WATER HYGIENE IN BOTSWANA

FROM WATER HYGIENE CAMPAIGN TO EDUCATIONAL PROGRAMME

Final Report
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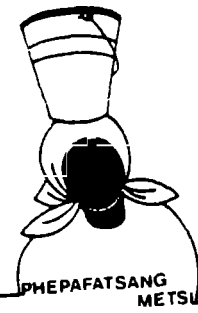

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SUMMARY

The Water Hygiene Campaign was launched at the National Family Health Day in August 1984 after seven months of preparation, mainly production of educational material. From August onwards workshops at the national, regional and village level were used in order to train community workers in water hygiene and to spread information about the campaign to the public. Massmedia (radio and newspapers) were also involved. The campaign has worked through existing channels of information, primarily schools and the health education system. The main objective has been to make villagers in villages with piped water aware of the health risks of using contaminated water for drinking and teaching them more hygienic methods of handling and storing water.

The campaign has been run by a coordinator in cooperation with a reference group of members from the Ministries of Mineral Resources and Water Affairs, Health, Education, Local Government and Lands, Finance and Development Planning, the department of Tirelo Setshaba and SIDA. From February 1985 the coordinator had a local counterpart.

The Water Hygiene Campaign has achieved considerable attention and support all over the country during less than a year of work. From May 1984 to April 1985 the Water Hygiene Handbook, the Water Hygiene Workbook, posters, pamphlets and other educational material have been finalised and radio programmes have been produced. Eleven water hygiene workshops have been arranged in different parts of the country. Around 2.000 persons have got information about the campaign through workshops, seminars and lectures. Nine household water quality surveys have been carried out. Handwashing projects have been initiated in two schools.

The achievements have been due to the following factors:

- The ground was prepared as health and hygiene education had been carried out for a long time in the country. Health staff were prepared to add water hygiene education to their tasks and use the educational material produced.
- The coordinator was allocated an office within the Ministry of Mineral Resources and Water Affairs, which added significance to the campaign and facilitated the work in practical matters.

- The coordinator had freedom to act and react directly at ideas and proposals and to add new elements to the campaign.
- Funds were readily available for workshops and projects without innecessary bureaucratic restraints.
- The reference group had an advisory function. It discussed and approved of plans of implementation at large but did not interfere in details.

Major constraints have been:

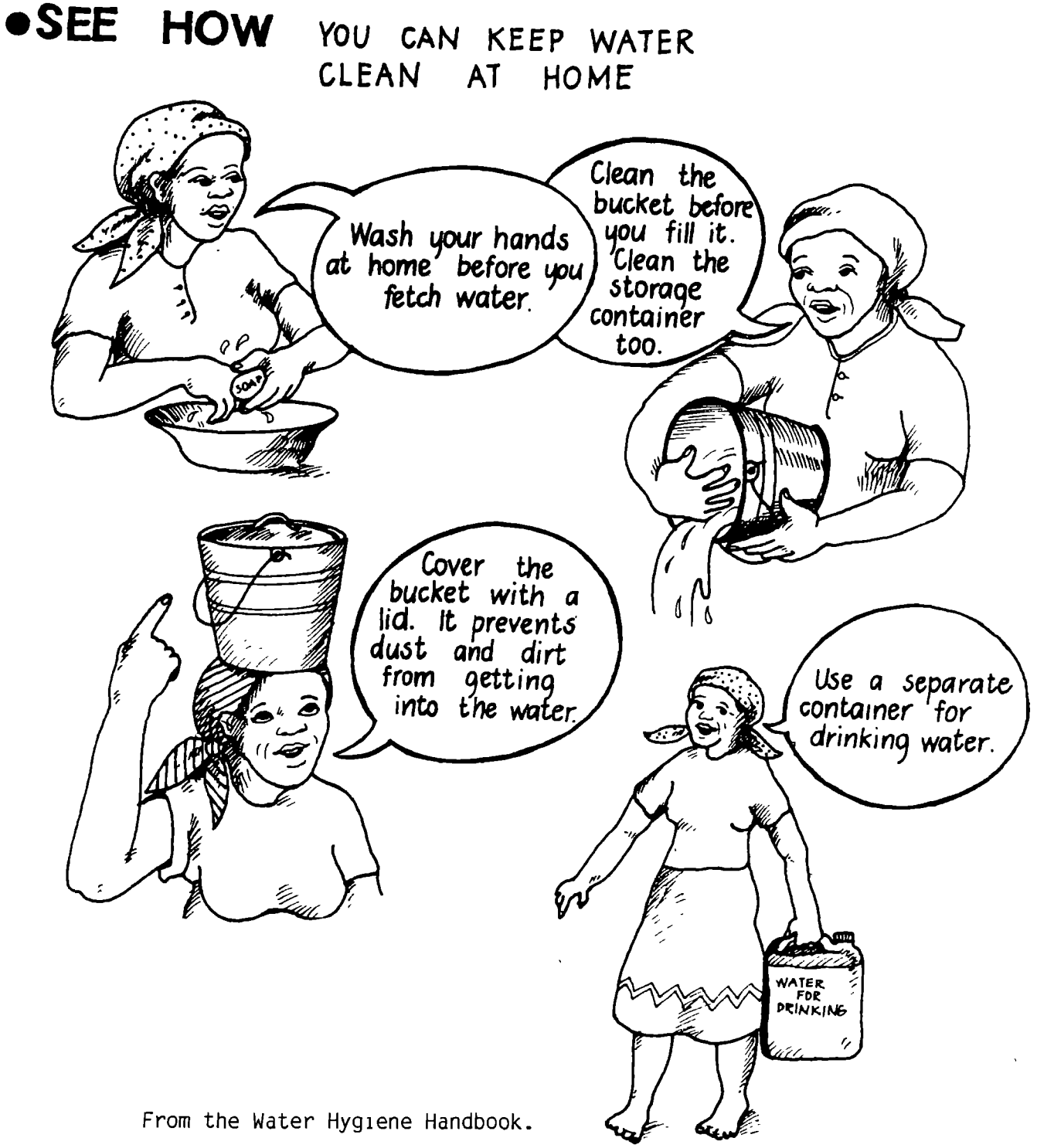
- The short term contracts of the coordinator.
- Delay to identify a counterpart.
- Lack of transport.

From July 1985 the campaign will gradually develop into an ongoing health education programme of water hygiene. Funds of SEK 1500.000 have been granted by SIDA for a three year period.

The water hygiene education programme will work from the health education unit, Ministry of Health, and is planned to continue along the same lines as the campaign with workshops and household water quality surveys as the basic means of dissemination of the messages and assessment of the programme. Educational material produced for the campaign should be used and the production of local educational material should be encouraged. The programme should be monitored through a system of workshops, meetings, fieldtrips and regular reporting.

Cooperation and involvement of officers at all levels from different ministries will be a crucial factor for the impact of the programme. To this end an interministerial workshop, with the purpose of promoting coordination of efforts and discussing practical ways of cooperation, has been proposed. The interest and involvement of women in the Water Hygiene Campaign has been an important factor for its success and it is important that it is sustained, but as the programme deals with the health and wellbeing of the whole family, men should not be left outside but be encouraged to do their share of health education both as professionals and at home.

A continuous evaluation of the programme should be carried out in the form of household water quality surveys. An assessment of the effectiveness of the educational material should be made. An in-depth study on water quality, handling and storage should be carried out. Together with baseline data from the national health survey the study would provide material for an assessment of changes in household water quality and behaviour in relation to water and possibly also to changes in health status.



From the Water Hygiene Handbook.

INTRODUCTION

The Water Hygiene Campaign was initiated in order to complement the SIDA-financed Village Water Supply Programme, which since its start in 1971 has supplied almost 50 percent of Botswanaś rural population with piped water of good quality for drinking. The aim of the programme has been to increase both the quantity and quality of water available for household purposes in the villages with the ultimate goal of improving the health status of the villagers.

But even in villages with piped water of high quality and although water consumption almost doubles in the households when a village gets piped water, diarrhoea and other water-related diseases are prevalent and diarrhoea with following dehydration is the most common cause of death in small children.

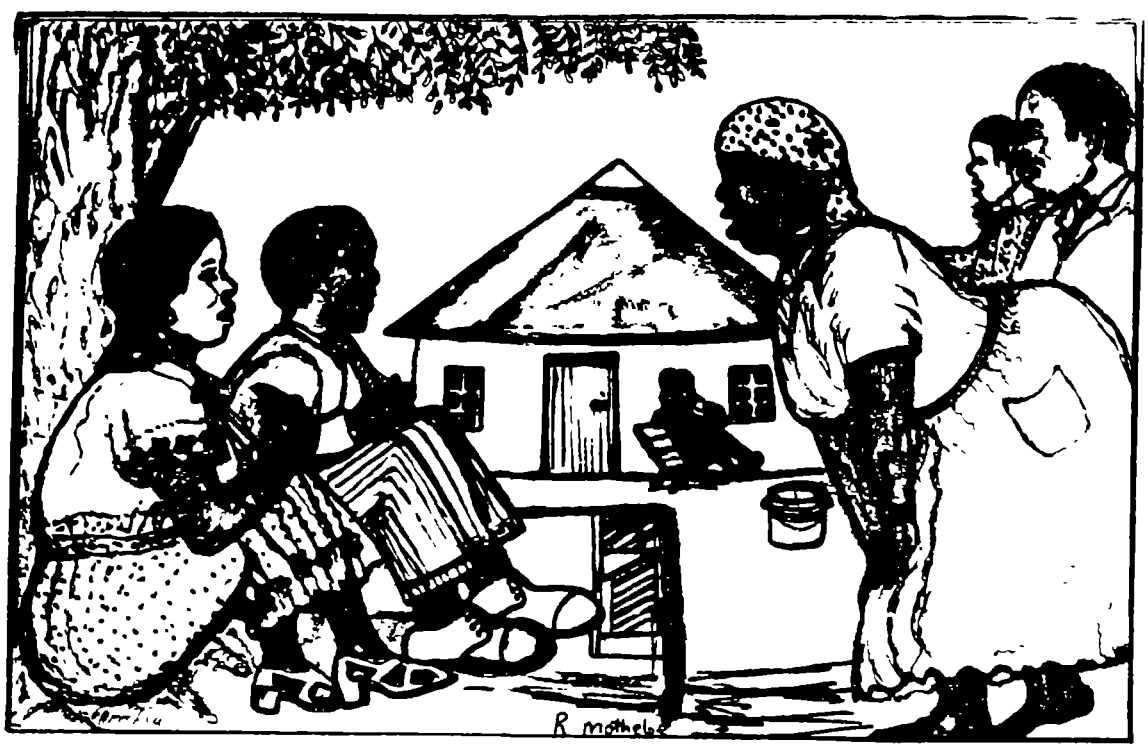
In 1982 it was stated that the provision of piped water in the villages should be combined with a programme of community water hygiene education in order to get all the possible health benefits of the clean water provided at the standpipes. The consultants of the Water Quality Study (1982) observed that water kept and consumed in the households was often contaminated. These findings were confirmed by the household water quality surveys carried out during the planning period and implementation of the Water Hygiene Campaign. The contaminated water in the household containers and the disease pattern in the country demonstrated the need to make an educational programme of water and hygiene an integrated part of the Village Water Supply Programme and gave an indication of the scope.

The Water Hygiene Campaign was launched in August 1984. From July 1985 the campaign will gradually develop into an ongoing programme of water hygiene education within the health education unit of the Ministry of Health and be integrated with other health education activities in the country. SIDA has granted funds (SEK 1500.000) for the following three years. At a reference group meeting in April 1985 it was decided that it was of vital importance for the development of the water hygiene education programme that the achievements, problems and constraints of the Water Hygiene Campaign and the experiences of the coordinator should be compiled into a final report.

The report is in two parts, which can be read and used separately. The first part is a description of the Water Hygiene Campaign from December 1983 to April 1985 and is based on the progress reports and the coordinator's personal experiences. It is also an attempt to evaluate the campaign in relation to the goals set in the plan of action of the report Water Hygiene Campaign Botswana, 1983.

