig where they develop into infective cysts in the animal's muscles. Transmission occurs when a person eats raw or insufficiently cooked meat.	■			■		
Schistosomiasis (bilharzia)	From faeces or urine to skin: Worm eggs in human faeces or urine have to reach water where they hatch and enter snails. In the snails they develop and are passed on as free swimming "cercariae" which penetrate the skin when people come into contact with infested waters. In the Asian version of the infection, animal faeces also contain eggs.	■	■	■			
Guinea worm	From skin to mouth: The worm discharges larvae from a wound in a person's leg while in water. These larvae are swallowed by tiny "water fleas" (cyclops), and people are infected when they drink this contaminated water.					■	
Scabies, ringworm, yaws	From skin to skin: Both through direct skin contact and through sharing of clothes, bedclothes and towels.		■	■			
Trachoma, conjunctivitis	From eyes to eyes: Both direct contact with the discharge from an infected eye and through contact with articles soiled by a discharge, such as towels, bedding, clothing, wash basins, washing water. Flies may also act as transmission agents.		■	■			
Louse-born typhus, Louse-born relapsing fever	From person to person: Through bites of body lice which travel from person to person direct and through sharing clothes and bedclothes, particularly when underwear is not regularly washed.		■	■			
Malaria, yellow fever, dengue	From person to person through the bite of an infected mosquito. The mosquito breeds in standing water.			■			■
Bancroftian filariasis	From person to person through numerous bites by infected mosquitoes. The mosquitoes breed in dirty water.	■		■			■

Motivating improved hygiene: An annotated bibliography with keywords on hygiene behaviors, motivating factors and country

1. Ahmed, N.U. et al. (1993). A longitudinal study of the impact of behavioral change intervention on cleanliness, diarrhoeal morbidity and growth of children in rural Bangladesh. *Social Science and Medicine*, Vol. 37 (2), pp. 159-171.

During participatory discussions mothers discussed their hygiene practices, sanitary conditions, beliefs regarding causes of diarrhoea and possible treatments. This resulted in twenty target changes, like sweeping floors more often. They were tried by project workers and volunteer mothers of the target group. Applicable advice was translated into simple messages, resembling popular folksongs, popular proverbs and poems. Local leaders supported the campaign. Observations showed that the intervention site had substantially higher cleanliness scores, a lower diarrhoeal morbidity and better growth status of infants compared to those of the control group.

Handwashing, sanitary practices, food hygiene; understanding, influence (from local leaders), enabling factors (brooms); Bangladesh.

2. Aini, Fitri (1991). Radio show spreads the words about water, health and sanitation to islands in Indonesia. Paper presented at the Global Assembly on Women and the Environment, Miami, Florida, 4-8 November 1991.

Lack of good excreta and garbage disposal pollutes water sources and is a common cause of water-related diseases in Indonesia. A radio programme for farmers' women uses a dialogue between two farmwomen to promote practical understanding and sanitary self-improvements. Broadcasts are at a suitable time (5.30 a.m.) and use simple language. The scenario's are based on meetings and interviews with the target

group. In a questionnaire survey listeners reported better knowledge and practices, but there are no before/after observations to confirm these results.

Excreta disposal, waste disposal, water use, hygiene practices; understanding, peer influence, enabling factors (easy access to relevant information); Indonesia

3. Alam, N. et al. (1989). Mothers' personal and domestic hygiene and diarrhoea incidence in young children in rural Bangladesh. *International Journal of Epidemiology*, vol. 18 (1), pp. 242-247.

A combination of hygiene practices decreased yearly diarrhoea incidence in children by more than 40% compared to children living in households where none or only one of these practices was observed in two rural areas in Bangladesh. The observed practices included use of handpump water for drinking and washing, removal of children's faeces from the yard, and maternal handwashing before handling of food and after defecation of self and child. More mothers living in the intervention area, where handpumps were installed and hygiene messages were spread observed all four hygiene practices than mothers living in a control area.

Handwashing, water use, domestic hygiene; understanding, facilitation; Bangladesh

4. Albihn, M. et al. (1982). Integrating women as a means of rural development. A case study of the Swedish CADU project. Stockholm, SIDA.

The project covered irrigation, improvement of agricultural practices and water supply. It concentrated on male participation. Women got classes on health, hygiene and home

economics. Over 8000 women attended. Half applied new practices, but none felt able to influence hygiene practices of other household members. Where women participated in siting, wells were placed satisfactorily, but after a while 60% could not be used for lack of maintenance.

Domestic hygiene, water source use; influence, enabling factors (gender); Ethiopia.