The description of the implementation of the Water Hygiene Campaign with achievements and constraints will give a general background for the development of the campaign into a programme of water hygiene education. It can also serve as guidelines for similar programmes in other countries.

Part two of the report deals with the development of the water hygiene education programme and discusses relevant issues from the implementation of the Water Hygiene Campaign. It formulates a plan of action for an educational programme, based on the experiences of the Water Hygiene Campaign, and suggests a system of monitoring the programme. It also discusses the possibility of evaluating the programme in relation to improvement of health status and proposes different methods of evaluation.



From the literacy booklet Moloi wa metsi.

WATER HYGIENE CAMPAIGN BOTSWANA

BACKGROUND

The Water Hygiene Campaign in Botswana was initiated in order to complement the Water Development Programme. The agreement between SIDA and Botswana government in 1981 on phase IV of the Village Water Supply Development Programme contained an element of "information with regard to health and sanitary aspects". In May 1982 the SIDA Joint Review Team expressed its opinion that the provision of piped water to the villages should be supplemented by a programme of community health education, which should aim at raising the awareness of the villagers of beneficial health effects of handling water in a hygienic manner. The intention was to strengthen ongoing efforts in the country and build in a bias towards water hygiene in other hygiene education projects. Pula 144.000 was set aside for health and hygiene campaigns.

Village woman learns about water hygiene through the literacy programme.

In March 1983 I was engaged as a SIDA-consultant to do the planning for the Water Hygiene Campaign. The aim of the consultancy was to identify the extent of water contamination in the households, state the most important messages of the campaign and formulate a plan of action. In June 1983 a final report was presented and it was decided that a Water Hygiene Campaign should be implemented in accordance with the plan of action in the report. In December 1983 I started working as a coordinator of the campaign with a contract that would expire in April 1984. This contract was first extended to June 1984 and later until April 1985. In February 1985 I got the assistance of a local counterpart, a newly graduated health inspector, who continued the work when I left Botswana in April 1985.

IMPLEMENTATION DECEMBER 1983 - APRIL 1985

In December 1983 I started to work on the implementation of the Water Hygiene Campaign in accordance with the plan of action in the report Water Hygiene Campaign Botswana (1983). The first half of 1984 was almost totally dedicated to the production of educational material in order to get a pamphlet and a poster ready in time for the launching of the campaign in August 1984. Members of the reference group and staff from other departments were also contacted in order to ascertain how different ministries and departments would be able to assist the campaign in terms of production of material and implementation. The preparation of the Water Hygiene Handbook, which would be the basic educational material for the campaign, was started.

At the reference group meetings in February and April more detailed plans for the campaign were discussed and the logo - a woman with a bucket on her head - was agreed upon in June. The logo was used as a poster for the National Family Health Day and on the cover of the pamphlet and also on letterhead and introduction cards.

Seminars and workshops arranged for teachers, health workers and extension workers turned out to be valuable for arousing interest in the campaign. Discussing water hygiene with students and professionals provided useful information on the situation in different parts of

the country for the detailed planning and implementation of the campaign. Lectures were given on the themes of the campaign for health assistant students at the National Health Institute and in Mahalapye for health assistants and inspectors in the region.

Initial contacts were taken with the regional health teams, the Self-Help Sanitation Project, Tirelo Setshaba and other groups of professionals who would be suitable to involve in the work. Plans were made for household water quality surveys in different parts of the country and in May surveys in Mogapinyana and Malolwane were carried out. The aim of the surveys was to obtain information about the handling and storage of water and the degree of contamination in order to direct the campaign.

Contacts were taken with the Teacher Training Colleges in Lobatse and Serowe and a draft of an activity book for primary schools, the Water Hygiene Workbook, was discussed. The College in Lobatse later tested both the Water Hygiene Handbook and the Water Hygiene Workbook. In June two literacy booklets were ready for print, after pre-testing in literacy groups. In July the Water Hygiene Campaign featured at the trade fair in Gaborone with a photo exhibition, distributed pamphlets and sold T-shirts and stickers with the logo.

The Water Hygiene Campaign was launched on the National Family Health Day on August 7 with a speach over the radio on the topic of the campaign - Keep the water clean. A poster and a pamphlet had been produced by the health education unit and were under distribution to the regional health teams. An article about the campaign was published in the Daily News.

From August onwards workshops at national, regional and village level were arranged in order to train community workers in water hygiene and to spread information about the campaign to the public. From end of September to December the campaign arranged six workshops in different parts of the country. Another household water quality survey, with samples taken from plastic containers, was carried out in Malolwane.

The contacts with most of the regional health teams were fruitful and in November the first national water hygiene workshop was arranged in Gaborone with participation of members of the regional health teams from the whole country. A printed draft of the Water Hygiene Handbook was presented and the participants of the workshop were trained in using it. Communication skills and the use of pictures in health education were also on the programme. Dates for regional water hygiene workshops in the beginning of 1985 were agreed upon. The participants requested a follow up of the workshop in April 1985 in order to assess achievements, share experiences and make plans for the future.

Twelve Matshelo-Programmes, produced by the Institute of Adult Education, were sent on the radio and several articles about the campaign were published in the Daily News. In December all the Tirelo Setshaba participants were briefed about the campaign at their training courses in Francistown, Serowe and Lobatse and got a copy of the Water Hygiene Handbook to use in the field.

In January 1985 the campaign entered a very active stage and turned more directly to the general public. All the planned regional workshops were arranged, as well as two village workshops. There were articles about the activities in the Daily News, Botswana Guardian and Kutlwano and the campaign was mentioned on the radio news. During the whole of January the logo of the campaign appeared in the head of the Daily News. Two pilot projects on handwashing in primary schools were started and educational material was tested and finalised. A group work on water handling and storage, produced by the campaign, and a Canadian video-film, "Prescription for Health", were used at the workshops. Six posters on handwashing, produced together with the occupational health unit, were printed and distributed to all primary schools and regional health teams.

In April 1985 the second national water hygiene workshop was arranged in Gaborone with participation of regional health teams from the whole country. The workshop included lectures on water sampling and the new WHO guidelines for drinking water, protection of wells, National Health Status Evaluation Programme and Self-Help Sanitation

Programme. The participants reported about water hygiene activities in their regions. The workshop finished with a set of general recommendations and guidelines for the development of the water hygiene education programme. An interministerial workshop, promoting cooperation in the field of water hygiene, was discussed and recommended.

Water hygiene education carried out in the form of song and dance.

IMPORTANT ISSUES FOR THE IMPLEMENTATION

MESSAGES

1. Keep the water clean

Keep the water clean -PHEPAFATSANG METSI - was early identified as the most important message of the Water Hygiene Campaign in Botswana. The Water Quality Study (1982) showed that 85 percent of the piped water in villages in Botswana was of good quality for drinking and that it was always of better quality than water from traditional sources. Household water quality surveys, carried out in different parts of the country by the Water Hygiene Campaign, showed that clean stand-pipe water was usually contaminated in the households due to unhygienic handling and storage of water. Thus people consumed contaminated water although they had fetched clean water from the tap. The most important part of the campaign would be to make people aware of this problem, to discuss handling and storage of water in practical terms and to give suggestions for more hygienic storage containers.

Discussing contamination of household water in the workshops, people have often been very shocked at the results of the tests. A combination of improved basic hygiene and more practical storage containers for water is necessary in order to improve the quality of household water. Plastic containers with small opening and lids have been distributed to villagers and sampling from them have given very encouraging results. Therefore this type of container has been recommended for storage of water.

Keep the water clean should be the most important message also for the water hygiene education programme.

2. Use more water for personal hygiene

Some water-related diseases are more due to the quantity of water consumed than to the quality. Due to the shortage of water in Botswana, water consumption has traditionally been very low and people use very little water for household purposes.

When a village gets piped water, water consumption usually doubles from 5-6 liters per person per day to 10-12 liters. Water schemes have been designed for a water consumption of 20 liters and the more recent ones for 30 liters, so there would normally be a scope for higher consumption. As the planning and implementation of the campaign was carried out during a drought period this message was sometimes difficult to convey and had to be used with care. Under this message more frequent handwashing, both in homes and at schools was promoted.

3. Keep to standpipe water

In Botswana people often have three sites for living - in the village, at the lands and at the cattlepost. This means that during part of the year they do not have access to piped water, but have to use traditional sources. Sometimes when piped water is available, people prefer water from traditional sources because it tastes nicer or the distance is shorter. Also when the water system breaks down traditional sources have to be used. Moreover people in small villages or remote areas will have to rely totally on traditional sources of water for many years to come.

The target of the Water Hygiene Campaign was villages with piped water but it has been impossible to ignore the use of traditional sources. So the third campaign message emerged: KEEP TO STANDPIPE WATER. As the campaign develops into a programme of water hygiene education the protection of wells and purification of water from traditional sources should be promoted through this message.

As diarrhoea is the most common and serious of the water-related diseases, information about the prevention of diarrhoea and treatment with oral rehydration therapy was included in the campaign. A combination of better personal hygiene, clean drinking water and treatment of diarrhoea with oral rehydration solution should decrease both the incidence of and deaths caused by diarrhoea with related dehydration, especially in children under five. A campaign informing of oral rehydration had previously been carried out in Botswana and the Water Hygiene Campaign could build on it. Health staff was well informed,

educational material had been produced and oral rehydration salt was available in most clinics and health posts. In the water hygiene workshops emphasis was put on the prevention of diarrhoea and practical advice was given.

CHANNELS

1. Regional health teams

The regional health teams were approached and asked for assistance at an early stage and a contact person was appointed in each region. They got information about the campaign through letters and pamphlets and personal visits by the coordinator to each region. Workshops arranged by the regional health teams were used for testing of educational material.

Members from the regional health teams participated in two national workshops in Gaborone. The workshop in November 1984 discussed the implementation and future of the campaign and served as an exchange of ideas. Many valuable suggestions came up and were later implemented. The participants suggested that national workshops for the regional health teams should become part of an assessment plan for the campaign and a second workshop was arranged in Gaborone in April 1985.

The regional health teams have made the practical arrangements for the water hygiene workshops in the regions and have also included the topic of water hygiene in the schedules for other workshops in 1985. The training they have got in water hygiene and the use of educational material produced for the campaign will enable them to give talks on the subject and conduct group works. The regional health teams have been very active and suggested new projects, for example hand washing projects in schools and the production of a video film for local use.

2. Family welfare educators

At the village level the family welfare educators have been very interested in the campaign and have done a lot of practical work, teaching villagers more hygienic methods of handling and storing

water. The problems with unhygienic treatment of water have of course not been unknown to them, but they have often been surprised at the level of contamination of household water that has been disclosed at the household water quality surveys. They have appreciated the material produced for the campaign and used it in their health talks and have often had ideas for improvement of the material. In many villages they have made the practical arrangements for the village workshops together with the village health committee. Nurses in the clinics have also taken a lot of interest in the campaign, but family welfare educators do most of the practical health education. Water hygiene education should be included in their training programme and followed up at in-service seminars.

3. Teachers

Planning the campaign it was clearly stated that teachers would be important key-persons for the dissemination of the messages. They have a great influence on schoolchildren as well as on adults through the parent teacher organisation and other volontary organisations. Teachers have been involved in the campaign through workshops organised by the regional health teams. They have been active and interested and have been keen on receiving the Water Hygiene Handbook and Workbook as no similar educational material has been available previously.

For the future the contacts with the teachers should be intensified and their involvement should be discussed with the district educational officers. Teacher training colleges should be informed about the programme and copies of the video-film "Prescription for health" should be bought and distributed to them together with educational material produced by the campaign. At teacherś in-service training water hygiene should be a topic and information given about the handbook and workbook.

4. Tirelo Setshaba

The Tirelo Setshaba participants have been considered important agents for the campaign as they both work as teachers and health educators and assist in the kgotla (village council). They are also well educated and highly motivated for "doing" something.

The participants were easy to reach for information as their training is concentrated. 500 participants got information about the campaign at the training courses in Francistown, Serowe and Lobatse in December 1984, and were given a copy of the Water Hygiene Handbook. Participants in the field have also been invited to regional and village workshops.

As Tirelo Setshaba participants usually work in remote areas, in villages without piped water, the department of Tirelo Setshaba has considered protection of wells and purification of water important topics to add to the water hygiene education programme. The performance of the Tirelo Setshaba participants has not yet been assessed in relation to teaching water and hygiene. This should be done as soon as possible.

5. Department of Non-Formal Education

Literacy groups were regarded as good channels for information and contact with the Department of Non-Formal Education was taken at an early stage. Cooperation has been very smooth and has resulted in two literacy booklets, printed by the department, and a series of radio programmes. The books have been appreciated by the literacy leaders and students. One constraint has been the distribution of material from the central organisation in the district to the literacy groups. The regional health teams have been asked to ensure that the books reach the groups.

6. Self-Help Sanitation Project

There has been a lot of cooperation between the Water Hygiene Campaign and the sanitation project. The coordinator of the project was a member of the reference group and at district level the campaign has worked with the district coordinators in Kgatleng and Kweneng. In Kgatleng two village water hygiene and sanitation workshops and several household water surveys were organised with the help of sanitation staff.

The effect of a combined effort of water hygiene and improved sanitation should be assessed in Malolwane, where most of the latrines have been built.

7. Water technicians and pumpers

Water technicians have been lectured on water and hygiene at their training courses. It has then been discussed whether water hygiene education should be carried out by them. Usually the students have responded favourably. Cooperation between the water technicians and the regional health teams should be strengthened so that they could assist each other in arranging water hygiene workshops in villages with new water schemes.

In the village the pumper could have an important function for water hygiene education. He should cooperate with the clinic and school and explain to the villagers how the water system works, thereby creating understanding for the "keep the water clean"-message.

HOUSEHOLD WATER QUALITY SURVEYS

The household water quality surveys have two purposes - they direct in the planning and implementation of the campaign and serve as a continuous evaluation. Random household water samples were taken and analysed in the Water Quality Study (1982). It was then found that the quality of the water deteriorated on the way from the tap to the point of consumption. The contamination of household water in storage containers was confirmed by more extensive household water quality surveys during the planning of the campaign, and decided the overall scope of it.

The household water quality surveys have continued during the implementation phase and have both served as a source of information of water handling and storage and as an evaluation of the effect of workshops and information and the use of plastic containers for water storage. Surveys have been carried out in villages with piped water before and after workshops and the distribution of plastic containers and also in some villages without piped water in order to determine the difference in water consumption and contamination of household water between traditional sources and piped water.

There is a risk for contamination of household water at the source (borehole and standpipe) if it is not protected (usually it is not in Botswana), but according to the Water Quality Study 85 percent of the piped water in the villages had a good quality for drinking. Serious contamination of household water happens in the homes due to unhygienic handling and storage. It has been the objective of the Water Hygiene Campaign to decrease the contamination of water in the households by creating an awareness of the problem and suggesting practical methods of handling and storing water. The surveys do not show any change in contamination after a period of information but there are indications that storage of water in closed plastic containers decrease contamination. Therefore the Water Hygiene Campaign has recommended the use of a separate plastic container with a lid for drinking water. When these containers have been distributed free of charge they have been readily accepted, but people usually find them too expensive to buy at their own expense.

See Tables page 63.

Mogapinyana

The first more extensive household water quality survey was carried out in Mogapinyana, Central District, a village where piped water had not yet been introduced. Mogapinyana has a population of 596, number of households 105 (census 1981). Most of the people in the village were occupied with traditional agriculture and a majority of the households were female headed. Most households had no sanitation, there were only 4 pit latrines in the village. Water supply came from a number of wells on the far side of the river, a well in the old dam and a new dam. There was a charge for the water from the old dam and it was only open in the mornings. The survey showed that the water sources were very contaminated but the contamination was still higher in the household containers. People often had 500-600 meters to walk and water consumption was 6-7 liters per person per day.

The intention was to come back to Mogapinyana for another survey after the introduction of piped water, but the water scheme was delayed and is expected to be installed in 1985. The first survey should

then be followed up by intensive water hygiene education in the village, household water quality surveys before and after training period and after distribution of plastic containers. It will then be possible to measure changes in quality and consumption of water at several stages and assess the effect on water quality in the households of water hygiene education and special storage containers.

Malolwane

Malolwane is one of the river villages in Kgatleng district. It has a population of 1.360, number of households 243 (census 1981). Most of the population is occupied with traditional agriculture and most of the households are female headed. Water is supplied from two boreholes and 9 standpipes. Four households have water piped in the plot. The majority of the people take water from the standpipes but use water from the river in case the pump breaks down. According to the Self-Help Sanitation Programme, which is working in the village, 41 households have pit latrines and ten more are under construction.

The Water Hygiene Campaign has worked in Malolwane in cooperation with the sanitation programme which has assisted in the household water quality surveys and made the practical arrangements for two workshops.

The water quality at the standpipes was good but water was badly contaminated in most of the households. Mean distance to a standpipe was 120 meters and the average water consumption was 10 liters per person per day. In the sample of 26 households there had been 6 cases of diarrhoea during the last 7 days.

Only two households had water with the same bacteria count as the standpipes. Eight households altogether had water of fairly good quality. The rest had contaminated water in their containers.

Two water sanitation workshops have been arranged in Malolwane, the first with participation of key persons from the village, the second also with participation from the other river villages included

in the sanitation programme. The results from the household water quality surveys were reported and different sources of contamination of household water were discussed. Hands and the dipper were identified as possible sources of contamination and it was decided to assess the degree of contamination of hands and dipper by distributing plastic containers for storage of water to the sample of villagers.

In July 1984, 30 plastic containers for storage of drinking water were distributed in Malolwane and in October 22, 1984, water sampling from the containers was carried out. The results were very encouraging. Overall the quality of water was better from the containers than from the traditional containers sampled in the previous test. There were no cases of diarrhoea in the sample, although the prevalence of diarrhoea is usually higher in October than in May, when the previous test was done. It is not possible to draw safe conclusions from this small survey, but the trend is evident - it is easier to keep water clean in a closed plastic container, where neither hands nor dipper can get into the water, than in an open bucket or drum.

Gamodubu

Gamodubu in Kweneng district has a population of 934 (census 1981). It is a lands area and the population is very much spread out. Water supply came traditionally from wells along the river and a dam, which is divided into two parts, one for human consumption and one for watering cattle. Cattle are also watered at the wells. At a sampling in the Water Quality Study on June 9, 1982 water from one of the traditional wells was tested and found to be heavily contaminated with bacteria.

Household water in Gamodubu was tested at four occasions, before and after the introduction of piped water and twice after the distribution of plastic containers. In the first survey, on June 11, 1984, water was taken from traditional sources and was found to be badly contaminated both at source and in the households. Most people had a long distance to walk for water, 1.500 meters was not unusual, and water consumption was only 5 liters per person per day. In the

sample of 20 households, with together 135 persons, there had been 9 cases of diarrhoea during the last seven days.

The water system was put into operation around October 1984 and a new household water quality survey was carried out on January 28, 1985. Most people then took water from the standpipes but at a kgotla meeting people complained that people living in the outskirts of the village had too far to walk for the standpipe water, thus they still used the traditional sources of water.

Water quality at the borehole and standpipes was good and water consumption had doubled to 10 liters per person per day. Only a few households had water of good quality in their storage containers, mostly the water was badly contaminated. In the sample of 21 households there had been 6 cases of diarrhoea, of which only one was a child under five.

A water hygiene workshop with participation of key-persons in the village was arranged on February 9, 1985 and after that plastic containers were distributed to the same households which had participated in the previous survey.

A third household water sampling from plastic containers was carried out on April 29, 1985. Eleven samples were taken from the plastic containers which had then been used for ten weeks. Six households in the sample took water from the river and well.

Standpipe water stored in the plastic container had a good quality for drinking. Two households had had a case of diarrhoea during the last seven days in children under five. One of the households took water from the river, in the other household the adults drank from the container but the children were given river water for drinking.

Another survey was carried out on June 12, 1985, because some of the test results at the previous survey were unsatisfactory. The good quality of the standpipe water stored in plastic containers was confirmed at this survey.

Shoshong

Shoshong in Central district has a population of 4.600 and the number of occupied dwellings was 731 (census 1981). Most of the households were headed by women. Most of the villagers were occupied with traditional agriculture. The village has three bore-holes and most people take water from the standpipes. 7 households have water piped into the plot. There are 3 flush toilets and 51 pit latrines in the village.

Household water sampled in the village of Shoshong.

Water in Shoshong has been sampled at four occasions, the first time during the planning stage in May 1983. A more extensive household water quality survey was carried out on October 7, 1984, and the test results confirm similar surveys in other villages - water was clean at the standpipe but becomes mostly heavily contaminated in the household. Every fifth household in the sample of 30 had had a case of diarrhoea during the last seven days.

A water hygiene workshop was arranged on October 10, 1984 and the results of the survey were discussed with key-persons in the village. The participants of the workshop were shocked at the results of the survey and discussed how water handling and storage could be improved.

Distribution of plastic containers were thought to be an interesting activity. Containers were distributed and water from them was tested on April 15, 1985. There was still some contamination of the water, but the quality was much better than from the traditional containers.

WORKSHOPS

Workshops has been the most effective means of spreading information about the messages of the campaign and to train health educators in water hygiene. Workshops have been arranged at three levels - national workshops, regional workshops with participation of health personnel, teachers, community workers etc, and village workshops with participation of key persons in the villages. The coordinator of the campaign has also lectured at workshops and seminars for health personnel, water technicians, community leaders etc.

National workshops

Two national workshops, with the participation of members of the regional health teams from the whole country, have been arranged. The workshop in November 1984 discussed health education and communication and the participants were trained in using the Water Hygiene Handbook. The development of the campaign was discussed. The participants

suggested a follow up of the workshop in April 1985 because the sharing of ideas was so valuable.

From the first national water hygiene workshop in November 1984.

The workshop in April discussed water sampling and the new WHO guidelines for drinking water, protection of water sources, the National Health Status and Evaluation Programme and sanitation. The participants reported about water hygiene activities in their districts. All regions had had water hygiene workshops and were prepared to include the topic of water hygiene in the programmes of seminars and workshops during 1985. They were interested in doing more water sampling and also to distribute plastic containers. The pilot projects with handwashing in schools were regarded as very interesting. In one district health clubs in the schools had been started. In Southern District a district water sanitation committee had been initiated, which will be responsible for the planning and reporting of water hygiene activities to the Water Hygiene Campaign. The other regions were interested in forming similar committees in their regions.

The workshop finished with a set of general recommendations and a plan of action for the future implementation of the campaign and the development into a programme of water hygiene education. Cooperation and coordination between different departments at district level

were discussed. An interministerial workshop on water and hygiene at senior operational level was suggested as a forum for discussion.

Regional workshops

Eleven regional workshops were arranged between September 1984 and April 1985, in Kang, Gantsi, Maun, Kasane, Molepolole, Letlakeng, Selebi-Phikwe, Francistown-Tutume, Mochudi-Mahalapye-Serowe and Ramotswa. Participants were health personnel, extension workers, teachers, district council staff, water unit staff, voluntary organisations etc. The workshops were organised by the regional health teams and have had around 40 participants each.

The workshops were opened and closed by a council secretary, chief or other "official" person. The regional medical officer or health inspector talked on water-related diseases and sanitation and an officer from the water unit briefed the workshop on the water situation in the district. The coordinator of the Water Hygiene Campaign and her counterpart talked on water handling and storage and the lecture was followed by a groupwork that led to interesting discussions and active participation of the workshop. A video-film, "Prescription for health", which gave an excellent summary of the talks on diseases, sanitation and clean water, was shown in some places.