5. Audibert, M. (1993). **Social and epidemiological aspects of guinea-worm control.** *Social Science and Medicine*, Vol. 36 (4), pp. 463-474.

Comparison of different strategies to eradicate guinea-worm in nine villages in Mali shows that provision of safe water sources can be effective, particularly in those regions where water is very scarce. Hygiene education to encourage filtering of water was primarily targeted at men, who were supposed to disseminate the information to their wives. The required long-lasting modification of behaviour did only come through under favourable conditions, like a strong social cohesion or co-ordinated group-action and/or when guinea-worm control is a population priority goal.

Watersource improvement, filtering; facilitation, understanding, influence; Mali

6. Aziz, K.M.A. et al. (1990). **Water supply, sanitation and hygiene education. Report of a health impact study in Mirzapur, Bangladesh.** *Water and sanitation report series 1.* Washington D.C., UNDP/World Bank.

This study evaluates the success of an integrated package of interventions in a rural area in Bangladesh. These interventions included: handpump water supplies at a short distance from households, pitlatrines for each household and an elaborate hygiene education programme. In the intervention area there was significantly less diarrhoea of all kinds in all seasons in the four years of follow-up than in the control area.

Wateruse, pitlatrines; facilitation, understanding, enabling factors; Bangladesh

7. Baranowski, T. (1992-1993). **Beliefs as motivational influences at stages in behaviour change.** *Int'l Quarterly of Community Health education*, Vol 13 (1), pp. 3-29.

Five theories of behaviour change are reviewed to identify motivational (belief) factors in promoting health behaviour changes at each of six stages of the behaviour change process: precontemplation, contemplation, decision, training, initiation and maintenance.

Understanding, facilitation, influence, enabling factors; general

8. Boot, M.T. (1991). **Just stir gently. The way to mix hygiene education with water supply and sanitation.** TP29. The Hague, IRC.

Ch. 2 and 3 discuss how to promote hygiene behaviour, Ch. 2 looks at it from a 'daily routine' point of view. Introducing new water and sanitation facilities forms an excellent opportunity to discuss hygiene behaviour. Hygiene promotion is more likely to be successful when usergroups are involved in selecting appropriate technical solutions, when it builds upon local culture and priorities and is supported by respected community members, project staff and authorities. Ch. 3 provides a short theoretical background. To plan a sound health education strategy one should first select a 'felt' health problem, then identify the linked behaviours and categorize these into predisposing, enabling and reinforcing factors.

Water supply and sanitation; facilitation, understanding, influence (from leaders), enabling factors; general

9. Boot, M. T. & S. Cairncross. (1993). **Actions speak. The study of hygiene behaviour in water and sanitation projects.** London, London School of Hygiene & The Hague, IRC.

The study of hygiene behaviour is important to improve the effectiveness of water supply, sanitation and hygiene education programmes. The available literature is reviewed to specify links between human behaviour and the transmission of water and sanitation related diseases. The authors conclude that

— in general — reduction of these diseases can only be achieved by a combination of better hygiene behaviours. Cultural concepts of purity and cleanliness, perceptions about transmission risks and socio-economic and demographic circumstances have to be taken into account when studying behaviours. Different methods to study behaviour — observations and interviews — are discussed extensively, as well as how to design and organize such a study.

Handwashing, excreta disposal, bathing and washing, water and food hygiene, soil contact, animal contact, fly control; transmission risks, knowledge, understanding; general.

10. Booth, E.M. (1992). Selecting and prioritizing target behaviours in public health programs. WHO, informal consultation.

There are two major criteria for the selection and prioritization of target behaviours: potential impact on the health problem and amenability to change. These require an in-depth understanding of the target audience. The paper gives a list of steps to perform — from analyzing the health practice to selecting and prioritizing behaviours. The behavioural analysis scale is a tool to use to see which behaviours have the most potential. Finally a case-study from a rural village near Guatamala-city is given to illustrate the steps to take to stimulate correct handwashing by mothers.

Hygiene behaviour, handwashing, transmission risks; facilitation, understanding; Guatamala

11. Booth, E.M. & E. Hurtado. (1992). The application of public health communication in water and sanitation programs. WHO, Informal consultation.

Introducing a simple device to reduce the amount of water needed for handwashing, combined with home-visits to spread key-knowledge concerning correct handwashing to make children healthy reduced diarrhoeal morbidity significantly in the intervention group in a village in Guatamala. Fathers and children got additional messages to reinforce the desired behaviours. No mass-media were used nor meetings at public places held to avoid contamination of the control group.

The authors stress the need to include time to 'maintain' new behaviours.

Handwashing; facilitation, understanding; Guatamala.