Village workshops

Village workshops were conducted in Maun, Thamaga, Gamodubu, Shoshong and Malolwane from October 1984 until April 1985. The workshops were arranged by the regional health teams and village health committees, and, in Malolwane, in cooperation with the Self-Help Sanitation Programme. Participants were around 40 key-persons in the villages. The programme consisted of lectures in the morning, mixed with songs and role play, and groupwork in the afternoon. In Malolwane, Shoshong and Gamodubu the workshops were combined with household water samplings.

Village water hygiene workshop in Malolwane 1984.

Thamaga had a workshop because the village has special problems with corrosive water, which makes people use river water instead of stand-pipe water. The workshop gave the participants an opportunity to discuss their problems and the Department of Water Affairs to explain what is being done to improve the water situation in Thamaga.

During the village workshops a pattern for future workshops emerged, that could be followed in villages with new water schemes. It is important to get different groups of people together and discuss the problem - health personnel, community workers, teachers and water unit personnel. The village health committees have proved capable of arranging workshops and should be asked to take on this responsibility in the future with the assistance of the regional health teams and the sanitation project. Workshops for key persons in a village should

be followed up with kgotla meetings for the general public and intensive water hygiene education at the clinic, in the school etc. The workshop should finish with a plan of action for water hygiene education, where the responsibilities of each group of community workers is clearly stated.

Lectures and information about the campaign

Water hygiene has been taught by the coordinator at the National Health Institute, at courses for water technicians and Tirelo Setshaba participants, and seminars for Nurses, Family Welfare Educators and community leaders. Lecturing at courses is an effective way of reaching a lot of people with information. Staff from the regional health teams in all districts have been trained in water hygiene and should be able to give talks on the topic, with the help of educational material produced for the campaign. In Kweneng district the coordinator informed about the campaign at a full council meeting. It is a very good forum for spreading information to village officials and the coordinator or staff from the regional health team should talk at full council meetings in all districts.

From May 1984 to April 1985 around 2.000 persons were reached by the messages of the Water Hygiene Campaign at workshop seminars, training courses and lectures.

The Water Hygiene Campaign has supplied the radio and the Daily News with press releases from most activities and has got good coverage. Articles for magazines have also been written. This kind of public relation work is very important for the spread of the campaign to the public and must be continued intensivly. Radio programmes have been produced for the campaign by the Institute of Adult Education and the Department of Non-Formal Education. It has been suggested that some of the radioprogrammes should be copied on casettes and distributed to the regional health teams where they could be used for discussion and radio learning groups. Other radio producing organisations, like 4B groups, should also be encouraged to spread information about water hygiene. The School Radio Broadcasting was contacted at an early stage but the contact did not continue due to

lack of time from the part of the coordinator. It would be an important contact to renew. At workshops the participants often write and compose special water hygiene songs that have been included in the radio programmes. A water hygiene song contest could be arranged to booster this interest.

EDUCATIONAL MATERIAL

Water Hygiene Handbook. The draft of the Water Hygiene Handbook was printed in 1.500 copies by the Cooperative Printers. It has been used and distributed at workshops, one copy has been sent to all primary schools and all Tirelo Setshaba participants have got a copy each. The revised final version of the Handbook was printed by the Government Printers in 10.000 copies and will be distributed to primary and secondary schools, Teacher Training Colleges and other training facilities, regional health teams, water units, District Councils etc. The Handbook will be translated into Setswana for the benefit of especially Family Welfare Educators, primary school teachers and pumpers. The Handbook forms the basis of educational material produced for the campaign and has been very well received.

Water Hygiene Workbook. The target group of the Workbook is upper primary and lower secondary schools, therefore it is in English. 10.000 copies has been printed by the Government Printers and will be distributed through the Ministry of Education.

Moloi wa Metsi. The book was produced as an Easy Reader for the literacy programme. It was printed in 10.000 copies by the Department of Non-Formal Education and has been distributed and used by literacy groups. It has been very well received and a reprint of 5.000 copies has been ordered for distribution to the primary schools.

Phepafatsang Metsi. The book was produced for the literacy programme and printed in 5.000 copies by the Department of Non-Formal Education.

Keep your water clean. The pamphlet was produced for the National Health Day 1984 and printed in 5.000 copies in English/Setswana. Another 5.000 copies have been printed and are being used for workshops.

Groupwork on handling and storage of water. The groupwork is in Setswana and was printed in 5.000 copies. It has been used at almost all the workshops during 1985. It takes an hour to do and leads to interesting discussions. In Kgalagadi and Francistown some of the participants did not understand Setswana, but they got help from other participants and could take part of the activity. The Groupwork has been distributed to the regional health teams for use in their workshops.

Posters. The Keep your water clean-poster was printed for the National Health Day in 5.000 copies. They are now finished and a revised poster is on order. A set of 6 posters on handwashing has been produced by the Water Hygiene Campaign in cooperation with the occupational health unit, Ministry of Health. The posters have been distributed to primary schools and regional health teams and to industries through the occupational health unit. They have been well received by health educators and teachers.

Radio programmes. A series of 12 programmes featuring role plays, interviews and songs, produced by the Department of Non-Formal Education, has been introduced by a speach by the Minister of Mineral Resources and Water Affairs. A series of 12 Matshelo-programmes were produced by the Institute of Adult Education in 1984. They will be repeated in 1985. It has been proposed that the best programmes should be copied on cassettes and distributed to the regional health teams for radio learning groups.

Video-film. "Prescription for Health", a Canadian video-film on the spread and prevention of disease, sanitation and handling of water in a clean way was purchased from the Canadian Institute of Development Research. The film has been very popular among the participants of the workshops and the purchase of more copies for the Teacher Training Colleges and other institutions with video has been recommended. The video-film has also given inspiration to the regional health team in Maun to try to produce their own film on water handling and storage.

Press releases and articles. Press releases were given to the information officers after most of the regional workshops and several articles about the campaign and special projects have been published. The article from Kutlwano has been used as an information pamphlet at workshops. Articles about the campaign have been written for MOSO and the teachers magazine. The campaign has also been mentioned on the radio on several occasions. During the whole of January the logo of the campaign appeared in the head of the Daily News.

Teacher teaches handwashing. From handwashing project in Maun 1985.

T-shirts and stickers. Phepafatsang Metsi T-shirts have been popular prizes in the draws that usually finish the workshops. 20 T-shirts have been given as prizes at a contest in the primary school magazine MOSO. Stickers have been distributed at workshops and put on cars.

PROJECTS

Handwashing project. Two pilot handwashing projects have been started, one in Maun and one in Lotlhakane Primary School, Lobatse. Botswelelo Primary School in Maun was visited in February and the project was discussed with teachers and students. Buckets, basins and soap were bought to all the classrooms at a cost of less than Pula 100. The children were encouraged to wash hands before eating and after being to the toilet. The teachers did extra hygiene education in all standards. One of the teachers had attended the water hygiene workshop in Maun in 1984 and planned to arrange a similar workshop for the other teachers at the school. The project in Lobatse has just started and no information is yet available as to how it works.

Local video-film. The regional health team in Maun has been granted funds (to buy a video-tape) in order to produce an educational film on water handling and storage.

T-shirt on sale at the Trade Fair in Gaborone 1984.

ACTIVITIES TO BE FOLLOWED UP

- Intensify contacts with the regional health teams. The Water Hygiene Campaign should distribute progress reports and other relevant material to the teams and they should send regular reports on water hygiene activities.

- Contact Teacher Training Colleges and discuss how water education can be integrated into their syllabus. Supply them with the Water Hygiene Handbook, the Water Hygiene Workbook and other relevant material. Buy copies of "Prescription for Health" and give to each college.

- Contact education officers in the districts and inform them about the campaign. Find out the best way of reaching teachers in the districts. Send information material to schools.

- Arrange special workshops for teachers in water hygiene and train them in using the material available.

- Contact officer in charge of 4B activities in the Ministry of Agriculture and discuss how water hygiene can be included in their activities.

- Follow up established contact with MOSO (Primary School magazine) and supply them with articles and prizes for contests.

- Discuss with the Ministry of Education how water hygiene can be included in the syllabus of secondary schools.

- Strengthen contacts with the Department of Tirelo Setshaba and ask the participants to report about water hygiene activities carried out by them and their experience with using the Water Hygiene Handbook. The Water Hygiene Workbook should be included in their training material.

- Find out if reprint of literacy booklets is needed. Discuss the distribution system to the villages and ensure that the booklets reach the field and are being used in literacy groups.

- Participate in training seminars for literacy officers.

- Strengthen contacts with the sanitation officers in the regions. Find out how the campaign best can cooperate with them in hygiene education.

- The regions have been asked to give suggestions for villages suitable for village workshops and household water sampling. Follow this up. Choose if possible villages with new water schemes.

- Encourage cooperation between health personnel and council water unit staff.

- Ensure that water hygiene is included in the schedules of workshops in the districts and that there are officers available for teaching.

- Arrange national water hygiene workshops twice a year, the next should be in October-November, and discuss this report.

- Participate in training seminars for health workers, extension workers and water department staff.

- Find out how water hygiene can be included in the training programme of Family Welfare Educators.

- Encourage the production of more radio programmes and give all possible assistance. Bring tape recorder at workshops and use material for programmes.

- Continue the household water quality surveys and follow up villages where the campaign has been before. After the introduction of piped water, before and after distribution of plastic containers, Mogapinyana should be sampled. Plastic containers have been sent to Kasane for use in Pandamatenga. The village should be sampled before and after distribution of the plastic containers. Arrange water hygiene workshops in villages with water sampling.

- Follow up Shoshong and Gamodubu and find out if the degree of contamination in plastic containers increases after some time. Also find out how many plastic containers are still used and if people buy them.

Drawing from Water Hygiene Groupwork shows different sources of water in Botswana.

EVALUATION

This is an attempt to evaluate the Water Hygiene Campaign in relation to the goals set in the recommended plan of action from June 1983.

PLACEMENT OF THE CAMPAIGN

The placement of the campaign within the Ministry of Mineral Resources and Water Affairs has been questioned many times, but has not been a disadvantage. Water producers must realise their responsibility for water quality not only to the borehole or standpipe, but to the actual point of consumption if the ultimate goal of the water development programme - improved health - shall be reached. In this respect the campaign has probably been able to influence more working from within the ministry that actually handles water development. The Department of Water Affairs is more concerned with the production than the quality of water, but individuals in the organisation have realised their responsibility to the consumers and the campaign has given them support in their work. Water hygiene has been included in the training courses for water technicians and council water staff and they have participated in water hygiene workshops. There have been no problems with other ministries due to the placement of the campaign in the Ministry of Mineral Resources and Water Affairs. In the districts better cooperation between regional health teams and district council water staff should be encouraged.

OBJECTIVE

The objective of the Water Hygiene Campaign would be to "create awareness among people in villages with piped water supply on how to handle and use water in a hygienic way so as to get an improvement in the health status and a better quality of life".

During less than a year of campaigning the Water Hygiene Campaign has certainly created an awareness of the problems with contaminated water in the households among health personnel and key persons over the whole country. Information and education has been carried out through massmedia and workshops. The household water quality surveys

have supplied basic facts on contamination and also information of water handling and storage.

It has been presumed that people will become healthier if water of good quality for drinking and other household purposes is available in adequate quantities, especially when water development is combined with health education, improved sanitation and better nutrition. The Water Hygiene Campaign has only dealt with the healt education factor and then specifically with contamination of water between source and consumption. A short time of health education cannot be expected to have measurable effects on health status.

The effect of the campaign on health status can only be evaluated after several years. The national health survey and the results of the household water quality surveys will then provide baseline data for an evaluation.

GOALS

The specific goals of the campaign would be to:

Increase water consumption for domestic purposes.

Water consumption for domestic purposes doubles in the households when a village gets piped water, but this increase cannot be attributed to the Water Hygiene Campaign. The pilot study on water handling and usage, which has been planned by the Ministry of Health, will indicate whether hygiene education increases water consumption for personal hygiene.

Decrease contamination of water in storage containers.