12. Brieger, W.R. et al. (1990-1991). Monitoring use of monofilament nylon waterfilters for guinea-worm control in a rural Nigerian Community. Int'l Quarterly of Community Health Education, Vol. 11 (1), pp. 5-18.

Monitoring of filter-use to prevent guinea-worm in a rural community in Nigeria highlighted the following problems. Despite hygiene education and availability at low cost of filters only about one third of the population bought filters, while others objected that filters could not prevent the disease, cost too much or were inferior to other solutions. Those who did buy did not use filters always (esp. near the farm), did not clean them regularly or used them upside down. Most people did not change filters after one year use when tiny holes appeared.

Water filtering; understanding, enabling factors (filters); Nigeria.

13. Burgers, L. et al. (1988). Hygiene education in water supply and sanitation programmes. TP 27. The Hague, IRC.

Behavioural changes are influenced by a number of factors other than health considerations — affordability, making life easier and solving a felt problem. Incentives to change behaviour are time gains, economic gains or increased status. Rewards and punishments do not usually have a long-lasting impact. Hygiene education programmes are more successful when they build on existing cultural practices and practical understanding of disease transmission and when supported by respected key-persons in the community. The book further gives an overview of three educational approaches to hygiene education: didactic, promotional and participatory and their respective advantages and disadvantages.

Water supply and sanitation; facilitation, understanding, influence (from key persons), enabling factors; general

14. Cairncross, S. & J. Cliff. (1987). Water use and health in Mueda, Mozambique. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 81, pp. 51-54.

Women living on average 300 meters from a standpipe used 2-3 times more water than other women. The extra water and saved time are used for bathing, clothes washing, food preparation and frequent washing of children. Trachoma incidence was half that of a neighbouring village without piped water.

Clothes washing, bathing; facilitation; Mozambique.

15. Clemens, J.D. & B.F. Stanton. (1987). An educational intervention for altering water and sanitation behaviours to reduce childhood diarrhoea in urban Bangladesh I and II. *Int. Journal of Epidemiology* Vol 125 (2), pp. 284-301.

Research in urban Bangladesh identified three water sanitation behaviours that differentiated groups of families with a low and high incidence of childhood diarrhoea:

1. Handwashing of mothers before the preparation of food
2. Defecation of the children in the living area of the family
3. Children placing garbage or waste products in their mouth.

Based upon these associations an educational intervention was designed, which consisted of a few simple messages whose prescribed behaviours already occurred in a number of households in the community. After the intervention, more mothers washed their hands before preparing food than in a control area. The incidence of diarrhoea experienced by children reduced substantially. However, no improvement was observed for defecation and waste disposal practices.

Handwashing, defecation of children, waste disposal practices, facilitation, understanding; Bangladesh

16. Derslice, J. van & J. Briscoe. (1991). All coliforms are not created equal: a comparison of the effects of water source and in-house contamination on infantile diarrhoea disease. University of North Carolina.

Water source contamination poses a much more serious risk of diarrhoea than in-house contamination of water, as shown by a study with 2355 Filipino infants. The first introduces new pathogens in the family, whereas family members are likely to develop some level of immunity to pathogens commonly encountered in the household. Moreover, in the second case, person-to-person contact or food contamination are more likely transmission routes.

Water hygiene (water source quality and water storage); diarrhoeal disease transmission routes; Philippines.

17. DiPrete Brown, L. & E. Hurtado. (1992). Development of a behaviour-monitoring system for the health education component of the rural water and health project — CARE Guatemala. Wash field report no 364. Washington D.C., Wash.

A simple monitoring system for assessment of CARE Guatemala's water, sanitation and hygiene education programme was developed by the Wash project, using approximately 40 indicators. These include measures concerning health impacts (children's diarrhoea), mother's knowledge (ORT) and health behaviours (diarrhoea management, personal and domestic hygiene).

Personal and domestic hygiene; practices, knowledge; Guatemala.

18. Edungbola, L. et al. (1988). The impact of UNICEF-assisted rural water project on the prevalence of guinea-worm disease in Asa, Kware state, Nigeria. *Am. J. Trop. Med. Hyg.* 39 (1), pp. 79-88.

Provision of handpumps and boreholes, combined with (minimal) health education reduced guinea-worm prevalence enormously within three years of intervention in eight villages in Nigeria. In twelve other villages where improved watersources were less favourably sited, had an inadequate water

coverage, an unpleasant watertaste, color or smell or were otherwise malfunctioning the decline of the disease was less dramatic. This demonstrates the importance of a convenient planning and design of watersources.