Household water quality surveys were carried out before and after water hygiene workshops but the workshops did not lead to any significant improvement in water quality. However, by storing water in plastic containers with lids, contamination was reduced. There is also an indication of a decrease in the prevalence of diarrhoea in children under five when drinking water is stored in closed containers.

Reduce occasional consumption of contaminated water.

The third message of the campaign, "Keep to standpipe water", has been discussed a lot at village workshops. Evidently even in villages with piped water, people often take water from other sources. The workshops have created an awareness of the problems but the practical difficulties with breakdown of standpipes or long distance are still there and have to be attacked in order to get a reduced consumption of contaminated water.

Increase knowledge and awareness of water usage and handling.

The campaign has worked through existing channels of information as planned. The most important ones were thought to be schools and the health education system. The regional health teams have turned out to be the most effective disseminators of the campaign. The tasks were in line with what they already did and it was easy to make them interested in additional training. When the campaign develops into a programme of water hygiene education it will be important to get the teachers more involved in the work. They can be approached through the district education officers and in-service seminars.

Other channels of the campaign suggested in the report were the Tirelo Setshaba participants, literacy groups, sanitation projects, water technicians and pumpers. The campaign has been in contact with these groups and cooperated in different ways.

The Tirelo Setshaba participants got information of the campaign at their training courses and were provided with copies of the Water Hygiene Handbook. Their activities in relation to water hygiene should be assessed.

Cooperation with the Self-Help Sanitation Project has been especially lively in Kgatleng district, where joint water hygiene and sanitation workshops were arranged. Water hygiene education should be included in the sanitation projects and as they grow stronger in other parts of the

country, cooperation with the water hygiene education programme should be strengthened.

Water technicians and water unit staff have been lectured on water hygiene and obtained information of the campaign. Cooperation between the district water unit and the regional health team has been especially encouraged. The pumper will be given the Water Hygiene Handbook in Setswana, when it is ready. Much effort should be put into the training of technical staff in water hygiene so they understand their responsibility for the quality of the water not only to the standpipe but also to the point of consumption.

The Water Hygiene Campaign has worked through many different channels of information, therefore knowledge about the campaign and awareness about the problems with contaminated water in the households have reached different groups of professionals and they have in their turn been able to influence the general public. Workshops at different levels have been effective in training health and community workers and other key persons in the villages. The general public has got information about the campaign through massmedia and educational material, such as pamphlets and posters.

To summarize, the campaign has certainly created an increased knowledge and awareness of water usage and handling, and has paved the ground for a programme of water hygiene education.

All the groups of professionals approached have responded favourably and added water hygiene education to their tasks. The achievements should now be assessed. New groups of key persons should also be approached in order to spread the campaign. Professionals from different departments and ministries must be encouraged to cooperate in order to increase the impact of their work and make it more rewarding.

IMPLEMENTATION

The organisation of the Water Hygiene Campaign with a coordinator working as a consultant but with an office in a ministry and in close cooperation with an interministerial reference group has been functional. But the working capacity and efficiency of the campaign would have been improved if the coordinator had got a local counterpart at an earlier stage.

The terms of reference for the campaign stated that it should build on ongoing health education efforts in the country and strengthen them. It would have been totally wrong, and very expensive, to build up an organisation of water hygiene education of its own. The most effective and less costly way has been to work through existing channels of information.

The campaign was planned to start in phases and at local and national level at the same time. It has been good for the development of the campaign that it started gradually and learned from experiences. It has also provided an opportunity for careful testing of the material. The local level (villages) has functioned as pilot projects for the implementation of the campaign at national level.

The campaign was planned to start in January 1984 but as the coordinator started her work in December 1983 the launching date had to be postponed. The campaign was launched in August 1984 at the National Family Health Day and in January 1985 it had gained full momentum with workshops in all regions, newspaper articles, news reels on the radio etc.

The campaign stage was planned for one year and after that the campaign messages should be included in the syllabuses for schools and other training facilities. The campaign will continue as an ongoing programme of water hygiene education for another three year period and that amount of time is certainly needed to reach this goal. The campaign stage has prepared the ground but a lot of practical work still has to be done.

TOPICS

In the recommended plan of action eight topics for the campaign were stated. The five topics that relate to the handling of water in a more hygienic way have been most important. Plastic containers have also been recommended for the storage of water, as suggested in the plan of action. The recommendation to dig soakaways and plant trees at the standpipes has been discussed at workshops, but has not been attended to practically. It has been felt that it is the responsibility of the Department of Water Affairs to construct standpipes that do not create health hazards. The new standpipes have a better construction than the older ones.

The topic to "give instruction for a simple sink with a soakaway for washing dishes and washing hands before the meals at school" has given inspiration to handwashing projects in schools. As they have recently started they have not yet been evaluated.

EDUCATIONAL MATERIAL

A lot of educational material has been produced for the campaign and distributed through different channels: Workshops, literacy groups, schools, clinics etc. The material was pretested and changes were made accordingly. There is a real need in health education for books and pamphlets and the material has been well received.

Teachers have found the Water Hygiene Handbook very useful and a Water Hygiene Workbook for upper primary and lower secondary schools has been produced.

The production of a slide show was planned and slides were put together and tested. The series was not finalised due to lack of time and also because it did not prove so useful. Showing slides has some practical problems - projector, generator and a screen are needed. The workshops often took place in classrooms and as their were no curtains for the windows, it was not dark enough. If the practical problems are overcome a slide series would be a

good educational material. In 1985 a video-film on water hygiene and sanitation was shown at workshops and was very much appreciated. Locally produced video-films have been used in the Tirelo Setshaba training programme and have proved very effective. A video-film on water hygiene should be produced in Botswana for the use at training facilities, for example teacher training colleges, which have video-equipment.

Radio programmes were produced by the institute of adult education and the Department of Non-Formal Education. A series of 12 programmes was sent late in 1984. The other was planned to start in January 1985, but has been delayed. Radio is said to be an effective medium for spreading health messages. The programmes seem to be popular but it has not been assessed if they influence behaviour patterns.

Handwashing before eating is an important issue in health education.

CONCLUSIONS

The Water Hygiene Campaign has achieved considerable attention and support all over the country during less than a year of work. At the national water hygiene workshop in April 1985 it was clear that the regional health teams were very much involved in the work and ready to start projects and take initiatives of their own. They were keen on sharing ideas and experiences and anxious that the workshops should be regular, thereby strengthening the contact with the coordinator as well as between the regions and enhancing the exchange of ideas.

It is very important at this stage of the campaign not to lose grip but to continue ongoing efforts and develop further. The coordinator is a very important person in this respect. He/she must be very encouraging and assist the regions in the planning and implementation of their projects and allow them space for own initiatives at the same time as the programme develops further. Pushing and follow up must be done continuously so that water hygiene retains its high priority in the regions.

It is also now time to identify new groups of professionals who could continue the campaign work in cooperation with the regional health teams, thereby giving the campaign a stronger impact. In the planning discussions for the campaign teachers were thought to be the most effective group of professionals for the dissemination of the messages. When work started the regional health teams turned out to have a better organisation and teachers have been involved in campaign work through workshops organised by the regional health teams. Plans should be made how to get more teachers involved in the work through discussions with the district education officers.

Better information within the district council and to the councillors in the district is also needed. It should be investigated if community development officers could take on more responsibility for spreading information about the campaign within the district council as well as among field officers.

The campaign could get off ground after only a short time of preparation. One reason for this was that the ground was well prepared in the country and a lot of health education activities had already been carried out. There had recently been a campaign on oral rehydration therapy and the Water Hygiene Campaign could build on experience from this campaign and use educational material prepared for it. The problem with contaminated water in the households was not unknown to health educators and health staff in the field, but they were surprised at the degree of contamination. The household water quality surveys played an important role in creating awareness about the problems by showing with figures and test results the extent of household water contamination.

Many of the achievements of the campaign have been due to the freedom of the coordinator to act and react directly to ideas and projects initiated by community workers in the field. Funds were also readily available for workshops and projects without any bureaucratic constraints. Examples of this are the handwashing projects and the video-film that is being produced in Maun. It is very important during the first phase of a programme to be able to answer directly to needs and to start pilot projects without tedious waiting.

It has been possible to produce a lot of educational material because funds were available for the hire of graphic artists and writers, and for printing. It is important to ensure that educational material is being used in the right way. Reprinting must be done before stocks are finished and ideas for new educational material should be discussed. The regions should be encouraged to produce their own educational material, with the assistance of the coordinator. It is also important to keep the public informed about the activities through massmedia.

A problem has been the short term contracts the coordinator has been working with. They have made long term planning very difficult and created uncertainty in the contacts with for example the regional health teams. Discussions about contracts have also taken a lot of time from active campaign work. A realistic contract period for a hygiene campaign coordinator for the preparation, implementation and follow-up of the campaign would be two-three years.

It has also been a constraint to the work that it took so long to find an understudy for the coordinator. The counterpart should ideally have started work together with the coordinator from the beginning and would then have gained a lot of knowledge and experience that would have enabled her to take over the work in a better way.

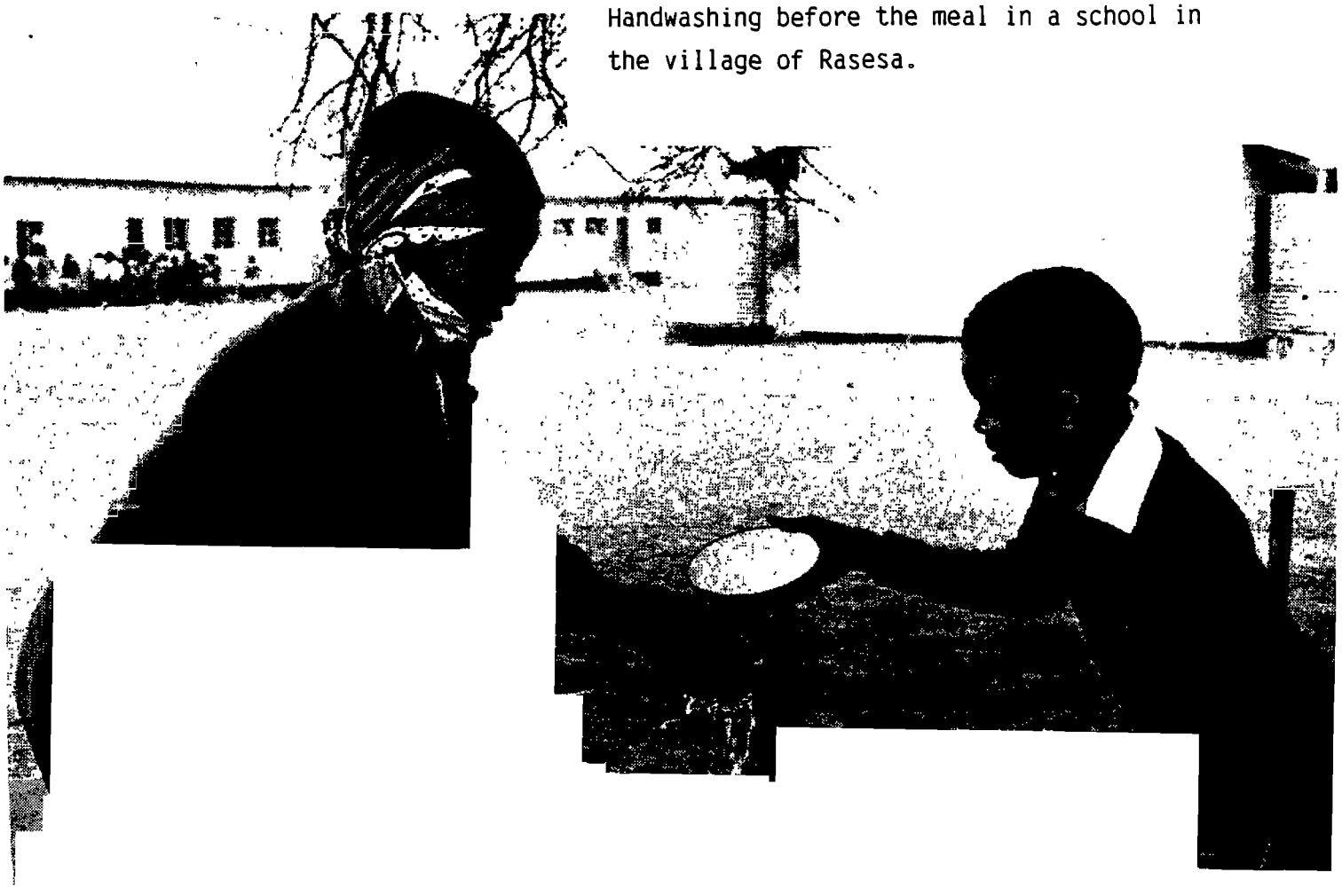
Lack of transport has been a major problem, especially during 1985 when the coordinator travelled extensively. A 4-wheel drive vehicle should have been allocated to the campaign from the beginning as it would have made travelling easier and spared a lot of frustration. A vehicle has been budgeted for the water hygiene education programme.