Wateruse; facilitation, understanding; Nigeria

19. El Katsha, S. & S. Watts. (1992/93). A multifaceted approach to health education: a case study from rural Egypt. *International Quarterly of Community Health Education*, 13 (2), pp. 139-149.

Nurses and teachers in two villages were most effective in influencing hygiene practices — water storage, infant feeding, hand washing, food preparation, latrine cleanliness and hygienic handling of dung cakes for fuel. Messages focused on practical understanding of how household practices can transmit disease. Public Service Candidates, conscribed by the government for one year's voluntary work, best reached illiterate women at home. Trained female village leaders were least effective: high turnover, high support need, low outreach. This is ascribed to the limitations to voluntary organization from Egyptian law. Enabling factors were time and housing space.

Water storage, infant feeding, hand washing, food preparation, latrine hygiene and hygienic handling of dung cakes for fuel; understanding, influence, enabling factors; Egypt.

20. El-Katsha, S. & A. White. (1989). Women, water and sanitation: household wateruse in two Egyptian villages. *Water International*, vol. 14 (3), pp. 103-111.

A survey in two similar delta villages revealed that the better water and sanitation infrastructure of one village did not account for better health. Hygiene behaviour, rather than service levels, had the greatest influence. Understanding of disease transmission was fragmentary. Facilitation and popular beliefs determine actions. Clothes washing is in the canals, because the water is softer, gives a better lather and no sullage weakens the houses. Schistosomiasis is seen as a real danger but thought to be caused only by swimming and drinking, not by standing in the water.

Clothes washing; facilitation, understanding (lack of); Egypt.

21. Fukumoto, M. & R. del Aguila. (1989). Why do mothers wash their hands? in : *Dialogue on Diarrhoea*, issue 39, December 1989, p.5.

In shantytowns near Lima, Peru, mothers have different handwashing practices according to various kinds of dirtyness, using different types of soap and water. Since water is expensive, much water in the household is reused. Understanding existing practices and beliefs allows designing health interventions that reinforce cultural beliefs and practices and are more effective.

Handwashing, beliefs, understanding, facilitation; Peru

22. Gilman, R.H. & P. Skillicorn (1985). Boiling of drinking water: can a fuel scarce community afford it? *Bulletin of the World Health Organization*, Vol. 63 (1), pp.157-163.

The economic feasibility and the health impact of boiling drinking water are both highly questionable. A village study in Bangladesh demonstrates that, when collectable fuel is limited, families in the lowest income quartile would have to spend 22% of their yearly income on fuel. Moreover villagers seldom take their drinking water only from the drinking pot, but draw water from various (polluted) sources. The authors recommend the installation of handpumps as a more appropriate solution.

Drinking water; enabling factors (fuel); Bangladesh

23. Haggerty, P.A. (1991). Community based hygiene education to reduce diarrhoeal disease in rural Zaire: Measurement of hygiene behaviour before and after the intervention. Paper presented at the workshop on measurement of hygiene behaviour, Oxford, April 8-12, 1991.

A hygiene education intervention in rural Zaire was based on four key-messages: handwashing before food preparation, and eating and after defecation, proper disposal of faeces and sweeping of compound twice

daily. It was implemented by female community volunteers, using songs, stories, etc. Compared to a control group, in the intervention area children suffered from less and shorter periods of diarrhoea and observed above mentioned hygiene behaviours improved. Interestingly, behavioural change was highly associated with volunteer performance.

Handwashing, domestic and personal hygiene; understanding; Zaire

24. Han, Aung Myo & T. Hlaing. (1989). Prevention of diarrhoea and dysentery by handwashing. *Transactions of the Royal Society of Tropical medicine and Hygiene*, no. 83, pp. 128-131.

Giving mothers soap to wash hands before preparing and eating main meals and after defecation reduced diarrhoea episodes in their under 5 year old children, compared to a control group. Dysentery incidences decreased less.

The authors state that a lasting positive behaviour change requires both culturally appropriate educational programmes and readily and cheaply available soap.

Handwashing; understanding, enabling factors (soap); Burma.

25. Henry, F.J. & Z. Rahim. (1990). Transmission of diarrhoea in two crowded areas with different sanitary facilities in Dhaka, Bangladesh. *Journal of Tropical Medicine and Hygiene*, 93, pp. 121-126.

In two densely populated areas in Bangladesh 137 children were studied to compare the importance of contaminated hands and drinking water in the transmission of diarrhoea. In both areas there was a significant correlation of contaminated hands and diarrhoea incidence. No correlation was found between water contamination and diarrhoeal incidence. This relationship strongly supports the promotion of handwashing as a method of controlling diarrhoeal diseases and, by implication, the greater importance of water quantity compared to quality.

Handwashing; facilitation, disease transmission routes; Bangladesh

26. Hoque, B.A. & A. Briend. (1991). A comparison of local handwashing agents in Bangladesh. *Journal of Tropical Medicine and Hygiene*, vol. 94, no. i, pp. 61-64.

For handwashing traditional agents are as effective as soap. The authors counted faecal coliforms from fingertip rinses in a group of 20 women. On five consecutive days, the women washed hands with soap, ashes, mud, water only or not at all. No washing led to contaminated fingers for 14 women. Washing with water only made no difference. Washing with mud, ashes or soap effectively removed faecal bacteria. As handwashing with traditional agents is not promoted, this practice is not widespread (15% use mud) and many women are not aware of its benefits.

Handwashing; facilitation, understanding, enabling factors (availability, cost), Bangladesh.

27. Hubley, J. (1993). *Communicating health. An action guide to health education and health promotion*. London, The Macmillan Press LTD.

This book explores the role of communication in improving people's health and discusses strategies for health education, health promotion and empowerment of families and communities to take action on health issues. Practical guidelines are given on how to carry out effective communication with families, communities and through schools, health services and the mass media. Ch. 2 discusses factors that influence health behaviours; the role culture, social change and economic factors play in determining behaviours and how this can be used to plan health education and health promotion programmes. Ch. 3 treats basics of the communication process, provides guidelines for successful communication and explores the main characteristics of a range of communication methods.

Hygiene behaviour (general); beliefs, understanding, influence, enabling factors; general

28. Jaeger-Burns, J. & F. Mattson. (1989). **Evaluation of the environmental component of the community-based integrated health and nutrition project in Guatemala.** (WASH Field Report no. 251). Arlington, U.S.A., WASH.

In four years the project helped construct 168 village water systems and 13,500 latrines. Evaluation showed reasonable functioning and use, but home storage of water, child sanitation and to a lesser extent latrine hygiene were unsatisfactory. The authors conclude that facilitation improves hygiene, but that hygiene education and adaptation of latrine design are required.

Water storage, water use, latrine use, latrine hygiene; facilitation; Guatemala.

29. Kanki, B. et al. (1991). **Measuring hygiene behaviours: experiences of a comprehensive approach in Burkina Faso. A contribution to the workshop on measuring hygiene behaviours, Queen's College, Oxford, 8-12 April 1991.**

Different study techniques — discussion groups, questionnaires and observations — used in a study of child health in a town in Burkina Faso highlighted various elements of hygiene behaviours. Differentiation was made between the ideal — what mothers' real belief tell them that they should do; the image — the image mothers choose to present to field workers; and the actual — what mothers actually do.

Domestic hygiene; practices, beliefs; research techniques; Burkina Faso

30. Laike, S.A. (1992). **The quality of drinking water in Gondar, Ethiopia: influence of demography, socio-economic factors, environmental hygiene and health education.** (Technical Publication no. 90) Tampere, Tampere Technical University.

Test for bacteriological density at the source, during water transport and in household storage containers showed high faecal contamination at all three locations. Selected households were given hygiene education combined with the introduction of a low-cost water treatment system and simple tech-

niques for safer water storage in the home. This resulted in considerable lower counts for bacteriological contamination than before the intervention and in comparison with the control group.

Water filtering, water storage; knowledge, understanding, enabling factors (larger storage containers and simple gravel and sand filtration systems); Ethiopia

31. McCauley, A.P. et al. (1990). **Changing water use patterns in a water poor area: lessons for a trachoma intervention project.** *Social Science and Medicine*, Vol. 31 (11), pp. 1233-1238.

Mothers in this dry area did not wash children's faces frequently because they prefer economic uses of water and time and belief that face washing demands much water. Other influencing factors were neighbours' examples and husbands' attitudes. An experiment with women and men practising face washing demonstrated that with one litre the former managed 30-35 faces, the latter 12. The findings are used for a project to change face washing practices in the whole community and measure impact on trachoma.

Face washing; understanding, influence, enabling factors; Tanzania

32. Mc Cauley, A.P. et al. (1992). **Household decisions among the Gogo-people of Tanzania: determining the roles of men, women and the community in implementing a trachoma prevention program.** *Social Science and Medicine*, Vol. 34 (7), pp 817-824.

A study in preparation of a trachoma prevention programme found that mothers were reluctant to wash children's faces more often. Fetching the perceived extra amount of water would take too much time not spend on more important duties like growing food, for which they would be criticized by their husbands and mothers-in-law. Mothers did not believe washing would cure all eye-problems. Besides children would be re-infected by their play-mates. Therefore the health intervention campaign addressed all community members to get support for the mothers from their family members and to ensure as many

children faces to be washed as possible. A demonstration showed that in fact facewashing requires little water.