Starting a health education programme like the Water Hygiene Campaign it has to be realised that it is a question of creating awareness of problems and changing people's behaviour, which takes a much longer time than more technical projects. Changes in behaviour in the majority of the target group cannot be expexted until health education has been carried out for a long time and an evaluation in relation to health benefits cannot be done until several years have passed. Therefore a health education project like the Water Hygiene Campaign should not be started without a good idea of the problems, how they should be attacked and by whom and, most important of all, ample time for the implementation of the project should be secured.

WATER HYGIENE EDUCATION PROGRAMME

INTRODUCTION

The water hygiene education programme should be based upon the achievements and experiences of the Water Hygiene Campaign and some of these will be highlighted on the following pages. The overall objective of the programme would be to improve the health of people by reducing the use of contaminated water in the households and increasing the use of water for personal hygiene. The methods include strengthening ongoing health education efforts in the country and increasing the attention given to water hygiene. Selected operational research into water-related issues should improve the basis for intervention.



Handwashing before the meal in a school in the village of Rasesa.

The Water Hygiene Campaign has increased an awareness of health problems associated with contaminated water in the households and it is hoped that the programme will gradually develop community based activities in support of improved water hygiene. The programme should emphasize the long term goals, for instance by including the topic of water hygiene into the syllabuses of schools, adult education programmes and other training activities.

Water hygiene education at a literacy group in Malolwane.

IMPORTANT CONCLUSIONS BASED UPON THE WATER HYGIENE CAMPAIGN

OBJECTIVE

The ultimate objective of the Water Hygiene Campaign was "to improve the health of the people". The rationale behind was that although clean water in adequate quantities was available in all major, medium-sized and many small villages in Botswana, diarrhoea and other water-related diseases were still prevalent. Contamination of household water between source and consumption and low water consumption were identified as the main problems. Thus two of the campaign messages emerged: KEEP THE WATER CLEAN and USE MORE WATER FOR PERSONAL HYGIENE. The third campaign message KEEP TO STANDPIPE WATER encouraged people to use standpipe water when it was available.

The objective of the water hygiene education programme would be the same: To improve the health of people by reducing the use of contaminated water in the households and increasing the use of water for personal hygiene. Thus the campaign messages would still be valid and should be used for promoting the programme.

TARGET

The campaign was designed to complement the water development programme. Therefore villages with piped water and villages with new water schemes were the target of the campaign. Clean water available in adequate amounts is a prerequistite for the campaign messages. The campaign has concentrated on contamination of water from the tap to the mouth but it has also given information of the risk of contamination of the source if the borehole and standpipe are unprotected.

Part of the population in Botswana does not have access to piped water and even in villages with piped water, people have to rely on water from traditional sources when they stay at the lands or cattle-posts or if the water system breaks down. It has been a strong demand from participants of village water hygiene workshops to look closer into this problem. They want more information about protection of wells and simple methods of purification of contaminated water.

With increasing awareness of the dangers of contaminated water this demand will grow stronger and has to be considered in the development of the water hygiene education programme.

The target of the Water Hygiene Campaign has been villages with piped water. During the course of the campaign there were increasing demands from the public to extend the programme to villages without piped water and also to cover protection of traditional wells and to inform about simple methods of purification of water. This is a natural development of the programme and should be considered, but it is important to keep in mind that the campaign has been closely linked to the water development programme and that villages with piped water, and especially villages with new schemes, should remain the main target group.

One way of extending the programme to include protection of traditional wells and purification of water would be for the regional health teams to work more closely in collaboration with the district water unit. The tasks could then be divided in such a way that the water unit takes the responsibility for the technical aspects and the regional health team for the related health education.

ROLE OF THE REFERENCE GROUP

The role of the reference group should be discussed and the duties of the members better assessed. It might be more effective with a smaller group that meets more often and where the members have identified tasks.

CHANNELS

The Water Hygiene Campaign was launched at stages at the national and local level. The regional health teams were involved in the dissemination of the campaign messages and educational material and radio programmes were produced for the use over the whole country at the same time as intensive water hygiene education was carried out in selected villages. The village workshops were often combined with household water quality surveys and gave useful directives for the implementation of the campaign.

The campaign used existing channels of information for the dissemination of the campaign messages, primarily the health education system, primary schools and other training facilities. The intention was to include the topic of water hygiene in the school curricula.

The water hygiene education programme should intensify contacts with groups of professionals who have been involved in the Water Hygiene Campaign and identify new groups, who can participate in the programme and help to spread it through new channels. The involvement of teachers in health education should be encouraged. The education officers in the districts should be approached in order to discuss how to best inform teachers about the water hygiene education programme. Teachers should get copies of the Water Hygiene Handbook, the Water Hygiene Workbook and the Groupwork and training how to use them at in-service seminars.

A new group of professionals to approach would be the District Development officers, who could promote the programme both in the district council and among community development officers in the field.

COOPERATION - COORDINATION

The Water Hygiene Campaign has used an integrated approach with participation in water hygiene education of officers from several ministries and departments. This has proved very successful and it is of crucial importance for the planning and implementation of the water hygiene education programme that the integrated approach is maintained and infact strengthened.

One reason for the integrated approach in water hygiene education is that many ministries and government departments are involved in different aspects of water development. The policy for water development is laid down by the Ministry of Mineral Resources and Water Affairs while the plans are executed by the Department of Water Affairs, which also controls the water quality and maintains the water supply system in major villages. The Ministry of Local Government and Lands is in charge of the maintenance of the water system in medium-sized

and small villages through the district council water unit and train pumpers for these villages. Pumpers in major villages are being trained by the Department of Water Affairs. The Ministry of Local Government and Lands is also responsible for the development of water sources in remote areas and settlements and the sanitation programme. The Ministry of Health is responsible for health education in the country and one of the duties of the regional health teams is to take water samples at sources and send them to the Department of Water Affairs water laboratory for analysis. This division of labour appears rational and there is no need to make significant changes during the implementation of the programme.

The responsibility for the programme has moved from the Ministry of Mineral Resources and Water Affairs to the health education unit, Ministry of Health. Therefore it is especially important to keep in mind that health education is not the task of health workers only. Cooperation and coordination at all levels - ministerial, district, village, individual - is needed in order to make people change their behaviour in certain respects. It has to be acknowledged by health educators and health workers at all levels that health and hygiene education could and should also be carried out by teachers, community development workers and, in the case of water hygiene, by water department staff. Mechanisms for actively involving these people and giving them an element of instruction or training need to be developed, primarily by the regional health teams.

WOMEN'S INVOLVEMENT

Women have been strongly involved in the implementation of the Water Hygiene Campaign as most of the staff in the field, responsible for the practical work with the campaign, have been women. Most of the health staff, but doctors, have been women and almost all the primary school teachers. In the homes the women, mothers, are responsible for both fetching water and health and hygiene education among the children. Therefore women's participation in the campaign has naturally been intensive.

Women's interests and participation should of course be further assessed for the future but men's involvement must not be set aside for this sake. Men are the policy makers in Botswana (in government and districts) and their support has to be secured. Water hygiene is not a programme that only concerns women but the whole family, therefore men must participate at all levels and give the water hygiene education programme support and practical assistance.

Women fetching water in a village in the north of Botswana.

PLAN OF ACTION

MANAGEMENT

Coordinator

The programme should be directed by a programme coordinator with an office in the health education unit, Ministry of Health, assisted by a reference group of members from the Ministries of Mineral Resources and Water Affairs, Education, Local Government and Lands, Finance and Development Planning, department of Tirelo Setshaba and SIDA. The duties of the coordinator should be to initiate action and coordinate efforts in relation to water hygiene from the ministries and departments involved.

Reference group

Reference group meetings should be chaired by the Ministry of Health and convened by the programme coordinator every three months. Before the meeting a progress report, including a plan of action for the next six months, should be distributed to the members of the reference group.

The reference group should keep its advisory role from the Water Hygiene Campaign. It will play an important role in the development of the water hygiene education programme as it functions as a means of coordination and cooperation. The members should be at senior level and the membership should be personal. The tasks of the members should be discussed and clearly identified. The members should be committed to promoting the programme within their own departments and giving all possible assistance to the coordinator also between meetings.

Progress reports and minutes from the meeting should be sent to the regional health teams for information and comments.

Water Hygiene and Sanitation Committee

At the regional level Water Hygiene and Sanitation Committees should be formed. They should be chaired by a member of the regional health team and reflect the composition of the reference group with members from different ministries, for example education officer, water technician, district community development officer. The composition of the committee and the duties of the members should be assessed by the regional health team.

The committee should meet regularly and make plans for water hygiene education in the region (workshops, household water quality surveys, projects, educational material) and submit them to the programme coordinator for funding. Villages with new water schemes or household water quality surveys should be prioritized.

IMPLEMENTATION

Interministerial Water Hygiene Meeting

In order to promote cooperation and coordination of efforts at all levels the Ministry of Health, having now assumed responsibility for the water hygiene programme, should arrange an interministerial water hygiene meeting, with participation of senior operational staff from the ministries already involved in the implementation of the campaign. The meeting should determine the specific role of each participating ministry and agree on procedures for interministerial collaboration in the field of water hygiene. The objectives of the interministerial meeting should be:

- To present and discuss the Water Hygiene Campaign Report.
- To present the findings of the pilot-study on water handling and storage.
- To specify the tasks of each ministry in the ongoing water hygiene programme.

- To formulate guidelines and procedures for interministerial collaboration in relation to water hygiene education, and to identify liaison officers in each ministry.
- To launch the water hygiene education programme and discuss the implication of its integration in the health education unit, Ministry of Health.
- To define areas for future research in the promotion of water hygiene.
- To draw up plans for future follw-up, intervention activities.
- To determine whether regular coordination meetings should be arranged in the future, and, if so, who should meet and when.

Even if it is difficult to reach a consensus of cooperation at ministerial level it is important that cooperation between staff from different ministries at district and village level is encouraged and intensified. Cooperation should always be discussed and promoted at regional and village workshops. The programme coordinator should ensure that health workers do not take over all water hygiene education but share the responsibilities with staff from other ministries and departments in a balanced and rational manner.

Annual regional review and planning meeting

There should be a review and planning meeting (a continuation of the national water hygiene workshop from the Water Hygiene Campaign) every year with participation of the regional health teams, which should give the participants the opportunity to share ideas and experiences and formulate plans for the future. A water hygiene and sanitation report should be presented to the coordinator one month before the meeting and should contain regional activities and projects in relation to water hygiene and sanitation as well as a discussion of problems and constraints. It should also contain a plan of action for the future implementation of the programme.

The annual review and planning meeting should be convened and arranged by the programme coordinator. It should form part of the monitoring system of the programme.

Regional water hygiene workshops

Water hygiene workshops were arranged in the regions by the Water Hygiene Campaign and should continue during the programme. The workshops should be convened and arranged by the regional health team in collaboration with the programme coordinator. The workshops should have an integrated approach and allow professionals from different fields of work (health personnel, teachers, community workers, water department staff) to meet and discuss cooperation in water hygiene education and assess their assistance. The regional workshops should make plans for water hygiene education in the field and suggest villages for workshops.