Face-washing; knowledge; influence (from husbands and mother-in-law), enabling factors (time, water); Tanzania

33. Mukherjee, N. (1990) People, water and sanitation: what they know, believe and do in rural India. New Delhi, National Drinking Water Mission.

A KAP study concerning water and sanitation was carried out in 22 districts in 8 states in India. Although only 4-15% of interviewed people have a private latrine, around 86% mentioned privacy and convenience as advantages of having one. Health hazards were not frequently considered. Children's faeces are believed harmless. Significantly, concerning water, women mentioned the cooking quality as a reason to choose a certain source. Women were more willing than men to pay and repair (new) installations.

Water use, latrine use; beliefs, practices, facilitation, understanding; India.

34. Narayan, D. (1989). Indonesia: evaluating community management. (Technical Series), New York, PROWESS/ UNDP.

Using participatory methods and local organizations, 4 villages were assisted to improve their water supply and hygiene. After 14 months, 65% of the households used improved water sources, and water use increased to 10 l/c/d, not counting water used at the source. Observed cleanliness of containers and water decreased, but may be due to stronger subjective norms of the village evaluators and shows the need for objective measurement criteria. Observed safekeeping of water dippers improved.

Water sources, water consumption, water storage; facilitation; understanding; Indonesia.

35. Pinfold, J. (1990). Faecal contamination of water and fingertip-rinses as a method for evaluating the effect of low-cost water supply and sanitation activities on faecal-oral disease transmission: II. A hygiene intervention study in rural northeast Thailand. Epidemiology and Infection, no 105, pp. 377-389.

Hygiene education combined with provision of a plastic container with tap was more successful in improving hand- and dishwashing practices than health messages alone. Indicators of compliance were the direct observation of soaking dishes and the presence of faecal streptococci from fingertip rinses.

Hand- and dishwashing; facilitation, understanding; Thailand.

36. Sandhu, S.K. et al. (1977). Adoption of modern health and family planning practices in a rural community in India. International Journal of Hygiene education, 20, (4), pp. 240-247.

Contacts with health staff made a significant difference in adopting five new health practices by a sample of 170 women. Construction of latrines was lowest (12%), although knowledge was high. The authors ascribe this to health being not a major reason for installing a latrine and the presence of an accepted alternative (sufficient nearby fields with vegetation).

Latrine construction; influence (from health staff); India

37. Simpson-Hebert, M. (1993) Sanitation: the unmet challenge. New issues paper for the water supply and sanitation collaborative council. Rabat meeting. CWS unit/WHO.

By prioritizing certain key hygiene messages, improving the educational techniques of promoters and involving women and communities more, demand can be created and sanitation can become more successful. Innovative approaches should be shared and policy makers convinced of the economic and health implications of sanitation.

Latrine use, handwashing, domestic hygiene; promotion, policy making; general

38. Smith, G.D. (1993). Cultural construction of diarrhoea in Nicaragua. *Social Science and Medicine*, Vol 36 (12), pp. 1613-1624.

Interviews and group discussions with 70 mothers in a rural area in Nicaragua revealed that most mothers differentiated between 9 types of childhood diarrhoea and sought treatment according to the type. Dismissal of traditional beliefs and practices by the health centres and their strong focus on ORS and improved hygiene promotion seems to result in treating only certain types of diarrhoea in health centers and may alienate people from official health promotion messages. Moreover, one misses the chance of co-operation with traditional healers who could become important agents in the promotion of ORS.

Beliefs, influence (traditional healers); Nicaragua.

39. Soeripto, N. (1989). Impact of environmental improvement on the pattern of soil-transmitted helminth infections: the Yogyakarta case: paper presented at the Asian Parasite Control/ Family Planning Conference, 11th Parasitologists Meeting, Jakarta, Indonesia, 16-20 October 1989.

Mass treatment of worms, construction of new wells and latrines and hygiene education through women, local leaders and health cadres reduced prevalence of whip- and hookworm in a village in Indonesia. Latrine coverage increased 40%, latrine hygiene 64% and reported use 70%. This combination of interventions proved more effective than those that used only mass treatment or in combination with health education and wells construction.

Latrines, use and hygiene; facilitation, understanding, influence (local leaders); Indonesia.

40. Spector, P. et al. (1971). Communication media and motivation in the adoption of new practices, an experiment in rural Ecuador. *Human Organization*, 30 (1), pp. 39-46.

Latrine installation and adoption of 3 other health practices were significantly greater in two towns with gender-specific media

campaigns than in one control town. Men were motivated to build latrines by holding meetings in town with audio-visual media and stimulating them to form teams for mutual help in construction. Women were motivated to adopt health practices at home by providing them with radios and reaching them with special health education programmes.

Latrine construction; knowledge; influence (from male peers); enabling factors (radios, labour); Ecuador

41. Srinivasan, L. (1990). Tools for community participation: a manual for training trainers in participatory techniques. New York, PROWESS/UNDP.

This manual intends to stimulate staff of water and sanitation projects to use participatory methods in their programmes. The manual offers a large number of activities and exercises to help local groups develop their cohesiveness and co-operation and to analyse local conditions, beliefs and practices. Local groups are stimulated to plan and implement problem solving actions and become creative in finding answers to at first insoluble problems.

Water and sanitation; participatory approaches; general.

42. Srinivasan, L. (1992). Options for educators. A monograph for decisionmakers on alternative participatory strategies. New York, PACT/CDS.

Part I of this book reviews three educational strategies for working with disadvantaged communities, the didactic mode, education for societal change and the growth centered educational approach. Part II suggests concrete ways to build participatory methods into the training of staff and volunteers. Part III shows ways of involving senior staff into participatory activities, to demonstrate its value.

Educational approaches; general

43. Srivastava, P.K. (1969). Acceptance of sanitary composting in rural areas. *Indian Journal of Public Health*, 13 (1), pp. 30-35.

Perceived economic benefit motivated 55 out of 77 households to compost cattle and household waste into pits, after they got information and influence from mass media, demonstrations, mass and group meetings and positive accounts from local leaders. Health benefits were recognized, but not mentioned as important. Enabling factors were: large landholdings and many cattle — so more waste and greater benefits — and small walking distance to refuse pit.

Pit latrines (manure pits, compost pits); understanding, influence (from leaders, peers), enabling factors, India

44. Steuart, G. et al. (1962). Sanitation changes in an African community: a study of primary group education. *Health Education Journal*, 20 (3), pp. 133-140

In a peri-urban community, health workers identified leaders in informal women's networks. Each worker trained 24 leaders on safe excreta and garbage disposal, fly prevention and killing and food and water protection. Home observations established a baseline. The leaders held meetings with friends, discussing disease transmission and hygiene practices and reaching 62% of the 1765 families. A post study showed significant change on all six conditions as compared to a control area which had the usual programme (mass media information and promotion of improvements at community level through working with prominent community leaders).

Excreta disposal, waste disposal, fly control, food hygiene, water hygiene; understanding, peer influence; South Africa.

45. Toit, F.P. du (1980). A design for rural village water points in Zimbabwe. Proceedings of the seminar on water supply and drainage services in developing countries. Pretoria, CSIR, National Building Research Institute.

Siting the waterpoint where the women wanted it (outside the village for a meeting

place and with land for a vegetable garden) and adapting the design to their needs (facilities for laundry and child-bathing) increased water use to 60 l/c/d. Waste water from washing/bathing was used to water the communal vegetable garden. The women also managed maintenance and hygiene. At the time of report the system, managed by the women, worked reliably for 7 years.

Water consumption, water reuse, drainage; facilitation; enabling factors (user management); Zimbabwe

46. Uddin Khan, M. (1982). Interruption of Shigellosis by handwashing. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 76 (2), pp. 164-168.

Health workers gave families with a confirmed case of shigellosis soap, water storage pots and education on handwashing and monitored handwashing behaviour. Transmission of shigellosis was significantly lower in this group than in a control group (10% versus 32%).

Handwashing; facilitation, influence, control (from health staff); Bangladesh

47. UNDP/World Bank (1990) Rural sanitation in Lesotho. Washington D.C. UNDP/World Bank Water and Sanitation Program and PROWESS.

Village health workers and interested villagers formed participatory learning groups to improve living conditions. Storytelling, games, dramatic presentations and community survey and mapping emphasized the relationship between good health and specific hygiene practices. Community leaders took part in workshops, volunteers (many of them women) were trained as builders and demonstration latrines were built at public places in the village. By showing the advantages of effective use of improved sanitation, latrines became a priority and actual hygiene practices changed. Households pay the full costs of improved latrines. A health impact evaluation in one area showed a significant decline in the incidence of diarrhoea.

Latrine use, handwashing, domestic hygiene; facilitation, understanding, influence; Lesotho

48. United Republic of Tanzania, Danida and CCKK. (1987). **Implementation of water waste plans for Iringa, Ruvuma and Mbeya Regions: water consumption in six villages.**

The installation of a piped water system with user involvement in tap location of the standpipes brought considerably higher water consumption than the average amounts collected from traditional sources before the project.