Water hygiene should also be brought in as a specific topic in seminars arranged in the regions. Staff from the regional health teams should then be prepared to talk on the subject.

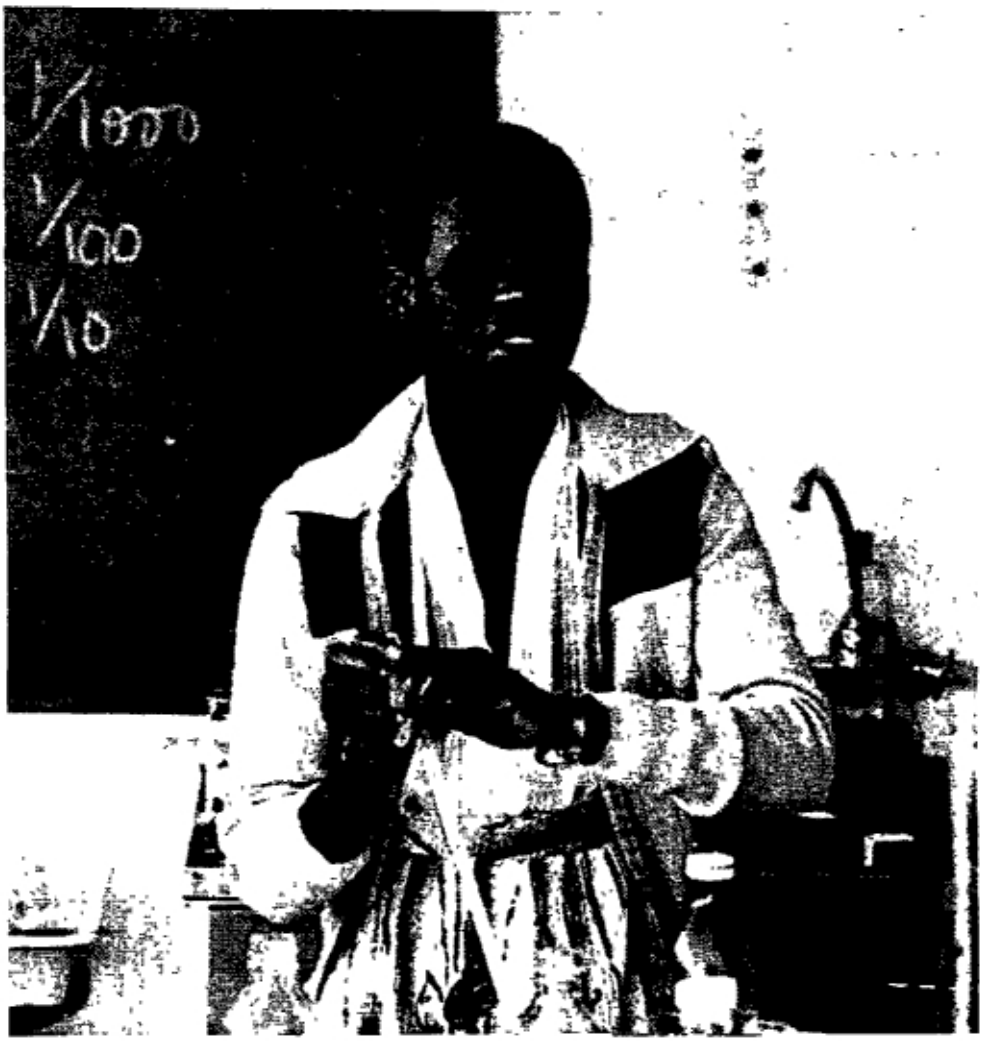
Village water hygiene workshops

Villages for water hygiene workshops should be suggested at the regional workshops. Priority should be given to villages with new water schemes and villages where household water quality surveys have been carried out. These workshops should also have an integrated approach with members of the regional health team or clinic staff and water unit staff as facilitators. The workshops should aim at training key-persons in the villages (members of the village development committee, village health committee, teachers, community workers, members of non-governmental organisations, religious leaders etc.) in water hygiene and discuss methods and ways of disseminating the messages to the villagers (kgotla-meetings, health talks at school and clinic, study visit to the borehole etc). The participants of the workshops should be trained in the use of available educational material.

Household water quality surveys

The household water quality surveys furnish information about water quality, handling and storage, thereby directing the work and assessing achievements. New villages should be surveyed and villages, surveyed earlier, should be followed up.

There is an indication that storage of water in plastic containers with lids is the simplest and quickest way of reducing contamination of household water. It will be important to assess these findings and follow up the investigations at shorter and longer intervals. It has to be found out if the containers are being used for water storage also after, for example, a year and if the degree of contamination is still low.



Samples of household water is analysed at the water laboratory.

It has to be discussed to which degree plastic containers should be distributed free of charge or if it is possible to let people buy them at a reduced price. In that case it has to be clearly stated who is responsible for the buying and selling of plastic containers.

Each medical region should make realistic plans for household water quality surveys, considering both their own work load and the capacity of the water laboratory. The regional health team will be responsible for the sampling of the water and follow-up with information to villagers. Analysis of water will be done at the water laboratory, Department of Water Affairs, in Gaborone. The possibility to extend the use of hospital laboratories for water analysis should be investigated. In some parts of Botswana the use of a mobile laboratory would be an advantage.

Forms for questionnaire on water handling and storage should be obtained from the programme coordinator. Results of the water analysis and questionnaires should be compiled into a report by the programme coordinator. The regional health team should be responsible for the dissemination of results to the villagers, possibly in the form of workshops.

Educational material

The educational material produced for the campaign should be scrutinized and, if needed, improved. Reprint has to be ordered in time and it has to be assessed that material is being distributed to the field and used as it was planned. The Water Hygiene Handbook should be translated into Setswana in order to get a wider recognition. The programme coordinator should be responsible for the production of material and should also assist in the production of local water hygiene education material.

Radioprogrammes already produced should be repeated and a selection should be copied on cassettes and distributed to the regional health teams for the use at clinic health education, schools or radio learning groups. New radio programmes should be produced. The school radio

broadcasting unit should be approached for discussion about the production of special water hygiene programmes.

Funds should be set aside for the production of a water hygiene video-film, possibly in collaboration with the department of Tirelo Setshaba. The video-film should be used at training courses and copies should be distributed to the Teacher Training Colleges and other training facilities with video equipment.

The topic of water hygiene should eventually be included in the syllabuses of schools and other training facilities. Cooperation with the school curriculum unit, Ministry of Education, has been intensive and should continue in order to reach this goal. It should be discussed whether water hygiene should have separate textbooks or if the topic should be included in for example science books.

FUNDING

Funds have been allocated to the water hygiene education programme for a three year period. One of the reasons for the achievements of the Water Hygiene Campaign has been that funds were readily available for workshops and projects without tedious waiting or bureaucratic restraints. A resonable amount of the funds should be allocated yearly to the regional health teams for water hygiene activities (workshops, projects, local educational material) in accordance with the plans formulated by the Water Hygiene and Sanitation Committee and approved of by the programme coordinator.

Plans should be made how to include water hygiene activities in the regular health education budget when the special funds are not available any more.

The special funds for water hygiene activities in the health education unit must be handled with delicacy, so as not to create jealousy within the unit that could jeopardize the implementation of the programme.

MONITORING

The Water Hygiene Campaign was monitored through reference group meetings, progress reports, formal meetings and informal discussions with members of the reference group and the regional health teams national water hygiene workshops, verbal reporting, field trips, household water quality surveys. On basis of the experience of the campaign I would like to recommend the following procedures for monitoring the water hygiene education programme.

Reference group meetings every three months with presentation of progress reports and plans for future action.

Annual review and planning meeting with members of the regional health teams. These meetings should be a development of the two national water hygiene workshops carried out during the campaign. At the meeting an annual report on water hygiene activities, sanitation and water development in the region should be presented. The report should be submitted to the programme coordinator one month before the meeting.

Fieldtrips to the regions at least once a year, about half a year after the planning meeting, with meetings with the Water Hygiene and Sanitation Committee and other relevant persons. Visits to water hygiene projects in the area, for example schools with handwashing projects or villages with plastic containers for storage of water. The meetings should encourage a discussion on achievements and constraints and should thereby assist the regional health team in their work as well as give feedback to the programme coordinator.

Reporting of water hygiene related activities from the field to the regional health team, which should compile information in a report to the coordinator every two-three months. Water hygiene activities should be reported under a special heading at the regional health team's annual report to the Ministry of Health.

The reporting system should promote intersectoral cooperation as the regional health teams must obtain information about sanitation

activities and water development from these departments.

The Department of Water Affairs should report to the regional health teams through the district water unit about development of new water schemes, water sampling and development of other water sources.

Household water quality surveys should be carried out in order to monitor the programme and assess changes in water quality and handling of water. Each region should make realistic plans for water sampling, considering both their own capacity for doing the sampling and the follow-up in form of workshops or other information to the villagers as well as laboratory capacity. The possibility to use mobile laboratory equipment in remote areas should be considered.

On basis of the regional health team's suggestions for water sampling, the programme coordinator should work out a plan for the whole country in collaboration with laboratory staff.

Ad hoc-contacts, to my experience, can be more important for the execution of the programme than written reports and formal meetings and their value must not be underestimated. Ad hoc-contacts (chats) imply sharing of ideas, solving problems, giving encouragement. Health education is a difficult task and the results take a long time to show. Therefore it is important that people working in the field get continous appreciation and assistance. The best way of obtaining this is through frequent informal contacts.

EVALUATION

In-depth study on water quality, handling and storage

An in-depth study on water quality, handling and storage has been planned by the research unit, Ministry of Health. A follow-up study with the same basic design can be used as a tool for evaluation of the impact of information and training on behavior changes among villagers in relation to water handling.

It can also be combined with taking water samples to study changes in water quality after plastic containers have been introduced for storage of water. A pilot study in two villages was carried out in 1985. The findings and experiences from the pilot study should be used to design an evaluation plan for the water hygiene education programme.

Assessment of effectiveness of educational material.

A lot of relevant educational material has been produced for the campaign and will be used also during the programme. The material was pre-tested before printing but an assessment of its effectiveness should be done when it has been used some time. At this assessment the problems with distribution of material to the villages should also be looked into. An assessment of the Water Hygiene Handbook and Workbook should be done as soon as possible, so that improvements can be made before reprint.

Two series of radio programmes have been produced for the campaign and will be repeated during the programme. An assessment of the effectiveness of using radio in health education should be done. It has been suggested to copy programmes on cassettes and use them at schools, health talks at clinics and radio learning groups. This idea should also be looked into and the effectiveness of the cassettes should be compared with that of the radio programmes. The advantage with cassettes is that they can be used at a suitable time for the listeners and can be repeated many times.

Household water quality surveys

During the campaign household water quality surveys were carried out repeatedly in order to help provide guidance for the work and to assess changes. For the same reasons the surveys should be continued, and possibly even expanded, during the programme. Household water quality surveys, including samples taken at different points between the source and the point of consumption, represent a practical way of assessing changes both in water quality and water-related behaviour patterns and function as an ongoing evaluation of the programme.

National Health Survey

It is much to early to assess if the campaign has had any effects on health status. It can be presumed on the basis of a wealth of data from relevant studies elsewhere that an increase in water consumption and an improvement of the water quality will have an impact on the health of people, especially on the incidence and the severity of diarrhoea cases of small children. An evaluation of the impact on health status can be done after a minimum of three years and should be designed in collaboration with the national health survey.

Drinking water should be stored in a special container with a lid.

WATER HYGIENE WORKSHOPS

National	Gaborone	26-27 November, 1984
		April, 1985
Regional	Tsabong	18-19 September, 1984
	Kang	20 September, 1984
		19 February, 1985
	Ghanzi	21-22 February, 1985
	Maun	25 February, 1985
	Kasane	28 February, 1985
	Molepolole	6 March, 1985
	Mochudi	10 March, 1985
	Letlakeng	11 March, 1985
	Selebi-Phikwe	12 March, 1985
	Francistown-Tutume	13 March, 1985
	Mahalapye-Molepolole-Serowe	2 April, 1985
	Ramotswa	24 April, 1985
Village	Malolwane	7 July, 1984
	Shoshong	10 October, 1984
	Malolwane	27 October, 1984
	Maun	16 November, 1984
	Gamodubu	9 February, 1985
	Thamaga	24 April, 1985

SUMMARY HOUSEHOLD WATER QUALITY SURVEYS

Mogapinyana	May 23, 1984	Traditional sources
Malolwane	May 28, 1984	Water system
	October 22, 1984	Plastic containers
Gamodubu	June 11, 1984	Traditional sources
	January 28, 1985	Water system
	April 29, 1985	Plastic containers
	June 12, 1985	Plastic containers
Shoshong	July 10, 1984	Water system
	February 12, 1985	Water system
	April 15, 1985	Plastic containers

Results per 100 ml

T.C.	= Total Coliforms	< 100
F.C.	= Faecal Coliforms	< 10
F.S.	= Faecal Streptococci	< 10
CG	= Confluent Growth	
TNTC	= Too numerous to count	

HOUSEHOLD WATER QUALITY SURVEY MOGAPINYANA
May 23, 1984
Water from traditional sources

Water source		T.C.	F.C.	F.S.
100 Macheleng well		213	112	195
101 Mothopi well		238	195	217
102 Old dam		340	400	380
103 New dam		520	720	340
Household no	1	32	37	63
	4	TNTC/10 ml	TNTC/10 ml	TNTC/10 ml
	14	12	10	7
	16	2000	500	1030
	20	TNTC/5 ml	TNTC/5 ml	TNTC/5 ml
	24	980	1000	450
	27	455	300	128
	32	2000	TNTC/10 ml	2500
	34	380	500	170
	35	590	790	410
	40	200	260	270
	41	TNTC/20 ml	TNTC/20 ml	280
	42	265	300	150
	46	210	800	215
	47	275	TNTC/20 ml	280
	49	700	1180	640
	50	TNTC/10 ml	TNTC/10 ml	500
	59	3500	4000	740
	69	130	230	100
	70	237	112	357
	71	540	1020	160
	72	TNTC/10 ml	TNTC/10 ml	1500
	74	TNTC/5 ml	TNTC/5 ml	TNTC/5 ml
	85	5000	TNTC/5 ml	2400
	86	840	TNTC/5 ml	200
	89	670	960	600
	91	293	360	390
	92	660	340	360
	97	500	300	400

HOUSEHOLD WATER QUALITY SURVEY MALOLWANE I
May 28, 1984
Water from water system

Water source		T.C.	F.C.	F.S.
BH 3075, standpipe		< 2	< 2	< 2
BH 989, standpipe		< 2	< 2	< 2
River pool		< 2	14	900
Household no	7	CG	330	50
	10	500	< 2	2
	14	10	< 2	< 2
	15	CG	1200	100
	17	150	5	240
	38	CG	CG	TNTC/10 ml
	47	60	< 2	2
	48	< 2	< 2	30
	54	CG	1400	54
	59	22	20	< 2
	60	500	22	13
	76	CG	1450	50
	80	CG	120	110
	98	< 2	< 2	40
	101	300	12	30
	102	< 2	2	< 2
	108	380	< 2	< 2
	130	CG	140	35
	146	100	< 2	30
	150	350	< 2	< 2
	153	90	2	< 2
	154	700	4	170
	157	300	< 2	3
	164	120	45	1400
	169	TNTC/10 ml	< 2	8

HOUSEHOLD WATER QUALITY SURVEY MALOLWANE II
October 22, 1984
Water sampled from plastic containers

Water source		T.C.	F.C.	F.S.	Remarks
BH 3075, standpipe		< 2	< 2	< 2	
BH 989		< 2	< 2	< 2	
Household no	7	70	100	6	
	14	< 20	CG	< 20	Cloudy
	17	CG	960	60	Cloudy
	25	< 2	20	CG	Cloudy
	25	< 2	< 2	< 2	
	28	< 2	38	4	
	54	CG	112	36	
	59	< 2	2	6	
	60	20	< 20	40	
	60	< 2	< 2	4	
	76	< 2	4	158	
	80	100	20	< 20	Cloudy
	98	< 2	< 2	2	
	109	< 2	2	2	
	130	< 2	< 2	< 2	
	133	2	< 2	< 2	
	151	< 2	< 2	2	
	154	12	4	4	
	157	< 2	CG	2	
	170	< 2	< 2	2	

HOUSEHOLD WATER QUALITY SURVEY GAMODUBU I
June 11, 1984
Water from traditional sources

Water source	T.C.	F.C.	F.S.
Dam	CG	51	213
Well I	CG	TNTC	TNTC
Well I (bucket)	CG	TNTC	TNTC
Well II	CG	CG	TNTC
Household no 1	15	< 2	15
3	CG	CG	TNTC
4	CG	CG	TNTC
5	CG	CG	TNTC
6	CG	385	140
8	< 2	5	40
10	CG	TNTC	TNTC
12	CG	TNTC	TNTC
13	CG	550	TNTC
18	CG	1125	1115
19	CG	CG	270
20	CG	440	180
24	< 2	< 2	700
25	CG	CG	375
27	12	< 2	10
28	CG	TNTC	TNTC
30	550	555	TNTC
32	1575	540	TNTC
33	CG	350	TNTC
34	CG	420	TNTC

HOUSEHOLD WATER QUALITY SURVEY GAMODUBU II
January 28, 1985
Water from water system

Water source		T.C.	F.C	F.S.
BH 4397		2	2	2
Household no	1 (River)	< 2 x)	< 2	28
	2 (River)	< 2 x)	10	62
	3	< 2 x)	< 2	40
	3A (River)	100	100	26
	4	< 2 x)	< 2	2
	5	CG	CG	CG
	6	CG	< 2	< 2
	7	< 2 x)	< 2 x)	< 2
	9	< 2 x)	< 2 x)	< 2
	13	800	750	380
	14 (Borehole)	CG	1300	346
	15	< 2 x)	< 2 x)	CG
	17	< 2	< 2	< 2
	18	< 2	< 2	4
	19	< 2	< 2	168
	20	< 2	< 2	< 2
	26	< 2 x)	< 2	18
	27 (Other)	600	< 2	2
	28 (Well)	< 2 x)	< 2 x)	184
	29	CG	TNTC	CG
	30	CG	150	298

x) = Confluent growth of other bacteria

HOUSEHOLD WATER QUALITY SURVEY GAMODUBU III
April 29, 1985
Water sampled from plastic containers

Water source			T.C	F.C.	F.S.	
Standpipe		(Clinic)	80	850	< 10	
Household no	1	(River)	< 10	TNTC	< 10	
	2	(River)	CG	2160	< 20	Diarrhoea of child
	3A	(River)	CG	CG	< 20	Open bucket
	3	(River)	CG	3800	< 20	Open can
	4	(Standpipe)	< 10	< 10	< 10	
	5(1)	(Standpipe)	< 10	< 10	< 10	
	5(2)		760	< 20	< 20	Small container for children.
	6	(Standpipe)	< 10	260	< 10	Drum outside
	7		N/A	N/A	N/A	No water home
	9		N/A	N/A	N/A	Not sampled
	13		N/A	N/A	N/A	Lost container
	14	(Standpipe)	< 10	< 10	< 10	
	15	(Standpipe)	< 10	< 10	< 10	x)
	17	(Standpipe)	< 10	< 10	< 10	
	18	(Standpipe)	30	30	< 10	Container with big opening used.
	19		N/A	N/A	N/A	Not sampled
	20		N/A	N/A	N/A	Not sampled
	26	(standpipe)	< 10	< 10	< 10	
	27	(Open well)	< 20	TNTC	< 20	Container just rinsed with water.
	28	(Open well)	20	< 10	< 10	Container rinsed once a week with just water.
	29		< 10	< 10	< 10	
	30	(Standpipe)	< 10	< 10	< 10	

x) Only adults used the water from the container. Children used an open bucket. Child under five had diarrhoea.

HOUSEHOLD WATER QUALITY SURVEY GAMODUBU IV
June 12, 1985
Water sampled from plastic containers

Water source			T.C.	F.C.	F.S.	
Standpipe (Clinic)			15	< 2	< 2	
Spring			CG	30	< 10	
Rain water tank			< 10	< 10	< 10	
Household no	1	(Standpipe)	CG	< 2	< 2	
	2	(Standpipe)	< 2	< 2	< 2	
	3A	(Standpipe)	10	< 2	< 2	
	6	(Standpipe)	51	< 2	< 2	
	7	(Standpipe)	2	< 2	< 2	
	13	(Dam)	CG	3	< 10	Open drum outside
	27	(Spring)	21	10	< 10	Not boiled
	28	(Spring)	19	< 10	< 10	Boiled

HOUSEHOLD WATER QUALITY SURVEY SHOSHONG I
July 10, 1984
Water from water system

Water source	T.C	F.C	F.S.
Borehole, Shoshong school	< 2	< 2	< 2
Borehole, Kgamane school	20	< 2	20
Borehole 3365	< 2	< 2	< 2
Household no 1	CG	350	TNTC
2	CG	TNTC	TNTC
4	CG	200	TNTC
7	190	TNTC	70
8	920	900	550
9	6	< 2	2
10	13	< 2	11
11	CG	60	100
17	39	12	22
18	CG	< 2	20
19	CG	TNTC	TNTC
21	CG	TNTC	TNTC
28	920	260	10
30	CG	290	10
32	CG	TNTC	90
33	320	30	50
35	TNTC	TNTC	30
37	CG	180	< 2
38	320	TNTC	30
39	TNTC	180	250
41	60	< 2	20
47	250	130	90
48	CG	20	10
50	CG	TNTC	TNTC
51	CG	8	TNTC
53	CG	TNTC	30
54	CG	TNTC	30
55	CG	TNTC	TNTC
56	110	TNTC	420
60	1070	TNTC	TNTC

HOUSEHOLD WATER QUALITY SURVEY SHOSHONG II
February 12, 1985
Water from water system

Water source		T.C.	F.C.	F.S.
Standpipe		< 10	< 10	< 10
Household no	1	CG	CG	360
	2	< 10	< 10	< 10
	4	30	< 10	< 10
	7	< 10	< 10	< 10
	8	80	30	10
	9	430	770	130
	10	160	CG	320
	11	CG	CG	10
	17	CG	CG	210
	19	60	< 10	< 10
	21	720	160	10
	28	CG	50	< 10
	30	CG	CG	< 10
	32	< 10	< 10	< 10
	33	CG	1540	< 10
	37	TNTC	2720	130
	38	TNTC	TNTC	< 10
	39	< 10	20	< 10
	41	CG	2680	110
	47	50	100	< 10
	48	CG	3740	70
	53	CG	CG	540
	54	CG	700	< 10
	55	CG	TNTC	< 10
	56	290	< 10	< 10
	60	1520	530	10

HOUSEHOLD WATER QUALITY SURVEY SHOSHONG III
April 15, 1985
Water from plastic containers

Water source		T.C.	F.C.	F.S.	
Household no	7	< 10	< 10	< 10	
	8	TNTC	210	< 10	
	9				No test results
	10	50	10	< 10	
	11	100	50	< 10	
	19	40	30	< 10	
	21	120	< 10	< 10	
	28	110	< 10	< 10	
	33	< 10	< 10	< 10	
	39	120	10	< 10	
	41	480	90	< 10	
	47	120	90	< 10	
	48	TNTC	370	< 10	Rinsed container only with water
	53	20	40	< 10	
	54	180	20	< 10	
	56	70	< 10	< 10	
	1	< 10	< 10	< 10	Water from ordinary storage tank

Remarks:
No feacal streptococci in any sample!