Water consumption; facilitation; Tanzania

49. WHO/CWS/CDD. (1993). **Improving water and sanitation behaviours for the reduction of diarrhoeal disease.** Geneva, WHO.

Safer disposal of faeces, handwashing after defaecation and before preparing food and eating and maintaining drinking water free from contamination are three key hygiene messages to be promoted to reduce diarrhoeal morbidity. To promote improved water and sanitation related behaviours three innovative and effective approaches are discussed: public health communications, participatory methods and school hygiene education.

Transmission risks; educational approaches

50. Wilson, J. M. et al. (1991). **Handwashing reduces diarrhoea episodes: a study in Lombok, Indonesia.** Transactions of the Royal Society of Tropical Medicine and Hygiene, 85, pp. 819-821.

Sixty-five mothers from a village in Lombok, Indonesia, received soap and simple health messages on causes of diarrhoea. These included suggestions to wash hands before preparing and eating food and after defaecation and were repeated fortnightly. Compared to a control group, diarrhoea episodes of children of these mothers reduced by 80% during the period of study. Whether the campaign has lasting results remains to be seen.

Handwashing; understanding, enabling factors (soap); Indonesia

51. Yacoob, May. (1989). **The USAID/CARE community water project in Haiti: an assessment of user education.** (WASH Field report, no 258). Arlington, Water and Sanitation for health project.

Local women promoters organize health discussions with groups of 10-15 men and women in a community standpipe programme in Haiti. Themes in the three weekly meetings are based on results of baseline surveys and include handwashing, latrine use, standpost hygiene and covering water vessels. Evaluation of the health impact is planned for, but focusses on increased knowledge. The author recommends to look for handwashing materials in cooking areas and near latrines as indicators for actual behavioural change.

Handwashing, latrine use, waterhygiene; facilitation, understanding; Haiti

52. Zeitlyn, S. (1991) **Measuring hygiene behaviour: the importance of meaning and definition.** Paper presented at the workshop on measuring hygiene behaviours, Queen's College, Oxford, 8-12 April 1991.

Handwashing is taken as an example to illustrate that for a behaviour to be measured usefully, it must be found out why people behave as they do — different types and reasons of handwashing — and which aspects of the behaviour are most important to reduce disease transmission — quantity of water used, type of cleansing agent, action of the hands etc. To be able to modify behaviour it must be evaluated which crucial aspects are practically applicable in everyday life.

Handwashing; practices, beliefs, research methods, Bangladesh

53. Zeitlyn, S. & F. Islam. (1991) The use of soap and water in two Bangladeshi communities: implications for the transmission of diarrhoea. *Review of infectious diseases* 1991; 13 (4), pp. 259-264.

A study done in two poor communities in Bangladesh revealed that cleanliness is viewed in a socio-religious context of purity versus impurity and not directly related to diseases. Handwashing after defecation and before eating is done by routinely pouring water over the hands and is thus not effective in removing pathogens. Soap is seen as a luxurious and expensive item and not often used. Rubbing hands is avoided because right and left hands should be kept separate. Children are not encouraged to wash hands because of the deleterious cooling effects of both water and soap.

Handwashing; beliefs, practices; Bangladesh

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Motivating Better Hygiene Behaviour: Importance for Public Health Mechanisms of Change

Each year millions of children suffer from diarrhoea and other diseases. Many of these diseases, and the resulting malnutrition, disability and death, result from risky hygiene practices. Addressing these practices and the associated health problems is of vital importance in achieving the World Summit Goals and the Water and Sanitation Decade Goals set by member countries of the United Nations.

Currently, UNICEF is working towards strengthening the hygiene component in water and sanitation programmes. Simply, improved water and sanitation facilities do not automatically lead to their appropriate use and adoption of better hygiene practices. However, conventional hygiene education programmes are not a solution either.

This paper summarizes why conventional hygiene education programmes fail in convincing people to adopt and use safer hygiene practices. First, fallacies are discussed to dispel myths about hygiene practices and hygiene education. The paper then discusses how people change their hygiene behaviour, as individuals, groups and communities. It also addresses the motivating factors that play a major role in the process of behaviour change. It presents two alternative types of hygiene programmes that aim especially at good practices. Special attention is paid to the roles played by differences in socio-economic and cultural conditions and the reasons for a gender approach in all hygiene programmes. The final chapter provides suggestions for politicians and managers, stressing the need for professional recognition of hygiene, research gaps, and opportunities for information exchange.

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